

The 3<sup>rd</sup> TU-K International Conference

on

# INNOVATIVE TECHNOLOGIES FOR DEVELOPMENT

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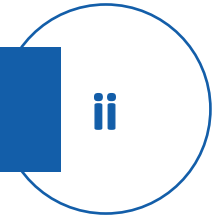
*Nairobi, 23<sup>rd</sup> to 25<sup>th</sup> February 2016*

## **Conference Theme:**

*“Technologies as Drivers for Development”*

<b>ORGANIZED BY:</b>	<i>The Technical University of Kenya</i>
<b>IN CONJUNCTION WITH:</b>	<i>NACOSTI, Research Africa</i>
<b>KEYNOTE SPEAKER:</b>	<i>Professor John O. Mugabe, University of Pretoria, South Africa</i>
<b>VENUE:</b>	<i>Laico Regency Hotel, Nairobi, Kenya</i>

# CONFERENCE PROGRAMME



## 1. Kenya National Anthem

1

Oh God of all creation,  
Bless this our land and nation,  
Justice be our shield and defender,  
May we dwell in Unity,  
Peace and Liberty,  
Plenty be found within our borders.

2

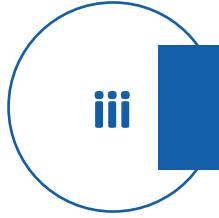
Let one and all arise,  
With heart both strong and true,  
Service be our earnest endeavour,  
And our homeland of Kenya,  
Heritage of Splendour,  
Firm may we stand to defend.

3

Let all with one accord,  
In common bond united,  
Build this our nation together,  
And the glory of Kenya,  
The fruits of our labour,  
Fill every heart with thanksgiving.

## TECHNICAL UNIVERSITY OF KENYA

### 1. VICE CHANCELLOR’S WELCOME NOTE



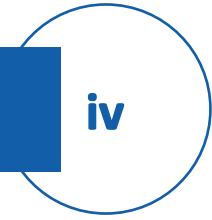
*Dear Colleagues,*

The 3<sup>rd</sup> Technical University of Kenya International Conference (TU-K CONFERENCE 2016), 23<sup>rd</sup> – 25<sup>th</sup> February 2016 in Nairobi Kenya, will be dedicated to the exploration and discussion of advances in Applied and Engineering Sciences, Technology, Innovation, and the Applied Social Sciences. This annual gathering is a crucial opportunity for National, Regional and Global academics, policy makers and practitioners to examine the latest developments in Science, Technology, Innovation and related research to explore how scientific advances can be translated quickly into effective development activities.

Nairobi, and indeed Kenya’s unique location and as an emerging regional hub makes it a living a bridge for both North-to-South and South-to-South knowledge exchange. The Technical University of Kenya is proud to be on the forefront in technological education, training and research in this region. Considering that much of Sub-Saharan Africa still has significant strides to make to attain the technical and scientific outputs necessary to achieve its development goals, it is refreshing to be able to host such a Conference in one of the leading cities of the region.

In the days ahead, we urge you to have fruitful discussions and exchanges during the three days of the conference and hope that you will establish lasting future collaborations amongst yourselves as stakeholders in the broad area of science, technology and innovation. We anticipate that the discussions and interactions at this forum will enable us to collectively step up our efforts to further all facets of innovative technologies for development.

**Prof. Dr.-Ing. F. W. O. Aduol**  
Vice Chancellor  
The Technical University of Kenya



## KEYNOTE SPEAKER

### **Prof. John. O. Mugabe**

Professor of Science and Innovation Policy.  
*Graduate School of Technology  
University of Pretoria, South Africa*

## GUEST SPEAKERS

### **Dr. Nicholas Ozor**

Executive Director.  
*African Technology and Policy Studies Network*

### **Prof. Reuben Marwanga**

Chairperson  
*Kenya National Innovation Agency*

### **Prof. Paul Baki**

Professor of Physics  
*Technical University of Kenya*

### **Dr. Jerome Ochieng**

Director  
*Integrated Financial Management Systems  
The Treasury  
KENYA*

### **Dr. Kipkirui Langat**

Director General.  
*The Technical and Vocational Education and Training Authority (TVETA), Kenya*

### **Dr. Cosmas Ochieng**

Executive Director.  
*African Center for Technology Studies.*

## SESSION CHAIRS

1. Dr. Austin Aluoch – *Faculty of Applied Sciences and Technology*
2. Prof. P. M. Matu – *Faculty of Social Sciences and Technology*
3. Prof. Nixon Muganda – *Faculty of Social Sciences and Technology*
4. Prof. Omondi-Oketch – *Faculty of Social Sciences and Technology*
5. Dr. Garnette Oluoch Olunya – *Faculty of Social Sciences and Technology*
6. Dr. Samson O. Ayugi – *Faculty of Engineering Sciences and Technology*

## RAPPORTEURS

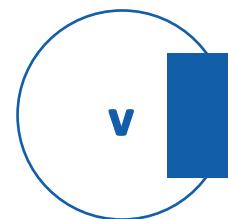
1. Dr. Esther Kiruja – *Faculty of Social Sciences and Technology*
2. Dr. Patrick Kiliku – *Faculty of Social Sciences and Technology*
3. Dr. Alfred Akwala – *Faculty of Social Sciences and Technology*
4. Dr. Quin Juma – *Faculty of Social Sciences and Technology*
5. Dr. Lewis Sitoki – *Faculty of Applied Sciences and Technology*
6. Dr. Patrick Okanya – *Faculty of Applied Sciences and Technology*
7. Mr. Jacob Kittinya – *Faculty of Engineering Sciences and Technology*

## THE 3rd TU-K INTERNATIONAL CONFERENCE ON INNOVATIVE TECHNOLOGIES FOR DEVELOPMENT

*Nairobi, Kenya  
23rd to 25th February 2016*

Conference Theme: “Innovative Technologies for Development”

VENUE: Laico Regency Hotel



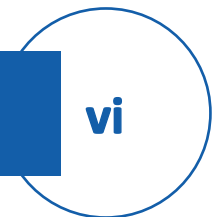
### Conference Sub-themes

- ICT, Engineering and Architecture
- Food Security and Agriculture
- Biological and Physical Sciences
- Environment; Conservation; Energy and Climate Change
- Water; Sanitation and Health
- The Arts, Entrepreneurship and Social Sciences

## 2. CONFERENCE PROGRAMME

### Day 1: Tuesday, 23rd February, 2016

MAIN HALL		
Time	Event	
08.00 – 09.00	Delegates Registration	
09.00-10.30	Session Chair: Prof. Paul M. Shiundu Opening Ceremony <ul style="list-style-type: none"> <li>• Kenya National Anthem</li> <li>• Prayer</li> <li>• Introduction to the 3rd Technical University of Kenya International Conference</li> <li>• Introduction to the Programme</li> <li>• Opening address by Prof. Dr.-Ing. F. W. O. Aduol – Vice Chancellor – Technical University of Kenya</li> <li>• Keynote Speaker: Prof. John O. Mugabe – Professor of Science and Innovation Policy, Graduate School of Technology, University of Pretoria, South Africa</li> </ul> <i>Presentation: “Technological Innovation for Growth and Human Development in Africa: Towards New Policy Regimes and Institutional Arrangements”</i>	
10.30-11:00	Tea Break	
<b>SESSION I: Chair – Prof. Wilson Ogola Co-Chair – Dr. Patrick Dikirr</b>		
11.00-12:30	11:00-11:20 11:25-11:45  11:50-12:10 12:15-12:35	Professor Gituro Wainaina – Executive Director, Kenya Vision 2030 Dr. Moses Rugutt – Director General, National Commission for Science and Technology  <i>Transforming Kenya’s Innovation System through Radical Institutional Changes:</i> Professor Reuben Marwanga – Chairperson, Kenya National Innovation Agency <i>The Role of Technical and Vocational Education and Training Authority (TVETA) in the Enhancement of Innovative Technologies for Development:</i> Dr. Kipkirui Langat. Director General. TVETA. Kenya
12.40 -13.00	Discussion	
13:00-14:00	LUNCH BREAK	



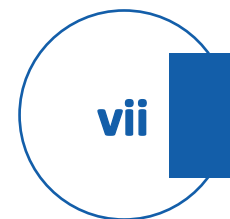
<b>SESSION II: Chair – Prof. Wilson Ogola. Co-Chair – Dr. Patrick Dikirr</b>		
<b>14.00–16.00</b>	14:00-14:20	<i>The Square Kilometre Array: Current Technology for Looking Back to the Origin of the Universe</i> Prof. Paul Baki – Professor of Physics, Technical University of Kenya
	14:25-14:45	<i>Improving Agricultural Productivity and Resilience to Climate Change Using the Land Potential Knowledge System (LandPKS) Mobile Technology</i> : Dr Nicholas Ozor – Executive Director, African Technology and Policy Studies Network.
	14:50-15:25	<i>The Implementation of Integrated Financial Management Information Systems (IFMIS) in the Public Sector</i> : Dr. Jerome Ochieng, Director, IFMIS, The National Treasury, Kenya
	15:35-15:55	Dr. Cosmas Ochieng, Executive Director. African Center for Technology Studies.
	15:55- 16:15	Discussion
<b>16.15</b>	<b>TEA BREAK</b>	

**Day 1: Tuesday 23<sup>rd</sup> February 2016: 6:30 pm - 8:30 pm**

**DELEGATES RECEPTION**

**Day 2: Wednesday, 24<sup>th</sup> February, 2016**

<b>PARALLEL SESSIONS: ROOM A APPLIED/ENGINEERING SCIENCES AND TECHNOLOGIES</b>		
<b>Time</b>	<b>Event</b>	
<b>08.00 – 08.30</b>	Registration	
<b>SESSION III</b>		
<b>08.55 – 09.15</b>	<b>Plenary Lecture:</b> 1. <i>Harnessing the Power of Networked Technologies and Media to Improve and Enhance STEM Education in Disadvantaged Communities</i> . Dr. Patrick Dikirr. Center for Science and Technology Studies. Technical University of Kenya.	
<b>09.15–10.00</b>	2. <i>A Conceptual Data Mining Model (DMM) Used in Selective Dissemination of Information (SDI): Case Study, Strathmore University Library</i> : Ambayo Jackson Alunga Department of Information and Knowledge Management, Technical University of Kenya. 3. <i>How Innovation and Technology are Shaping Libraries of Today</i> : Jackson Omondi Owiti. Department of Information and Knowledge Management – Technical University of Kenya, 4. <i>Enhancing the Findability of Library Information Resources Using the Internet of Things</i> : Tom Kwanya. Department of Information and Knowledge Management, Technical University of Kenya 5. <i>Application of Big Data in Records Management in Public Organizations in Kenya</i> : Lucy Kibe. Department of Information and Knowledge Management, Technical University of Kenya,	<b>Session Chair:</b> Dr. Samson Ayugi  <b>Rapporteur:</b> Mr. Jacob Kittinya
<b>10.00 – 10.30</b>	<b>Tea Break</b>	
<b>SESSION IV</b>		
<b>11.15-12.55</b>	6. <i>Performance Evaluation of Wired VoIP Networks Compared to VoWLAN</i> : Eliud Manyinsa – Jomo Kenyatta University of Science and Technology, Kenya 7. <i>On the In-Door Low-Voltage Power Line for Broadband Data Communication</i> : Steven O. Awino and Joseph O. Abok. Technical University of Kenya, Kenya 8. <i>On Positivity and Norms of Norm-Attainable Normal Operators and Their Applications to Quantum Mechanics</i> : N.B. Okelo, School of Mathematics and Actuarial Science, Jaramogi Oginga Odinga University of Science and Technology. Kenya	<b>Session Chair:</b> Dr. Samson Ayugi  <b>Rapporteur:</b> Mr. Jacob Kittinya
<b>13.00–14.30</b>	<b>Lunch Break</b>	



SESSION V		
14.30 – 17.00	<p>9. <i>Development of a Microbicidal Contraceptive Gel, UniPron for Preventing Pregnancy and Sexually Transmitted Infections Acquisition:</i> <sup>1,5</sup>Obiero J.A, <sup>1</sup>Waititu K.K, <sup>1</sup>Mwethera P, <sup>2</sup>Mule I, <sup>3,4</sup>Kavoo L, <sup>5</sup>Jaoko W, <sup>5</sup>Stones W.<sup>1</sup>Institute of Primate Research, Nairobi, Kenya, <sup>2</sup>Department of Veterinary Pathology, University of Nairobi, <sup>3</sup>Department of Obstetrics &amp; Gynaecology, Nairobi Hospital, Nairobi, Kenya, <sup>4</sup>Department of Obstetrics &amp; Gynaecology, University of Stellenbosch, Tygerberg, Cape Town, South Africa, <sup>5</sup> Department of Medical Microbiology, University of Nairobi, Kenya, <sup>6</sup> Department of Obstetrics &amp; Gynaecology, Aga Khan University Hospital, Nairobi, Kenya</p> <p>10. <i>Socio-demographic factors associated with entry into motherhood by out-of-school, single, 15-24 year-old girls in Mukuru Slums, Nairobi:</i> Nguku, Julius<sup>1,2</sup>Gathogo, Janet<sup>2</sup>;Mulei, Francis<sup>1</sup>; Mbai, Fiona<sup>2</sup> – <sup>1</sup>HOPE worldwide Kenya (HWWK); <sup>2</sup> Department of Biomedical Sciences, Technical University of Kenya</p> <p>11. <i>Impact of an Integrated HIV/STI Project in Reducing behavioral risks for out-of-school, 15-24 year- old girls in Mukuru Slums, Nairobi:</i> Nguku, Julius<sup>1,2</sup>, Gathogo, Janet<sup>2</sup>;Mulei, Francis<sup>1</sup>; Mbai, Fiona<sup>2</sup> – <sup>1</sup>HOPE worldwide Kenya (HWWK); <sup>2</sup> Department of Biomedical Sciences, Technical University of Kenya</p> <p>12. <i>Evaluation of Pathogenic Micro organisms in the Water Supply in Selected Estates of Nairobi:</i> Ogombo, Kendrick Derrick<sup>1</sup>; Bosire Rosevalentine<sup>1</sup>; Ochola Rachel<sup>11</sup>Department of Biomedical Sciences, Technical University of Kenya</p> <p>13. <i>Waicella Cibiria NN20 isolated from fermented Kimere product in Kenya: it's ability to sequester AFB1 invitro and ability to prepare yogurt compared fermented milk products:</i> <sup>1</sup>Nduti N. N, <sup>2,5</sup>Reid G,<sup>3</sup>Sumarah M, <sup>4</sup>Hekmat S – <sup>1</sup>Department of Food science and Technology, Technical University of Kenya, <sup>2</sup>Lawson Health Research Institute-Canada, <sup>3</sup>Agri-food Canada, <sup>4</sup>Brescia College, University of Western Ontario, <sup>5</sup>University of Western Ontario</p>	<p><b>Session Chair:</b> Prof. Francis Gatheri</p> <p><b>Rapporteur:</b> Dr. Lewis Sitoki</p>

