



PROGRAMME AND BOOK OF ABSTRACTS

13TH ANNUAL INTERNATIONAL CONFERENCE ON

COMPETENCIES IN APPLIED RESEARCH, SCIENCE AND INNOVATION
FOR SUSTAINABLE DEVELOPMENT



DATES: 16TH -17TH OCTOBER 2024

ORGANIZED AND HOSTED BY

THE ELDORET NATIONAL POLYTECHNIC

ISO 9001:2015 CERTIFIED INSTITUTION



Ee Mungu nguvu yetu
Ilete baraka kwetu
Haki iwe ngao na mlinzi
Natukae na undugu
Amani na uhuru
Raha tupate na ustawi.

Amkeni ndugu zetu
Tufanye sote bidii
Nasi tujitoe kwa nguvu
Nchi yetu ya Kenya
Tunayoipenda
Tuwe tayari kuilinda

Natujenge taifa letu
Ee, ndio wajibu wetu
Kenya istahili heshima
Tuungane mikono
Pamoja kazini
Kila siku tuwe na shukrani



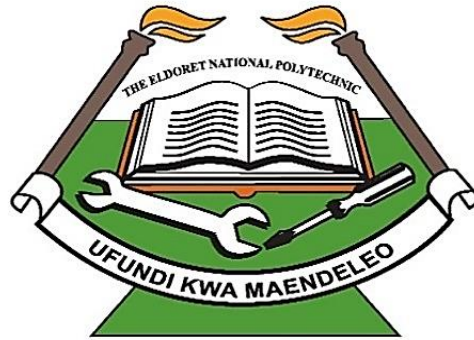
Ee Mungu twaomba ulinde
Jumuiya Afrika mashariki
Tuwezeshe kuishi kwa amani
Tutimie na malengo yetu.

Jumuiya yetu sote tuilinde
Tuwajibike tuimarike
Umoja wetu ni nguzo yetu
Idumu jumuiya yetu.

Uzalendo pia mshikamano
Viwe msingi wa umoja wetu
Natulinde uhuru na amani
Mila zetu na desturi zetu.

Viwandani na hata mashambani
Tufanye kazi sote kwa makini
Tujitoe kwa hali na mali
Tuijenge jumuiya bora

CIRIS 2024



THE ELDORET NATIONAL POLYTECHNIC

13TH ANNUAL INTERNATIONAL RESEARCH

CONFERENCE

ON

**COMPETENCIES IN APPLIED RESEARCH, SCIENCE AND
INNOVATION FOR SUSTAINABLE DEVELOPMENT**

(CIRIS 2024)

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CIRIS 2024

OUR PARTNERS



Kenya
VISION 2030



Kapa Oil Refineries Ltd.

SPEECHES



Principal Secretary, State Department for Vocational and Technical Training (TVET), Ministry of Education.

Dr. Esther Thaara Muoria, PhD

Distinguished Guests, Esteemed members of The Eldoret National Polytechnic, Researchers, Innovators, Exhibitors and All conference participants;

I am honoured to be here today at the 13th Annual International Conference of The Eldoret National Polytechnic (TENP). This gathering exemplifies our commitment to advancing the BETA Economic Model through Technical and Vocational Education and Training (TVET) in Kenya. This model aligns our training initiatives with industry needs and promotes innovation and sustainable economic growth.

First, I want to express my heartfelt gratitude to the management and the entire Eldoret National Polytechnic community for their dedicated efforts in promoting a culture of excellence in research, training, and innovation. This commitment has established the institution as a beacon of technical excellence, providing valuable opportunities for trainees and other stakeholders to enhance their skills.

In our pursuit of excellence, it is essential to integrate research, skills, and innovation into our TVET programs. This year's TENP Annual International Conference explores various thematic areas that enhance our training frameworks by prioritizing sustainability through an innovative and skilled mindset. This will go a notch higher in empowering our trainees to become problem-solvers and change-makers in the communities.

We need to embrace Competency-Based Education and Training (CBET) and particularly Dual Training that focuses on skill-based learning through the implementation of 60 percent

training, which happens in the industry, and 40 percent in the classroom. Moreover, we are prioritizing the Recognition of Prior Learning (RPL) that recognizes informal skills. In RPL, individuals will have an opportunity to be assessed and issued certificates in their various areas of skill, and this will present them with an opportunity to access government tenders and employment both locally, regionally, and globally.

As a government, we acknowledge the crucial role that TVET plays in equipping our youth with the essential hands-on skills needed for today's dynamic job market. We are dedicated to making TVET training accessible to everyone. To this end, the government has rolled out the New Higher Education Financing (HEF) Model, designed to enhance accessibility, sustainability, and equity in funding higher education. This initiative supports trainees in pursuing their studies by addressing funding gaps through scholarships that cover up to 70% of tuition, depending on individual needs.

I encourage all TVET institutions to integrate productivity across all service areas by enhancing efficiency and optimizing resource utilization, along with launching income-generating activities. This strategy will not only stimulate growth and promote sustainability within our training framework but also enhance financial independence and provide trainees with invaluable real-world experience and entrepreneurial skills.

In conclusion, I urge all stakeholders to work together in revolutionize our training system. Together, we can ensure that every young Kenyan has the opportunity to thrive and succeed.

Thank you!



The Chairperson
Governing Council,

Dr. Paul K. Murgor, PhD.

Our Chief Guest, esteemed guests, distinguished speakers, valued participants, Ladies and Gentlemen;

Today, we gather here to discuss the pivotal role of applied research and innovation in achieving sustainable development. In a rapidly changing world, we must cultivate competencies that empower our learners, trainers, and researchers to tackle the pressing challenges we face.

Our 13th Annual International Conference, themed "Competencies in Applied Research, Science, and Innovation for Sustainable Development" is a commitment to bridge the gap from innovation to solutions, ensuring that we not only generate ideas but also implement them effectively for the betterment of our communities and our nation.

As we delve into these discussions, I must emphasize the critical need for robust infrastructure that supports our mission. The Eldoret National Polytechnic is a beacon of knowledge, thus we must enhance our facilities to accommodate all learners. Therefore, I call upon the government to continue its invaluable support in developing our infrastructure, particularly by completing our library complex and addition tuition blocks. A well-resourced library is not just a building; it is a hub of research and innovation, providing essential space for collaboration among trainers and trainees alike.

Moreover, we must prioritize the recruitment and employment of trainers. The quality of training and research is fundamentally linked to the expertise of those who lead it. By investing in our trainers, we can elevate the standards of training and research, equipping our trainees with the skills and knowledge they need to thrive in a competitive global landscape.

In addition, researchers and innovators, your involvement is crucial for promoting excellence within the Competencies in Applied Research, Science and innovation (CIRIS) framework and ensuring that our collective efforts yield tangible benefits for the youth and our nation. Let us create platforms where ideas can flourish and transform into actionable solutions.

As we embark on this journey together, let us remember that our work is not just for today but for the generations to come. By fostering an environment that nurtures creativity, research, and collaboration, we can inspire the youth to be the innovators and leaders of tomorrow.

Finally, I extend my heartfelt gratitude to all who have contributed to making this conference possible.

Thank you.

CIRIS 2024



The Chief Principal

The Eldoret National Polytechnic

Dr. Charles K. Koech, DHL

Distinguished Chief Guests, Esteemed Guests, Researchers, Innovators, Exhibitors, Trainers, trainees, ladies and gentlemen,

It is with great pleasure and pride that I welcome you all to the 13th Annual International Conference of The Eldoret National Polytechnic. This year's theme, "Competencies in Applied Research, Science, and Innovation for Sustainable Development," reflects our unwavering commitment to empowering individuals and communities through Training, Research, and Innovation.

I would like to extend a special welcome to our Chief Guest, whose presence honours us today, and to all our distinguished guests who have taken the time to join us. Your support and engagement are invaluable to the mission we hold dear.

Today, we also celebrate the remarkable achievements of our trainers and trainees who represented us at the World Skills 2024 Competitions in Lyon, France. Your dedication and excellence have brought pride to our institution and showcased the incredible talent we nurture here at The Eldoret National Polytechnic. Thank you for your hard work and commitment to excellence.

I would like to take this opportunity to express our sincere appreciation to the government for its continued support, particularly in the employment of new trainers. This initiative is vital for bridging the gap in our training management, ensuring that we can provide the highest quality training and mentorship to our trainees. We urge the government to continue this support by facilitating the employment of more trainers, allowing us to further enhance the training we are offering.

I also want to acknowledge the organizing committee of the 13th CIRIS for their tireless efforts in bringing together this conference. Your work not only nurtures research, skills and innovation but also provides a platform for valuable paper presentations, exhibitions and skills competitions that inspire knowledge sharing. Let us continue to encourage more research initiatives that enhance innovation which contribute to sustainable development.

As we reflect on our growth, it is crucial to address the pressing need for infrastructure improvement to cater to our ever-increasing trainee population. An investment in infrastructure is an investment in our future. We call upon the government to support us in this endeavour, ensuring that we can accommodate our trainees effectively and cultivate an environment conducive to learning and research.

Currently, The Eldoret National Polytechnic is undertaking significant research activities, including the formulation of poultry feeds utilizing locally available materials. This initiative aims to enhance sustainability and reduce production costs, ultimately benefiting our local communities. We are committed to developing more funding proposals not only to enhance our research capacity but also to address societal challenges, and promote environmental sustainability.

I am proud to report that we have assessed over 200 claimants through the Recognition of Prior Learning (RPL) program, and we anticipate even greater enrollment as we move forward. This program is vital in advancing the skills required in the present century, allowing individuals to gain recognition for their experiences and competencies.

Lastly, I encourage all stakeholders to join us in this mission. Let us work together to mainstream innovations, support research, and enhance our training infrastructure. By doing so, we will not only empower our youth but also contribute to the sustainable development of our nation.

I wish you all a fruitful and inspiring conference.

Thank you!



Research and Development Coordinator

Dr. Fredrick Agengo, PhD

Esteemed Chief Guest, Distinguished Speakers, Invited Guests, Presenters, Innovators, Exhibitors, Colleagues, and Dedicated Trainees:

It is my great honour to welcome you to the 13th Annual Conference at The Eldoret National Polytechnic. Today, we gather to explore the theme "Competency in Applied Research, Science, and Innovation for Sustainable Development."

I would like to extend my heartfelt gratitude to TENP management for the unwavering commitment to hosting the annual conference over the past 13 years. This year, we have seen a remarkable 90 percent increase in the number of submitted abstracts, as well as a significant growth in exhibition participation. As a result, TENP has become a beacon of knowledge and a hub for research and innovation, driven by our promise to advance applied research that has not only transformed our institution but has also significantly benefited our communities and the nation.

In Kenya and across Africa, we encounter unique challenges that demand innovative solutions. While the rapid pace of technological advancement and globalization presents exciting opportunities, it also requires us to adapt and respond effectively. Therefore, to navigate these complexities, we must embrace collaborative research initiatives that involve all stakeholders, academia, industry, and government. It is crucial to recognize research as a vital tool for sustainable development. Applied research is essential in addressing issues such as climate change, improving healthcare, and enhancing agricultural practices, as it reveals effective and lasting solutions.

In recognition of the skill development enhanced by the new curriculum, I am particularly excited to announce that this year's research fair we have dedicated spaces for pitching innovations, showcasing skills, and hosting exhibitions. This initiative aims to enhance collaboration and networking among researchers, innovators, and industry leaders, ultimately improving our performance on the global stage. Together, we can share knowledge, learn from each other, and transform our challenges into opportunities, igniting the spark that will guide us toward a sustainable future.

Likewise, as we engage in today's discussions, I encourage all presenters to consider publishing their papers in our Journal of Socio-Economic Development. This platform not only increases the visibility of your work but also provides an opportunity to tackle pressing global challenges. As a result of sharing your findings and solutions through this respected journal, you can ensure that your research reaches those who can benefit most, contributing to meaningful progress in our various fields.

Thank you once again for your dedication and contributions to this conference. Similarly, I would also like to extend my gratitude to my Research Committee for their invaluable support.

In conclusion, let us embrace the opportunities ahead, build on the knowledge shared during this forum, and keep pushing the boundaries of what we can achieve together.

Enjoy the conference, and may it be both inspiring and productive!

Thank you.

KEY NOTE SPEAKERS

**Senior Lecturer and Head of Department**

*Pharmacology and Therapeutics Centre Leader, Natural Products Research and Innovation Centre.
Contact Person for Science, Technology and Innovation -
Office of the President (STI-OP)
Busitema University Faculty of Health Sciences*

Dr. Samuel Baker Obakiro (BSc.Chem & Bot; MSc. Pharm; PGDE; PhD)

Dr. Samuel Baker Obakiro is a Pharmacologist and Analytical Chemist with special interest in Drug discovery and development, Toxicology, Medicine access and Antimicrobial resistance. He is a Senior Lecturer and Head of Department at the Department of Pharmacology and Toxicology Busitema University Faculty of Health Sciences. As an innovator, he developed two pharmaceutical products (*TazcovTM* and *GlucotakTM*) for management of acute respiratory illness and diabetes mellitus which have been registered by the National Drug Authority. As a leader, he is the Founder and Director of the Busitema University Natural products Research and Innovation Centre. He championed and chaired the committee for the development of the Bachelor of Pharmacy and Masters of Pharmacology (Drug Discovery and Development) at Busitema University in 2024.

He has won several grants and scholarships from STI-OP, IFS, BRIGHT - NETWORK, TWAS-ICCBS, ACEIIPRE, RISE-AFNNET, MEPI-MESAU and Ugandan Government with grant portfolio that amounts to USD 1,504,164. He is a member of the Africa Phytomedicine Scientific Society, Natural Products Research for Eastern and Central Africa, Uganda Pharmacological Society and Natural Product Industry Advancement Network Africa. He is an active early career researcher with 25 publications (h-index 25) and a reviewer of several international journals. He is the Contact Person for the Ministry of Science, Technology and Innovation - Office of the President (STI-OP) at Busitema University. He has Co-supervised five masters and 3 PhD students at Makerere University and Busitema University. He is an external examiner for the Department of Pharmacology for Mbarara University of Science and Technology and Makerere University where he has assessed over 10 masters and 3 PhD thesis.



Chief Executive Officer

Africa for SDGs ®My Goals Foundation

Dr. Joe Bonga

Dr. Joe Bonga is a Pan-Africanist at heart, loaded with the dream to transform Africa through intergenerational mentorship glazed with African solutions for African Problems. He believes that the Africa we want can only be established by the Africans for the Africans.

Dr. Joe is the Chief Executive Officer of the Africa for SDGs. He is the Founder of Africa for SDGs Fellows Program, which offers a platform to young people across the region to incubate their innovative, implementable, scalable and transferable ideas that meet the urgent challenges facing Africa for localization. He serves as the Regional Director for Africa of ICY Africa that operates in more than 30 countries. As a consultant, Joe's passion is reflected on his emphasis on Good Governance, Leadership and Sustainability.

He possesses extensive experience in Africa and beyond. He is a mentor and a life-coach with greater prowess in strategic thinking, participatory learning and community led change plan. His commitment towards Education for Sustainable Development and Global Citizenship Education has seen him partner with the Kenya Education Management Institute and other like-minded agencies and organisations to advocate and champion for the acceleration of SDGs through mainstreaming of ESD in learning institutions for knowledge, skills, values and attitudes to transform Africa's youth bulge into a demographic dividend. Dr. Joe believes that the Africa we want is possible.

**Lecturer**

*Nelson Mandela African Institution of Science and
Technology (NM-AIST)*

Dr. Cecilia Rolence China

Dr. Cecilia Rolence China is a Lecturer at the Nelson Mandela African Institution of Science and Technology (NM-AIST), where she teaches Materials Science courses. Her research interests lie in industrial cleaner production technologies, particularly in the development of innovative, eco-friendly chemicals for industrial processing. With 9 years of experience in industrial research and development, she has made significant strides in this field.

Recently, she developed a cost-effective and eco-friendly method for preparing organic tanning chemicals from local resources. She successfully transferred this technology to a cluster of 15 SMEs in Kilimanjaro, Tanzania. Her current research focuses on valorizing agricultural wastes to produce organic chemicals for leather processing and converting leather wastes into biofertilizer, thereby reducing pollution in the leather processing industry.

In addition, Dr. Cecilia China has invented an improved tannin extraction apparatus and developed a method for extracting tannin, innovations that earned her the Best Innovation Award at the National Innovation Week in 2020. In 2021, she was awarded the prestigious YALI-Mandela Washington Fellowship, a flagship program for young African leaders, where she honed her leadership skills in business management. Currently, she is a 2024 OWSD Early Career Fellow and leading a groundbreaking project focused on valorising cashew nut shells and banana stems to produce tannins for eco-friendly leather processing. She is also a 2024 BioInnovate Africa for Women Scientists Fellowship, conducting research on converting leather wastes into biofertilizer to promote a circular economy in the leather industry.

Dr. Cecilia has published 14 peer reviewed articles and presented her research at both local and international conferences, including those organized by the International Union of Leather Technologists and Chemists Societies (IULTCS).

Moreover, she is a social entrepreneur. As the founder and CEO of AfriTech Organic Leather Company Limited, she leads a remarkable enterprise dedicated to transforming the leather industry through innovation and sustainable practices. As a pioneer in technology development, she aspires to transform Tanzania's leather industry through technology transfer mechanisms.