## Day 2: Wednesday, 24th February 2016

PARALLEL SESSIONS: ROOM B THE ARTS, ENTREPRENEURSHIP AND SOCIAL SCIENCES		
Time	Event	
08.00 – 08.30	Registration	
<b>SESSION III</b>		
08.30 – 09.15	<p><b>Plenary Lecture:</b></p> <p>25. <i>Contextualising Arts in Education for a Cultured Community:</i> Emily Achieng<sup>3</sup> Akuno. Technical University of Kenya</p>	<b>Chair:</b> Prof. P. M. Matu
09.15–10.30	<p>26. <i>Greening the Music Atmosphere:</i> Virginia Onyara Multimedia University of Kenya</p> <p>27. <i>Arts Education for Community Development: The Role of Musical Arts Education in Boosting Kenya's Economy:</i> Clencie Mbeche Owino. Kenyatta University. Kenya.</p> <p>28. <i>Teaching Oral Literature In Kiswahili: A Step Towards Harmonious Cultural Relationships:</i> Diborah Nanyama Amukowa. Maseno University. Kenya</p> <p>29. <i>Arts Education and Community Participation Considerations from the Field:</i> Gloria Patricia Zapata R. Escuele de Musica. Fundacioni, Univerita Juan Corpus. Bogota D. C-Colombia.</p>	<b>Rapporteur:</b> Dr. Patrick Kiliku
10.00 – 10.30	<b>Tea Break</b>	

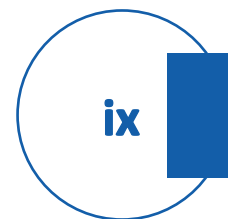


<b>SESSION IV</b>		
<b>10.30-11.15</b>	<p><b>Plenary Lecture:</b></p> <p><i>30. Interweaving Communal, Educational and Academic Ideas: Festive Dances from Israel's Kibbutz Community in Dance Notation:</i> Shlomit Ofer – The Kibbutzim College of Education, Technology and the Arts, Tel Aviv, Israel.</p>	<p><b>Chair:</b> Dr. Garnette Oluoch-Olunya</p>
<b>11.15-12.55</b>	<p><i>31. A Cultural Response to Oppression: Music During the Holy Spirit Movement:</i> JP Odoch Pido. School of Creative Arts and Technology, Technical University of Kenya.</p> <p><i>32. A Double Edged Sword: The Role of Indigenous Philosophies and Practices in Contemporary Education:</i> Donna Pido. Department of Design and Creative Media, Technical University of Kenya.</p> <p><i>33. Diaspora, Identity and Xbosa Ancestral Tradition: Culture in Transience:</i> Zingisa Nkosinkulu. Department of The Arts, University of South Africa</p> <p><i>34. Problematizing the Gap between Policy and Administration of Cultural Institutions in Nigeria:</i> Nneamaka Igboezim, Akwa-Ibom State Nigeria</p>	<p><b>Rapporteur:</b> Dr. Patrick Kiliuku</p>
<b>13.00–14.30</b>	<b>Lunch Break</b>	
<b>SESSION V</b>		
<b>14.30 – 17.00</b>	<p><i>35. Conformity: Visual Reflection on the Social and Cultural Life of Nguni Women:</i> Bongani Ntombela. Department of The Arts, University of South Africa</p> <p><i>36. Mentorship Methodology for Arts Education in Africa:</i> Siphon Mdanda. Freedom Park and Department of The Arts, University of Johannesburg, South Africa</p> <p><i>37. Rhodes Must Fall: Reframing South African Universities:</i> Churchill Madikida. Department of The Arts, Walter Sisulu University. South Africa</p> <p><i>38. Intelligent and Emotional Quotient in the Social Thinking and Communication for Strategic Community Engagement in Kenya:</i> W. Okumu-Bigambo – School of Human Resource Development. Moi University, Kenya.</p> <p><i>39. Effects of Online and Blended Teaching Strategies on Secondary Students' Achievement in Social Studies.</i> IGE Olugbenga Adedayo. Adekunle Ajasin University, Akungba Akoko, Nigeria.</p>	<p><b>Chair:</b> Dr. Garnette Oluoch-Olunya</p> <p><b>Rapporteur:</b> Dr. Alfred Akwala</p>

**Day 2: Wednesday, 24th February, 2016**

<b>PARALLEL SESSIONS: ROOM C THE ARTS, ENTREPRENEURSHIP AND SOCIAL SCIENCES</b>		
Time	Event	
<b>08.00 – 08.30</b>	Registration	
<b>SESSION III</b>		
<b>08.30 – 10.00</b>	<p><i>40. Technology and its Impacts on Terrorism and Counter-Terrorism in Africa:</i> Kigen Morumbasi – Technical University of Kenya, Department of Governance and Public Policy. Kenya</p> <p><i>41. Technology, Terrorists and Geopolitics: A Comparative Approach to Kenya's Proposed Border Wall with Somalia:</i> Brendon J. Cannon – Kisii University. KENYA</p> <p><i>42. An Investigation into Implementation of Outsourcing Strategy by Selected Manufacturing Firms in the Chemical and Allied Sector in Kenya:</i> Awino Zachary Bolo<sup>1</sup>, Grace Georgine Oyombe<sup>2</sup> – <sup>1,2</sup>School Business, University of Nairobi. KENYA</p>	<p><b>Chair:</b> Prof. Nixon Muganda</p> <p><b>Rapporteur:</b> Dr. Alfred Akwala</p>
<b>10.00 – 10.30</b>	<b>Tea Break</b>	

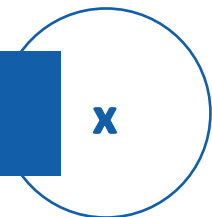




	<b>SESSION IV</b>	
10.30-12.15	<p>53. <i>The Influence of Youth Capacity Building through Uwezo Fund on National Development in Kenya: A Case Study of Vihiga County:</i> Alfayo Alfonze Agufana<sup>1*</sup>, Evans Vidija Sagwa<sup>2</sup>, John Mbugua<sup>3</sup> – <sup>1,3</sup>Nairobi Extra-Mural Centre; University of Nairobi, Kenya;<sup>2</sup>School of Business and Management Studies. Technical University of Kenya.</p> <p>54. <i>A Tracer Study of Graduates in the Fields of Bachelor of Engineering 2011 Cohort:</i><sup>1</sup>Gachau, A. M*. and<sup>1</sup> Micheni, E.M. – <sup>1</sup>Technical University of Kenya</p> <p>55. <i>Factors contributing to resilient biodiversity based on indigenous knowledge system: An Application to Ramogi Hill, Kenya:</i> Esther Were Shisia<sup>1*</sup> Florence Nelima<sup>2</sup>, Benson Ateng<sup>3</sup> – <sup>1</sup>University of Nairobi, Kenya; <sup>2,3</sup> Department of Economics and Resource Management, Technical University of Kenya.</p> <p>56. <i>Economic Performance and Perceived Impact on People's Wellbeing:</i> Benson Ateng<sup>1*</sup>, Florence Nelima<sup>2</sup> – <sup>1,2</sup>Department of Economics and Resource Management, Technical University of Kenya.</p>	<p><b>Chair:</b> Prof. Nixon Muganda</p> <p><b>Rapporteur:</b> Dr. Esther Kiruja</p>
13.00–14.30	<b>Lunch Break</b>	
	<b>SESSION V</b>	
14.30 – 17.00	<p>57. <i>Incorporating Digital Technology in the Teaching of French as a Foreign Language (FFL) in Technical University of Kenya:</i> Teresa Atieno Otieno – Technical University of Kenya</p> <p>58. <i>Innovative Competitive Strategies Adopted By Top Performing Banks in Kenya:</i> Headmound Okari – School of Business and Management Studies, Technical University of Kenya,</p> <p>59. <i>Benchmarking Kenya's Attractiveness as Foreign Direct Investment Destination:</i> Benson Ateng<sup>1*</sup>, Kenneth Aduda<sup>2</sup>, Florence Nelima<sup>3</sup> – <sup>1,3</sup> Department of Economics and Resource Management, Technical University of Kenya; <sup>2</sup>Jaramogi Oginga Odinga University of Science and Technology. Kenya</p> <p>60. <i>Changes in Brain during Adolescence:</i> Arun Datta<sup>1</sup> – <sup>1</sup> Technical University of Kenya</p>	<p><b>Chair:</b> Prof. Nixon Muganda</p> <p><b>Rapporteur:</b> Dr. Esther Kiruja</p>

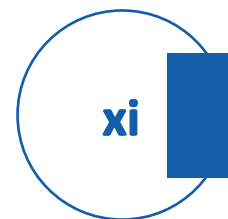
**Day 3: Thursday, 25th February, 2016**

<b>PARALLEL SESSIONS: ROOM A APPLIED/ENGINEERING SCIENCES AND TECHNOLOGIES</b>		
<b>Time</b>	<b>Event</b>	
08.00 – 08.30	Registration	
	<b>SESSION VI</b>	
09.15–10.15	<p>14. <i>Potential Environmental Impacts from Production and Use of Bioethanol:</i> Bilha Eshton Gitonga – Technical University of Kenya</p> <p>15. <i>Application of Clay Nanoparticles in Removal of Lead and Cadmium from water:</i> David Mutegi Marikah<sup>*1</sup>, Wanyika Harrison<sup>1</sup> and Erastus Gatebe<sup>2</sup>. <sup>1</sup> Department of Chemistry; Jomo Kenyatta University of Agriculture and Technology. Kenya.</p> <p>16. <i>Developing local phytoplankton identification keys using biometric and morphometric measurements in Lake Victoria:</i> Sitoki Lewis. Department of Geosciences and the Environment. School of Physical Sciences and Technology. Technical University of Kenya</p> <p>17. <i>Enhancing Energy and Environmental Conservation for Sustainable use and Management of Natural Resources:</i> Laban K. Rotich, Richard O. B. Makopondo, Paul Olola. School of Hospitality &amp; Tourism Studies, Technical University of Kenya.</p>	<p><b>Session Chair:</b> Dr. Austin Aluoch</p> <p><b>Rapporteur:</b> Dr. Patrick Okanya</p>
10.15 – 10.30	<b>Tea Break</b>	



<b>SESSION VII</b>		
<b>11.15-12.55</b>	<p>18. <i>Reduction of the solar rack dried Sardine fishery post-harvest loss through vacuum packaging in coastal Kenya:</i> <sup>1</sup>Ogongo Bernard, <sup>1</sup>Odote Peter – <sup>1</sup>Department of Natural Products &amp; Post-Harvest Technology, Coastal &amp; Marine Fisheries Programme, Kenya Marine &amp; Fisheries Research Institute</p> <p>19. <i>Bacterial and Fungal Zoonosis in Two Commonly Cultured Fish Species Reared in Hatcheries at Sagana, Jambo and Mvea Fish Farms:</i> Njagi Isaac<sup>1</sup>, Maingi John<sup>2</sup>, Charo Harrison<sup>3</sup> – <sup>1</sup>Technical university of Kenya; <sup>2</sup>Kenyatta University; <sup>3</sup>National Aquaculture Research Development Centre (NARDTC)</p> <p>20. <i>Applying the Community Based Conservation Approach to Enhance Knowledge and Promote Development:</i> Nancy N. Moinde<sup>1</sup>, Stanislaus M. Kivai<sup>1</sup>, Peter N. Fundi<sup>1</sup>, Tom Letiwa<sup>2</sup> – <sup>1</sup>Institute of Primate Research-National Museums of Kenya, Conservation Biology Department, <sup>2</sup>Namunyak Wildlife Conservation Trust (NWCT)</p> <p>21. <i>Collision-Induced Dissociation Studies of 1,10-Phenanthroline Complexes: Determination of the Third Sequential Binding Energies:</i> Holiness Nose<sup>1</sup> and Rodgers, M. T<sup>2</sup>. – <sup>1</sup>Department of Chemical Science and Technology, Technical University of Kenya; <sup>2</sup>Department of Chemistry, Wayne State University, Detroit, Michigan</p>	<p><b>Session Chair:</b> Dr. Austin Aluoch</p> <p><b>Rapporteur:</b> Dr. Patrick Okanya</p>
<b>13.00–14.30</b>	<b>Lunch Break</b>	
<b>SESSION VIII</b>		
<b>14:30-16.00</b>	<p>22. <i>Determining the Most Effective Legume in the Push-Pull Pest Control Technology Using the Analysis of Variance Model:</i> L N Mbugua<sup>1</sup> C M Mwalali<sup>2</sup> – <sup>1</sup> School of Mathematics, Technical University of Kenya; <sup>2</sup> School of Science, Maasai Mara University. Kenya</p> <p>23. <i>Developing a Numerical Simulation of Vascular Brain Tumor Growth Using 3-Dimensional Partial Differential Equations:</i> <sup>1</sup>Wanjau P.M, <sup>1</sup>Koskei J.K, <sup>2</sup>Gatheri F.K – <sup>1</sup>Moi University; <sup>2</sup> School of Mathematics, Technical University of Kenya.</p> <p>24. <i>A Numerical Investigation Of Turbulent Natural Convection In A 3-D Enclosure Using K- ST Model And Piso Method:</i> F. K. Gatheri<sup>1</sup>, K. O. Awuor<sup>2</sup>, J. K. Kimunguyi<sup>3</sup> – <sup>1</sup> School of Mathematics and Actuarial Sciences, Technical University of Kenya, <sup>2</sup> School of Pure and Applied Sciences, Kenyatta University</p> <p>61. <i>Potential Use and Challenges of Constructed Wetlands for Waste Water Treatment and Conservation in Game Lodges and Resorts in Kenya:</i> Richard O. B. Makopondo <sup>1</sup>, Cynthia G. Kamau <sup>2</sup> – <sup>1</sup> School of Hospitality and Tourism Studies, Technical University of Kenya; <sup>2</sup> P. O. Box 6431-00200, Nairobi Kenya</p>	<p><b>Session Chair:</b> Dr. Samson Ayugi</p> <p><b>Rapporteur:</b> Mr. Jacob Kittinya</p>
<b>16.00 –16.45</b>	<b>Tea Break</b>	
<b>16.45</b>	<b>MAIN HALL- Vote of Thanks and Closing Ceremony</b>	

**Day 3: Thursday, 25th February, 2016**



PARALLEL SESSIONS: ROOM B THE ARTS, ENTREPRENEURSHIP AND SOCIAL SCIENCES		
Time	Event	
08.00 – 08.30	Registration	
	<b>SESSION VI</b>	
08.30 – 09.15	<b>Plenary Lecture:</b> 43. <i>Embedding Theory in Performance Contexts in the Arts of Kenyan Productions: An Examination of Case Studies of KNDF and Local TV Productions:</i> Peter L. Barasa and Carolyne Omulando. Moi University. Kenya	<b>Chair:</b> Prof. Omondi-Oketch
09.30 – 10.15	44. <i>Bespoke Projects: Inclusive Worldviews in Creative Research and Production:</i> Odun Orimolade – University of South Africa 45. <i>The 'Artists in Schools Programme' in South Africa: An Examination of Ithuteng Art's Involvement:</i> Pfunzo Sidogi – Tshwane University of Technology, South Africa 46. <i>Research on Arts and Culture Management, Culture Policies and Culture Economics: A Colombian and Latin American Experience:</i> Santiago Niño Morales, Universidad Distrital Francisco José de Caldas – Bogotá, Colombia, South America 47. <i>Toward a Culturally Sensitive Blended Learning Environment:</i> Martin A. N. Khamala. Department of Design and Creative Media, Technical University of Kenya,	<b>Rapporteur:</b> Dr. Quin Juma
10.15 – 10.30	<b>Tea Break</b>	
	<b>SESSION VII</b>	
10.30-11.15	<b>Plenary Lecture:</b> 48. <i>Decolonizing the African Art Curriculum: A Reflective Discourse:</i> NombekoMpako. Department of The Arts. University of South Africa	<b>Session Chair:</b> Prof. Omondi-Oketch
11.15-12.55	49. <i>The Visual Narrative Relating to Social Performance during Burial:</i> Siphe Potelwa – Department of The Arts. University of South Africa 50. <i>A Visual Narrative Reflecting on Upbringing of Xhosa Girls with Special Reference to 'Intonjane':</i> Siziwe Sotewu. Department of The Arts. University of South Africa 51. <i>Migration in Transforming Shona People's Identity:</i> Wadzanai Tirimboyi. Department of The Arts. University of South Africa 52. <i>Documentary Filmmaking in the 21st Century: Animating the Public Sphere:</i> Lieza (Elizabeth) Louw. The Wits School of Arts. The University of Witwatersrand. South Africa.	<b>Rapporteur:</b> Dr. Quin Juma
13.00–14.30	<b>Lunch Break</b>	
14.30–16.15	DISCUSSION FORUM	
16.45	<b>MAIN HALL- Vote of Thanks and Closing Ceremony</b>	



The 3<sup>rd</sup> TU-K International Conference

on

# INNOVATIVE TECHNOLOGIES FOR DEVELOPMENT

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*Nairobi, 23<sup>rd</sup> to 25<sup>th</sup> February 2016*

**Conference Theme:**

*“Technologies as Drivers for Development”*

# ABSTRACTS

## 1. Harnessing the Power of Networked Technologies and Media to Improve and Enhance STEM Education in Disadvantaged Communities

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**Sub-theme:** ICT, Engineering and Architecture

### Abstract

The ongoing revolution in networked technology and media is, for better or for worse, increasingly influencing and transforming nearly every other sector of society. In Africa, as in the rest of the developing parts of the world, unprecedented opportunities have been witnessed in how citizens organize and agitate politically, how they source markets, transact in business, and market and deliver goods and services. Radical shifts have also been witnessed in the ways in which people gather, process and consume information. Indeed, networked technologies and media have spectacularly influenced how people live, conduct business, seeks to entertained, work, and how they envision their individual as well as societal futures. There is no gainsaying that no single aspect of human life has remained unscathed, unaffected by technology. And as F.O Carroll astutely states, information and communication technologies are progressively “remaking the world and changing the way human beings create, communicate, organize, share information, and [even] learn.”

However, that as it may be, in Africa, most noticeably in the education sector, the adoption and uptake of networked technology and media is still in its infancy. Of course, compared to a few decades ago, some gains have been realized. For instance, institutions of higher learning that have somewhat embraced and deployed technology have remarkably improved their management systems, created better working conditions for their employees, modernized pedagogical approaches to meet the needs of twenty first century learners, opened a lot more the doors of education to populations that would have otherwise been locked out, enhanced staff and students learning experiences and opportunities, and, moreover, are now able [compared to a few decades ago] to effectively (if not instantaneously) track student progress. In terms of creating a larger footprint in society, whose impact is perhaps comparable to Safaricom’s MPesa revolution, an impact so large and whose geographical reach is seismically felt, not much has however been realized. In Kenya, particularly, institutions of higher learning have in fact done little in terms of, for example, creating a nation-wide infrastructure that would allow for a massive democratization of basic education.

This paper therefore seeks, in that spirit, to describe how, by harnessing the power of networked technology and media, universities in Kenya may become key catalysts of democratizing basic education—especially in the fields of science, technology, engineering and mathematic (STEM). What most interests me here is how universities, in spite of the many challenges they face (including limited government funding), may be at the very forefront of bridging the many educational disparities/inequalities—whether they be economically driven, regionally based, gendered, or ethnic centered.

Keywords?

## 2. A Conceptual Data Mining Model (DMM) Used in Selective Dissemination of Information (SDI): Case Study, Strathmore University Library

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**Ismail Ateya Lukandu**

Strathmore University

### ABSTRACT

**Purpose:** The process of locating and acquiring relevant information from libraries is getting more complicated due to the vast amount of information resource one has to plough through. To serve users purposefully, an academic library should be able to avail to users' tools and services that will lessen the task of searching of information and be more of an information provider.

**Design:** A case study approach was taken with the collection and analysis of data. Random sampling technique facilitated the choice of 100 library users and library staff from which data was collected using self-administered and researcher administered questionnaires. Data was presented using descriptive statistics, cross tabulations and graphs allowing the analysed and correlated.

**Findings:** It was ascertained that there is a demand of relevant information amongst the library users pertinent to their needs with a need for a specialised service geared towards selectively acquiring information.

**Practical implications:** The mining of user data within library databases would enable user needs and requirements to be understood and specialised services developed.

**Originality/value:** The model is original as it is one of a kind that suggests partnering SDI and data mining in libraries. Data mining, Selective Dissemination of Information (SDI), Information needs, Academic libraries

### 3. How Innovation and Technology are Shaping Libraries of Today

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**Jackson Omondi Owiti**

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#### Abstract:

**Purpose:** -There is no doubt that technology has changed the information seeking behaviour in this century. Once thought to be going the way of traditional bookstores and eventual death, libraries have rebounded and are thriving in innovation and technology fuelled world. The purpose of this paper is to question contemporary accounts of “the network enterprise” and “the virtual organisation”, arguing that these are founded on a logic which abstracts innovation from its institutional and organisational context.

**Design/methodology/approach:** – The paper uses a literature review to explore the ways in which libraries are keeping up and will continue to exist even with the information overload experienced today though information communication technology and innovations.

**Findings:** – The literature review suggests that there is a need to go beyond the using information communication technology applications and be creative and innovative to keep up with the current information sage.

**Practical implications:** – The findings can be utilized to evaluate the libraries and change how Kenyan libraries can improve in providing its services and attracting more users. The innovations and ideas in this paper are very useful and authentic source for planning to improve the libraries’ infrastructure, library automation and in reducing the gap between it and its users

**Originality/value:** – The paper shows that the innovation in library offers a more propitious environment for more patrons and attract new as well.

Keywords: Communication technologies, libraries, Library automation, Innovation in Library, library users

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### 4. Enhancing the Findability of Library Information Resources Using the Internet of Things

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**Tom Kwanya**

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#### Abstract

**Purpose:** The “Internet of Things” is a network of physical things – living and non-living – with a capacity to send and receive digital data without requiring human intervention. The purpose of this study was to explore the potential of this technological development to enhance the findability of information resources in research and academic libraries in Kenya.

**Methodology:** Given that the concept of the “Internet of Things” is a recent development, this study was designed as an exploratory research. Data for the study was collected through a combination of literature review and interviews with librarians in research and academic libraries. The librarians were selected through information-oriented purposive sampling. Data was analysed through content analysis.

**Findings:** The findings of this study indicate that research and academic libraries in Kenya can use the “Internet of Things” to enrich the information experience of their users by aiding them to identify, locate, use and share information resources effectively. The “Internet of Things” thus has a great potential of increasing the usage of library resources by making them findable.

**Practical implications:** Research and academic library usage statistics indicate that users spend more time searching for information rather than the actual usage of the materials. The findings of this study can be used by research and academic librarians to enhance the findability of credible information materials by applying the “Internet of Things” in their libraries.

**Originality:** This study is original both in terms of its subject matter, scope and application. There is currently no scholarly study on the application of the “Internet of Things” in libraries in Kenya.

Keywords: “Internet of Things”, findability, searching, retrieval, libraries, Kenya



## 5. Application of Big Data in Records Management in Public Organizations in Kenya

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### Abstract

**Purpose:** Big data is data whose size is beyond the ability of commonly used ICT tools and techniques to capture, manage, and process within tolerable time. Public organizations create, receive, store, share and use vast volumes of records which are becoming difficult to manage effectively with ordinary systems. This study investigated the potential and application of big data concept and tools in the management of records in public organizations in Kenya.

**Methodology:** This study was designed as a survey to ascertain the current status of the application of big data in managing records in public institutions in Kenya. Primary data was collected through interviews with records management officers in government ministries in Kenya. Additional data was collected through literature review.

**Findings:** The study revealed that most public institutions in Kenya are not utilizing the full potential of big data to enhance the management of their records. This scenario is caused by inadequate understanding of the real potential of big data for records management; lack of adequate ICT skills and infrastructure; inadequate records management policies; and information overload.

**Practical implications:** The findings of this study can be used by records management officers in public institutions to develop and implement records management systems using big data. They can also be used by training institutions to develop curricula which build the competencies of records managers to use big data.

**Originality:** Only scanty literature exists on big data and records management in Kenya. This is an original study which seeks to bridge this gap by contributing to the discourse on big data and records management.

Keywords: Big data, records management, public organizations, Kenya

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## 6. Performance Evaluation of Wired VoIP Networks Compared to VoWLAN

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**Sub-Theme:** ICT, Engineering and Architecture

### Abstract

Voices over Internet Protocol (VoIP) allow users to make calls and receive calls by connecting through internet protocols to deliver voice data. The reasons behind growing popularity of VoIP include; low cost, efficient bandwidth and flexibility over Public Switched Telephone Network (PSTN). VoWLAN is a VoIP system implemented over WLAN (Wireless Local Area Network), which offers a significantly extended operational range. Users increasingly rely on WLAN connections creating a challenge due to increase in demand.

The designed model used in this paper is simulated to derive measurements of selected parameters such as delay, jitter, packet loss and throughput. The performance of voice communication over wired connections to its WLAN counterpart is done using NS-3 simulator, in areas such as operational stability and operational range. With interest in WLAN as the main wireless internet connectivity, VoIP becomes a central topic for voice communication over WLAN network due to less cost as compared to other mode of communication.

The paper evaluates the performance difference between wired and wireless VoIP networks. It has noted that the wireless nodes are affected by its proximity to the base station, acting as the receiver. In close proximity, the wireless nodes will perform better than the wired network. However, the latency and jitter is unstable for wireless networks, especially as the distance increases between the mobile nodes and the base station.

Keywords: VoIP, WLAN, VoWLAN, NS-3, Delay Throughput

## 7. On the In-Door Low-Voltage Power Line for Broadband Data Communication

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Steven O. Awino<sup>1</sup>, Joseph O. Abok<sup>2</sup>, Thomas J. O. Afullo<sup>3\*</sup>

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**Sub-theme:** ICT, Engineering and Architecture

### Abstract

In this paper, we investigate the usage of the in-door low-voltage electrical power supply network as a communication channel for the provision of broadband communication services. This is done through simulations and measurements of the power line channel transfer function in the frequency band of 1-30 MHz. A Parallel Resonant Circuit (PRC) channel model is then proposed to model the power line network and results compared to a Series Resonant Circuit (SRC) model. The model is simulated and validation done through measurements on a test bed for a cascaded network with three T node branches. Transverse Electromagnetic (TEM) transmission line resonant circuit theory is employed to calculate and optimize the obtained parameters of the model. From the results obtained, the simulated models and measurement results are confirmed to compare very well with each other, and thus the proposed PRC model is considered appropriate for the characterization and modelling of the power line network channel.

**Keywords:** *Power line communication (PLC), power line network, channel modelling, parallel resonant circuit (PRC), Transverse Electromagnetic (TEM) mode*

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## 8. On Positivity and Norms of Norm-Attainable Normal Operators and Their Applications to Quantum Mechanics

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**Sub-theme:** Biological and Physical Sciences

### Abstract

The study of norms of operators forms a very important aspect in functional analysis. In this, paper we present positivity and norms of operators in Hilbert spaces. We outline the theory of normal, self-adjoint and norm-attainable operators. Lastly, we give results on norms of normal, norm-attainable and self-adjoint operators and their applications to mechanics.

**Keywords:** Hilbert space, normality, norm-attainability, self-adjoint operators and Positivity

## 9. Development of a Microbicidal Contraceptive Gel, UniPron for Preventing Pregnancy and Sexually Transmitted Infections Acquisition

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**Sub-theme:** Biological and Physical Sciences

### Abstract

To determine the safety of UniPron, baboon vaginal pH, clinical chemistry profile, vaginal flora characteristics, vaginal and cervical histopathology were assessed at baseline. Thereafter, 20 animals were randomized into four groups in the ratio of 1:1:1:1 to receive either placebo (Smugel), 0.4g, 0.8g, or 1.2g of UniPron intravaginally twice a week for six weeks. Sample collection and analyses were continued during treatment period. Every time product application was done, there was physical examination of the vagina and cervix to assess any signs of mucosal irritation. To determine its effectiveness as contraceptive, 10 sexually mature female baboons of proven fertility were randomized into two groups. For six complete menstrual cycles, 0.4g of UniPron was administered into the vagina of baboons in the treatment group and time-mated within three hours. Time-mating was continued after treatment was stopped. To determine the microbicidal activity, sensitivity tests were carried out on *Neisseria gonorrhoea*, *Gardnerella vaginalis*, *Candida albicans*, *Haemophilus ducreyi* and *Escherichia coli*. From the study, there were no significant differences observed in vaginal pH and clinical chemistry profiles ( $p > 0.005$ ) between control and experimental groups. Histological findings at baseline and after treatment were similar with no signs of vaginal or cervical mucosal irritation, and vaginal flora characteristics were found to be similar throughout the study groups. All control animals conceived, but UniPron treated animals conceived only after treatment was stopped. Sensitivity tests were positive for all the microorganisms tested. The implication is that UniPron is a safe, effective and reversible non-hormonal contraceptive in baboons and has microbicidal activities against sexually transmitted infections causing pathogens. UniPron warrants further investigation to assess its safety and efficacy as a vaginal microbicidal contraceptive gel in women.