Dr. Cecilia holds a PhD in Materials Science and Engineering and a Master's degree in Environmental Science and Engineering, both from NM-AIST. She also earned a Bachelor of Science degree in Education from Sokoine University of Agriculture (SUA).

CIRIS 2024

**Chief Executive Officer***TVET-CDACC***Prof. Kisilu Kitainge**

Prof. Kisilu M. Kitainge is currently the Chief Executive Officer of TVET CDACC. He is a distinguished academic with a strong background in academic leadership and education reforms. He is the former Director of the Directorate of Industrial Linkages, Partnerships and Collaborations. He was also a professor and Dean of the School of Education at the University of Eldoret.

Prof Kisilu M. Kitainge was an Associate Professor of Technology Education in the School of Education at the University of Eldoret. He is a holder of an earned Doctor of Philosophy (Ph.D.) degree from the Royal Melbourne Institute of Technology (RMIT University-Melbourne, Australia) in Applied Learning (TVET). Further, he holds a Master of Philosophy Degree in Educational Psychology from Moi University, Kenya. In Addition, he holds a First-Class Honors Bachelor of Education in Technology Education, specializing in power mechanics. He has served Moi University and, subsequently, the University of Eldoret University as a lecturer and researcher since 1998.

He is an accomplished scholar with precise clarity of thought and a high reputation locally and internationally. He is an academician of high integrity and moral standing who has participated in developing several policies and worked in different Senate committees of the University of Eldoret. He is a hardworking, self-motivated, driven, focused, honest, and organized person who is result-oriented and an achiever in whatever he does. He has successfully held many departmental, school, and university-wide positions. He has exceptional organizational skills and has been instrumental in organizing conferences, workshops, and seminars.

He successfully served two terms at the University as the Head of Technology Education Department (2013-2018). Moreover, from August 2011 to 2015, he was the Coordinator for the School of Education of the Professional Courses in Education. The areas he coordinated

were the equivalent of six fully-fledged departments in a university. Also, between 2009 and December 2011, he was the School of Education Coordinator for all the School of Education and Social Studies programs in Central Kenya Campus (Now Karatina University) of Moi University. This Position required that he coordinate all the academic activities for the School of Education and Social Sciences at the Central Kenya campus. In Addition, between 2006 and 2013, he was the coordinator of Postgraduate programs in the School of Education, Chepkoilel Campus. At the same time, he was a zone coordinator for teaching practice in charge of the Turbo-Timboroa and Baringo zones.

Between 1996 and 1998, he was a Lecturer at the Mombasa Polytechnic (Currently Technical University of Mombasa) in the Department of Mechanical and Automotive Engineering. Between 1993 and 1996, he was a Trained Graduate Technical Teacher of Power Mechanics at Mutito Boys High School in Kitui County.

Prof. Kisilu M. Kitainge has also served in various committees, including the Presidential Working Party on Education Reforms in Kenya appointed by H. E the President Dr. William Ruto in September, 2022. The committee was tasked with giving Education reform recommendations aimed at revamping Kenya's education system.

ORGANIZING COMMITTEE**Secretariat**

Chairperson: Dr. Charles Koech

Co-chairperson: Dr. Fred Angeng'o

Technical Committee

Dr. Fred Ageng'o

Danol Rotich

Jacinta Muthuri

Emmanuel Kipruto

Finance committee

Dr. Charles Koech

Richard Sang

Logistics Committee

Dr. Charles Koech

Emmanuel Meres

James Mwangi

Dr. Fred Ageng'o

Charles Ruto

Research Committee

Dr. Fred Angeng'o

Jacinta Muthuri

Danol Rotich

Virate Kiprop

Raphael Murei

Joshua Sisimwo

Emmanuel Sawe

Benedict Otieno

Emmanuel Kipruto

Betty Chemutai

Grace Njenga

Carolyn Bii

Luyali Irene

Hyline Mokano

Daniel Nyandema

Ronald Yego

Celestine Jepchumba

Wilmar Otieno

Dorcas Sambu



THE ELDORET NATIONAL POLYTECHNIC

13TH ANNUAL INTERNATIONAL RESEARCH CONFERENCE

THEME:

COMPETENCIES IN APPLIED RESEARCH, SCIENCE AND
INNOVATION FOR SUSTAINABLE DEVELOPMENT

(CIRIS 2024)

DATES: 16TH -17TH OCTOBER 2024

CONFERENCE PARALLEL SESSIONS SCHEDULE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

TIME	ITEM
0800 - 0830	<ul style="list-style-type: none"> ◆ Registration of participants at the reception Desk
0830 - 1030	<ul style="list-style-type: none"> ◆ Tour of exhibition and skills show tents
	Chief Guests and other Invited Guest <ul style="list-style-type: none"> ◆ Arrival and Signing of visitors' Book ◆ Tour of TENP and Planting of trees by chief guest.
1030 - 1100	HEALTH BREAK
1100 - 1300	<p>Keynote Presentations and Official opening ceremony</p> <p>Venue: The Dome</p> <p>Director of program: Mr. Emmanuel Meres</p> <p>Session Chair: Dr. Paul Murgor</p> <p>Rapporteur: Dorice Koech Angela Vwamula Musiega</p> <p><u>1st keynote presentation</u></p> <p>“Securing Grants in a Competitive World: Strategies for Success in Research and Innovation Funding” By Dr. Samuel Baker Obakiro - <i>Senior Lecturer & Head of Department, Pharmacology & Therapeutics Centre Leader, Faculty of Health Sciences, Busitema University.</i></p> <p><u>2nd keynote presentation</u></p> <p>“The Effectiveness of CBET in Addressing Skills Gaps and Preparing Learners for Future Career Challenges” By Prof. Kisilu Kitainge CEO TVET-CDACC</p> <p><u>Official opening ceremony by the chief guest</u></p>
1300 - 1400	LUNCH BREAK
1400 - 1700	Break-out to Parallel Sessions (A-J)
1700 - 1730	HEALTH BREAK
1730	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (A)

SUB-THEME I: CLIMATE SMART AGRICULTURAL TECHNOLOGIES

Venue: JL 04

Chair: *Dr. Peter Koskei*Rapporteur: *Louret Atsenga Andalo*

TIME	TITLE
1400 - 1420	The Role of Educational Systems as a Community - Centered Initiative in Restoring Aquatic Ecosystem: A Case Study of Mbita Beach <i>Violet Atieno, Ochieng Mary Mercy, Gabriel O. Ng'ong'a, Anne Auma Ogwari, Sawanda K'odera</i>
1420 - 1440	The Role of Agro Technology (Soil pH Testing) in Achieving High Crop Yield in the Rural Areas – A Case Study of Bondo Sub County <i>Violet Atieno, Ochieng Mary Mercy, Gabriel O. Ng'ong'a, Anne Auma Ogwari, Daniel Onyango and Sawanda Kodera</i>
1440 - 1500	Effect of Adapting Hydroponic Farming on Sustainable Agriculture in Uasin Gishu County <i>Betty Chemutai Terer and Susan Maiyo</i>
1500 – 1520	Effects of <i>Spodoptera frugiperda</i> (Fall Army Worm) Larva on <i>Zea mays</i> (Maize) Yield and Control Strategies Awareness among Farmers in Rural Africa: Case Study of Bondo Sub-County, Kenya <i>Ouko Emanuel, Sawanda K'odera, and Ouku Faith</i>
1520 - 1540	Impacts of Microcredit Access on Climate Change Adaptation Strategies Adoption and Tomato Yield in Kabomoi, Uasin Gishu, Kenya <i>Shadrack Limo</i>
1540 – 1600	Techno-Economic Survey on Sweet Sorghum Potential for Climate Smart Agro-processing in Kenya <i>Charles E. Butiko</i>
1600 – 1620	The Impact of Inclusive Approach towards Sustainable Blue Economy Initiatives <i>Daniel Onyango and Walter Omog</i>
1620 - 1640	Regenerative Agriculture for Environmental Sustainability: A Case Study of Nyeri County <i>Joel Amunga</i>
1640 - 1700	Harnessing Agrivoltaic Systems for Climate Smart Agriculture in Kenya <i>Isaiah Ong'ong'a</i>
1700-1720	Effects of Online Learning on Student's Academic Performance in Public Secondary Schools in Langat Sub-County, Nairobi County, Kenya <i>Joan Jeptoo</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (B)

SUB-THEME I: CLIMATE SMART AGRICULTURAL TECHNOLOGIES AND CROSS CUTTING- ENVIRONMENT

Venue: JL 05

Chair: *Dr. Zipporah Berut*Rapporteur: *Jared Lagat*

TIME	TITLE
1400 - 1420	Utilization of Sodom Apple (<i>Solanum incanum</i>) as a Pesticide and Insecticide in Agriculture <i>Eric Idamboh</i>
1420 - 1440	Assessment on Climate Smart Agriculture Technologies and Innovative Indigenous Knowledge on Food Production by Small Scale Farmers in Laikipia County, Kenya <i>Gachuiga Martha Wairimu</i>
1440 - 1500	Influence of Market Intelligence on the Success of Pisciculture Project among Youth Groups in Trans Nzoia County, Kenya <i>Celestine Jepchumba</i>
1500 – 1520	Homestay Tourist Accommodation as Promotional Tool for Local Food Production in Uasin Gishu County <i>Bochaberi Dorcas Ondicho</i>
1520 - 1540	The Assessment of an Automated Poultry Feeder with Intrusion Alert in Poultry Farming for Optimized Production. <i>Eng. Opiyo Nicholas Onyango</i>
1540 – 1600	Assessment of Onshore Petroleum Spillages Preparedness in Kenya <i>Chepkirui Jenifer</i>
1600 – 1620	Extraction and Characterization of Biomordant from <i>Acacia nilotica</i> and Banana Pseudo Stem Sap for Natural Dyeing of Leather <i>Louret Atsenga Andalo, Rose Tanui, and Paul K. M. Sang</i>
1620 - 1640	Environmental Conservation and Management for Continued Provision and Uptake of Herbal Medicines <i>Isaac M. Inganga</i>
1640 - 1700	Use of Fortified Silt in Floor Tile Manufacture as a Conservative Measure in Agro-Forestry <i>Simon Ochieng Odende and Lillian Achieng Odongo</i>
1700-1720	Relationship between Green Supplier Selection and Performance of Cement Manufacturing Firms in Kenya <i>Solomon Kipsiria Biwott, Yusuf Kibet, Christopher Ngacho, and Caleb Akuku</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (C)

SUB-THEME II: ADAPTIVE STRATEGIES AND TECHNOLOGIES IN HEALTH

Venue: JL 10

Chair: *Dr. Susan Keino*Rapporteur: *Yegon Sharon*

TIME	TITLE
1400 - 1420	Exploring Traditional Food Preservation Techniques within African Communities Preceding Modern Technological Advancements. A Review <i>Emmanuel Kipruto, Mildred Limo, and Fredrick Agengo</i>
1420 - 1440	Effects of Compositing Wheat-Sorghum and Wheat with Omena Powder on Physical Characteristics and Sensory Attributes of Biscuits <i>Esther K. Ateka, Charlotte A. Serrem and Gertrude M. Were</i>
1440 - 1500	Healthy Food Consumption Habits on Menu Choice among Customers in Star-Rated Hotels in Nakuru County, Kenya <i>Mildred J. Limo, Emmanuel Kipruto and Fredrick Agengo</i>
1500 - 1520	Development of Mushroom Enriched Millet-Orange Flesh Sweet Potato Porridge Flour for Supplementary Feeding of Young Children <i>Fredrick Agengo and Mildred Limo</i>
1520 - 1540	Nutritive Value of the Pineapple Peels Compared to the Flesh and its Incorporation to Human Diet and Nutrition <i>Gertrude Onsando and Chepkwony Peter</i>
1540 - 1600	The Critical Role of Nutrition in Achieving Universal Health Coverage: A Documentary Review <i>Chepkwony Peter</i>
1600 - 1620	The Linkage between Socio-Demographic and Economic Characteristics and IYCF Practice among Children 0-23 Months in the Ilchamus Community of Baringo County, Kenya <i>Joyline Rotich</i>
1620 - 1640	Comparison of Nutritional Content of Indigenous (Kienyeji) and Exotic Eggs of Chickens Reared within Tharaka Nithi County <i>Benard Murimi Marete and Virate Kiprop</i>
1640 - 1700	Health Education and Caregiver Perception of Utilization of Immunization Policies at The Maternal Child Health Clinic of Kakamega Teaching and Referral Hospital <i>Antony Musabi</i>
1700-1720	Analysis of Survival Rate for Cervical Cancer by Use of Nelson Aalen Model <i>Cyrus King`ori Maina</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (D)

**SUB-THEME II: ADAPTIVE STRATEGIES AND TECHNOLOGIES IN HEALTH
AND CUTTING- GENDER AND SOCIAL TRENDS**

Venue: JL 11

Chair: *Dr. Peter Mark Odera*

Rapporteur: *Kelvin O. Otieno*

TIME	TITLE
1400 - 1420	The Influence of Food Insecurity on Student's Academic Performance among Students in TVET Institutions: A Case Study of Uasin Gishu County, Kenya <i>Kelvin O. Otieno</i>
1420 - 1440	Healthcare Seeking Behaviour at a Workplace Health Promotion and Wellness Program: A Case of Rift Valley Technical Training Institute <i>Cheruiyot Sambu and Aron Langat</i>
1440 - 1500	Nutritional value, Production and Utilization Potential of Some Minor and Under-utilized Root and Tuber Crops in Kenya: A Review <i>Fedinand Opondo</i>
1500 - 1520	Challenges in Using Stable Isotope Techniques to Assess Environmental Enteric Dysfunction in a Rural Kenyan Setting Amid the Covid-19 Pandemic <i>Silvester. N. Jaika, Shadrack Oiye, Gordon Nguka, Victor. O. Owino, and Silvenus Konyole</i>
1520 - 1540	Kenya, a Drug-Free Nation from Alcohol and Drug Abuse: A Study of Employees at Various Workplaces <i>Peris S. Ngala, David, M Litala, Kennedy W. Nyongesa, and Reuben K. Chemitei</i>
1540 - 1600	Perception of Trainees On Gender Equality in TVET Institutions. A Case Study of Siaya Institute of Technology, Siaya County, Kenya <i>Gibore B. Cecilia</i>
1600 - 1620	An Investigation of Social Stratification on Implementation of Socio-Economic Policies in TVET Institution. A Case Study in Kisii County, Kenya <i>Brenda Moraa Ndege</i>
1620 - 1640	Examining Strategies and Interventions to Promote Gender Equality and Social Inclusion in TVET Systems <i>Jacqueline Kidiya</i>
1640 - 1700	TVET Community Outreach Programmes in Enhancing Sustainable Competency Skills: A Case of TVET Institutions in Kenya <i>Murrey Benson and Leen Jepleting</i>
1700-1720	Quality Control Practices by Fashion Designers in Kapsaret, Eldoret Uasin Gishu County <i>Florence Okaka</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (E)

SUB-THEME III: BUSINESS SOLUTIONS, ENTREPRENEURSHIP AND GOVERNANCE

Venue: JL 12

Chair: *Dr. Robert Odhiambo Onyango*Rapporteur: *Chepkirui Jeniffer*

TIME	TITLE
1400 - 1420	Mapping Important Bird Priority Areas for Green Skills Entrepreneurship in Kwale County <i>Nixon Gogo and Solomon Mutava</i>
1420 - 1440	Influence of Staffing Policy on Trainer's Efficiency in Technical and Vocational Training Institutions in Uasin Gishu County, Kenya <i>Keter Philemon Kibet</i>
1440 - 1500	Effect of Employee Diversity on Organization Performance among Public Technical Institutions in Uasin-Gishu County <i>Luyali M. Irene</i>
1500 - 1520	Assessing the Role of TVET in Promoting Green Entrepreneurship in Northern Kenya <i>Ernest Kipkorir Kurgat</i>
1520 - 1540	Analyzing the Contribution of Public Works Management Challenges to Poor Quality of Construction Works in Public Learning Institutions in Baringo County, Kenya <i>Hosea Kibet Cheron, Kyalo Muthoka Ndunda, and Bonaventure W. Kerre</i>
1540 - 1600	Effect of Safety Protocols on Employee Performance among Star-Rated Restaurants of Nairobi City County, Kenya <i>Nancy Sei, Raphael Murei and Irene Sei</i>
1600 - 1620	Significance of the Auditing Control on Financial Performance of Financial Institutions <i>Kimitei Oliver</i>
1620 - 1640	Effects of Internal Control System on the Management of Finances in Public Secondary Schools within Uasin Gishu County Kenya <i>Regina Nyongesa</i>
1640 - 1700	Monetary Policy Transmission Mechanisms and Performance of Mutual Funds in Kenya <i>Ojwang' George Omondi</i>
1700-1720	The Effect of E-Learning on Academic Performance of Technical Training College Students in Uasin-Gishu County: A Case Study of the Eldoret National Polytechnic <i>Sharon C. Yegon</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (F)