**Keywords:** vagina, microbicide, contraceptive, safety, baboon

## 10. Socio-demographic factors associated with entry into motherhood by out-of-school, single, 15-24 year-old girls in Mukuru Slums, Nairobi

Nguku, Julius<sup>1</sup>; Gathogo, Janet<sup>2</sup>; Mulei, Francis<sup>2</sup>; Mbai, Fiona<sup>1</sup>

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**Sub-theme:** Biological and Physical Sciences

### Abstract

One of the challenges found among adolescent girls in Nairobi's informal settlements is the high rate of premarital motherhood that predisposes the girls to a wide range of social, economic and health challenges. This paper looks at the socio-demographic factors associated with entry into motherhood by out-of-school, unmarried girls aged 15-24 years in Mukuru Slums, Nairobi. Data is drawn from a one year baseline survey in a program offering sexual and reproductive health and rights interventions for girls in urban informal settlements.

523 15-24 year old girls were enrolled into the project. To provide baseline information, socio-demographic data was collected from 523 girls in the age group 15-24 girls and reported as proportions. A regression model was used to determine any socio-demographic differences between the single girls who have initiated motherhood and those who had not. 402 (77%) of the girls were single 111 (27.6%) of whom had initiated motherhood. Significant differences ( $p < 0.05$ ) were observed in the age groups: 15-17 years (referent age-group), 18-20 years, 21-22 years, 23-24 years with 11%, 20%, 50% and 73% respectively having initiated motherhood; having an income compared with having no income (OR 4.522 95% CI 2.466-8.291); living alone compared with living with parents or guardians (OR 9.58 95% CI 4.08-22.49) and not completing primary school compared to having complete primary school education (OR 3.985; (95% CI 1.539-10.315). The Practical implication is that entry into motherhood for out-of-school, single, 15-24 year-old girls in Mukuru Slums seem to be associated with: being older, having an income, not having completed primary school and staying alone. Programs providing SRHR interventions to adolescent girls and young women in Nairobi's informal settings should consider more focussed and targeted messages for the particular sub-groups of girls.

**Key words:** premarital motherhood, adolescent girls, urban informal settlements.

## 11. Impact of an Integrated HIV/STI Project in Reducing Behavioural Risks for Out-of-school, 15-24 Year-old Girls in Mukuru Slums, Nairobi

Nguku, Julius<sup>1</sup>; Gathogo, Janet<sup>2</sup>; Mulei, Francis<sup>2</sup>; Mbai, Fiona<sup>1</sup>

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Sub-theme: Water; Sanitation and Health

### Abstract

This paper looks at the self-reported changes in behavior of 523 girls in the age group between 15-24 years enrolled into the project who participated in a one-year research project that aimed to increase adoption of safer behaviors by girls aged 15-24 years who reside in Mukuru Slums, Nairobi. The project integrated HIV prevention, gender and economic empowerment aspects. More than 60% of new HIV infections in Kenya occur among young people aged between 15-34 years and young women aged 20-24 years are over three times more likely to be infected than young men of the same age group. 523 15-24 year-old girls were enrolled into the project. Behavioral data was collected and reported as proportions at baseline and midterm levels. A regression model was used to determine any differences in self-reported behavior (health/health information-seeking, reduction in number of sexual partners; and correct and consistent condom use) between the two levels. The girls who had tested for HIV in the last three months increased from 1% to 53% (OR 75.83; 95% C.I 26.22-219.31;  $p < 0.0001$ ), and those who sought information from HIV programs from 41% to 89% (OR 11.68; 95% C.I 6.10-22.38;  $P < 0.0001$ ). Self-reported correct and consistent condom use during sex increased significantly from 13% to 68% (OR 14.22; 95% C.I 8.70-23.24;  $p < 0.0001$ ) and the proportion who had more than one sexual partner reduced from 16% to 2%. The Implications is that integrated project seemed to facilitate improvement in health/health information-seeking behavior; reduce the number of sexual partners; and increase correct and consistent use of condoms among the 15-24 year-old girls in Mukuru Slums. HIV prevention programs targeting girls in resource-poor settings are encouraged to consider integrating HIV prevention, gender and economic empowerment aspects in order to enhance behavior change.

**Key words:** HIV, young women, integrated program, behavior change.

## 12. Evaluation of Pathogenic Micro organisms in the Water Supply in Selected Estates of Nairobi

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Sub-theme: Biological and Physical Sciences

### ABSTRACT

Tap water is directly utilized by a majority of people across the world as there is the belief that it is safe, clean and the best for use and drinking. This was a cross sectional study, which was conducted between October and November 2015, and was aimed at evaluating possible microbial contamination of tap water supplies in 5 selected estates in Nairobi: Nairobi Central Business District (Technical University of Kenya), Eastlands area (Kayole and Huruma (borders 2 slum regions); Landmawe and Langata. Convenience sampling was carried out to select these areas and 5 water samples per collection point were collected using sterilized universal bottles on 4 days with a two week interval between the first two and the last two sample collection days. The samples were cultured and any bacteria colony grown, identified using an array of standardized biochemical tests. A total of 100 samples were collected, from which 21% (n=21;  $P < 0.05$ ) had bacteria colonies identified. Twenty of these samples were from Huruma and the one other from Kayole. The most common bacteria found in the water samples included, *Escherichia coli* (n=5) and *Shigella* spp (n=12), *Proteus* spp (n=4) all from Huruma; and *Pseudomonas* spp. (n=1) and *Salmonella* spp (n=1) from Kayole and Huruma respectively. This is a clear indication of fecal contamination of the water supply to some of the estates in Nairobi. It is suggested that further analysis of microorganisms should be carried out in a wider region and analyze for further microorganisms such as *Giardia* spp, *Entamoeba* spp and *Cryptosporidium* spp. be included, to enable the Ministries of Health and Water become more aware of the nature of the pathogens in the water supplies of Nairobi. More work should urgently be carried to ensure delivery of clean and safe water to all residents of Nairobi.

Key words: \*Huruma, \*Water \*Shigella, \*Proteus, \*E.coli.

## 13. *Waicella Cibiria* NN20 isolated from fermented Kimere product in Kenya: it's Ability to Sequester AFB1 Invitro and Ability to Prepare Yogurt Compared Fermented Milk Products

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Sub-theme: Food Security and Agriculture

### Abstract

From Mali to Mozambique, for centuries, fermented foods have been a staple part of SSA culture and cuisine. NN20 were isolated from Kimere a fermented food products from Eastern part of Kenya. The purpose of this study was to find out the survival and growth in media with AFB1 of the cells *weissellacibiria* NN20, *lactobacillus rhamonusus* GR1(positive control) and *Escherichiacoli* GR12 (negative control) and try the ability of *weissellacibiria* NN20 to ferment milk product of yogurt characteristics using yogurt preparation procedure. To achieve this, laboratory experiments for survival or growth of the cells in modulated medium, binding with AFB1 and milk fermentation were conducted. The means survival in gastric juice, captured by measuring ods spectrophotometrically at 600nm for *weissellacibiria* NN20, *lactobacillus rhamonusus* GR12 and *Escherichia coli* GR12 were  $1.515 \pm 0.132$ ,  $1.459 \pm 0.085$ ,  $1.442 \pm 0.047$  respectively. The survival difference was found to be insignificant between *L. rhamonusus* GR1 and *E.coli* GR12  $P(0.76)$ . statistically there was no difference in survival between the survival of NN20 and GR1 as well as NN20 and GR12 in a paired samples t-test reporting 0.00 values. Binding of AFB1 was found to be slightly better than GR1 and statistically better than GR12. In comparasion *weissella* NN20 and *Lactobacillus rhamonusus* GR1 were found to be better sequesters than *E.coli* GR12. Fermented milk had organoleptically tested, the same as fermented milk with traditional yogurt starter cultures. Binding was at  $42.7 \pm 2.3$  % sequestration capable of bringing down many Aflatoxin concentrations in food products to below internal limits of 5ppb. The NN20 cells were later used in another study to investigate invivo lowering concentration of AFM1 in urine of school children in eastern Kenya (ethics certificates P446/8/2013 of KNH/UoN-ERC). The study concluded that *weissellacibiria* NN20 isolated from kimere had capacity to lower AFB1 concentrations in a gut simulated invitro solutions and had capacity to prepare yogurt like fermented milk products.

**Key words:** *weissellacibiria* NN20, yogurt, Kimere

## 14. Potential Environmental Impacts from Production and Use of Bioethanol

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Sub-theme: ICT, Engineering and Architecture

### Abstract

This paper presents the potential environmental impacts of the production and use of bioethanol from sugar cane molasses, an alternative to gasoline. Contribution of bioethanol production and use to greenhouse gas (GHG) emissions, acidification, eutrophication, human toxicity, terrestrial ecotoxicity and photochemical oxidant formation was analysed using Life Cycle Assessment (LCA) tool. The functional unit (FU) of the study was defined a cubic meter of anhydrous bioethanol. The study found the sugar cane production phase to account for more than 75% to the studied environmental impacts. Burning of sugar cane prior to harvesting was the major source of observed emissions followed by the use of agrochemicals during farming and use of diesel for irrigation and transport of farm inputs and outputs. Instead of burning sugar cane, trash could be harvested and used as supplement energy in industrial boilers for power cogeneration. Replacing gasoline with bioethanol observed to lower GHG emissions and human toxicity, however, other environmental impacts were observed to increase in higher magnitudes. In this study, multi-products were allocated based on their economic values. Sensitivity analysis on the allocation methodology found allocation based on energy values results into higher environmental impacts than allocation based on economic values. An increase of more than 160% was observed when sugar and molasses are allocated based on their energy contents. Since bioethanol is expected to contribute to economic value of a producing country, the study recommends results based on economic allocation to be considered. The results of this study are meant to inform stakeholders and policy makers in bioenergy sector.

**Keywords:** *Sugar cane, Molasses, Bioethanol, Life cycle assessment, Environmental impact.*

## 15. Application of Clay Nanoparticles in Removal of Lead and Cadmium from water

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### Abstract

The importance of water purification especially removal of heavy metals has been emphasized again and again, hence the need to develop water purification materials that are cheap, easily available and efficient. This study involves removal of Lead and Cadmium from water using clay nanoparticles (CNP) through batch process. Clay was acquired locally, purified by treating with H<sub>2</sub>O<sub>2</sub> and NaOH and CNP isolated by sedimentation and centrifugation. The CNP were characterized using FTIR, UV/VIS and XRD where the crystal size was 40.1 nm. CNP had a Lead removal efficiency of 88% at initial concentration of 80 ppm and 94% for Cadmium at initial concentration of 50 ppm. Lead adsorption study data fitted well in Freundlich isotherm with a R<sup>2</sup> of 0.9718 while Cadmium data fitted well in Langmuir isotherm with a R<sup>2</sup> of 0.9921 and q<sub>m</sub> (maximum adsorbed capacity) of 400 mg/g. Both data were fitted in Elovich isotherm where Lead had a R<sup>2</sup> of 0.9172 and 0.0238 for Cadmium. The free energy of adsorption was calculated using B<sub>p</sub>, a constant related to free energy and derived from Dubinin–Radushkevich isotherm, where -3.107 kJ/mol for Cadmium and -5.345 kJ/mol for Lead. Finally the data was fitted in Florry-Huggins isotherm to determine surface coverage, where the number of Cadmium ions on the surface of CNP was 2.30 and 0.2 Lead ions on CNP surface. Clay being locally available in large quantities in deposits, can provide a cheap material for removal of Lead and Cadmium in water and isolation of CNP, increases its efficiency as evident by the 88% removal efficiency for Lead and 94% for Cadmium hence would highly recommend use of CNP for Lead and Cadmium removal both at household and large-scale levels.

**Key words:** Clay Nanoparticles (CNP), Lead and Cadmium

## 16. Developing Local Phytoplankton Identification Keys Using Biometric and Morphometric Measurements in Lake Victoria

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**Sub-theme:** Environment, Conservation and Climate

### Abstract

Phytoplankton are primary producers in aquatic ecosystems and adversely affect fisheries. Although phytoplankton investigations in Lake Victoria started in the late 19<sup>th</sup> century, few studies have been done on the biovolume measurements and taxonomic descriptions for group of organisms. Between July 2008 and September 2009 several sites within Nyanza Gulf and the central lake basin were investigated for phytoplankton species compositions, species characteristics and biovolume assessments. More than 155 taxa belonging to 57 genera within the six taxonomic units of Cyanobacteria, Bacillariophyceae, Cryptophyceae, Dinophyceae, Euglenophyceae and Chlorophyceae were recorded. Cyanobacteria and Bacillariophyceae were quantitatively the most abundant groups with Cyanobacteria comprising of 40 species although frequently dominated by few cyanotoxin producing species. There were 30 species of planktonic diatoms identified with high abundance of pennates compared to the centrics. Among the diatoms, the genus *Nitzschia* was the most species rich taxa (14). Species richness within sites varied widely with the maximum number recorded in the offshore waters site (KO5, 105 species). Overall, the central lake basin sites (site NG4 and KO5) had significantly ( $p < 0.05$ ) higher species diversity and evenness compared to the inside gulf sites. The size structure of the phytoplankton varied widely from the smallest cyanobacteria *Aphanocapsa* (0.4  $\mu\text{m}^3$ ) to the intermediate filamentous forms such as *Planktolyngbya* spp. *Pseudoanabaena* and *Romeria victoricae* (20- 683  $\mu\text{m}^3$ ) to the larger sizes *Aulacoseira* sp. (5091  $\mu\text{m}^3$ ) and *Ceratium* sp. (59796  $\mu\text{m}^3$ ), all of which have implications on fish distributions and abundance.



## 17. Enhancing Energy and Environmental Conservation for Sustainable use and Management of Natural Resources

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**Sub-theme:** Environment, Conservation, Energy & Climate Change

### ABSTRACT

The environment constitutes Natural resources for example fresh water, timber, minerals, coal, gas, the biological resources of the land and water ecosystems that provide the basis for human survival and development. Natural resources provide services on which all human activity depend. Natural resources also provide opportunities for income generation through jobs and small enterprises in forestry, tourism and wildlife trade fostering sustainable development. The increasing demands on these resources, decrease in availability, increasing populations and climate change pose one of the most serious threats to the environment especially conservation and energy usage. Climate change poses serious challenges to Natural resource management and conservation efforts. This paper describes how climate change is a challenge for environmental conservation and energy usage through a review of various articles related to this study. As nations strive to improve economic welfare through energy generation a large part of the costs of these efforts are being passed on to the environment and future generations. Findings indicate about a quarter of the earth's land area is highly degraded (up from 15% in 1991) and 5.2 million hectares of forests are lost every year posing challenges on environmental conservation. Rivers and lakes are drying up, groundwater aquifers are getting depleted, oceans are becoming acidified, and more than 30% of global fisheries that are harvested are overfished, 27% of the world's 845 species of reef-building corals have been listed as threatened and an additional 20% are considered near threatened.