SUB-THEME III: BUSINESS SOLUTIONS, ENTREPRENEURSHIP AND GOVERNANCE

Venue: JL 13

Chair: *Dr. Keter Philemon Kibet*Rapporteur: *Sammy Makori*

TIME	TITLE
1400 - 1420	The Role of Public-Private Partnerships in Ensuring Agricultural Development for Food Security- A Case Study of Machakos County <i>Ronald Kibet Yego</i>
1420 - 1440	Influence of Organizational Fundamentals on Entrepreneurial Success and Sustainability in Uasin Gishu County <i>Chemutai Betty Terer</i>
1440 - 1500	Influence of Psychosocial Hazards on Housekeeper's Job Performance within Selected Three-Star Hotels in Eldoret City <i>Charlotte Chepkoech and Raphael Murei</i>
1500 - 1520	Digitalization Gig Economy the Future of Work in Africa: A Training Needs Analysis of Gig Economy Skills of TENP 2022 Graduates <i>Raphael Murei and Evelyn Rotich</i>
1520 - 1540	Assessing the Socio-Economic and Environmental Impact of Cage Farming on Fisherfolk Livelihoods: A case Study of Ogal Beach, Kisumu County <i>Thomas Nyango'r and Charles Nyangara</i>
1540 - 1600	The Effects of Mobile Money Transfer on Cost Effectiveness of International Non-Governmental Organizations in Kenya <i>Phyllis Chelangat, Christine Jepchirchir and Christine Obwogo</i>
1600 - 1620	The Role of the Government and TVETs in Enhancing Blue Economy, and Kenya's Economic Growth through Fostered Research and Sustainable Agricultural Development: A Case of the Sigalagala National Polytechnic, and Kenya Marine and Fisheries Research Institute, Kenya <i>Omondi Argwings</i>
1620 - 1640	Effect of Organizational Compatibility on Quality Health Care Services among Private Hospitals in Western Region <i>Walumbe Titus, Yusuf Kibet, Christopher Ngacho, and Caleb Akuku</i>
1640 - 1700	Digital Risk Perception among Students in Higher Learning: A Cyber Security Study <i>Graham Milla Kituzi and Crispus Oroni</i>
1700-1720	Enhancing Vocational Skills Development: An Exploration of the Impact of Skills Competitions on TVET Trainees in Kenya <i>Joseph Okwwaro Athenus, David Chepkangor</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (G)

SUB-THEME IV: PROCESS AUTOMATION TECHNOLOGIES IN ICT AND
ENGINEERING

Venue: JL 18

Chair: *Prof. Okemwa*Rapporteur: *Caleb Jumbwe*

TIME	TITLE
1400 - 1420	The Role of ICT Integration in TVET Curriculum Development and Delivery <i>Gitau Bonface Njoroge</i>
1420 - 1440	Effect of Technology Innovation on the Financial Performance of Commercial Banks in Kenya (A Case of Equity Bank- Eldoret) <i>Sammy Makori</i>
1440 - 1500	Network Forensic Framework for Managing Security Incidents <i>Peter, K. Kemei, Joel Cherus, and Moses Thiga</i>
1500 - 1520	Harnessing Cyber-security Resilience in Kenya: A Comprehensive Analysis of Threats, Vulnerabilities, and Mitigation Strategies <i>Pauline W. Kariuki</i>
1520 - 1540	Use of Digital Technologies for Sustainable Energy Management in Developing Smart Cities across Africa: A Review <i>Joel, K. Mosonik and Stephen, K. Kimutai</i>
1540 - 1600	Harnessing Green Power through Nano Hydrogenerators in Agricultural Piped Systems <i>Wangari Ndung'u. S</i>
1600 - 1620	An overview of integration of 3D Printing on Engineering Education: Technical and Vocational Education and Training Institutions <i>Koech, D. C</i>
1620 - 1640	Strategic Framework for Integrating Artificial Intelligence (AI) in Technical and Vocational Education and Training (TVET). A case study of The Jitume Lab, initiated by the Konza Technopolis Development Authority, <i>Brevin K, Kibet and Kebenei William</i>
1640 - 1700	Effects of Automated Security System in Dissemination of Registry Records at Uasin Gishu County Registry System <i>Christine Obwogo, Phylis Chelangat, and Christine Chepchirchir</i>
1700-1720	Adoption of Technology in the Land Survey Sector a Case Study of Uasin Gishu County <i>Shalin Jebet Rotich</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (H)

SUB-THEME V: CROSS CUTTING- EDUCATION AND TRAINING

Venue: JL 19

Chair: *Prof. Koech*Rapporteur: *Mildred Limo*

TIME	TITLE
1400 - 1420	Models and Structures for Dual Technical and Vocational Education Training: A Comparative Review Study of the German, Swiss and Austrian Models and their Potential Lessons for Kenya <i>Mark Peter Odero, Fredrick Agengo, and Graham Kituzi</i>
1420 - 1440	Challenges of Mainstreaming Inclusivity and Assistive Technologies in TVET Institutions <i>Andrew Juma Khisa</i>
1440 - 1500	Predictive Modeling of Unemployment Using Machine Learning Techniques <i>Caleb Jumbe</i>
1500 - 1520	Barriers to Book Reading Among TVET Students in North Rift Counties of Kenya <i>Ernest Kipkorir Kurgat</i>
1520 - 1540	Implementation Status of Recognition of Prior Learning by TVET Providers in Kenya <i>Langat, K., Masai, L. K., Mulinge, J. M., and Kemei, M.</i>
1540 - 1600	Role of Guidance and Counseling in Responsiveness towards Alcohol and Drug Abuse in TVET Institutions in Kenya <i>Fred Ododa</i>
1600 - 1620	The Impact of TVET on Income Growth and Employment of Trainees <i>George Oboo</i>
1620 - 1640	Digital Technologies for CBET Implementation in TVET Institutions in Kenya for Employability <i>Monica Wahu Ndirangu</i>
1640 - 1700	Implementation of E-Learning in Technical and Vocational Education Training Institutions in Uasin Gishu County, Kenya: The Role of Organizational Learning Culture <i>Robert Onyango and Sisimwo Faith Maiba</i>
1700-1720	Assessment of Impacts of Dual Training on the CBET Implementation Process <i>Joshua Ochieng Oduor</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (I)

SUB-THEME V: CROSS CUTTING- EDUCATION AND TRAINING

Venue: JL 20

Chair: *Dr. Samikwo Dinah*Rapporteur: *Regina Nyongesa*

TIME	TITLE
1400 - 1420	Science Anxiety and Performance in Secondary School Biology in Bungoma County, Kenya <i>Kennedy W. Nyongesa</i>
1420 - 1440	Analyzing the Effectiveness of Industry-Driven Curricula in TVET: Case of the Kisii National Polytechnic, Kenya <i>Omwoyo Peter</i>
1440 - 1500	Non-Cognitive Skills for Lifelong Learning in Curriculum Development: A Systematic Literature Review <i>Jacqueline Wambui</i>
1500 – 1520	Introduction of Dual Vocational Education and Training in Kenya: Perception of Selected TVET Institutions and Companies <i>Claude Juma Ochuila and Calestus Wanjala Omilo</i>
1520 - 1540	Empowering Climate Solutions through STEAM Education: A Case of Sigalagala National Polytechnic <i>Charleen Andalo</i>
1540 – 1600	An Assessment of Influence on Uptake of Technology and Innovations by Introduction of CBET Curriculum in Kenya <i>Terah Mugendi,</i>
1600 – 1620	Tertiary Trainers Problems in Speaking English and the Strategies they use to enhance their speaking skills in Daily communication in Eldoret National Polytechnic, Kenya. <i>Nyamwaya Judith, Robert Masinde and David Wanyonyi</i>
1620 - 1640	Influence of Individual Factors on Effective Adoption of E-Learning in Kenyan Technical Training Institutions: Case of The Kisii National Polytechnic, Kenya <i>Fredrick Okinda, Ronald Orucho</i>
1640 - 1700	Influence of Teacher Preparation in Teaching Oral Skills in English Language in Public Primary Schools in Ainabkoi Sub-County, Uasin Gishu County <i>Gladys Gesare O. Karani, Florence Okari and Seraphine Chepkosgei</i>
1700-1720	Recognition of Prior Learning (RPL): A Life Changer to Informal and Non-Formal Sector Technicians? <i>Tabitha Wambui Kibuthu</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY ONE: WEDNESDAY, 16TH OCTOBER, 2024

PARALLEL SESSION (J)

SUB-THEME V: CROSS CUTTING- GENDER AND SOCIAL TRENDS

Venue: JL 21

Chair: *Dr. Faith Yego*Rapporteur: *Nancy Sei*

TIME	TITLE
1400 - 1420	Mainstreaming Gender in TVET Programmes through Female Role-Model Intervention for Sustainable Development <i>Jane Pauline Awuor</i>
1420 - 1440	Assessment of Gender Mainstreaming Status in Kenyan TVET Institutions <i>Langat, K., Osawa, W. O., Ambuli, M. A., and Wato, U. B.</i>
1440 - 1500	Effects of Crèches on Parenting Female Trainees' attendance, retention and Performance in TVET Institution in Uasin Gishu County, Kenya <i>Betty Chemutai Terer and Susan Maiyo</i>
1500 - 1520	Gender Attitudes towards Biology Practical and the Influence on Academic Performance in Biology Subject <i>Chemutai Irene Sang and Samikwo Dinah</i>
1520 - 1540	Empowering Women through a Sustainable Blue Economy <i>Fredrick Oluoch Orwa</i>
1540 - 1600	Enhancing Women's Safety in Kenya: Adoption of Anti-GBV Clothing for Personal Security in the Face of Femicide and Gender-based Violence <i>Betty Oganda</i>
1600 - 1620	Profile of Tour Operators' Sustainable Environmental Practices and Visitor Choice Behavior in Narok County, Kenya <i>Grace Wanjiku Ndegwa</i>
1620 - 1640	Assessing the Socio-Economic Implications of Sewer Line System Blockage: Insights for Sustainable Urban Development <i>Otieno Evance Oloo</i>
1640 - 1700	Effects of Athletics Sport Competitive Events on the Performance of Para Athletes in Kenya <i>John K. Kiptembur, Wambui Ng'ang'a, and Robert Otuya</i>
1700-1720	Reflecting on Kenya's Sustainable Development Journey <i>Enock Kiprono Ngeny</i>
1720 - 1800	HEALTH BREAK
1800	END OF DAY ONE

DAY TWO: THURSDAY, 17TH OCTOBER, 2024

PLENARY SESSION

TIME	ITEM
0800 - 0830	<ul style="list-style-type: none"> ◆ Registration of participants at the reception Desk ◆ Tour of exhibition and skills show tents <div style="text-align: right;"> <p>Invited Guests</p> <ul style="list-style-type: none"> ◆ Arrival and Signing of visitors' Book </div>
0830 - 1030	PLENARY PRESENTATIONS
	<p>Keynote Presentation and Panel Discussion</p> <p>Venue: The Dome</p> <p>Director of program: Mr. Emmanuel Meres, The Deputy Principal Administration.</p> <p>Session Chair: Dr. Faith Yego</p> <p>Rapporteur: Dorice Koech</p> <p><u>1st Keynote presentation</u></p> <p>“Bridging the Gap: From Innovations to Solution” By Dr. Cecilia Rolence China</p> <p><i>Lecturer at the Nelson Mandela African Institution of Science and Technology (NM-AIST)</i></p> <p><u>Panel Discussion</u></p> <p>“Revolutionizing Kenya’s Education Landscape through Innovative Online Programs, Recognition of Prior Learning (RPL), Industrial linkages and the Promotion Startups.”</p> <p>Moderator: Angela Vwamula Musiega</p> <ol style="list-style-type: none"> 1. Prof. Thomas Kimeli Cheruiyot, PhD – VC UoE 2. Prof. Elijah I. Omwenga – VC (Ag) Open University of Kenya 3. James Mwangi – Deputy Principal Academics TENP 4. Kevin Rotich- Team Lead -TVET Expert-GIZ 5. Magdaline Chepkemoi- EldoHub
1030-1100	HEALTH BREAK
1100-1200	Exhibitors and Partners
1200-1330	<p><u>2nd Keynote presentation</u></p> <p>“Business Solutions, Entrepreneurship and Governance” By Dr. Joe Bonga-</p> <p><i>Founder and CEO Africa for SDGs.</i></p> <p><u>Official closing Ceremony by Chief Guest</u></p>
1330	LUNCH BREAK

ABSTRACTS

SUB-THEME:
CLIMATE SMART AGRICULTURAL
TECHNOLOGIES

The Role of Educational Systems as a Community-Centered Initiative in Restoring Aquatic Ecosystem: A Case Study of Mbita Beach

**Violet Atieno^{1*}, Ochieng Mary Mercy¹, Gabriel O. Ng'ong'a¹, Anne Auma Ogwari¹,
Sawanda K'odera¹**

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Abstract

Aquatic pollution has been a heightening danger for several decades in Kenya. The aquatic environment has suffered momentous issues of pollution as a result of; oil spillage, plastic debris washed in the shoreline, domestic wastes, and illegal fishing. Despite the fact that Kenya has undertaken a collaborative approach like Kenya Constitution 2010 to ensure a safe and clean environment, the National Aquatic Litter Management Authority still reports that by 2030 the action plan on the national strategies for waste management in the water bodies could be executed. This research hence examined the role of educational systems as a community-centred initiative in restoring the aquatic ecosystem in Mbita Beach. The study employed a cross-sectional survey, where data was collected through structured questionnaires among 375 people living around Mbita Beach. Data analysis was done using IBM SPSS software version 25.0. Descriptive statistics was used to analyze the effects of domestic and industrial wastes on the water body whereas the relationship between these factors and aquatic life was established by Chi-square (χ^2) tests. A greater portion (81.2%) of Mbita residents acknowledged that they were uninformed about the impact of pollution on the aquatic environment as compared to 19.8% who had basic information on the same. A significant association existed between harmful activities and the condition of the aquatic ecosystem (P- value = 0.041120193). This study reveals that unawareness of the impact of waste on aquatic ecosystems is a major contributing factor to water pollution. Consequently, educational systems should emphasize training the community on the consequences of waste on aquatic ecosystems.

Keywords: Aquatic Ecosystem, Educational System, Community-Centred, Water Pollution

The Role of Agro Technology (Soil pH Testing) in Achieving High Crop Yield in the Rural Areas – A Case Study of Bondo Sub County

**Violet Atieno^{1*}, Ochieng Mary Mercy¹, Gabriel O. Ng'ong'a¹, Anne Auma Ogwari¹
Daniel Onyango¹ Sawanda Koderi¹**

¹Bondo Technical Training Institute (BTTI) P.O Box 377-40601, **BONDO KENYA.**

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Abstract

The main source of food for 80% of people in the rural population in Kenya depends on agriculture; nevertheless, close to half of the population of the country constantly lives below the poverty line as stipulated by KNBS, 2008. Food production has not been equivalent to the increasing population pressure each day in recent decades, this has resulted in continued food insecurity within the country, particularly the populations in the arid and semi-arid areas. Limited practice of agro-technology and lack of knowledge on precision cultivation e.g. soil pH could be part of the causal factors of the low yields. This research hence examined the role of agro-technology (soil pH testing) to prompt high yields. Using interview schedules, in-depth and topsoil samples were collected from 5 five different large-scale farming sites within the 5 wards of Bondo Sub County. Through the experiment, a DIY kit was used to determine the pH of the soils. The relationship between Soil pH results and crop yield was analyzed using the Multivariate analysis. The average soil pH in the 5 wards ranged from 3.5 to 4.9; which indicated that various soils in Bondo Sub County are highly acidic, with a p-value ($p < 0.0001$). The crop yields reduced from 60% to 30% of 50 Kg of bags harvested from the previous year. This study hence recommended appropriate maintenance of a favourable soil PH, which significantly boosts soil fertility and increases crop yields in Bondo Sub County.

Keywords: Agro Technology; Food Security; pH Testing; Precision Agriculture; Techniques

Effect of Adapting Hydroponic Farming on Sustainable Agriculture in Uasin Gishu County

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Abstract

This study examines the impact of adopting hydroponic farming on sustainable agriculture in Uasin Gishu County, a region characterized by agricultural significance in Kenya. Hydroponic farming, known for its soil-less cultivation method and efficient resource utilization, has the potential to revolutionize agricultural practices in the county. The research focuses on evaluating the effects of this innovative farming technique on sustainability, economic viability, and food security within Uasin Gishu County. The study was guided by the following objective: To evaluate the ease of adopting hydroponic farming technologies for farmers in Uasin Gishu County. The study also explores environmental benefits, such as water conservation, reduced land usage, excessive use of chemical fertilizer and lower pesticide reliance, thus more sustainable practices. Moreover, the research addresses social and cultural factors, assessing the acceptance of hydroponic farming among local farmers and communities. Through field surveys interviews with stakeholders, and analysis of existing hydroponic projects in the county, this study provides a comprehensive understanding of the challenges and opportunities presented by hydroponic farming. The findings reveal that the adoption of hydroponic farming in Uasin Gishu County requires significant investment and technical training, it offers substantial benefits in terms of yield improvement, resource efficiency, and environmental sustainability. It was concluded there is no other choice but to adopt soil-less farming to ensure food security and quality production. Recommendations include the need for government support, capacity-building initiatives, and the development of affordable hydroponic technologies to ensure wider adoption. By addressing these factors, Uasin Gishu County can leverage hydroponic farming to enhance its agricultural sustainability, boost local food production, and contribute to overall food security.