**Key words:** Environment, Technology use, Conservation, Climate Change

## 18. Reduction of the Solar Rack Dried Sardine Fishery Post-harvest Loss through Vacuum Packaging in Coastal Kenya

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**Sub-theme:** Food Security and Agriculture

### Abstract

The small-scale fisheries (SSFs) account for more than half of the world's total food fish, income and employment to millions of people especially in developing countries. However, they also face high levels of post-harvest fishery losses (PHFLs) that contribute to food insecurity through loss of valuable animal protein for consumers and lost income for fishers, processors and traders amongst other challenges. Thus, reduction of the solar dried clupeid sardine fishery postharvest loss (PHL) in coastal Kenya resulting from gunny bag storage kept under ambient conditions is a key pathway to the improvement of food and nutrition security along the Kenyan coast. Kenya Marine and Fisheries Research Institute (KMFRI) therefore undertook shelf life study changes of mitigating the solar rack dried Sardine fishery postharvest loss stored under different conditions at Kenya's Jasini-Vanga where approximately 65 tonnes of the fishery has been always seasonally lost due to lack of modern storage facilities and methods. Shelf life changes of the 12  $\mu$ -polyester laminated with 300 gauge low-density polyethylene packaged pouch (size: 15x22 cm) samples of the experimental vacuum-packaged (EVP) and polythene air packaged (EAP) dried sardines stored chilled; and the gunny bag (GBP) and polythene air packaged (CAP) samples stored under ambient laboratory conditions were periodically examined to determine their microbiological, chemical, textural and sensory changes. *Staphylococcus aureus*, Enterobacteriaceae and Faecal streptococci counts were also determined both at packaging and sensory rejection time. From the study, ambient condition stored gunny bag and polythene air packaged samples had a 14 and 30 days shelf life respectively. Chilled polythene air-packaged 45 days while chilled vacuum-packaged 90 days. Thus, vacuum-packaging in combination with chilling is the best for use in delaying spoilage of solar dried fish products during storage. This significant shelf life extension in tropical environments is ideal for food and nutrition security improvements in malnourished countries.

**Key words:** Dry fish, packaging, chilling, quality, shelf life

## 19. Bacterial and Fungal Zoonosis in Two Commonly Cultured Fish Species Reared in Hatcheries at Sagana, Jambo and Mwea Fish Farms

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Sub-theme: Biological and Physical Sciences

### ABSTRACT

Private and public hatcheries in Kenya has increased tremendously due to fingerlings shortage experienced at the launch of Fish Farming Enterprise Productivity Program (FFEPP) a move likely to compromise quality. The present research work was conducted from March 2014 to July 2014. Fish farms have different sources of water, and feeding regimes.. 150 tilapia (*Oleochromis niloticus*) and 150 African Catfish (*Clarias gariepinus*) 5 weeks old, 5-6 g in weight were sampled. Results showed considerable variation in different months during the study period. Dissolved oxygen varied from 94.70±0.33 to 155.47±6.49 mg/L in Mwea and Sagana respectively .The results revealed that there was a significant difference in the mean of bacteria species in tilapia in Sagana fish farm as indicated by a p-value of 0.016. Aeromonas spp had a mean of 39.0±2.8, Escherichia spp 41.0±7.1, Klebsiella spp 36.0±1.4, Salmonella spp 32.0±7.1, Streptococcus iniae 36.5±7.8 while Vibrio spp had a mean of 30.0±2.8. There was a significant variation in water quality of the three different fish farms and the level of infection as indicated by a p value of 0.05. Results indicated that river water had the highest infection level as supported by a mean of 7.0 while borehole had a lower infection level with a mean of 1.0. Nile tilapia was more susceptible to disease compared to Catfish. Diseases were more in mwea and sagana compared to jambo. It was recommended all fish farms should strive to have a research Laboratory for frequent disease diagnosis ,water and feed analysis.

**Keywords:** Bacteria, Fungi, Tilapia, catfish , Hatchery

## 20. Applying the Community Based Conservation Approach to Enhance Knowledge and Promote Development

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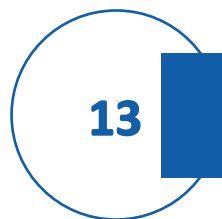
### Abstract

The Conservation Biology Department (CBD) within the Institute of Primate Research (IPR) and under auspice of the National Museums of Kenya (NMK); is directly involved with community based conservation endeavours in areas where institutional primates research is undertaken. The department's mission is to influence, encourage and facilitate communities to conserve the integrity of primates; the biodiversity within their habitats and; ensure that any use of natural resources is equitable and ecologically sustainable through research, training and ecological tourism initiatives through implementation of communal based conservation endeavors. The department has been conducting primate behavioral and ecological research at Namunyak Wildlife Conservancy in Samburu County over the last three years developing good working relationship with the community. This resulted in the community requesting for the establishment of a research station within the conservancy spearheaded by CBD. The station going by the name "Mathew Ranges Forest Research Station" will go a long way in facilitating the attainment of the conservancy goals which are aimed at benefitting the community. This will be achieved through research, training, capacity building and eco-educational tourism programs. The research station will be a model for a community based initiative which promotes conservation while ensuring sustainable sharing of benefits with all the stakeholders. This case study aims to present a developing framework that aims to promote research, training and eco-tourism while enhancing a sustainable community based development initiative.

**Key words:** Conservation, training, research, eco-tourism, Samburu



## 21. Collision-Induced Dissociation Studies of 1,10-Phenanthroline Complexes: Determination of the Third Sequential Binding Energies



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Sub-theme: Biological and Physical Sciences

### ABSTRACT

The third sequential binding energies of the late first-row divalent transition metal cations to 1,10-phenanthroline (Phen) are determined by energy-resolved collision-induced dissociation (CID) techniques using a guided ion beam tandem mass spectrometer. Five late first-row transition metal cations in their +2 oxidation states are examined including: Fe<sup>2+</sup>, Co<sup>2+</sup>, Ni<sup>2+</sup>, Cu<sup>2+</sup>, and Zn<sup>2+</sup>. The kinetic energy dependent CID cross sections for loss of an intact Phen ligand from the M<sup>2+</sup>(Phen)<sub>3</sub> complexes are modeled to obtain 0 and 298 K bond dissociation energies (BDEs) after accounting for the effects of the internal energy of the complexes, multiple ion-neutral collisions, and unimolecular decay rates. Electronic structure theory calculations at the B3LYP, BHandHLYP, and M06 levels of theory are employed to determine the structures and theoretical estimates for the first, second, and third sequential BDEs of the M<sup>2+</sup>(Phen)<sub>x</sub> complexes. B3LYP was found to deliver results that are most consistent with the measured values. Periodic trends in the binding of these complexes are examined and compared to the analogous complexes to the late first-row monovalent transition metal cations, Co<sup>+</sup>, Ni<sup>+</sup>, Cu<sup>+</sup>, and Zn<sup>+</sup>, previously investigated.

## 22. Determining the Most Effective Legume in the Push-Pull Pest Control Technology Using the Analysis of Variance Model

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Sub-theme: Biological and Physical Sciences

### ABSTRACT

In this study, an evaluation of maize (*Zea mays* L.) yields when intercropped with different species of legumes in a pest infested region is conducted to identify the most appropriate legume. Six legumes; mucuna (*Mucuna pruriens*), stylo (*Stylosanthes fruticosa*), siratro (*Macroptilium atropurpureum*), canavalia (*Canavalia ensiformis*), lablab (*Lablab purpureus*) and clitoria (*Clitoria ternatea* L) are compared to the use of a pesticide which is a positive control. Completely randomized block experimental design was used of which twenty one plots were sampled. Data of maize yield per plot and the number of maize cobs produced for every 30 plants that stood per plot was collected. Analysis of covariance was conducted to determine the influence of cobs and the overall effect of legumes on the maize yield. A significant difference between legumes effects on the maize yield was found after adjusting for the effect of the number of cobs (p value=0.025). The adjusted mean for the control was found to be 1245.76 and for legumes; stylo, siratro, canavalia and clitoria, the unadjusted mean was found to be greater than that of the whole sample's mean of 944.57 with a standard error of 86.45. The adjusted mean for Canavalia was 1137.88 with a standard error of 92.68 which was slightly lower compared to the control but higher than the adjusted means of the other legumes. This study concludes that of the six legumes, canavalia was the most promising for use in the push pull technology in the coastal region of Kenya.

**Key words:** Intercropping, Randomized Design, Regression Analysis, Yields

## 23. Developing a Numerical Simulation of Vascular Brain Tumor Growth Using 3-Dimensional Partial Differential Equations

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Sub-theme: Biological and Physical Sciences

### Abstract

In this paper a model of vascular brain tumor is developed and solved using Adomian Decomposition Method (ADM). The model is developed as a set of partial differential equations giving the spatial-temporal changes in cell nutrients concentrations based on diffusion dynamics. The model predicts the volume of the tumor within certain time schedules. It is formulated in three dimensions whereby the tumor is assumed to be growing in radial symmetry. Under this algorithm, equation is decomposed into a series of Adomian polynomials. The model predicts the volume of the tumor at any time schedule after vascularization without necessarily imaging. Results obtained from the simulation of growth and dynamics of malignant brain tumor (GBM) compares well with those from medical literature hence, can provide clinical practitioners with valuable information on the potential effects of therapies in their exact schedules.

## 24. A Numerical Investigation of Turbulent Natural Convection in A 3-D Enclosure Using $k-\omega$ ST Model And PISO Method

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Mathematics Subject Classification: Applied Mathematics -Computational Fluid dynamics and Modeling

### Abstract

In Natural convection [transport](#) mechanism, the fluid motion is generated by buoyancy-induced density gradients resulting from internal body forces due to heating. The objective of this paper is to conduct a numerical investigation of turbulent natural convection in a 3-D cavity using the  $k-\omega$  SST model and the PISO method. The problem being investigated is computational study of turbulent natural convective flow using a primitive variable. The statistical-averaging process of the mass, momentum and energy governing equations introduces unknown turbulent correlations into the mean flow equations namely Reynolds stress ( $\overline{u_i u_j}$ ) and heat flux ( $\overline{u_i \theta}$ ), which are modelled using  $k-\omega$  SST model. The Reynolds-Averaged Navier-stokes (RANS), energy and  $k-\omega$  SST turbulent equations are first non-dimensionalized to reduce the effort required to make a study over a range of variables. The resulting non-dimensional equations are discretized using Finite Volume Method and solved using PISO and SIMPLEC algorithms. The residuals convergence criterion was such as to reduce the absolute residuals below of  $1.0 \times 10^{-5}$  for energy and  $1.0 \times 10^{-3}$  for continuity, momentum and  $k-\omega$  SST turbulent equations. Turbulence was modelled using the  $k-\omega$  SST model. The Rayleigh number of  $1.58 \times 10^9$ , an Aspect Ratio of 0.5 and Prandtl of air of 0.71 were be used. We then validated the predicted results using the experimental benchmark results found by Ampofo et al. (2003). The results showed that two boundary layers are formed which collide in the region between the window and the heater and that the cavity was thermally stratified into three regions i.e. a hot region near the hot surface, a warm region at the confluence and a cold region near the cold surface.

**Keywords:** PISO Method; SIMPLEC Method; Turbulent Natural Convection; Heat transfer

## 25. Contextualising Arts in Education for a Cultured Community

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Arts education for community development

### ABSTRACT

The arts are expressions that embody a community's world view, and through which cultural norms, mores and practices are expressed and reflected upon. As education moves towards effective socialisation of individuals into their societies, it exposes learners to elements of culture and a perception of reality as espoused by the system or authority responsible for providing that education. It is therefore to be expected that an effective education should include a fair dose of arts education as a way of implementing the socialisation process. The society is then an outcome of the education process, its culture being that espoused and engineered by educational planning and practice. To the extent that education embeds quality and values, the culture of the community will demonstrate quality and values. Quality and values being elements in culture, they are communicated through the community's cultural expressions, music and art included. The arts therefore become tools of entrenching culture in the community, developing a cultured community. Guided by aesthetic functionalism, this study interrogates the qualities and values signified by arts and how these are transmitted to learners through the experience of music during learning. It argues that the value of (musical) art is in its ability to serve a significant social/community function. The paper analyses the activities of Music for Literacy Development project in a bid to articulate the benefits of entrenching arts experience in the process of education. It subsequently proposes a model for ensuring healthy dialogue amongst arts, education and the community as an avenue for achieving tangible cultural development and awareness in learners. This is found significant in view of the effects of globalisation and calls for cultural relevance in education.

**Key words:** educational planning; educational practice; culture, development

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## 26. Greening the Music Atmosphere

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Arts education for community development

### ABSTRACT

Electronic waste or e-waste is one of the rapidly growing problems of the world. E-waste comprises of a multitude of components, some containing toxic substances that can have an adverse impact on human health and the environment if not handled properly. It can have serious repercussions for those in proximity to places where e-waste is recycled or burnt. A computer contains highly toxic chemicals like lead, cadmium, mercury, beryllium, BFR, polyvinyl chloride and phosphor compounds. The advent of digital music and other forms of entertainment downloaded over the Internet has staggering repercussions for not only the music industry and the consumer experience, but also for the environment. For example, CDs are a mix of polycarbonate, plastic and aluminum; they don't easily break down and are not easily recycled. They are also not biodegradable, so they won't break down in landfills. And when incinerated they release toxic fumes into the air. Consumer electronics contain large amounts of nasty toxins such as lead, mercury and cadmium, so when computers, monitors and MP3 players end up in landfills, they can contaminate the surroundings and become a serious health issue. This review article provides a concise overview of e-waste scenario in music industry, namely magnitude of the problem, environmental and health hazards, current disposal methods, existing legal framework, organizations working on this issue and recommendations for action.

**Key words:** E-waste, music atmosphere, music industry

## 27. Arts Education for Community Development: The Role of Musical Arts Education in Boosting Kenya's Economy

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Arts education for community development

### ABSTRACT

In curriculums of developing countries and educational planning for development, Arts education is often overlooked. African countries subscribe to the attainment of the Millennium Development Goals (MDGs) with a commitment at the turn of the century, to do all in their powers to improve the lot of their citizens. For these goals to be attained, Africa needs a well-structured curriculum at all levels of learning, adapted to the local economic and social environment with good implementation strategies to produce individuals who would facilitate the attainment of the MDGs. In Africa and specifically in Kenya, the content of the curriculum is not very well adapted to the 21<sup>st</sup> century challenges. The youth, who form the bulk of the population are mobile, have access to instant information through the internet, face daunting challenges like unemployment and health threats such as HIV/Aids. There is therefore a need to revitalize cultural values provided by indigenous knowledge systems to enable the youth cope with these challenges and enable them take part in the attainment of the MDGs. This paper argues for a complete mind shift in how people perceive education in music. The current perception is that music is so abundant in everyday activities hence society does not see why children should pursue music professionally. The paper further shows ways in which music is currently being used to create employment and how it could be used further to boost Kenya's economy and help in the attainment of the government's development agenda of vision 2030 whose overarching vision is to be a globally competitive and a prosperous nation with a high quality of life by 2030.