Keywords: Hydroponic Farming; Sustainable Agriculture; Soil-less; Farming Techniques; Economic Viability.

Effects of *Spodoptera frugiperda* (Fall Army Worm) Larva on *Zea mays* (Maize) Yield and Control Strategies Awareness among Farmers in Rural Africa: Case Study of Bondo Sub-County, Kenya

Ouko Emanuel^{1*}; Sawanda K'odera¹, and Ouku Faith¹

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Abstract

Kenyan Agriculture has faced a lot of challenges caused by various invasive insect crop pests. This has threatened the efforts of the Kenyan government in actualizing Sustainable Developments Goals (SDGs) towards agriculture. Invasion of insect pests in sub-Saharan Africa, particularly on cereals crops is one of the major threats to their effective utilization. Although several methods have been utilized towards the control of these pests, optimum utilization is still a challenge. This is because Integrated Pest Management (IPM) strategies have been underexplored by the farmers. A survey was conducted in Bondo Sub-County, Kenya, among maize farmers using a questionnaire to evaluate the level of awareness about FAW among farmers, control strategies practiced by farmers in eradicating FAW in farms and the effects of fall armyworm on maize yield. Among 62 respondents spread across the entire Sub-County, 40% of the respondents first learnt about FAW in the media (Radio, TV, internet and newspapers) and 60% learnt about FAW when their farms got invaded. 58% of respondents use insecticides in controlling FAW in their farms, 9.7% apply biological control strategies while 21 % use both chemical insecticides and biological control methods. However, approximately 29% of farmers are not sure of effective control strategies of FAW in farms. From the survey, it was established that the average bag of maize (50kg) produced per acre in the Bondo sub-county when there is no invasion of fall armyworm is 45 bags. However, when farms are invaded the average number of bags that can be produced in a single planting season is 37 bags. A paired t-test statistical analysis was used to establish if there was a significant difference in the average no. of bags of maize produced before and after FAW invasions. At $\alpha = 0.05$, t score was found to be 9.66 with a corresponding p -value < 0.00001 . The result was found to be significant at $p < 0.05$. From this study, it is clear that there is a need to strongly sensitize farmers about FAW management. We recommend to the Ministry of Agriculture of the Republic of Kenya, NGOs and international bodies dealing with agriculture to prioritize sensitizing farmers in the Bondo sub-county on appropriate FAW management strategies and best farming practices that are eco-friendly.

Keywords: Invasive Insects; Sustainable Development; Integrated Pest Management; Cereal Crops; Fall Army Worm.

Impacts of Microcredit Access on Climate Change Adaptation Strategies Adoption and Tomato Yield in Kabomoi, Uasin Gishu, Kenya

Shadrack Limo^{1*}

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Abstract

Access to microcredit has garnered significant attention, yet its impact on the adoption of climate change adaptation strategies and crop yield remains underexplored. This study examines the effects of microcredit access on the adoption of climate change adaptation strategies and the tomato yield in Kabomoi, Uasin Gishu, Kenya. Utilizing a multistage sampling procedure, 320 tomato farmers were selected for the study. Data were analyzed using the Multivariate Profit regression model, the Poisson regression model with endogenous treatment, and the Endogenous Switching Regression Model. The findings reveal that age, educational status, household size, farm size, and years of farming experience significantly influence the adoption of climate change adaptation strategies. Access to microcredit substantially enhances the adoption of key climate change adaptation strategies, including irrigation, high-yield seeds, fertilizer use, and pest and disease management. Ranked by importance, the most adopted strategies were high-yield seeds, irrigation, fertilizer use, and pest and disease management. Access to microcredit significantly intensifies the adoption of these strategies and positively impacts tomato yield. Therefore, policies that enhance access to microcredit should be promoted to improve climate change adaptation and crop yield among tomato farmers.

Keywords: Microcredit; Climate Change; Crop Yield: Tomato Farmers

Techno-Economic Survey on Sweet Sorghum Potential for Climate Smart Agro-processing in Kenya

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Abstract

Despite existing evidence that sweet sorghum has the potential to improve food security, provide animal feeds, as well as replace sugarcane in sugarcane processing zones in Kenya amongst other benefits, not sufficient research has been done to authenticate the exact commercial value attached to the climate-smart crop in the face of real challenges of climate change. This study focuses on the potential of sweet sorghum for growth in climate-smart agro-processing in Kenya. It employs an exploratory survey based on best-case studies, and technology transfer potential, and establishes the economic viability of the various products that can be processed from sweet sorghum. The values of extractable, processable products from sweet sorghum are deduced based on best-case scenario agro-technical practices as well as models for potential agro-processing which is compared to existing replaceable products already in the market, or improved forms of the products. It establishes that sweet sorghum syrup, fortified honey, jaggery sugar, fuel ethanol, animal feeds, organic fertilizer, and sorghum grain/ flour are some of the products that can be derived from the sweet sorghum value chain. The list can be longer with the various potential derivatives of the syrup like candies (toffees) and other molasses-based functions. Various industries involved in the production of conventional products were surveyed to authenticate the sources of their raw materials for deduced potential sweet sorghum industrial products. The study further explored technical challenges related to the products and how they can be navigated. Based on a modelled size of 20 hectares' coverage with the assumption of optimal production, exact quantities of agricultural and agro-processing outputs are mathematically computed, giving a hint of the economic feasibility when the products' values are compared with existing market values. An exploration of the model agro-process set-up is hinted at based on industrial principles and a conclusion on the potential for sweet sorghum in climate-smart agro-processing is deduced.

Keywords: Climate Smart; Agro-processing; Sweet sorghum; Industrial potential

The Impact of Inclusive Approach towards Sustainable Blue Economy Initiatives**Daniel Onyango^{1*}, Walter Omog¹**¹Bondo Technical Training Institute, P.O. Box 377- 40601, **BONDO, KENYA.*****Corresponding Author Email:** onyangod67@gmail.com**Abstract**

Blue economy entails various aquatic activities that intend to improve the livelihood of communities. The blue economy sector has a prospect of growth and development and for that reason; most governments have taken measures to ensure the sustainability of such resources as guided by the available policy frameworks. People living around the aquatic resources have always prioritized their financial gains at the expense of the preservation of the aquatic ecosystems. This research explored how to achieve sustainable blue economy initiatives using an inclusive and community-driven approach. It assessed how the participatory and inclusive approach complies with the available environment protection guidelines as it solves the individual interests of the community stakeholders. This information can be used by government agencies, policymakers and blue economy stakeholders to achieve an environmentally compliant sustainable blue economy. To investigate the various blue economy strategies employed in the Usenge landing site in Bondo Sub County data was collected using a case study and holding interviews with the blue economy stakeholders to gather information relevant to the research. Questionnaires were administered to 368 respondents. A significant chi-square result ($\chi^2 = 0.97$, $p\text{-value} = 0.032$.) indicated a significant association between the participatory approach and compliance levels. Further analysis showed that this approach had a higher compliance with the environmental regulations. This research also identified factors that promote community inclusion and the role community members play in the blue economy initiatives.

Keywords: Blue Economy; Sustainability; Community-Driven; Inclusivity; Environment Regulations.

Regenerative Agriculture for Environmental Sustainability: A Case Study of Nyeri County

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Abstract

Regenerative agriculture represents a transformational approach to farming that prioritizes soil health, biodiversity, and ecosystem balance. This green technology focuses on sustainable practices that restore and enhance agricultural ecosystems, rather than depleting them. In Nyeri County, Kenya, regenerative agriculture has shown significant promise as a sustainable solution to the environmental and agricultural challenges faced by local farmers. By employing methods such as crop rotation, cover cropping, minimal tillage, and agroforestry, farmers in Nyeri are witnessing improved soil fertility, increased crop yields, and enhanced resilience to climate change. This case study explores the implementation of regenerative agriculture in Nyeri County, examining its impacts on soil health, water management, and socio-economic benefits for the local farming communities. The study reveals that the adoption of regenerative practices has led to a marked improvement in soil structure and organic matter content, which in turn enhances water retention and reduces erosion. These benefits are crucial for Nyeri's predominantly smallholder farmers, who rely on the land for their livelihoods. The economic analysis within the case study indicates that regenerative agriculture has the potential to increase farmers' incomes by reducing input costs and improving crop diversity and productivity. In conclusion, the case study of Nyeri County demonstrates that regenerative agriculture is not only an effective green technology for sustainable farming but also a viable pathway for rural development and environmental conservation.

Keywords: Regenerative Agriculture; Green Technology; Biodiversity; Sustainable Farming; Climate Change; Environmental Conservation.

Harnessing Agrivoltaic Systems for Climate Smart Agriculture in Kenya**Isaiah Ong'ong'a^{1*}**¹The Kisumu National Polytechnic- Kenya***Corresponding Author Email:** isaiah.ongonga@kisumupoly.ac.ke;
info@kisumupoly.ac.ke**Abstract**

Food, energy security and self-sufficiency are the main drivers of modern economies. Photovoltaic installations offer more sustainable solutions to satisfying energy requirements; however, they also need land. In order to solve this dilemma, agrivoltaics has been proposed. This research focuses on the applicability of agrivoltaic systems as a smart tool for simultaneously producing food and energy on the same piece of land. Agrivoltaics, which integrates photovoltaic power generation with agricultural activities, is considered to be the novel and a highly promising technology to optimizing land use in Kenya's diverse climates. The paper aims to recommend an appropriate agrivoltaic system customized to Kenya's agricultural landscape, with an emphasis on crops and livestock grazing. By analyzing the existing methods, technologies, and system architecture, the study highlights how agrivoltaics can contribute to food, water, and energy security in Kenya. It examines the effects of photovoltaic panel shading on crop yield and the benefits of semi-transparent photovoltaic materials, which allow for more efficient land use. In addition to enhancing crop production, agrivoltaic systems can mitigate the effects of dust and improve solar panel performance, making them well-suited to Kenya's varied environments. The study gives a comparative analysis of the most relevant technologies and system characteristics, providing insights into how such systems properly be implemented in Kenya to support sustainable farming practices and electricity production using new energy generation methods.

Keywords: Agrivoltaic; Photovoltaic (PV); Solar Power; Smart Agriculture; Food Production; Electricity Generation

Utilization of Sodom Apple (*Solanum incanum*) as a Pesticide and Insecticide in Agriculture

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Abstract

The increasing concern over the environmental and health impacts of synthetic pesticides has led to growing interest in plant-based alternatives. *Solanum incanum*, commonly known as Sodom apple, has shown potential as a natural pesticide and insecticide due to its rich composition of bioactive compounds, particularly alkaloids, saponins, and flavonoids. These compounds exhibit strong insecticidal, antifungal, and antibacterial properties, making Sodom apple a promising candidate for pest management in agriculture. This review explores the use of Sodom apple as a bio pesticide, focusing on its mode of action, preparation methods, and potential benefits in controlling pests and plant diseases. The plant extracts, derived from leaves, fruits, and roots, have been found to be effective against a variety of agricultural pests such as aphids, caterpillars, and beetles, as well as pathogenic microorganisms responsible for plant diseases. Furthermore, the application of Sodom apple as a pesticide provides an environmentally friendly alternative to chemical pesticides, reducing the risk of soil contamination and biodiversity loss. However, the paper also highlights the need for further research to evaluate the optimal concentrations, application techniques, and potential effects on non-target organisms like pollinators and beneficial insects. In conclusion, Sodom apple presents a viable, sustainable option for pest management in organic and ecological farming systems. Nonetheless, large-scale field trials and regulatory assessments are necessary to confirm its efficacy and safety before widespread adoption in agricultural practices.

Keywords: Chemical Pesticides, Efficacy, Plant Extracts, Synthetic Pesticides, Large-Scale Field

Assessment on Climate Smart Agriculture Technologies and Innovative Indigenous Knowledge on Food Production by Small Scale Farmers in Laikipia County, Kenya

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Abstract

Globally, food insecurity has been one of the major challenges ailing people especially in developing countries. This is an ever-expanding threat with detrimental effects on people's social economic welfare affecting gross domestic per capita of an individual country. Several researches on food insecurity have been carried out world-wide revealing that one of the major causes is climate change. Other factors documented to contribute to low food production in agricultural sector include lack of access to modern farming technologies practices, pest problems among others. In Africa, climate smart agriculture (CAS) technologies have been one of strategy practice to curb the shortage of food. In Kenya, government has put in place bodies such as Kenya agricultural and livestock research organization (KALRO) whose mandate is to regulate all aspects of research in agriculture and livestock development and promote the application of research findings, technologies and innovations. Despite research and educative campaign to the farmers on CAS, food insecurity continues to be a great challenge in the country especially in the semi-arid areas. This formed the basis of this study which aimed at assessing if small scale farmers in Laikipia County had knowledge on climate smart agriculture and also evaluate the indigenous methods used by farmers. Survey questionnaires and informal interviews was used as the data collection tools. The data was analyzed and presented using descriptive statistics. Findings revealed that 95 % of the small-scale farmers have no knowledge on climate smart agriculture, 70% of the farmers inadequately use amalgamation of traditional, indigenous and conventional methods. On the other hand, 100% farmers interviewed reported inadequate food production hence poor social economic status. The overall conclusion is that climate smart agriculture is still a new term to farmers, innovative indigenous knowledge which are eco-friendly and costs effective are not adequately used by farmers. This study recommends the relevant authority to reach out small scale farmers who comprise the great percentage of population in Kenya and educate them on CAS and innovative indigenous methods of farming to curb food insecurity.

Keywords: Climate Smart Agriculture (CAS), Food Insecurity, Indigenous Knowledge

Influence of Market Intelligence on the Success of Pisciculture Project among Youth Groups in Trans Nzoia County, Kenya

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Abstract

Worldwide, pisciculture has significantly grown over the past half-century to around 52.2 million tonnes in 2008 into US\$98.5 billion. Kenya's agriculture sector is the largest foreign exchange earner taking 10 percent of annual economic growth, with horticulture taking 4 per cent making it a popular industry for providing informal self-employment and income-generating opportunities. The purpose of the study was to examine the extent to which market intelligence influences the success of pisciculture projects among youth groups. The study was guided by the theory of production. The study adopted a descriptive research design where the target population of the study was 1025 individuals consisting of 1020 youths from 102 youth groups and 5 key informants from the county government agricultural department. Using Yamane's formula of sample size determination 288 respondents were selected. Simple random and purposive sampling techniques were used to sample the youths and agricultural officers respectively. The data was collected through the use of questionnaires and interview schedules. The data collected was analyzed using descriptive statistics as well as inferential statistics. The composite mean of 3.057(SD=1.491) showed that the youths have neutral market intelligence skills in their pisciculture projects. Marketing intelligence skills have a significant influence on the success of pisciculture projects among youth groups, $t(267) = -5.814, p < 0.05$. The government can also promote pisciculture farming in vulnerable rural communities by providing funding and capacity-building programmes and youths should be provided with the necessary market intelligence skills.

Keywords: Pisciculture, Horticulture, Market Intelligence, Youth-Groups

Homestay Tourist Accommodation as Promotional Tool for Local Food Production in Uasin Gishu County

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Abstract

In Kenya, achieving food security has been challenging, with small-scale farming contributing about 75% of the total agricultural output. To ensure food security in the country, it is crucial to prioritize the welfare of small-scale farmers who offer homestay tourist accommodation services. Unfortunately, despite many research identifying various intervention for improving food production in Kenya, there has been limited knowledge on the role of homestay tourist accommodation in promoting food production in rural areas. Therefore, the current study explored types of food produced for homestay tourist accommodation, the tourist experience of locally produced food and its influence in promoting local food production in Uasin Gishu County. The study purposively sampled 78 homestay tourist accommodation services providers and 12 tourists in rural areas in Uasin Gishu County, Kenya. The study was anchored on Skinner's theory of motivation. A descriptive research design was employed. Data was collected using both open and close-ended questionnaires and interview schedules. Data was analyzed using descriptive statistics. Qualitative data was thematically coded and analyzed through text analysis. Findings showed that there was a positive significant relationship between tourist food experiences, satisfaction and local food production. Descriptive results showed that food that had high experience and satisfaction among tourist were highly produced. Some of the tourists suggested donor support toward increasing some of the local foods produced in Uasin Gishu County. The findings imply that promoting local food production can be a win-win situation for both the tourism industry and the local community in Uasin Gishu County. By offering authentic and locally sourced foods to visitors, the tourism industry can attract more visitors and generate economic benefits for the local community. At the same time, increased demand for local foods can help to support local farmers and producers and preserve traditional culinary practices.

Keywords: Homestay Tourist Accommodation, Local Food Production, Tourist Experience

The Assessment of an Automated Poultry Feeder with Intrusion Alert in Poultry Farming for Optimized Production.

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Abstract

The huge cost labour demand associated with the deep litter system of poultry farming poses a great challenge to poultry farmers. Poultry farm attendant has to get directly involved in feeding and giving water. This project helps to feed and water chicken automatically and conserve electric power that can be powered by solar energy. Over-involvement of humans in almost all aspects of operation of the manual feeding pattern consequently increases disease outbreak, weakness and poor bird growth. The proposed system mimics the roles of real-life poultry attendants in delivery of feed and water to birds at specified interval of time. The system senses the level of feed and water in the respective trough and intelligently dispense water and feed in response to the sensed levels. The proposed system is able to send a short message alerts in case of farm intrusion as well as it alerts the attendant when feeds and water levels have dropped in main collection chamber. It is designed to be an easy to operate mechanism whether by a child or an old man. The objectives of the study are to design and fabricate an automated poultry feeder, an intrusion alarm and easy to operate litter disposal mechanism. This study utilized a quantitative-experimental research design. The system senses the level of feed in the respective trough and intelligently dispense feed in response to the sensed levels.

Keywords: Automation, Feeding System, Poultry Farm, Sensors, Micro controller, labour, Automation.

SUB-THEME:
BUSINESS SOLUTIONS,
ENTREPRENEURSHIP AND
GOVERNANCE

Mapping Important Bird Priority Areas for Green Skills Entrepreneurship in Kwale County

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Abstract

Economies of the world and workforce levels of skills are changing rapidly. The spread of new technologies redefines what skills workers need to remain productive. Technical and Vocational Education and Training (TVET) is an educational stream that provides vocational skills to youth and produces a skilled workforce for the industry. New skills in emerging areas, transversal skills such as problem-solving, and cross-occupational competencies in areas such as entrepreneurship, will be demanded more frequently. The purpose of this paper was therefore to use GIS to map IBA for green skills entrepreneurship in Kwale County. This study presents a proximity analysis approach of GIS using the weighted sum model (WSM) where a mapped feature of three factors that have a high impact on IBA to assess their spatial relationship in distance with its neighbours, thus enabling suitable site selection for IBA green entrepreneurship. These data included administrative boundary maps, forest, IBA status, mangroves, rivers, dolphin breeding sites, and corals. Based on the results, areas such as Kasemeni, eastern parts of Kinango, Ngombeni, Waa, Tshimba, and Tiwi show suitability for IBA improvement and should be prioritized towards green entrepreneurship efforts of IBA by county agents and stakeholders. The information is useful for the collection and dissemination of data on emerging skills for planning, critical for future-oriented TVET programmes. Thus, the study recommended green skills entrepreneurship education should be given high priority in TVET, schools, community site support groups and beach management units; and integrating green entrepreneurship with economic development training on eco-tourism for sustainable development.

Keywords: IBA conservation, GIS, proximity analysis, TVET greening, TVET future, green skill

**Influence of Staffing Policy on Trainer's Efficiency in Technical and Vocational
Training Institutions in Uasin Gishu County, Kenya**

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Abstract

This study examines the impact of institutional staffing policies on the efficiency of trainers in public Technical and Vocational Training Institutions in Uasin Gishu, Kenya. The study was conducted based on resource dependence theory. The population under consideration consisted of 300 tutors, and a sample of 171 tutors was picked using the method of simple random selection. The questionnaires served as devices for collecting data. The data was analyzed using descriptive statistics, specifically means and standard deviation, as well as inferential statistics, specifically Linear Regression. The regression coefficient $R^2 = 0.473$ indicates that the staffing policy accounts for 47.3% of the variation in trainer efficiency in TVET institutions. The findings indicated that the staffing policy had ($\beta=0.736$) a notable impact on the efficiency of trainers in Technical and Vocational Training Institutions. The study determined that implementing an appropriate staffing policy, hiring personnel with the necessary qualifications, and effectively motivating them will significantly influence the efficacy of trainers in Technical and Vocational Training Institutions. The study suggests that management of Technical and Vocational Training Institutions should strictly follow the protocols for recruiting and assigning staff members to their respective areas of expertise. This practice would enhance staff motivation and facilitate the effective transfer of knowledge to trainees. The report also recommends that institutions rigorously comply with government norms and laws on staffing, as this will improve their effectiveness.

Keywords: Staffing Policy, Trainer's, Efficiency, Technical and Vocational Training Institutions

Effect of Employee Diversity on Organization Performance among Public Technical Institutions in Uasin-Gishu County

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Abstract

The purpose of this study was to investigate the effect of employee diversity on organizational performance among public technical institutions in Uasin-Gishu County. The following was the research question; what is the effect of age on organization performance among public technical institutions in Uasin Gishu County? The researcher adopted a descriptive survey design. This research design was used because it allowed the researcher to gain a deeper insight into the topic of study. The study targeted a population of 187 composed of staff from public technical institutions in Uasin Gishu County. In this study, the researcher used simple random sampling to select the sample size of the study, which constituted 30% of the population. This was done through simple random sampling. Data analysis took the form of descriptive research which involved the use of figures to describe the population. Descriptive statistics were used because of the ability to provide simple summaries of the sample and the measures. Being that the researcher was interested in describing the respondent characteristics, this method was viewed as appropriate. Based on the findings, 65.8% of all the respondents agreed that employees are from many age categories. Training and other opportunities are made available for employees from all age groups. This shows that age diversity is an important component of an organization. It was concluded that the success witnessed in terms of customer satisfaction can be attributed to all the employees. The study recommends that it is important to ensure that there is age diversity at all times, especially for proper succession planning within public technical institutions. It was recommended that the same study should be done in other counties in Kenya as this will help to identify if other regions have similar or different levels of diversity.

Keywords: Employee Diversity; Organizational Performance; Public Technical Institutions; Descriptive; Training.

Assessing the Role of TVET in Promoting Green Entrepreneurship in Northern Kenya**Ernest Kipkorir Kurgat^{1*}**¹The Eldoret National Polytechnic, P.O. Box 4461-30100, **ELDORET - KENYA**.***Corresponding Author Email:** ernestkgt@gmail.com**Abstract**

The role of Technical and Vocational Education and Training in fostering green entrepreneurship is recognized as essential for sustainable development. The study examined the impact of TVET programs on promoting green entrepreneurship in Northern Kenya, a region characterized by unique environmental challenges and socio-economic dynamics. The study utilized a mixed-methods approach and gathered data through surveys, interviews, and case studies from TVET institutions, students, and local entrepreneurs across the region. The findings indicate that TVET programs in Northern Kenya have begun integrating green skills and sustainability concepts into their curriculum, with varying degrees of success. Key areas of focus included renewable energy and sustainable agriculture. Students equipped with these skills demonstrated significant potential in initiating green businesses, contributing to both environmental sustainability and economic development. However, the study also highlights several barriers hindering the full realization of TVET's potential in this context. These barriers include inadequate funding, limited access to modern training facilities, a shortage of qualified instructors with expertise in green technologies, and insufficient collaboration between TVET institutions and the local business community. To overcome these challenges, the study proposed several strategic interventions. Increasing investment in TVET infrastructure and resources is critical, along with enhancing the capacity of instructors through specialized training in green technologies. Strengthening partnerships between TVET institutions, local enterprises, and government agencies can facilitate the development of relevant curricula and provide students with practical exposure to green entrepreneurship. Additionally, promoting awareness within the community can create a supportive ecosystem for budding entrepreneurs. By addressing these challenges and implementing the recommended interventions, TVET can play a pivotal role in nurturing green entrepreneurs and driving sustainable development and resilience in the region.

Keywords: TVET, Green Entrepreneurship, Sustainable Development, Environmental Sustainability, Vocational Training.

Analyzing the Contribution of Public Works Management Challenges to Poor Quality of Construction Works in Public Learning Institutions in Baringo County, Kenya

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Abstract

Public works management is critical to construction projects in public learning institutions in Kenya. Many completed construction projects in this sector are of poor quality. The contribution of public works management to poor quality of work is not understood. The purpose of the study was to assess how public works management challenges contribute to the poor quality of construction works in public learning institutions in Baringo County, Kenya. Objectives of the study included; determining how inaccurate designs; incomplete designs; inaccurate bills of quantities; untimely supervision of works; and, premature terminal evaluation and issuance of completion certificates, contribute to poor quality of construction projects. The study was anchored on the theory of discounted cash flow. The research design was a descriptive survey with quantitative data. The target population was 1895 with a sample size of 950 individuals. The sample was obtained from among the heads of public learning institutions, construction project PMC chairpersons, sub-county public works officers, NG-CDF fund managers, county director of TVET and county director of primary and secondary education together with contractors who had recently participated in construction works in schools and colleges. A process of multistage random sampling was applied. Research instruments included a questionnaire, an interview schedule and an observation checklist. Research instruments were pretested for validity and reliability. Analysis of data was conducted for descriptive statistics and by linear regression. All independent variables demonstrated a reasonable capacity to account for variations in the quality of construction works. Inaccurate designs had the lowest standardized beta at 0.182. Incomplete designs realized the greatest standardized beta (0.228). The correlation between all the independent variables and the quality of work was high ($R^2 > 0.958$). Collinearity between independent variables was far below the 0.8 tolerance limit (0.086-0.110). All results were statistically significant at a 95 per cent confidence level. It was concluded that all five public works management challenges studied significantly affected the quality of construction works in public learning institutions. The public works department should be facilitated to eradicate the stated challenges.

Keywords: Inaccurate Designs; Incomplete Designs; Inaccurate Bills of Quantities; Untimely Supervision of Works.

Effect of Safety Protocols on Employee Performance among Star-Rated Restaurants of Nairobi City County, Kenya

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Abstract

Although workplace safety has been widely researched, its effects on employee performance are not clear. However, global outlets that have well-established workplace safety management strategies report high performance that is attributed to employees. Most catering outlets in third-world countries that adopt varied safety management strategies on the other hand report low to moderate performance. Findings on workplace safety protocols in these countries are also limited. The specific objective of the study is; to establish the effect of safety protocols on employee performance among star-rated restaurants in Nairobi City County. The study adopted a cross-sectional research design. In Nairobi City County, there are 1635 restaurants whereas 117-star rated restaurants were selected. The target population of the study was 468 respondents consisting of restaurant: human resource, service, production and stores heads of departments. The sample size of 216 was determined using Yamane (1960) while stratified sampling techniques were used to derive the sample from the target population. Data collection tools included questionnaires, where data collected was screened, and analyzed using descriptive (frequencies, percentages, mean, variance) and inferential statistics (Pearson Moment Correlation coefficient). Data presentation was in the form of frequency distribution tables, graphs, and charts for an insight into the variables of the study. Descriptive findings showed work safety protocols influence employee performance in the workplace. The correlation analysis findings showed a positive close relationship between work safety protocols and employee performance. In conclusion, work safety protocols affect employee performance. The study recommends that the human resource department in restaurants incorporate safety training and policies in their human development programmes.

Keywords: Employee's Performances; Workplace Safety; Star-Rated Restaurants; Safety Protocols.

Significance of the Auditing Control on Financial Performance of Financial Institutions**Kimitei Oliver^{1*}**

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Abstract

In order to secure consistent good financial performance appropriate good management practices and audit services are needed to guarantee sustainable good results through optimal use of resources. For purpose of this study was to determine the impact of audit services on the financial performance of commercial banks in Kenya. Audit services that were used were international auditing standards, professional competence, internal controls, independence of auditors, various audit services bank liquidity and reported fraud levels. The study used a sample of 20 respondents who were senior managers selected from 20 banks located in Nairobi. The researcher used questionnaires to collect data from the respondents. Secondary data was sourced from the respective banks' websites for periods 2013 through 2017. Methods of analyzing data that were applied were quantitative and regression analysis. It was established that liquidity and fraud didn't frequently have a direct positive association with financial performance. Also, it was found that change in audit services results in changes in the financial performance of commercial banks. It is recommended that the management of commercial banks adopt audit practices that are effective based on international auditing standards, advocate the independence of auditors, and auditors' professional competence and strengthen internal controls and other audit services to secure the financial performance of their organizations.

Keywords: Financial Performance; Management Practice; Commercial Banks; Auditing; Internal Control.

Effects of Internal Control System on the Management of Finances in Public Secondary Schools within Uasin Gishu County Kenya

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Abstract

The purpose of this study was to find out the effects of the internal control system on the management of finances in public secondary schools within Uasin Gishu County, Kenya. The study was guided by the following research question: What are the effects of a controlled environment on the management of finances in public secondary schools within Uasin Gishu County? It was guided by Agency Theory. The sample size was computed using Yamane's formulae to get a sample of 144 respondents. The instrument for data collection was a questionnaire. Data was analyzed using descriptive statistical methods and the measures of central tendency such as mean, mode and standard deviation were used. The study findings indicated that the study variable control environment is effective in the management of finances in public secondary schools within Uasin Gishu County. The study recommended that secondary schools should ensure that aspects relating to control activities are enhanced to ensure the attainment of objectives. The study suggested that future studies should explore the determinants of internal controls to be put in place in the management of finances in both primary and secondary schools. Researchers should go ahead and establish the reasons behind the failure of internal control practices among secondary schools.

Keywords: Internal control system; Control Environment; Management of finances.

**Monetary Policy Transmission Mechanisms and Performance of
Mutual Funds in Kenya**

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Abstract

Using secondary data from the Capital Markets Authority (K) for the periods 2016 to 2020, this study sought to correlate monetary policy transmission mechanisms and the performance of mutual funds in Kenya. The study adopted a positivistic research philosophy and correlational research design through the use of content analysis to evaluate quantitative data. Pooled multiple regression was used for data analysis on a saturated sampling of 34 licensed mutual funds in Kenya. Findings indicated that interest rates had the largest contribution to Return on Investment at 0.633 followed by Exchange rates at 0.578 while bank credit came last at 0.481. These findings inform policy coordination between the national treasury (fiscal policy) and central bank (monetary policy) in the phase of fiscal dominance and activist central banking about non-bank financial intermediation. Similarly, monetary policy actions drive risk-taking behaviour of mutual funds which calls for greater surveillance by prudential and regulatory authorities. Central banks, as regulatory authorities, have to lift the veil off Non-bank financial institutions through macro prudential safety nets to tame systemic risk.

Keywords: Monetary policy Transmission Mechanisms, Fund Performance, Fund Flows, Mutual Funds

**The Role of Public-Private Partnerships in Ensuring Agricultural Development for
Food Security- A Case Study of Machakos County**

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Abstract

Regional smallholder agricultural practices engage various stakeholders across the value chain and policy framework, aligning with Sustainable Development Goal 2 (Zero Hunger). This goal aims to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture. Stakeholder involvement emphasizes value-addition fabrications to enhance economic output across value chains. Effective collaboration among stakeholders, through Public-Private Partnerships with universities, seed companies, and agro-input providers, is essential to prevent resource duplication and maximize impact. The County government underscores agriculture's critical role in food security and economic growth, advocating for coordinated efforts among public and private entities in Machakos County. This approach supports the agricultural sector development strategy, aiming to reduce unemployment, alleviate poverty, and stimulate growth. The forum highlights the need for innovative and cooperative strategies to achieve these objectives.

Keywords: Public-Private Partnerships (PPPs), Agricultural Development, Food Security, Stakeholder Collaboration

Influence of Organizational Fundamentals on Entrepreneurial Success and Sustainability in Uasin Gishu County

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Abstract

This study investigates the influence of Organizational Fundamentals on Entrepreneurial Success and Sustainability in Uasin Gishu County, Kenya. With a growing focus on regional economic development, understanding how organizational fundamentals influence entrepreneurial behavior is crucial for fostering a robust entrepreneurial ecosystem. The research identifies key organizational fundamentals, including leadership, organizational culture, resource availability, and support systems, the objective of the study was to examine the effects of Organization fundamental on entrepreneurial success and sustainability in the county. Descriptive research design was used. The target population was 500 Entrepreneurs and 100 Salaried drawn mainly from business sectors. Multistage sampling was used to sample 50 Entrepreneurs and 10 Salaried respectively. Open and closed ended questionnaires was used and which was self-administered. The findings reveal that effective leadership and supportive organizational fundamentals significantly enhance entrepreneurial behavior by promoting innovation, collaboration, and resilience. Conversely, limited access to resources and inadequate support systems present challenges to entrepreneurial growth. The study highlights the need for targeted interventions to strengthen organizational structures and support mechanisms to boost entrepreneurship in the region. The results have implications for policymakers, business support organizations, and entrepreneurs themselves, offering insights into how core organizational factors can be leveraged to create a more conducive environment for entrepreneurship. This research contributes to the broader understanding of how organizational factors influence Entrepreneurial Success and Sustainability in emerging economies and provides a foundation for future studies in similar contexts.

Key words: Organization Fundamentals, Ecosystem, Entrepreneurs,

**Influence of Psychosocial Hazards on Housekeeper's Job Performance within Selected
Three-Star Hotels in Eldoret City**

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Abstract

Occupational injuries constitute a significant public health issue, with hotel housekeepers being identified as a particularly vulnerable group compared to their counterparts in other departments within the hotel industry. Therefore, the main aim of this study was to establish the influence of psychosocial hazards on housekeeper's job performance. The research design was descriptive survey design. The target population comprised of housekeepers' managers and housekeepers' employees within selected three-star hotels in Eldoret City totaling 100 housekeepers' employees. The study employed a census sampling technique. The data was collected using questionnaires. Quantitative data from the study was cleaned, coded and analyzed through descriptive statistics by the help of Scientific Packages for Social Scientists software (SPSS) and Microsoft excel. Frequencies and percentages of the individual responses were used to interpret the data. The data was presented by use of bar graphs, pie charts and frequency tables. Majority of respondents (73.8%) agreed that working hours are rigorous. Majority 81.8% of participants agreed that housekeepers volunteer for additional work. The study concluded that the psychosocial hazards include long working hours, lack of motivation, and a perceived lack of fair promotion and compensation systems. The study recommend that hotels should also focus on improving employee motivation through recognition, career development, and a positive work environment.