**Key words:** Arts education, Millennium Development Goals (MDGs), indigenous knowledge systems

## 28. Teaching Oral Literature In Kiswahili: A Step Towards Harmonious Cultural Relationships

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Arts education for community development

### ABSTRACT

The purpose of this paper is to examine how the teaching of Oral Literature in Kiswahili emphasizes on practices of multicultural art education in Kenya and how it may be expanded in order to address current issues related to cultural diversity in society. In traditionally homogenous Kenya communication and multicultural education has to focus on the need for culturally different "others" to assimilate, an approach that would cultivate understanding and tolerance in students. Oral literature in Kiswahili as an art may be a tool to rectify this disparity. Incorporating contemporary oral literature in Kiswahili that reflects cultural diversity issues can play an important role in educating students about cultural diversity, since oral literature is an art that reflects and offers new perspectives on social cultural realities. As a barometer of society, then, such contemporary art, in the context of more meaningful art education, can help art educators to address current challenges associated with cultural diversity in Kenya. By cultivating greater awareness of the self and "others" within societal and global contexts, art educators can help prepare Kenyan students to live in their increasingly multicultural society. This is because culture is defined in the broadest possible sense, encompassing race, ethnicity, nationality, language, religion, class, gender, sexual orientation and exceptionality. Generally, multicultural education is predicated on the principle of educational equity for all students, regardless of culture, and it strives to remove barriers to educational opportunities and success for students from different cultural background. Therefore, multicultural education may entail the use of texts, materials; literary examples that are understandable to students from different cultural background or that reflect their particular cultural experience.

**Key words:** Oral Literature, Kiswahili, cultural diversity, multicultural education

## 29. Arts Education and Community Participation Considerations from the Field

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Arts education for community development

### ABSTRACT

This session will outline some reflections about a research project carried out in the North Western locality of the city of Medellin, Colombia, with four arts community organizations during a period of intense violence in the city, which affected especially young people from deprived neighbourhoods. The presentation will describe initially some key characteristics of the arts community organizations and their type of work on specific artistic fields; then it will show methodological considerations and the process of getting in touch with participants and organizations; and finally it will present the main conclusions as a matter of what can we learn from this experience; some conclusions are regarded to the role of process of autonomy, giving shape to our selves, collective practices and inter-subjectivity.

**Key words:** Arts community organizations, collective practices, inter-subjectivity

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## 30. Interweaving Communal, Educational and Academic Ideas: Festive Dances from Israel's Kibbutz Community in Dance Notation

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Implications of indigenous philosophies and practices for modern education and practice

### ABSTRACT

The Kibbutz is a unique collaborative form of community which was founded in Israel since the beginning of the 20<sup>th</sup> century. It was based on the aspiration of Zionist-secular movement to resettle in Israel together with socialist values of equality among human beings and application of those ideas through idealistic-economic cooperation. The young kibbutz pioneers restored the linkage with the Hebrew language and its classical sources. Their meeting with the landscape of the Bible led to the growth of a cultural renewal which was based on the Hebrew-Jewish annual cycle and its symbols, agricultural markers and seasons, the freedom from traditional gender segregation, and to communal – rather than a family-centered – cultural frame of reference. This process opened up a variety of modes of expression in Jewish-Israeli artistic creation, in which movement and dance, which are in the focus of this presentation, had a central presence. The centrality of dance was expressed both – in the progressive educational ideas, which argued for creative artistic expression as a central channel in the design of a new Israeli generation, as well as in the communities' cultural gatherings, where newly invented dances were performed and accepted as a form of “folk dance”. My presentation will bring examples from a group of dances composed by Israeli choreographer Tirza Sapir: a kibbutz member, dance teacher and the senior disciple of Noa Eshkol, the founder of Eshkol-Wachman Movement Notation (EWMN). Sapir wished to use the opportunity of preparing dances for the community holiday celebrations to improve the movement skills of the non-professional participants, both young and adults. Those exercises-to-be-dances are written in two forms: the accepted form of EWMN, and a newly invented form of easier, illustrative graphical representation, I initiated. The combination of the three sources – traditional Jewish-Israeli symbols, dance education orientation, and academic study in movement notation – may bring a novel perspective to connect traditional forms of art to education, culture and academic research.

**Key words:** Festive Dances, Israel's Kibbutz Community, Zionist-secular movement, traditional Jewish-Israeli symbols

## 31. A Cultural Response to Oppression: Music During the Holy Spirit Movement

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### ABSTRACT

Indigenous problem solving mechanisms are often used to inform, educate and communicate with the public outside the formal schooling system and apart from formal, if not governmental, structures. Using illustrative examples from Africa and elsewhere, the author explains common historically documented reactions to political, social and psychological oppression. He then focuses on the little studied educational value of popular music among the Acholi people of Northern Uganda going back to the 1980s when the spirit medium Alice Lakwena led an army of religious fanatics in a hopeless effort to take control of the nation state. The Acholi have a long tradition of composing personal songs and sharing them with family and community. These songs have long been an integral part of the indigenous education system. Songs that appeal to a wider audience within the community gain widespread acceptance and become 'top of the pops' thus enshrining their educative message in tradition. Building on this musical heritage created over a 200 year period of oppression by various external forces, Acholi musicians with access to publication facilities produced a stream of popular songs that informed, comforted and humored people who had first suffered many decades of official harassment and were then being tormented by an internally generated menace and existential threat. The author has recorded and analyzed the texts of many of the songs. Detailed analysis of one song, 'Lili Oduru' sheds light on the details of desperation and the sense of humor that brought some relief to the Acholi people under severe stress.

**Key words:** Political, social and psychological oppression, Holy Spirit Movement, Acholi musicians

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## 32. A Double Edged Sword: The Role of Indigenous Philosophies and Practices in Contemporary Education

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### ABSTRACT

The author recounts the known history of knowledge accumulation, discovery, storage and transmission among Kenyan and foreign communities in pre-colonial, colonial and post independence periods. While vast bodies of information and ideas have been stored in other parts of the world, East African peoples, for several reasons, have lagged behind in durable recording and wide dissemination of their own knowledge. Factors influencing this include, non-literacy, generational locking, metaphorical transmission, non-verbalization and gender segregation. External forces have included Social Darwinism and the political and ideological snobbery of colonialism. Refusal to share and refusal to acknowledge have had negative effects on contemporary education and the ability of all communities to apply East African wisdom to 21st century life among all peoples. This has led to a need for "salvage" oriented study of Kenyan cultures in order to create a record and put that record to constructive use. Author presents indigenous problem solving models and symbolic expressions as examples of the positive application of indigenous knowledge. Parallel to that, is the failure/refusal to modify indigenous systems of education and training to keep pace with changing times, a problem that has faced many nation states. A stunning example is the immediate and far reaching ripple effects of the process of initiation that, while once excellent, has led Kenyans into an intellectual setting that exacts an exceptionally high cost upon the nation state and all its peoples. Two case studies, from Kisii (Okwaroka) and the Maasai ceremonial cycle will be described briefly to illustrate their negative effects, played out in user hostility in schooling and other facets of life in East Africa.

**Key words:** Indigenous Philosophies, knowledge accumulation, East African peoples, Contemporary Education

### 33. Diaspora, Identity and Xhosa Ancestral Tradition: Culture in Transience

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Implications of indigenous philosophies and practices for modern education and practice

#### ABSTRACT

Most Xhosa people experience the condition of feeling dislocated and confused when choosing a spiritual belief. This paper uses the concept of diaspora to describe the mental dislocation that people experience through processes of Acculturation. The paper is based on the phenomenon of diaspora as a state of identity in the contemporary cultural identity of the Xhosa people of the Eastern Cape Province, by exploring the interrelationship between the key concepts, namely, identity, culture, land, and home as they relate to ancestral worship and Christian practice. Two installation artworks by Bill Viola and Nicholas Hlobo were selected for a comparative analysis under the Xhosa ancestral tradition and Christian belief spectacle. In this paper through auto-ethnography approach, I will try to explain how identity is constructed within a particular geographical and ideological culture and how self-identity can be constituted through the construction, deconstruction, and reconstruction of cultural histories. The paper seeks to find a place for African traditional beliefs systems and practices in transience, in the transforming and modern world. It touches on notions of mediation, altar, and dislocation, by using Martin Buber's concept of I AND THOU to weave the key concepts together.

**Key words:** Xhosa people, concept of diaspora, Eastern Cape Province, African traditional beliefs

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### 34. Problematizing the Gap between Policy and Administration of Cultural Institutions in Nigeria

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#### ABSTRACT

This paper is structured to give a detailed analysis of the art practice in Akwa-Ibom state, South East Nigeria, with the emphasis on matters relating to policy and administration, and their effect on educational projects and community development. The focus of this paper is on the dance practice of the Akwa-Ibom state as seen in the state's council for arts and culture which is an institution functioning under the Ministry for culture and tourism, and houses the state's dance troupe. This institution is charged with the responsibility of preserving, protecting and promoting the state's arts and cultural heritage that are deemed as valuable, and also (re)presenting these artistic expressions as identity markers to the local communities, the Nigerian nation and international audiences. The research findings are gotten from a nine week internship / fieldwork, which was done by the researcher for the completion of a Master degree, in the council for arts and culture between June and August 2014. This research problematizes the gap between policy, administration and execution of these policies as seen in the actual daily practice of some cultural institutions. It also highlights the impact of education, both formal and informal, on the development of artistic expressions and how this can positively affect the community. Finally, it identifies the importance of collaborations between the arts industry and educational sector, as both can work together to develop a better understanding of the arts and increase the level of arts appreciation and community engagement in Nigeria and the world at large. Research methodologies employed for data gathering include observation, participation, interviews, reflective ethnography and past experience in the field. This work will be presented as a 20 minute spoken paper.

**Keywords:** Akwa-Ibom, State, Council for Arts and Culture, Nigeria, State dance troupe.



## 35. Conformity: Visual Reflection on the Social and Cultural Life of Nguni Women

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### ABSTRACT

This study which this paper will be reporting on was a reflection on the culture and social life of modern Nguni women from a man's perspective. The research sought to interpret how the Nguni culture and social values emerge as source of identity not a simple act of conformity. The manifestation of cultural values is presented through gallery installation of soft sculptural artworks. The artworks seek to expose the complex nature of deep social bonds which the study suggested that they are responsible for the creation of the ultimate value of aesthetic experience within a social and ethical context. An analysis and interpretation of the significance and symbolic nature of traditional wedding rituals in relation to conformity and social identity will be presented. Various concepts and themes will be discussed to ascertain how participating in these social and cultural performances helps individuals to pursue their own understanding and meaning of their experience within their lived environment.

**Key words:** Nguni culture, cultural values, aesthetic experience

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## 36. Mentorship Methodology for Arts Education in Africa

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### ABSTRACT

Africa as a continent thrived on education, religion, culture and commerce until colonisation destroyed significant amount of the fabric of African Culture. Over hundreds of years since the scourge of colonialism, the free African countries have battled to shake off the colonial legacies. It is over half a century since the first African country earned its independence and 21 years since the last bastion of apartheid was destroyed in South Africa but 'Free Africa' battles to coin arts education systems that work in its favour. For years, African governments struggle with the assimilation of Western education systems against tried and tested methods transmitted to them by their forebears. These illustrate the extent of the damage colonialism and missionary education has caused on the African continent. This calls for the 'return to source', popularised by Amical Cabral in his seminal speech. This paper will argue that Africans need to adopt African solutions to African challenges, devoid of western metrics and methodologies. The paper will demonstrate the various uses of 'Mentorship Methodology' as one of the solutions for the restoration of the 'Arts Education' in African schools. The history of this methodology, its application and the results it continues to produce, not only in Africa but the world over will be analysed with the hope to chat a new way to resolving challenges facing the successful implementation of arts education in schools.

**Key words:** Mentorship methodology, African culture, arts education



## 37. Rhodes Must Fall: Reframing South African Universities

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### ABSTRACT

South African educational institutions were introduced to cultivate Western ideologies by creating an ‘enlightened’ Africa. A number of these institutions still reflect a painful history filled with memories of oppression, conflict and trauma for the majority of black South Africans. What began as the Rhodes Must Fall campaign, led to a revolutionary movement that completely halted activities in university campuses and the momentum of the strikes spread like wildfire across universities culminating in a national shut-down of all university campuses. A call to make the transition from an apartheid framework to a democratic state, aspects of the South African educational institutions need to reflect the participation of all its citizens, especially those that were marginalized and disenfranchised by the apartheid system. My paper will look at the Rhodes Must Fall campaign specifically how the campaign in many ways reflects Frantz Fanon’s analysis of violence and colonialism in his book entitled “Towards an African Revolution”. I propose to use Fanon’s analysis of violence in exploring the violence inherent in both the 1976 and the 2015 student protests. According to Fanon, colonization instigated a form of violence that negates the indigenous people absolutely in terms of their culture, their social and political institutions, and their physical and mental capacities. Decolonizing South African universities as such might require a complete reconfiguration of the intentions behind their creation and an entire overhaul of the system. The paper will explore the current debates that stem out of these protests in a bid to frame the student Rhodes must Fall protests as changing both the political and social landscape of the country by reclaiming the historic narrative of our country.

**Key words:** Rhodes Must Fall campaign, Decolonizing South African universities

## 38. Intelligent and Emotional Quotient in the Social Thinking and Communication for Strategic Community Engagement in Kenya

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### ABSTRACT

Society today is drawn to immense complaints, intimidation, jealousy, and unnecessary outbursts. This is due to lack of specific value-related social thinking paradigms. There are relational gaps that initiate intra- and inter-stressors that are the result of lack of strategic communication. The basic question is: Are Kenyan youths avoiding critical thinking for competitive performance? Relationships have been more compounded by the current digital era. This paper seeks to investigate, raise data, and discuss the emerging new directions in interactions and transactions in, especially, youth programmes in Kenya. The methodology will involve focus group discussions with the youth in diverse community-based entrepreneurial projects in Busia County. The findings will be used to illustrate the emerging new knowledge and directions for responsible community engagement and sustainable development in Kenya.

**Key words:** communication, social thinking, social psychology; personality differences; community participatory development.

## 39. Effects of Online and Blended Teaching Strategies on Secondary Students' Achievement in Social Studies

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### Abstract

The need to enhance students' learning outcomes has become integral in secondary schools in Nigeria due to increased students enrollment. Research has shown that the strategies utilized in teaching secondary school students have significant influence on their learning outcomes. At present in Nigeria, public secondary schools have not been deploying learning technologies to teach students despite the surge in enrollment. Consequent on the non use of learning technologies by public secondary school teachers, this study, therefore, determined the effects of online and blended teaching strategies on students' achievement in civic education.