Keywords: Psychosocial, Housekeepers, Job Performance, Hazards

**Digitalization Gig Economy the Future of Work in Africa: A Training Needs Analysis of
Gig Economy Skills of TENP 2022 Graduates**

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Abstract

The advent of online platforms has been considered one of the most significant economic changes. This has led to a gig economy involving the exchange of labor and resources through digital platforms, independent contracting, and freelancing instead of full-time employees. Studies reveal that a staggering 85% of the jobs that will exist in 50 years have not yet been conceived. A study and training gap are needed on the gig economy as a matter of public policy, the future of work, and economic development. The gap is addressed by the following objectives: to assess TENP 2022 graduates interest in gig economy work and to evaluate TENP 2022 graduates' gig economy skills. The target population was 2165 students in the graduating class of 2022, and using Yamane's (1960) formula the sample size was 338 where stratified sampling was employed. An online survey with a structured questionnaire was used, and thereafter, the data was analyzed using descriptive statistics and presented using frequency distribution tables. Findings showed that the majority of the graduates were interested in the gig economy and willing to work 2-3 jobs per month for any job outside their specialty. They are willing to multitask and work remotely. Majority of graduates have technology, multitasking, and time management skills but lack job procurement, saving, and entrepreneurship skills. In conclusion, graduates lack some skills relevant to the gig economy. The study recommends that TVET institutions develop learning modules focusing on the gig economy. Additionally, TVET trainers need to embed certain skills in their course units to address gig economy skills gaps.

Keywords: Gig Economy, Skills, TVET's, Technology, Workforce

Assessing the Socio-Economic and Environmental Impact of Cage Farming on Fisher Folk Livelihoods: A case Study of Ogal Beach, Kisumu County

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Abstract

This study explores the socio-economic and environmental impacts of cage farming on the livelihoods of fisher folk at Ogal Beach, Kisumu County. As cage farming becomes a prevalent aquaculture practice in Lake Victoria, its effects on the income, employment, and resource access of local fishing communities have raised concerns. The primary objective of the research is to evaluate how cage farming influences the livelihoods of fisher folk, focusing on income generation, employment opportunities, and access to traditional fishing grounds, while also assessing the environmental implications of this practice. The study employed a mixed-method approach, combining qualitative and quantitative data collection techniques. Structured questionnaires and in-depth interviews were conducted with fisher folk engaged in both traditional fishing and cage farming, as well as key stakeholders, including community leaders and local authorities. Secondary data was gathered from government reports, academic literature, and relevant studies. Statistical analysis was used to determine the relationship between cage farming and fisher folk livelihoods, while qualitative data was analyzed thematically. The findings indicate that cage farming has significantly boosted fish production at Ogal Beach, leading to increased income and improved livelihood security for those involved in the practice. However, a disparity exists between fisher folk who have the financial capacity to invest in cage farming and those who continue to rely on traditional fishing methods. Additionally, environmental concerns, such as water pollution and restricted access to fishing grounds, were identified as challenges negatively impacting the local community. Growing competition between cage farmers and traditional fisher folk has also attracted more business interest in the area, altering market dynamics. In conclusion, the introduction of cage farming at Ogal Beach has had both positive and negative effects on the fisher folk community. While it provides an alternative livelihood and enhances fish production, it has also led to socio-economic inequalities and environmental challenges. The sustainability of cage farming depends on the adoption of better management practices, equitable access to resources, and effective market regulation. The study recommends the implementation of policies to ensure equitable access to cage farming opportunities, the promotion of sustainable farming practices to minimize environmental harm, capacity-building programs to assist traditional fisher folk in transitioning to aquaculture, and the strengthening of market infrastructure to prevent price volatility. Additionally, community-driven conflict resolution mechanisms should be established to address resource use and access issues. This research offers valuable insights into the potential and challenges of cage farming as a sustainable livelihood option for fishing communities.

Keywords: Fisher folk Livelihoods, Socio-Economic Impact, Environmental Sustainability, Environmental Sustainability, Aquaculture Management

The Role of the Government and TVETs in Enhancing Blue Economy, and Kenya's Economic Growth through Fostered Research and Sustainable Agricultural Development: A Case of the Sigalagala National Polytechnic, and Kenya Marine and Fisheries Research Institute, Kenya

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Abstract

Blue economy has diverse components, including established traditional ocean industries such as fisheries, tourism, and maritime transport, but also new and emerging activities, such as offshore renewable energy, aquaculture, seabed extractive activities, marine biotechnology and bioprospecting. The aim of this paper was to undertake a comprehensive analysis of the role of the government and TVETs in enhancing blue economy, and Kenya's economic growth through fostered research and sustainable agriculture development. This paper used published, unpublished and analyzed data as the key methodological design. The blue economy concept seeks to promote economic growth, social inclusion, and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of the aquatic spaces by supporting various SDGs. It drives Kenya's economic growth, and development, with an estimate of 13,000 metric tons (Ksh. 30 billion) of freshwater fisheries production and 18,000-23,000 metric tons (Ksh. 5 billion) of aquaculture production annually. But we have some challenges to the perspective of blue economy such as frequent floods, marine pollution including ocean acidification and blue carbon, lack of trained personnel, harmonizing sectoral policies, plans and laws, poor ocean governance and political support. Thus, in order to harness blue economy in Kenya, the government and TVETs have played a key role in fostering research and sustainable agriculture development. This has been achieved through ecosystem restoration/carbon trading, training of personnel, aquaculture production, green jobs, blue jobs, and government partnerships. Also, through Kenya Marine and Fisheries Research Institute, the government has invested in aquaculture production, infrastructural development, stock assessment, training of deep sea personnel, focus on the big four agenda, funding, and legal framework improvement.

Keywords: TVETs, Blue Economy, Sustainable Agriculture Development, Economic Growth

The Effects of Mobile Money Transfer on Cost Effectiveness of International Non-Governmental Organizations in Kenya

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Abstract

Mobile advancements are changing monetary life in developing nations, where most people are operating smartphones for the latitude of fiscal interactions, for instance, acquiring, and conveying cash exchanges. Certainly, mobile cash is as of now being utilized by banks and versatile system administrators to give many unbanked purchasers an approach to store and get to cash digitally. There are many types of electronic payments in Kenya such as M-pesa that is offered by Safaricom, Airtel money offered by Airtel, Equitel money offered by Equity Bank, and Western Union. Mobile money happens to be a type of electronic payment. The objective of the study was to ascertain the impact of mobile money transfers on the cost-effectiveness of International NGO's in Kenya. The research design used was a descriptive study. The target population was the International NGO's operating in Kenya that have adopted mobile money technology. This research being descriptive used primary data. This data was collected from the employees of the various INGOs. The data was analyzed using descriptive statistics. The study concludes that mobile money transfer is highly compatible with other operating systems used in the INGOs, that the mobile money system has minimal downtime, and that the mobile money system allows staff to share financial information in INGOs. In addition, the study concludes mobile money system reliability affects the cost-effectiveness of the NGOs largely that NGOs have enough hardware to support mobile money technology and that the mobile technology hardware is well maintained.

Keywords: Mobile Money; Banks; Electronic Payment; Money Transfer; Cost-Effective

Effect of Organizational Compatibility on Quality Health Care Services among Private Hospitals in Western Region

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Abstract

The effect of organizational compatibility on quality healthcare services is an important consideration in supply chain and operational management, particularly in healthcare systems. Private health care is often disastrous for poor and vulnerable community members who are left with low-quality, low-cost private providers that are too often unsafe and even illegal. However, there are limited studies on the link between Organizational compatibility and quality healthcare services among private hospitals in the Western Region, of Kenya. Thus, the general objective of the study was to find out the effect of organizational compatibility on quality healthcare services among private hospitals in the Western Region. This study adopted a descriptive survey research design with a target population target population was 183 general managers 183 Procurement officers and 514 assistant procurement officers totaling 880 employees from private hospitals in Western Kenya. The study used the Krejcie and Morgan table to arrive at a sample size of 248 respondents and distribute them using the Neyman formula within each stratum. A stratified and simple random sampling technique was used. Data collection was done by use of 336 self-administered structured questionnaires designed by 5-point Likert scaling. 34 questionnaires and interview schedules were piloted at Aga Khan Hospital, St Consolata Hospital, St. Luke Hospital, and St Monica Hospitals which are highly performing hospitals with great customer services in Kisumu City to test for validity and reliability. Data was analyzed by use of descriptive and inferential techniques using SPSS version 25 and presented using tables. From the findings, the value of R squared is 0.482 an indication that there was a variation of 48.2% on quality healthcare services in private hospitals in Western Kenya due to organizational compatibility, at a 95% confidence interval. In addition, there was a fairly strong positive relationship between the study variables as shown by $R=0.694$. Thus, organizational compatibility has a significant effect on quality health care services in private hospitals as supported by Service Quality Theory. In this regard, organizational compatibility had a significant effect on quality health care services in private hospitals in Western Kenya. This implies that if supply chain practices are aligned with the operational needs and strategic goals of a healthcare organization, there is a positive impact on patient care. This alignment leads to better patient outcomes, increased patient satisfaction, and overall higher service quality.

Keywords: Organizational Compatibility; Healthcare Services; Quality

**Quality Control Practices by Fashion Designers in Kapseret, Eldoret Uasin Gishu
County**

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Abstract

Quality control practices by fashion designers in Kapseret, Eldoret city is adopted and goes in line with the theme competencies in research, science and innovation for sustainable development. Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs". In simpler words, one can say that a product has good quality when it "complies with the requirements specified by the client". When projected on analytical work, quality can be defined as "delivery of reliable information within an agreed span of time under agreed conditions, at agreed costs, and with necessary aftercare". The objective of education in any learning institution is to instill skills, knowledge and attitudes to the learners within a specified period of time, it focuses on the ability to provide sustainability aspect and the innovativeness of a fashion designer in quality. It therefore seeks to improve and maximize production cost and uplift the economic stability in designing thus fulfilling the government's agenda. The project is carried out by applying the required skills, knowledge and attitudes to come up with informed decisions when inspecting quality and also is aimed at having significance impact on N.E.M.A quality waste disposal and create self-employment

Key words: Quality control, fashion designer,

SUB-THEME:
ADAPTIVE STRATEGIES AND
TECHNOLOGIES IN HEALTH

**Exploring Traditional Food Preservation Techniques within African Communities
Preceding Modern Technological Advancements. A Review**

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Abstract

In the realm of food preservation, various techniques have long been employed in the developing world to manage the physicochemical changes that lead to food decomposition. Within the African continent, methods such as over-fire cooking, smoking, steaming, fermenting, sun-drying, and salting have historically played crucial roles. The objective of this review was to explore traditional food preservation techniques within African communities preceding modern technological advancements. The review was conducted through a desktop search, utilizing the Google Scholar engine to source English-language articles pertinent to the topic. A total of 210 research papers were downloaded and their abstracts were scrutinized. The study established diverse traditional food preservation techniques across different African cultures and communities including the use of ash, pots, plant leaves, smoke, salt, drying, fermentation, as well as herbs and spices. These methods have been documented to significantly influence food and nutrition security by extending shelf-life, averting microbial spoilage, and enhancing nutrient quality. The underlying principles of these traditional techniques have been assimilated into modern food processing and preservation technologies, thereby augmenting efficiency and effectiveness in food preservation practices.

Keyword: Food; Physicochemical; Decomposition; Traditional techniques; Shelf-life

Effects of Compositing Wheat-Sorghum and Wheat with Omena Powder on Physical Characteristics and Sensory Attributes of Biscuits

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Abstract

Child undernutrition resulting from insufficient intake or absorption of nutrients is a continuing concern in developing countries. Affordability of a healthy diet is the key problem for most underprivileged resourced households that depend on cereal, root, and tuber-based crops to meet all their protein and energy requirements. Nearly all these staple crops have a high energy density and often are deficient in other major nutrients. There is a demand for overall improvement in the nutrient quality of starchy staples to meet the needs of children who are at risk. Biscuits are an excellent vehicle for fortification as a popular snack, especially for young children. The present study investigated the effect of fortifying wheat-sorghum composite flour with *omena* (*Rastrineobola argentea*) on biscuits' physical properties and sensory acceptability. Physical analyses were done by determining the biscuits' diameter, height, weight, spread ratio, and texture. Sensory evaluation of the biscuits was done using a 9-point hedonic scale. Compositing wheat-sorghum and wheat flour at 25% with *omena* powder significantly decreased the diameter of biscuits by 1.40 and 3.52 respectively compared to the control. Increased substitution of wheat-sorghum and wheat flour with *omena* powder from 5% to 25% reduced the biscuit's weight by 12.55 to 16.49 and 9.76 to 7.52 respectively. Wheat biscuits were thicker (13.2 mm) than wheat-sorghum biscuits (7.9 mm). The spread ratio decreased as substitution with *omena* powder increased in wheat-sorghum and wheat biscuits. Biscuit hardness significantly ($P < 0.05$) decreased from 31.42 g and 51.73 g in control wheat and wheat-sorghum biscuits to 18.39 g and 36.88 g in wheat and wheat-sorghum fortified at 25% with *omena* powder. Sensory evaluation showed that fortified biscuits were as acceptable as the control biscuits ($p > 0.05$) with a liking rating on total quality of between 5.24 and 7.07. Biscuits fortified with *omena* presented a considerable potential to have many macronutrients and micronutrients necessary in preventing Protein Energy Malnutrition. This study recommends suitable processing methods to improve the nutritive quality and utilization of low-value; fish products like *omena*, thereby improving access to animal-source foods in households as it is a cheap source of locally available animal protein.

Keywords: Biscuits, Children, *Omena*, Sorghum, Wheat, Sensory

Healthy Food Consumption Habits on Menu Choice among Customers in Star-Rated Hotels in Nakuru County, Kenya

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Abstract

Menus occupy a significant position in the hotel business as they purpose to navigate customers to achieve satisfaction and exceed expectations in their food choices. Customer food consumption habits are heavily influenced by the availability and accessibility of healthy foods, the frequency of family meals, and parenting practices. The main objective of this study was to assess the influence of healthy food consumption habits on menu choice among customers in star-rated hotels in Nakuru County, Kenya. The Food Choice Process Model and Theory of Planned Behaviour informed the study. The study employed an exploratory research design with a closed-ended questionnaire to collect data, which was then analyzed using the Statistical Package for Social Sciences (SPSS) version 26.0 and hypothesis tested at $p \leq 0.05$. The study findings show that healthy food consumption habits explained 32.1% of the variation in customer menu choice. Furthermore, Healthy food consumption habits ($\beta_1=0.597$, $p=0.000$) positively and significantly influenced consumer menu choice. The study concluded that healthy consumption habits are influenced by seasonal availability and demands for fresh foods on menus as consumers pay more attention to their diets, with traditional or indigenous foods receiving global attention due to increased consumer awareness on their potential to contribute to better health and sustainable diets. Customer menu choice is a prerequisite for changing consumption habits and shaping healthy behaviours. The study recommends that hotel managements should make traditional or indigenous foods available on their menus to enhance healthy consumption habits, as they are considered to be natural foods without additives.

Key word: Menu; Food consumption habits; Menu Choice; Star Rated Hotels; Customers

Development of Mushroom Enriched Millet-Orange Flesh Sweet Potato Porridge Flour for Supplementary Feeding of Young Children

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Abstract

Protein Energy Malnutrition and micronutrient deficiencies, continues to be a major health burden in developing countries. In order to increase the nutritional value of diets and promote food and nutritional security among resource-scarce populace in sub-Saharan Africa, formulation of composite flour from millet and other cereals or tubers enriched with mushroom flour has been suggested as a desirable solution. The aim of this research was to develop mushroom enriched millet-orange flesh sweet potato porridge flour for supplementary feeding of young children. Blending of millet-orange flesh sweet potato with mushroom flour gradually improved the protein, ash and energy contents of porridge from 12.43 to 18.23 g/100 g, 3.02 to 3.87 g/100g and 1559.96 to 1603.06 kJ/ 100 g respectively at $p < 0.05$. As well as the iron, zinc, calcium, magnesium and copper of the porridge improved. In vitro protein digestibility increased by 61% when the porridge was enriched at 30% with mushroom flour. Enriching with mushroom flour also resulting in total quality by consumers indicating that all the porridge formulations were preferred above average. Porridge enriched with mushroom flour is considerable potential to be used as protein rich foods in preventing Protein Energy Malnutrition among young children.