The study adopted the pretest-posttest, control group, quasi-experimental design using 2 x 2 x 3 factorial matrix. Ninety two students from six secondary schools in Ondo State were purposively selected for the study and randomly assigned to experimental and control groups. Five instruments used were: Students' Knowledge of Civic Education Test ( $r=0.78$ ), Computer Ability Test ( $r=0.78$ ), Online and Blended Teaching Instructional Guides for experimental groups and Conventional Lecture Method Guide for the control group. One hypothesis was tested at 0.05 level of significance. Data was subjected to Analysis of Covariance, Estimated Marinal Means, and Scheffe's Pairwise Comparison

There was a significant effect of treatment on students' achievement in social studies ( $F_{(1,75)} = 3.801, p < 0.05$ ). The students' exposed to Online Learning programme had higher adjusted achievement mean score ( $\bar{X} = 23.57$ ), than the control group ( $\bar{X} = 17.89$ ), and the blended instructional strategy group ( $\bar{X} = 2.20$ ). It was, therefore, recommended that teachers in public secondary schools in Nigeria should explore the benefits of teaching with online instructional strategy in social studies classrooms.

**Keywords:** Online teaching strategy, Blended teaching strategy, Achievement, Social studies, Secondary school students'.

## 40. Technology and its Impacts on Terrorism and Counter-Terrorism in Africa

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### ABSTRACT

In the Cold War era, the United States (US) and Union of Soviet Socialist Republics (USSR) used nuclear technology as a means of military deterrence. Since then, nuclear technology has improved exponentially both in terms of precision and time needed for deployment. Alongside this technological advancement is the emergence of non-state actors who question state legitimacy and threaten state sovereignty. The purpose of this research is to focus on these key questions with regards to terrorism: how has technology affected the nature of security in the international system? What is the rate of technological advancement for non-state actors in comparison with African states? Does the prowess of military force and technology equal effectiveness in tackling terrorism? Answers to these two questions will provide a unique analysis on the nature of threats to security faced by African states under the backdrop of state survival and sovereignty. This paper adopts a two pronged approach to analyze the role technology plays in the realm of terrorism both at the regional and sub-regional level, drawing implications for Africa. The instrumental and organizational approaches will form the lenses through which the terrorist phenomenon in Africa will be analyzed alongside military and non-military technological advancement. This research finds a weak correlation between the advancement of technology in modern state militaries and their effectiveness to counter the violent acts of non-state militants, especially terrorist networks. In the contemporary setting, terrorism has emerged as the most immediate threat to international peace and security. There has been limited success in containing the phenomenon. This paper attempts to shed light on the effectiveness of the strategies that have been used vis a vis available alternatives. There is limited literature on the limitations of technology in tackling terrorism in Africa. It will create practical solutions to the terrorist threat and elicit discourse on the same.

**Key Words:** Terrorism, international security, technology, non-state actors, Africa

## 41. Technology, Terrorists and Geopolitics: A Comparative Approach to Kenya's Proposed Border Wall with Somalia

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### ABSTRACT

According to the political scientist Robert Pape, the most promising way to reduce terrorism in a given country is to reduce the terrorists' confidence in their ability to carry out attacks against a target society. Based on this, states such as Kenya, who confront persistent terrorist attacks by armed groups such as al-Shabaab, should invest significant resources in border defences and other means of security. The paper will utilize international security theories and a comparative political science approach to explore the efficacy of Kenya's proposed border wall with Somalia. It will compile details of the proposed walls - to include technological and engineering details - and compare those with other, existing border walls. By doing so, the paper will not only gauge the chances of success of the Kenya/Somalia border wall (keeping out terrorists), but will also will have practical implications by acting as prescriptive. It will do so by highlighting lessons learned from other such ventures in places as disparate as Israel, Turkey and the USA. This paper will add significantly to the discipline of political science on account of its original contributions to theories of international security and comparative politics. It will also add considerably to the discipline of international relations (IR) by asking crucial questions and defining possible the geopolitical effects of the Kenya/Somalia border wall, which could have unintended, long-term and possibly detrimental outcomes.

**Keywords:** Terrorism, border, Kenya, barrier, Somalia

## 42. An Investigation into Implementation of Outsourcing Strategy by Selected Manufacturing Firms in the Chemical and Allied Sector in Kenya

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### ABSTRACT

Outsourcing has expanded considerably over the years. It involves the act of transferring some of an organization's recurring internal activities and decision rights to outside providers, as set forth in a contract. Whilst its merits continue to be debated by academicians and practitioners alike, and seen by many as a convenient way of minimizing costs and enhancing efficiency in the production process, the implementation process clearly remains unique to any given organization. This study attempted to investigate the implementation process of outsourcing as carried out by different firms in the chemical and allied sector in Kenya. The study employed a survey research design to investigate the research problem. The sample frame was composed of operational managers, accountants, production controllers, procurement officers, supplies and supply chain staff. The study posed a series of questions in relations to implementation of outsourcing strategy to respondents who informed the final results. While outsourcing as a business strategy is highly practiced in most companies, there are attendant challenges and the need to identify and promote best practice as highlighted by the various respondents. Most companies outsource so as to increase productivity and hence profitability by freeing up management time and minimizing cost. Fluctuation in pricing, quality uncertainty and affordability of outsourcing are major challenges to firms in implementation of outsourcing strategy.

**Key words:** Outsourcing, business strategy, chemical and allied sector

## 43. Embedding Theory in Performance Contexts in the Arts of Kenyan Productions: An Examination of Case Studies of KNDF and Local TV Productions

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences -Emerging trends and issues in the practice of arts

### ABSTRACT

This paper explores the value of embedding theatre and performance theory in our understanding of the arts and performance in the society today. This we engage in with a clear premise of trying to establish the nomenclature we should assign to the forms of art that today line the horizon around us more especially because the performers put claim to varied levels of success and admittedly so are the 'celebrities' in society. The paper therefore sets out to answer the questions: what is the role of theory in performance? What are the theoretical orientations that have shaped our contemporary understanding of performance in drama and theatre? What does practice without theory lack? Can this help us to define the nature and form of the art we experience today? How can this help create the principles that inform our practice and existence as educators of the arts in institutions of Higher Education? This is discussed in the context of the performances/stories staged during the Kenya National Drama Festival and a couple of local TV productions. In our view, what we gain through Arts Education (AE) creates relevance and direction in scripting, directing and protection of stage and TV performance. More important, AE, we insist, needs to focus on community growth; values shaping the society, given different contexts. This paper therefore is propped upon selected dramatic and theatre theories which we explore to provide sound educational ethos, approaches and structural organisation to performances from specific philosophical and theoretical perspectives. These orientations we believe should be able to provide an understanding of the interplay of theory, practice and performance in drama and theatre as accessible, although complex, tools for drama and theatre practitioners. The ideas here invite practitioners to embrace theory as a framework that can shape theatre making, emerging from practice, and foster new ways of seeing, creating, and reflecting upon the art of making theatre. This paper thus responds to central concepts and questions that frame the role of theory in drama and theatre. Ultimately, it offers inspiring ideas, moots new demands, and introduces ways to build theoretically-minded, dynamic productions and performances.

**Keywords:** Theatre, drama, performance, theory, production(s)

## 44. Bespoke Projects: Inclusive Worldviews in Creative Research and Production

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### ABSTRACT

This discourse highlights two creative research projects, first *a Secret Place: Multiplicities of Self and Subjective Locations*, which predominantly explored the visual development of a Yoruba inspired idea of multiple selves ('Emi') within one character, functioning within a subjective and generative space of the imaginatively fantastic. Secondly *Aso Ebi: Impact Of The Social Uniform In Nigerian Caucuses, Yoruba Culture And Contemporary Trends* which is concerned with The Social phenomena of uniform and performance of the Yoruba Owambe and Aso Ebi. By which it critiqued the underlying factors that perpetuate the visual presentation of the Owambe Spectacle and Aso Ebi culture of the Yoruba. These researches focused on the imaginatively fantastic as a medium or mechanism for managing a balance of internal and external experiences in social life, and engaging it as a functional and integral component of the human state. It also explored how the Owambe and *Aso Ebi* phenomena affect individuals in Yoruba caucuses in how they are bound to the concept of social identity by addressing the impacts and influence of conformity in cooperative behaviour by an individual within social identity and relationships. For these various theories of psychoanalysis, cooperative behaviour, identity conformity, and de-individualization were addressed and were approached with a phenomenological methodology. This paper highlights the inclusiveness of non-western philosophy/ worldviews in the research and development of metaphor for the visual productions that resulted from these studies.

**Key words:** *Multiplicities of Self, Yoruba Culture*, social identity, non-western philosophy/ worldviews

## 45. The ‘Artists in Schools Programme’ in South Africa: An Examination of Ithuteng Art’s Involvement

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### ABSTRACT

In 2011 South Africa’s Department of Arts and Culture (DAC) launched an ambitious programme aimed at improving the quality of arts education in public schools located in the township and rural regions of the country. Branded as the ‘Artists in Schools Programme’ (AiS), this initiative sought to dramatically increase the involvement of practicing artists in the public schooling system, which was punted as the panacea for the poor provision of arts education in these formally disadvantaged conservatories. Arts organisations were cited as key role players in the execution of this programme: “The implementation of the AiS project is carried out through the various specialist arts education organisations, including the higher education and training institutions.” Ninety eight organisations benefited from the AiS earmarked funding of R22 million per annum, which was disbursed through the National Arts Council (NAC) between 2013 and 2016. This paper will report on the activities of one such organisation, Ithuteng Art, which operates in select schools within the City of Tshwane metropolitan. This paper seeks to review whether or not the bold objectives trumpeted in the AiS founding document have been actualised through the lens of Ithuteng Art’s involvement in the programme. A portion of the paper will interrogate the prevailing theories and concepts that drive artists in schools projects globally. Lastly, the shortcomings and successes of the intervention in South Africa will be highlighted, with the aim of providing feasible recommendations on how the future implementation of the AiS can be more efficient and effective.

**Key words:** Artists in Schools Programme, Ithuteng Art, South Africa

## 46. Research on Arts and Culture Management, Culture Policies and Culture Economics: A Colombian and Latin American Experience

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### ABSTRACT

Research and educational process on arts management, culture policies and culture economics at the Master in Arts Studies and the future PhD in Arts Studies at Universidad Distrital Francisco José de Caldas, a public institution financed by the City Government of Bogotá, Colombia, shows a preliminary result that allows a first research developments balance, in graduate level for Colombian and Latin-American contexts. Initially, the process and results verify the necessary interdisciplinary and intercultural approaches to culture/policy/economics relationship research problems. Some researches can be developed from economics and administrative fields, but many others need social sciences, cultural studies, education, and art studies approaches. In consequence, a common area of research problems between art and culture management, culture policies and culture economics is necessary in order to contribute with their own theoretical frames exploring methodological solutions to integrated problems. Despite important advances, the field in Colombia and Latin America needs deepen on research developments in art and culture economic sector studies; creative industries research, especially focused on family, micro, small and medium creative business and enterprises; compared studies with other countries experiences, especially based on south-south cooperation; and studies and evaluation of management experiences and administrative models in culture organizations and communities. Finally, education contributes developing master program research objectives, and also providing strategies for extension and social projects.

**Key words:** Arts management, culture policies and culture economics, Colombia, extension and social projects

## 47. Toward a Culturally Sensitive Blended Learning Environment

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### ABSTRACT

Learners subconsciously know their physical world, beyond classroom walls and school buildings. It is as though they intuitively sift their way through life's countless concepts and content, seeking knowledge, wearing blindfolds. Through this natural progression, the traditional role of the teacher continues to be, to remove the blindfolds so that seemingly imperceptible information becomes clear and vaguely understood concepts, become comprehensible. Our hypothesis is that learners understand and remember concepts best when they are taught using methods and resources that evolve from their personal experiences in the realm within which they interact. The same can be said of teachers in relation to effective delivery of courses. Teachers achieve better results when course outcomes are aligned with their personal expectations. Using a minimal viable design approach, a multimedia prototype that responded to specific learner choices was designed, built and tested. The number of correct choices, the speed with which correct choices were made and activity completion times were captured in user controlled and experimental settings. Data was sampled in learner pairs and in independent learner groups of four. The paired data was compared between same sets of users while independent learner group data was compared across four different users of the same data set. The results were analyzed and the frequency distribution of learner choices examined for correlating distribution patterns. These implementation research findings explain the extent to which learner interest is stimulated and teacher expectation is met, by putting into use a blend of conventional teaching practices in tandem with emerging technologies. The study seeks to demonstrate innovative methods where emerging technologies can enhance learning in a standard 1 classroom user context.

**Key words:** Blended learning, emerging technologies, e-learning, learner expectation

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## 48. Decolonizing the African Art Curriculum: A Reflective Discourse

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Implications of indigenous philosophies and practices for modern education and practice

### ABSTRACT

This paper addresses issues of the lack of African content in most universities art Curriculums as the general order is predominantly Eurocentric in nature. The argument of this reflective discourse is meant to raise the issue of an insider's point of view as imperative in the development of original critical thinking within the African art curriculum. The objective of this paper is to encourage a direction of African contemporary art which is aimed at developing critical thinkers through conceptual aspects of art that are informed by African theories. This paper will make recommendation of what African contemporary art could be through our lived experiences and life circumstances as Africans. The paper will also present conceptual meanings of the following terms: decolonization, African renaissance and Pan Africanism and their relevance in informing the proposed arts education curriculum transformation. The Paper will also promulgates the need for radicalization of the African arts curricula in order to decolonize the African art by following to the footsteps of our literary contemporaries such as Chinua Achebe, Frantz Fanon, Ngugi Wa Thiongo and Achille Mbembe to mention just a few in the continent who have long paved the way in re-conceptualising the contemporary African literature.

**Key words:** African art curriculum, African contemporary art, re-conceptualising the contemporary African literature

## 49. The Visual Narrative Relating to Social Performance during Burial

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Emerging trends and issues in the practice of arts

### ABSTRACT

The paper will report on a study which made use of visual narratives to critique the extravagance associated with the burial practice of modern Xhosa people with special focus on the Eastern Cape of South Africa. The research made use of cultural conformism, and cooperative behaviour to explain why people cooperate by doing things that they consider to be the norm. The study suggests that this conformity and cooperative behaviour result to uncontrollable obsessive behaviour where people find themselves indulging into foreign practices sometimes at the expense of their well-being. The paper's main objective is to discuss the obsessive behaviour associated with this extravagance through the use of visual metaphors expressed in ceramic sculpture.