Keywords: Protein Energy Malnutrition; Micronutrient Deficiency; Health; Composite Flour

Nutritive Value of the Pineapple Peels Compared to the Flesh and its Incorporation to Human Diet and Nutrition

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Abstract

Pineapple peels refer to the tough outer layer or skin of the pineapple fruit, which is usually removed before consumption. The peels are fibrous and contain a higher concentration of nutrients and bioactive compounds compared to the flesh of the fruit which in most cases is rendered unused since its benefits have not been discovered to human health and nutrition. This research aimed to explore the nutritive value of pineapple peels compared to the flesh and its incorporation into the human diet and nutrition. An experimental research design was used through the proper selection of pineapples depending on their variety, maturity level and sizes in terms of their masses. Different food test processes were carried out at different times of the day to monitor the results of tests conducted in different conditions using pineapple peel products such as pineapple peels smoothie, pineapple tea, pineapple peel juice and syrup extracted from the peels to test for both macronutrients and micronutrients. The results were recorded on an observational checklist and analyzed using descriptive and inferential statistics methods which indicated that pineapple peels are rich in antioxidants such as zinc, copper, and B complex vitamins compared to the flesh there was an average percentage difference of 32% from every variety between the pineapple flesh and peels in their nutritive value about time and temperature under which the experiment was carried out. The peels are found to be of high nutritive value, especially the anti-oxidant substances. This research recommends the incorporation of this part of the fruit in the use of human diet and nutrition to curb and manage different oxidative conditions. Products from pineapple peels can also be used in the hospitality industry as important beverages to increase the variety of pineapple beverages.

Keywords: Peels, Nutrients, Macronutrients, Micronutrients, Anti-oxidant

The Critical Role of Nutrition in Achieving Universal Health Coverage: A Documentary Review

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Abstract

Achieving universal health coverage (UHC) remains a global health priority, necessitating a comprehensive understanding of the multifaceted determinants of health. Nutrition emerges as a critical component influencing the attainment of UHC, intertwining with various facets of healthcare delivery and outcomes. This research paper explores the pivotal role of nutrition within the context of achieving UHC, examining its impact on both individual health and population-level outcomes. Key factors explored include the influence of nutrition on disease prevention, management, and overall health promotion. By ensuring adequate nutrition, communities and nations can mitigate the burden of communicable and non-communicable diseases, thereby enhancing resilience against health crises. Moreover, nutrition plays a crucial role in maternal and child health, influencing early childhood development and long-term health trajectories. The paper also delves into the socio-economic implications of nutrition within the framework of UHC. Addressing malnutrition and food insecurity not only improves health outcomes but also fosters economic productivity and social equity. Effective nutrition interventions are integral to breaking the cycle of poverty and promoting sustainable development. Policy considerations are highlighted, emphasizing the need for integrated approaches that incorporate nutrition-sensitive interventions into broader health systems. Strategies such as fortified food programs, nutrition education, and regulatory frameworks are evaluated for their effectiveness in achieving equitable access to nutritious food and health services. The research draws on evidence from diverse global contexts, illustrating successful interventions and identifying gaps that hinder progress towards UHC. By synthesizing current knowledge and empirical data, this paper offers insights into how optimizing nutrition can contribute to realizing UHC goals worldwide.

Keywords: Universal Health Coverage; Nutrition; Health Outcomes; Disease Prevention; Health Equity.

The Linkage between Socio-Demographic and Economic Characteristics and IYCF Practice among Children 0-23 Months in the Ilchamus Community of Baringo County, Kenya

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Abstract

The World Health Organization recommends immediate breastfeeding after delivery, exclusive breastfeeding for six months, and complementary feeding with continued breastfeeding until two years. This study examined feeding practices and nutritional status among children aged 0-23 months in the Ilchamus pastoralist community in Baringo County, Kenya, facing challenges such as food insecurity and cattle theft. Using a cross-sectional analytical design, 206 caregivers were surveyed. Data were collected via a structured questionnaire and analyzed with SPSS version 22. Nutritional status was assessed using mid-upper arm circumference, weight-for-height, and weight-for-age Z-scores. Descriptive statistics summarized infant and childcare characteristics, while associations were analyzed using chi-square and Spearman's correlation at $p < 0.05$. Most respondents were mothers (92.2%) and married (80.9%), with Christianity being predominant (95.7%). The average household size was 6 ± 2.5 members. Educational levels were low, with 60.2% having primary education. Health facility deliveries were reported by 89.8%, with 89.4% assisted by professionals. Male children constituted 53.1%, and female children 46.9%, with an average age of 10.9 ± 7.3 months. Employment was low, with 58.6% unemployed, and the main income sources were farming (60.9%) and casual jobs (22.3%). Breastfeeding practices showed that 70.7% initiated breastfeeding immediately after birth, and 70.3% practiced exclusive breastfeeding. However, 29.7% did not comply with exclusive breastfeeding. Complementary feeding was introduced at 5.53 ± 1.86 months, primarily with semi-solid foods (64%). Early introduction of foods and drinks was reported by 34% of caregivers. Education level was significantly related to bottle-feeding practices ($p = 0.00$). Caregiver occupation was significantly related to bottle-feeding ($p = 0.00$) and the age of complementary feeding introduction ($p = 0.05$). Household income significantly influenced breastfeeding within an hour of birth ($p = 0.014$) and bottle-feeding practices ($p = 0.00$). The study highlights gap in feeding practices and nutritional challenges, indicating a need for targeted interventions to improve child nutrition in this community

Keywords: IYCF, Practices, Socio-demographic, Economic, Ilchamus Community

Comparison of Nutritional Content of Indigenous (Kienyeji) and Exotic Eggs of Chickens Reared within Tharaka Nithi County

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Abstract

Eggs have been found to be convenient delicacy for most residents of the highly populated areas, this has led to high consumption of eggs and more especially exotic eggs. This is due to the fact that the supply of indigenous is low as compared to exotic ones. There is a healthy concern about these eggs whether they have the same nutritional value as the indigenous ones and this formed the purpose of this study. The purpose of this study was to compare the nutritional content specifically proteins, carbohydrates, ash, fats content and moisture content in exotic as well as indigenous eggs, the statement of the problem was that there was a concern from consumer of eggs especially the eggs from exotic chicken on whether they meet the healthy standards of indigenous eggs or not. The specific objective to analyze protein content in exotic eggs and indigenous eggs in Tharaka Nithi county, to analyze carbohydrates content in exotic as well as indigenous eggs in Tharaka Nithi county, to analyze fat content in exotic as well as indigenous eggs in Tharaka Nithi county, to analyze ash content in exotic as well as indigenous eggs in Tharaka Nithi county, the method used for the proximate analysis was Kjeldahl for protein analysis, Muffle Furnace for ash, Soxhlet method for fats, Oven Drying method for moisture content and differential method for carbohydrate analysis, the moisture content was found to be; 75.71% for indigenous eggs and 75.65% for exotic eggs, lipids content as; 5.59 for indigenous eggs and 6.77% for exotic eggs, carbohydrate content as 4.16% for exotic eggs and 6.77% for indigenous eggs, ash content has 0.90% for exotic eggs and 0.86% for indigenous and the protein content as 12.52% for exotic eggs and 11.33% for indigenous eggs, the results showed that there was no significant difference in the ash, moisture content and fat content between indigenous and exotic eggs, however there was significant difference in the protein and carbohydrate content between the exotic and indigenous eggs, this therefore showed that the significant difference depended on the composition of feed given to the chickens, the conclusion was; according to the research, the difference was significant, the difference was between protein and carbohydrates, the research showed that the difference depended on the layers nutrition, fodder ingredients and housing systems, more studies are necessary to show the impacts of housing system between the indigenous and exotic eggs, I recommend the consumption of indigenous eggs, based on their nutritional merits in relation to the convectional eggs, I also recommend further studies inclusive of the veterinary residue, and long term effect of the exotic eggs.

Keywords: Exotic Eggs, Indigenous Eggs, Proximate Analysis, Muffle Furnace, Oven Drying.

Analysis of Survival Rate for Cervical Cancer by Use of Nelson Aalen Model**Cyrus King`ori Maina^{1*}**¹Mukiria Technical Training Institute***Corresponding Author Email:** cyrusmaina1993@gmail.com**Abstract**

Human health is a very crucial sector to any country and any related studies are highly encouraged. Cervical cancer specifically, is the second most deadly disease after lung cancer. Statistical Studies related to its survival analysis, its trend over years, major causes and prevention measures can be helpful to facilitate efficient management and treatment of the disease. The objectives of the study include is to determine and compare the survival rates for different age groups for each year, to determine whether there is positive correlation between age and risk of developing cervical cancer and to determine the trend in the number of women who were screened for cervical cancer. This study used the Nelson Aalen model to estimate the hazard and survival rate of cervical cancer at different age groups over a period of three years (2021, 2022 and 2023). Annual trends of cervical cancer over those years and the correlation between the age groups and hazard rates of different age groups were also determined. A sample of 10455 lives that were screened for cervical cancer in Nyeri County for the three years was used. The secondary data was obtained from Nyeri County Referral Hospital. The study used tables and graphical representation to analyse data. Excel spreadsheet was used to calculate hazard rates, survival rate, cumulative distribution probabilities and correlation coefficient between age and hazard rate for the three years. The findings revealed that the hazard rate for cervical cancer increases over the different age groups and years of the study. These findings indicate a correlation between the age groups and the hazard rate for different age groups.

Keywords: Survival Rates; Cervical Cancer; Nelson Aalen; Analysis; Trends

**The Influence of Food Insecurity on Student's Academic Performance among Students
in TVET Institutions: A Case Study of Uasin Gishu County, Kenya**

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Abstract

A substantial percentage of college students experience food insecurity which is a lack of access to adequate amounts of food, especially healthy foods. The general objective of the research was to determine the influence of food insecurity on student's academic performance among college students in technical and vocational institutions in Uasin Gishu County, Kenya. The research was conducted in colleges in Uasin Gishu County with a total of five institutions sampled out using simple random sampling. A Sample of 494 students was selected systematically using Slovin's formula; with 50% of the sampled students staying on -campus while the other 50% staying off-campus. The researcher used the following criteria for evaluation; food availability, food accessibility and food affordability. Questionnaires and interviews were used to collect data from students to gain an understanding of their current living situations and understand their personal experiences accessing food. Data was analyzed using Statistical Package for Social Sciences (SPSS). Data were grouped together to form categories and themes according to similarities and differences and the connection between categories and themes were explored to generate broader interpretations. The results presented using graphs, pie charts and tables. 45% of the respondents agreed that food insecurity is a menace at TVET institutions, with 55% of the respondents agreeing that food availability, affordability and accessibility all contribute to the wellbeing of a student in TVET institution. This research will help college students be able to plan their budgets well and will also assist the college management help students improve their grades by understanding their food insecurities. By exploring the other interconnected areas of study, like mental health development for TVET students, researchers can contribute to a deeper understanding of food insecurity among students in TVET institutions and inform evidence-based policies and interventions to support student welfare and success.

Keywords: Food Availability, Food Accessibility, Food Nutrition, Wellbeing, Food Insecurity

Healthcare Seeking Behaviour at a Workplace Health Promotion and Wellness**Program: A Case of Rift Valley Technical Training Institute****Cheruiyot Sambu^{1*} and Aron Langat¹**¹Rift Valley Technical Training Institute***Corresponding Author Email:** cheruiyotsambu@yahoo.com**Abstract**

Health-seeking behaviour is closely linked with the health status of a nation and thus its economic development Latunji & Akinyemi (2018). This study aimed to assess the health seeking behaviour of participants during a Workplace Health Promotion and Wellness Program at Rift Valley Technical Training Institute in Eldoret. The program aimed at improving participants' overall health and well-being through various interventions and activities. The study analyzed data collected during the wellness program in May 2023. Socio-demographic data were collected from participants during a three-day screening exercise. Data were then analyzed using descriptive statistics to predict program participation and assess the extent of engagement with wellness services. A desk review was also conducted to determine the proportion of participants. A total of 1,285 participants attended the wellness program, with 93% (n=1,191) being students and 7% (n=93) staff. There was a higher participation rate among males (57%), which was consistent among both staff (65% male) and students (55% male). Furthermore, 76% (n=71) of staff preferred to be screened in a private tent. This study highlights the need for routine workplace health promotion and wellness programs to address gender disparities in participation. The findings suggest the importance of integrating wellness programs into the institutional culture, ensuring sustainability and long-term benefits for trainers and students. Efforts should be made to encourage greater female participation and address privacy concerns to create a supportive environment for all participants. It is recommended to collaborate with relevant stakeholders, such as health professionals or organizations, to enhance the effectiveness and reach of the program. Additionally, comprehensive program evaluation should be conducted to assess the impact of the program on participants' health outcomes and inform future program planning. Wellness programs should be made more accessible to female participants and creating a more private and comfortable environment for participants, such as by providing private screening tents or a screening separate room for staff.

Keywords: Workplace Health Promotion, Wellness Program, Health Seeking Behaviour, Gender Disparity

Nutritional value, Production and Utilization Potential of Some Minor and Under-utilized Root and Tuber Crops in Kenya: A Review

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Abstract

Food and nutritional security are the major problem in the sub Saharan Africa where Kenya is located. In an effort to address food and nutritional security, there is need to diversify the current agricultural systems and to search for alternative food ingredients. A scoping review was conducted using online databases to review the nutritional value, production and utilization potential of roots and tuber crops. This is because roots and tuber crops are underutilized in Kenya despite their high nutritional properties. These crops provide a diversified diet of energy, vitamins and other nutrients. Hence, they are major contributors to food and nutritional security of tribal population. Roots and tuber crops are high in dry matter and contribute to daily calorie intake. These crops also possess health promoting components and antioxidants. Furthermore, these crops provide diverse products hence the exploration of their nutritional, production and utilization potential is an area in food systems that is expected to address the unmet nutritional needs of the society. In order to meet the nutritional needs of the Kenyan society, roots and tuber crops may also be used for preparation of functional products. The leaves and roots of tuber crops such as taro (*Colocasia esculenta* (L.)), yam (*Dioscorea* spp.), sweet potatoes (*Ipomoea batatas*) and cassava (*Manihot esculenta*) have proved to be rich in nutrients and minerals such as calcium, phosphorus, iron and vitamins such as niacin, riboflavin and thiamine. Because roots and tubers are considered in isolated areas, there is need to preserve and popularize them because of their utilization potential by the larger community. Therefore, this paper presents a review of the nutritional values, production trends and the utilization potential of roots and tuber crops in Kenya.

Keywords: Food Security, Diversification, Utilization Potential, Underutilized Crops, Food Systems

Health Education and Caregiver Perception of Utilization of Immunization Policies at the Maternal Child Health Clinic of Kakamega Teaching and Referral Hospital

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Abstract

Caregiver perceptions have often been associated with the utilization of immunization policies. Efforts to encourage childhood immunization services has always focused on creating awareness but still, vaccine-related diseases continue to rise. Then, a dilemma exists on what factors exactly influence the utilization of immunization policies on caregivers' perception at maternal child health clinic. Studies on caregiver's perception and utilization of childhood immunization policies have produced conflicting results hence there is a need for further research with a bias in Kenya and specifically Kakamega General Teaching and Referral Hospital. The study investigated the influence of Health Education on the utilization of immunization policies at the Maternal Health Clinic on Kakamega General Teaching and Referral Hospital. Primary data was used. The target population was 200 caregivers with children under 5 years and have at least a toddler attending MCH services at the hospital. A descriptive research design was used since it's suitable for the description and measurement of phenomena with a high level of accuracy. Structured questionnaires were used to collect data. A sample of 80 caregivers with children below five years was used. SPSS was used to analyze data and be presented using tables because this can easily communicate the findings to readers. The study findings showed a positive correlation between mothers' perception and utilization of immunization services ($R= 0.547$). It was evident from results that caregivers' perception affects the utilization of immunization policies and there was variation in the utilization of immunization policies due to changes in Health Education. Increase penalties and stringent measures for those advocating for cultural practices that impede utilization of childhood immunization. The study concluded that Health education influenced mothers' perception of the utilization of childhood immunization at Kakamega General Teaching and Referral Hospital.

Keywords: Caregiver; Immunization; Health Education; Cultural Practices; Childhood

Challenges in Using Stable Isotope Techniques to Assess Environmental Enteric Dysfunction in a Rural Kenyan Setting Amid the Covid-19 Pandemic

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Abstract

Researchers conducting clinical studies involving stable isotopes face technical and logistical challenges. They seldom discuss them in publications, yet they have serious ramifications on data quality and usability. To document methodological and technical challenges encountered during the implementation of a stable isotope-based sucrose breath test study to assess the relationship between environmental enteric dysfunction and linear growth among children aged 12-15 months in a resource-limited setting in Siaya County, Western Kenya. The study adopted cross-sectional analytical design. Included 100 mother-children pairs aged 12-15 months. The carbon-13C dioxide ($^{13}\text{CO}_2$) recovery following an oral dose of ^{13}C Carbon-sucrose sugar was determined for assessment of environmental enteric dysfunction. Key challenges included delayed ethical and logistical approvals, the COVID-19 pandemic, tardy study implementation, and revised protocol to minimize stay time. Furthermore, higher cost of supplies, difficulties in recruitment, spillage of the sugar solutions, dearth of local capacity to analyze the breath, local consumption of 4-carbon compound(C4) plant-based diets like sugar cane and Maize, with higher ^{13}C enrichment and high loss to follow up. Uncertainties like the COVID-19 pandemic present critical challenges to clinical studies, requiring novel preparedness plans. Adequate consent addresses myths and misconceptions. Further enrichment of the ^{13}C Carbon-sucrose sugar to overcome the challenge of C4 plant-based diets. Building local and regional analytical laboratory capacities to address the logistical and analysis hitches of breath samples.