**Key words:** visual narratives, burial practice, Xhosa people

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## 50. A Visual Narrative Reflecting on Upbringing of Xhosa Girls with Special Reference to 'Intonjane'

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### ABSTRACT

The research was set within Van Gennep (1960) and Turner (1967) theory of Liminality and this paper will critique the Xhosa custom called Intonjane which refers to initiation of girls to womanhood. The paper will discuss the significance of *Intonjane* in the upbringing of traditional Xhosa girls and conclude with a detailed discussion on how the theory of liminality was applied in conceptualisation and development of the emergent visual metaphors expressed in ceramic sculpture.

**Key words:** Liminality, Xhosa, Intonjane

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## 51. Migration in Transforming Shona People's Identity

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences - Emerging trends and issues in the practice of arts

### ABSTRACT

This paper reports on a study which used story telling through mural art to analyse how migration has affected Zimbabwean *Shona* people's identity resulting in a new hybrid identity. This identity morphing happens through the increased rate of trans-border mobility for economic survival and development. In addition the study sought to speculate how this movement and migration spurs difficulties that result in an evolution of identity with regards to immigrant experiences in foreign habitats. It also focused on historical and contemporary social relations of being *Shona* and the contrasts in historical manifestations of what is *Shona*. The research was informed by theories of Migration and Social identity. The main objective of this paper is to analyse the visual metaphors employed in the practical production of this research with a purpose to ascertain whether the artwork serves to influence the audience in the manner in which it was intended. The first part of the paper presents the methods applied in encoding towards the development of the artwork. The paper concludes with a comprehensive analysis and interpretation of a selection of the visuals that emanated from the research.

**Key words:** Migration, *Shona* people's identity, visual metaphors



## 52. Documentary Filmmaking in the 21st Century: Animating the Public Sphere

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### ABSTRACT

Documentary filmmaking has since its very beginnings been a controversial art form. From Robert Flaherty's *Nanook of the North* (1922) to *The Thin Blue Line* (Morris 1988), *Dear Zachary* (Kuenne 2008) and *The Act of Killing* (Oppenheimer 2013), the production process and authorial voice have and still are raising issues regarding representation and the ethics of non-fiction exposé. Despite the controversies, the genre, now labelled as New Wave Documentary, is popular and diverse and should be "understood as complex, multi-faceted" and as "influenced by a range of different contexts" (Chanan 2012). This diversification has prompted Plantinga (2005) to argue for a classification of the genre rather than the search for a definitive definition, as has been the historical practice. He supports the notion that a documentary film should be described as an asserted veridical representation of a real life experience. Chanan (2012) claims that the documentary genre shapes and, in turn, is shaped by the public communicative space, necessitated and foregrounded by negative mass media tendencies. He draws on Habermas who argues that real debate has been displaced by a mere semblance of discussion in what has become a pseudo-public sphere. Filmmaker Morgan Spurlock (*Supersize Me* 2004) maintains that documentary films have become the last bastion of free speech (Chanan 2012). As such new documentary plays an important role contesting the status quo by provoking critical debate in what has become a neoliberal hegemonic approach to governance across the world.

**Key words:** Documentary filmmaking, the genre, New Wave Documentary

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## 53. The Influence of Youth Capacity Building through Uwezo Fund on National Development in Kenya: A Case Study of Vihiga County

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### ABSTRACT

The purpose of the study was to find out the influence of youth capacity building through Uwezo Funds on national development in Kenya, Vihiga County. Descriptive survey research design was used for the purpose of the study. The target population for this study was 129,790 youths in Vihiga County. A sample of 384 was drawn using Krejcie and Morgan Table through purposive sampling technique. A questionnaire was used to collect data that was analyzed qualitatively and quantitatively using SPSS. The response rate was 85% which was considered reasonable enough for statistical generalizations. The study found out that the youth groups funded through Uwezo Fund mainly work through table banking. Uwezo Fund has empowered the youths to be more independent, earn a living, support their families and secure gainful employment. The study found out that most of the businesses funded through Uwezo Fund got more than sh.12,000 profits monthly as supported by 77.6% of the respondents. However, when the profit is distributed among the members they barely go beyond sh.1000. 88.6% of the respondents concurred that most businesses are similar which resulted in stiff competition. The study suggests that more research needs to be conducted on the entrepreneurial and managerial skills that could lead to diversification and optimum utilization of the Uwezo Fund for enhanced development as Kenya moves towards realization of Kenya Vision 2030. The study has empirically brought out the influence of youth capacity building through Uwezo Fund on national development Kenya which had not hitherto been done with the current study variables in Vihiga County.

**Keywords:** Youth Capacity Building; Uwezo Fund



## 54. A Tracer Study of Graduates in the Fields of Bachelor of Engineering 2011 Cohort

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### Abstract

The paper documents the result of a tracer study among graduates of the Technical University of Kenya. The study focused on TUK graduates who graduated in 2011 with Bachelor of Technology in Electrical and Electronic Engineering. The overall goal of the study was to reach out to all the graduates of 2011 cohort to establish their employability being the first TUK graduates to progress from diploma to degree after the upgrading of the institution to a university of Technology in 2007. The methodology adopted for the study consisted of a survey questionnaire which was designed using a frame of reference the survey instrument used in a similar study undertaken by the Tertiary Education Commission of Mauritius in 2003.

The questionnaire was administered to the under-graduates who completed their studies 2011 in School of Engineering Science and Technology graduates through their email addresses. Descriptive statistics such as frequencies and percentages were used to analyze the data using the Statistical Package for Social Science (SPSS)

The findings indicate that 87.5% of the graduates were employed while 12.5% were self employed at the time of graduation. Additionally over 50% were satisfied with their remuneration, working conditions and social conditions. The findings of the study provide valuable information for evaluating the results of the education and training at TUK. This information is also used for further development of the institution in the context of quality assurance and provides a basis for future planning activities.

## 55. Factors contributing to resilient biodiversity based on indigenous knowledge system: An Application to Ramogi Hill, Kenya

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### ABSTRACT

The study investigates how indigenous populations contribute to environmental conservation and sustainability by invoking cultural norms and values. Descriptive survey research design was adopted for this study. The target population was 7,239 Community Forest Association (C.F.A), youth leaders and Luo elders and elites. A sample of 400 was drawn using random, snowball and purposive sampling techniques respectively. A questionnaire was used to collect data that was analyzed qualitatively using SPSS. The response rate was 80% which was considered reasonable enough for statistical generalizations. Secondary data was obtained from existing literature, reports and journals based on the study area. The findings of the study reveal that the Luo population of Ramogi Hill and its environment use their environment for their spirituality in various forms. Therefore, taboos, religious beliefs, sacred sites/rites and totems provide a framework for defining acceptable use. In addition the study reveals various ways of regulating environment which include taboos such as no sharp objects are to be carried to the forest; no pregnant animal was killed by hunters; creeping animals considered sacred are not to be killed; rare and medicinal trees are preserved by strict rules. The study suggests that the indigenous knowledge system on environmental conservation should be integrated into interdisciplinary projects dealing with links between culture, the environment and development. The study has empirically brought out effect of indigenous knowledge system on resiliency of the biodiversity and its application to enhancing sustainable development.

**Keywords:** Resilience, Biodiversity conservation, Ramogi Hill

## 56. Economic Performance and Perceived Impact on People's Wellbeing

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### ABSTRACT

This study identifies challenges and opportunities in achieving greater social cohesion and their implications to regional development in East Africa. The study utilized an in-depth desk review approach of reports on historical economic performance in the East African region covering the period “lost decades” of the 1980s and 1990s and the period of improved economic performance (2000 to 2015?). In addition, a comparative analysis of East African region and selected countries globally in which social cohesion has enhanced regional sustained development and welfare was undertaken in order to offer lessons for the East African region. The findings of the study reveal that in spite of improved economic performance in East Africa region since 2000, majority of the population of the region do not share the perception that this leads to an improvement in their wellbeing. While a number of economies in the region like Rwanda are now among the fastest growing in the world, the growth has not translated into shared prosperity. The challenge facing governments of the countries in the region is how to improve equity and sustain high growth at the same time. In order to achieve a broad-based/shared prosperity, countries need to pay particular attention to public investments in social services and infrastructure with the aim of reducing poverty and promoting the well-being of their citizens. The study has empirically determined that the challenge facing governments of the countries in the region is how to improve equity and sustain high economic growth at the same time.

**Keywords:** Economic performance, social wellbeing, sustainable development

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## 57. Incorporating Digital Technology in the Teaching of French as a Foreign Language (FFL) in The Technical University of Kenya

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### ABSTRACT

In the last 10 years, the world has experienced a surge of technology, and this has had a lot of implications in the teaching of foreign languages. Learners are becoming more proficient and knowledgeable in about the digital world through Internet and social media, and through digital devices such as computers and smart phones. This research analyzes how lecturers in Technical University use Technology in their classrooms to motivate French as a Foreign Language (FFL) students to support their learning in French programs in Technical University of Kenya. The participants for this research are lecturers of French language who frequently use technology in the classroom to support FFL learning for all the levels. Findings illustrate the potential of technology integration in French classrooms for supporting students' French language learning.

**Keywords:** Technology, French as a foreign language, Learners, Instruction

## 58. Innovative Competitive Strategies Adopted By Top Performing Banks in Kenya

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### ABSTRACT

Today's local and global banking industry, like other business sectors is constantly under terrific fluidity occasioned by various factors that not only pose new challenges but also offer unique opportunities to the industry players. Technological and frequent innovations, heightened customer expectations and increased levels of competition are just but a few among a plurality of factors that have heightened competition in the banking industry. This phenomena has compelled the industry players to develop new approaches and strategies as they seek to remain relevant and competitive in such a dynamic industry. This paper is a narrative review of some of the current innovative strategies adopted by leading banks in Kenya. Literature related to current strategies adopted by Kenyan banks is analyzed from secondary sources, including publications, unpublished work, and various banks' reports. Some of the strategies discussed include; aggressive focus on small and medium-sized enterprises (SMEs); Diversified financial services; strategic partnership to gain synergistic advantage; Aligning CSR program to master strategy; enhancement of governance structures to command stakeholder confidence; investing in infrastructure and platforms to serve masses; increased branch network; enhanced human capital capacity through ongoing training and competitive reward strategies; ensuring easy accessibility and affordable loans and constant focus on exceptional customer experience and relationship banking. Finally, the paper concludes that in order for banks operating in the Kenyan environment to succeed, they must continue to invest in and enhance the identified strategies so as to build and sustain their competitive fronts towards optimal performance. The paper recommends continued search and investment in innovative strategies including; technologically enabled products that enhance customer convenience and flexibility, diversified financial services, attracting and maintaining of masses through strong branch networks and partnerships as being key for any bank seeking to hold a strategic position in the Kenyan Banking Industry.

**Key words:** Innovative, Strategy, Competitiveness, Performance

## 59. Benchmarking Kenya's Attractiveness as Foreign Direct Investment Destination

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**Sub-theme:** The Arts, Entrepreneurship and Social Sciences

### ABSTRACT

The main purpose of this research is to determine key factors that explain why Kenya is lagging behind selected African and Asian countries in attracting Foreign Direct Investment (FDI) inflows. We conducted benchmarking analysis of Kenya with selected African and Asian countries in attracting FDIs in order to explain why Kenya is lagging behind these countries. Several reforms have been undertaken to attract FDI, however, inflows into Kenya have been erratic and way below the country's potential. Varied problems/challenges are identified -- quality of infrastructure; macroeconomic policies; low levels of income; institutional framework; democracy and corruption; domestic savings and investments; low factor productivity; and high debt burden, etc. Comparison economies are a good indication of how well countries are doing against the competition, while comparisons with better performing economies can show where to head in the future. The paper makes recommendations that once implemented will go a long way in streamlining institutional, legal and administrative framework for attracting FDI and also in contributing to the achievement of Vision 2030 and Sustainable Development goals. Key recommendations include actions for improving infrastructure; addressing corruption and governance; improving and easing doing business; developing human capital; legislating wage policy; ensuring stable macroeconomic and political climate; improving quality and effectiveness of institutions for promoting FDI and; pursuing policies to reduce debt burden.

**Keywords:** Benchmarking, FDI, corruption, infrastructure, debt burden

## 60. Changes in Brain during Adolescence

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Sub-theme: Biological and Physical Sciences

### Abstract

Behavioral psychologists have been studying adolescents and have attributed the changes during this period of life to hormones. This paper attempts to explain the same in the light of new research findings by neuroscientists. In the last decade or so, detailed structural and functional MRIs of the human brain have become possible. This is due to the advancement in laboratory technology. It has been found that in the early childhood, there is an increase in the gray matter in the brain. During late adolescence, the gray matter starts to reduce and the process continues till the 20s onwards. Also, there is an increase in white matter during this period. Functional MRIs reveal that adolescents use more of prefrontal cortex whereas the adults use more of temporal region for social decision making. These physical changes in the brain are related to behavior changes. During adolescence one is most self-conscious and influenced by the peers. Adolescents want to impress their peers in order to seek their approval. At this age, one moves away from the security of parents and age-mates become more important. There is a need to be accepted and respected. Each social situation is seen as an opportunity and is evaluated independently in the light of old experiences. As one enters adulthood, the similarity and recurrence of social interactions is understood. One strategizes set responses to such situations. Evaluation of each situation independently requires many synaptic routes in the brain and explains the excessive gray matter till early adolescence. The set responses represent lesser but more frequented routes, which are coated by white substance, myelin. This accounts for the increase of white matter in the brain.

**Key words:** MRI, neurons, synapses, prefrontal cortex, temporal.

## 61. Potential Use and Challenges of Constructed Wetlands for Waste Water Treatment and Conservation in Game Lodges and Resorts in Kenya

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Sub-theme: Environment, Conservation, Energy & Climate Change

### ABSTRACT

Constructed wetlands are cost-effective, nature oriented alternatives for wastewater treatment that have gained acceptance worldwide. For the Kenyan hospitality industry in particular, constructed wetlands offer opportunities for wastewater reuse and resource recovery as well as improvements in local environmental health conditions. These establishments produce a large amount of waste water which is sometimes discharged into the water bodies, without being treated. This is not only harmful to communities living downstream of these rivers but also to the flora and fauna which is the source of attraction for most tourists who visit these lodges.

This qualitative study based on desk research, analysis and synthesis of empirical data from leading international case studies and research articles including Kenya, explores how constructed wetlands can be effectively used in the hospitality industry in Kenya with special focus on game lodges and resorts which are mainly situated in arid and remote areas of Kenya, with little to no waste management systems in place. Further, it identifies the re-use of treated waste water for purposes such as watering of grass lawns, flower gardens and plant gardens which would in turn become a habitat for birds and other small animals. This study suggests that game lodges and resorts are prime candidates for constructed wetland establishment.

**Keywords:** Constructed wetlands, waste water treatment and conservation, sustainable hospitality and tourism, Kenya