Keywords: Stable isotopes, Environmental Enteric dysfunction, ^{13}C Carbon-sucrose sugar

SUB-THEME:
PROCESS AUTOMATION
TECHNOLOGIES IN ICT AND
ENGINEERING

The Role of ICT Integration in TVET Curriculum Development and Delivery**Gitau Bonface Njoroge^{1*}**¹Karumo Technical Training Institute***Corresponding Author Email:** bonfacegitau@gmail.com**Abstract**

Technical and Vocational Education and Training (TVET) has transitioned from merely producing proficient basic operators to cultivating skilled professionals. Recognizing the pivotal role of ICT in higher education and school education, there is a pressing need to enhance its integration into TVET programs. The primary purpose of the study is to investigate the integration and utilization of ICT in TVET and identify some major challenges hindering the assimilation of ICT in TVET classrooms. This study will use a systematic system review to review existing literature on the application of ICT in TVET classrooms. Based on the study, the findings suggest that ICT integration is indeed prevalent across various disciplines and for diverse learners in TVET settings. The spectrum of applications ranges from fully mediated to partially mediated and supplementary. However, the primary focus of target learning outcomes appears to be on cognitive skills, with limited attention given to psychomotor skills development.

Keywords: ICT Integration; TVET Classrooms.

Effect of Technology Innovation on the Financial Performance of Commercial Banks in Kenya (A Case of Equity Bank- Eldoret)

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Abstract

Financial technology has been embraced by Commercial banks in their financial operations to increase financial performance and operational efficiency. The researcher's purpose of carrying out the research project was to find out the Effects of Technology Innovation on the Financial Performance of Commercial Banks In Kenya, A Case of Equity Bank, Eldoret branch, other objectives that led to this research are; To identify the extent to which automatic teller machine contributes to the performance of equity bank, to establish the extent in which mobile banking contribute to the performance of equity bank and lastly to determine the extend in which internet banking contributes to the performance of equity bank. With this fact in light, the research paper focused on establishing how the integration of financial technology by Commercial banks in Kenya would help in increasing their financial performance of equity bank financial status. The study employed a descriptive research design method in which 53 management staffs of equity bank were to be questioned by use of questionnaires. Other methods of data collection to be used were observation and use of stratified sampling since the population of respondents was huge. The use of qualitative and quantitative data collection methods led to the assembly of data since they all complied with the information required. In the findings, it was established that technological innovations like electronic fund transfer, mobile banking and Internet banking have a great effect on the performance of equity banks because they increase profitability, asset quality, Capital adequacy and liquidity. 88% of the target population responded to the questionnaire. Demographic information was collected from the respondents that included gender, level of education, position in the organization and period of employment. From the findings, 50.9 of the respondents strongly agree that mobile banking has helped in checking the balance in the account. 94.3% strongly agree that Internet banking helps save time while 81.8% of the respondents strongly agree that electronic fund transfers helped to get online loan applications. From the findings it is evident that innovation significantly affects the performance of equity banks therefore there is a need for financial institutions to increase the uptake of the internet, electronic fund transfers and mobile banking to improve their financial performance.

Keywords: Financial Technology; Financial Operation; Internet Banking; Commercial Banks; Financial Status.

Network Forensic Framework for Managing Security Incidents**Peter, K. Kemei^{1*} Joel Cherus¹, & Moses Thiga¹**¹Kabarak University***Corresponding Author Email:** peter.kemei@gmail.com**Abstract**

Network forensics is the science of determining and retrieving evidential information in a computer networked environment about criminality in such a way as to make it admissible. Computer forensics lays a strong foundation for network forensics as standard security frameworks, tools and techniques are in place for the detection, collection, preservation and presentation of evidence phases. Little has been done to address challenges in the examination, analysis and investigation phases. The challenges identified in these phases were identification and correlation, multi-data fusion, trace back and attribution to the source of the incident. The study objectives were to investigate, develop and evaluate a network forensic framework which addresses the challenges in the examination, analysis and investigation phases. The research methodologies were interrogative literature review, quantitative approach and evaluation based on prototype implementation which addresses the challenges in the examination, analysis and investigation phases. The proposed technique in the examination phase was identification and correlation. The identification provided attempts made to compromise a system and assist during the reconstruction of intruded information. The correlation validated the particular intrusion and guided in decision to proceed with the investigation. The techniques resulted in the confirmation of the DDoS, Portscan and XSS attacks dataset. The proposed techniques in the analysis phase were a combination of multi-data fusion security sensors and integration algorithms. Sensors rely on alerts attacked network events evidence which was subjected to confusion matrix and FAR metrics to validate the evidence accuracy. The Algorithm resulted in minimizing evidence file size from 100% to 92.96% saving the system storage capacity by 7.04%. The proposed techniques in the investigation phase were trace back and attribution techniques based on ASDPM, DIRM and marking algorithm. The techniques resulted in marking and logging of attacked packets or hybrid both towards the particular source of the attack and recorded accurate attached evidence based on evaluation metrics set by ISP.

Keywords: Network; Forensic; Framework; Examination; Analysis; Investigation.

Harnessing Cyber-Security Resilience in Kenya: A Comprehensive Analysis of Threats, Vulnerabilities, and Mitigation Strategies

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Abstract

The study aimed to investigate the current state of cyber-security in Kenya, focusing on identifying prevalent cyber threats and vulnerabilities that pose risks to individuals, businesses, and critical infrastructures. The study explored the evolving nature of cyber threats and the impact of technological advancements on the country's digital landscape. Additionally, it assessed the effectiveness of existing cyber-security measures and policies in mitigating these threats. The study population included cyber-security experts, policymakers, and regulatory bodies to gather perspectives on the existing cyber-security framework and identify potential areas for improvement which added up to 1,200 respondents. The research employed a mixed-methods approach, combining both quantitative and qualitative methods to gather in-depth insights into the current state of cyber-security. The methodology involved a survey to assess cyber-security awareness, attitudes, and practices among individuals and organizations. Additionally, qualitative interviews and case studies were conducted to gain a deeper understanding of specific challenges and successful mitigation strategies employed by key stakeholders. Quantitative data were analyzed using statistical techniques the Qualitative data were thematically analyzed. The findings of this study aimed to provide valuable insights for policymakers, cyber-security professionals, and stakeholders to strengthen Kenya's cyber defenses and safeguard its digital future. The rapid pace of technological advancements was observed to both benefit and challenge cyber-security efforts in Kenya. Emerging technologies, such as IoT and cloud computing, were identified as potential sources of increased vulnerability, requiring specific attention in cyber-security strategies. The study recommended that the organization invest in robust cyber-security infrastructure, including regular software updates, secure network configurations, and employee training. The research culminated in proposing robust and context-specific strategies to enhance cyber-security resilience in Kenya, taking into consideration the socio-economic, technological, and regulatory aspects of the country.

Keywords: Cyber-security; Threats; Vulnerabilities; Mitigation Strategies

Use of Digital Technologies for Sustainable Energy Management in Developing Smart Cities across Africa: A Review

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Abstract

Cities serve as focal points for driving economic development, both in developed and developing nations. Managing the complex energy systems that fuel urban economies in order to achieve maximum efficiency in energy use, optimized energy resource utilization and conservation requires sophisticated technological approaches and solutions. The Smart City concept, leveraging digital technologies, is increasingly gaining recognition as a promising solution. This paper is a review of selected literature on the deployment of digital technologies to enhance energy management systems in selected African Smart cities. The findings of the review indicate a growing interest and innovative efforts in leveraging digital technologies to enhance the intelligence of energy infrastructure, foster interconnectivity, facilitate effective communication and enhance efficiency in energy utilization. The research highlights the emergence and utilization of Smartphone-based applications in energy management functions. Despite these positive developments, visible results of the implementation of these technologies in energy sustainability strategy remains relatively low, hampered by challenges such as poor urban planning, lack of adequate resources, conflicting value systems, competing priorities and poor infrastructure. The study advocates for further research in order to quantitatively assess the impact of application and integration of digital technologies in energy management systems across African smart cities. While emphasizing the importance of embracing emerging technologies in the changing digital landscape, the paper highlights the need for supportive policies and robust legislative frameworks in the smart city agenda to facilitate the acceleration and full adoption of sustainable energy management principles.

Keywords: Urban Economies; Digital Technologies; Smart Cities; Poor Infrastructure; Resources

Harnessing Green Power through Nano Hydrogenerators in Agricultural Piped Systems**Wangari, S. Ndung'u^{1*}**¹Nyandarua National Polytechnic***Corresponding Author Email:** info@nyandaruanationalpoly.ac.ke; swangari8@gmail.com**Abstract**

Hydrogenerators are known for being highly efficient, converting up to 90% or more of the available energy into electricity and producing power without emitting greenhouse gases. This study investigated the integration of Nano hydro-generators into agricultural piped systems with varying water gate valves to harness energy from flowing water. Water is integral to every stage of all operations in the agricultural sector, influencing the quality and characteristics of the final products under any process. This provides the basis for piped water systems where in all these areas water has to be supplied. The project focused on optimizing the performance of hydro-generators under different flow conditions induced by varying water gate valve settings. By strategically placing Nano hydro-generators within the piped system and adjusting the water gate valves to control flow rates, to maximize energy extraction efficiently. The research employed a combination of theoretical modelling, and experimental validation to assess the impact of varying water gate valve configurations on energy generation. A prototype system comprising a 100-litre tank with a 0.75-inch outlet pipe, a gate valve with 10 graduations was used at timed intervals of 120 seconds to determine different flow rates into a 12v hydro-generator. Data was collected on the generated voltage from all 6 graduations, recorded and analyzed. It was noted that with each increase in valve opening, there was direct proportionality on the voltage output and thus the higher the flow rate, the more power produced. Through this approach, the project proved its practical implementation in piped systems, contributing to the development of innovative solutions for renewable energy generation and maximum utilization of available resources. It was concluded that the integration of Nano hydro-generators into piped systems presents a promising avenue for sustainable energy generation. By harnessing the kinetic energy of flowing water, this innovative technology offers a renewable and eco-friendly solution to meet energy demands while minimizing environmental impact. Embracing this project not only promotes the adoption of green energy but also contributes to the advancement of sustainable infrastructure and resource management.

Keywords: Green Energy, Hydro-generation

An overview of Integration of 3D Printing on Engineering Education: Technical and Vocational Education and Training Institutions

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Abstract

This review explores the potential impact of integration of 3D printing technology on engineering education within Technical and Vocational Education and Training (TVET) institutions. 3D printing also known as additive manufacturing is a technology that cannot be ignored by any country especially developing countries considering the rapid technological advancements. As the industrial benefits of this technology are still novel, developing countries have a chance to embrace it. The growth of 3D printing in developing countries is expected to impact, not only the area of manufacturing but also the education sector. Integration of 3D printing into TVET curriculum offers significant opportunities for enhancing pedagogical skills, practical skills, fostering innovation and bridging the gap between theoretical knowledge and real-world applications as it continues to revolutionize manufacturing and design processes. This study presents the benefits, challenges and provides feasible strategies for integrating 3D printing in TVET curriculum.

Keywords: 3D printing, Integration, TVET curriculum.

Strategic Framework for Integrating Artificial Intelligence (AI) in Technical and Vocational Education and Training (TVET). A case study of The Jitume Lab, initiated by the Konza Technopolis Development Authority,

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Abstract

The incorporation of Artificial Intelligence (AI) into Technical and Vocational Education and Training (TVET) is a strategic step that is likely to improve educational achievements and skills delivery. It is however noted the much enthusiasm towards application of artificial intelligence in education, little is known on its practical implementation in the context of vocational education and training. The purpose of this paper is to contribute towards the need for a carefully planned strategy for the use of AI technologies in TVET organizations. The specific objectives of the study were to: analyze the current state of AI integration in TVET; identify the key factors influencing AI adoption; and develop a strategic framework to facilitate the integration of AI in TVET programs. The study utilized a descriptive research design and case studies were drawn from selected TVET institutions for data collection and analysis. The results show that although there is an increasing acknowledgement of AI in TVET, institutions are burdened with challenges of infrastructure, training and resource management. There are various factors that are critical for the successful integration of AI and these include compatibility with existing curricula, user training, data management costs and security, and ease of implementation. Each of these factors is prioritized differently among stakeholders. This study therefore provided the necessary background for proposing a strategic framework to effectively enhance the integration of AI in TVET systems.

Keywords: Integration, Artificial Intelligence, Technical and Vocational Education and Training, Strategic Framework, AI Adoption.

**Effects of Automated Security System in Dissemination of Registry Records at Uasin
Gishu County Registry System**

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Abstract

The coming of new technology has influenced most of the sectors around the world. Substantial advancements have been made recently in the storage of records and archives administration. These advancements include the development of automated security systems in the security, dissemination, and storage of records. Registries are involved in keeping value records; thus, a registry needs to use a secure method. The objectives of the study were to identify the type of staff required in the process of securing E-resources in the Uasin Gishu registry system, to assess the level of security measures offered on electronic records of the Uasin Gishu registry center, to find out the policies implemented in the securing storage and dissemination of records and to identify challenges and solution faced when using automated security system in the storage and dissemination of information at Uasin Gishu registry. The research will assist the registry in facing unnecessary losses in case of a system failure or power outage. The target population of the study was 83 staff of the Uasin Gishu Registry Center. The research was conducted in two shifts, whereby the first shift was carried out through observation in contrast, the second shift was done through the issuing of questionnaires and interviews. The results obtained from the Uasin Gishu registry suggest that this system has improved not only the storage of records but also the process of disseminating records to the required place in the organization. It has also ensured that there is efficiency in the smooth running of the organization. The registry should have an annual backup system in case of failure of the system.

Keywords: Technology; Administration; Registry; E-resources; Storage of Records

Adoption of Technology in the Land Survey Sector a Case Study of Uasin Gishu County**Shalin Jebet Rotich^{1*}**¹The Eldoret National Polytechnic***Corresponding Author Email:** shalinrotich67@gmail.com**Abstract**

The adoption of advanced technology in the land survey sector is increasingly necessary to address the infrastructural demands of Uasin Gishu County. This study investigates the current state of technology adoption, the challenges encountered, and the benefits perceived by stakeholders. Through surveys, interviews, and secondary data analysis, it was found that while tools such as GPS and GIS have seen widespread adoption, advanced technologies like drones and LiDAR are underutilized due to high costs, technical expertise gaps, and regulatory barriers. GPS is used by 85% of firms, while drones and LiDAR have not been adopted. GIS is utilized by 37% of firms. Key challenges include the high cost of technology, lack of skilled personnel, and regulatory hurdles. Despite these barriers, firms that have embraced modern tools report improved project timelines, data accuracy, and long-term cost savings. The study concludes that for broader adoption, interventions such as capacity building, financial support, and streamlined regulations are necessary to fully realize the potential of advanced surveying technologies in Uasin Gishu County.

Keywords: Technology, GIS, LiDAR, GPS.

Digital Risk Perception among Students in Higher Learning: A Cyber Security Study**Graham Milla Kituzi^{1*} and Crispus Oroni¹**¹Rift Valley Technical Training Institute, P.O Box 244-30100 **ELDORET-KENYA.*****Corresponding Author Email:** graham.milla@rvti.ac.ke**Abstract**

In today's interconnected digital landscape, this study explores the correlation between digital risk factors, digital literacy, institutional support, and risk perception among 258 students across diverse academic institutions in Kenya. Using correlational research design and path analysis, the research explores how these elements shape students' perspectives on digital risks. The results reveal significant connections among these variables. Digital Literacy (DL) shows a strong positive link with Risk Perception of Students (RPS), highlighting the crucial role of educational initiatives in elevating students' awareness of risks. Additionally, Digital Risk Factors (DRFs) positively contribute to DL, indicating that exposure to digital threats bolsters students' proficiency in digital literacy. Increased exposure to DRFs also notably impacts RPS, indicating that greater exposure to digital risks aligns with a heightened perception of these risks among students. Institutional Support (IS) demonstrates a moderate impact on RPS, suggesting that while supportive institutional environments influence students' risk perceptions, their influence may be comparatively less impactful than other contributing factors. These findings underscore the critical roles of digital literacy, exposure to risks, and institutional support in shaping students' risk perceptions within digital environments.

Keywords: Digital risk factors, Digital literacy, risk perception, cyber security.

**SUB-THEME:
CROSS CUTTING**

EDUCATION AND TRAINING

**Implementation of E-Learning in Technical and Vocational Education Training
Institutions in Uasin Gishu County, Kenya: The Role of Organizational Learning
Culture**

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Abstract

The dynamism in the business environment globally calls for a workforce brazen enough to the emerging trends of technology without exception to Technical and Vocational Education Training Institutions (TVET). Despite the effort and investment made, trainers and staff hardly use technology and e-learning systems in the envisioned way since they are often underutilized. These altogether have left the stakeholders dissatisfied with the implementation of e-learning initiatives in higher learning institutions without exception to TVET institutions. In this regard, the study investigated the influence of organizational learning culture on the implementation of e-learning in TVET institutions in Uasin Gishu County. The study was guided by Rodgers's theory of Diffusion of innovation. The study adopted an explanatory research design with a target population of 94 electrical and electronic engineering trainers and 6 HODs of electrical and electronic engineering departments from public TVET institutes from Uasin Gishu County who were engaged in the study through census inquiry. Data was collected by use of a questionnaire. Quantitative data was analyzed by use of inferential statistics using SPSS version 25 while qualitative data used themes and subthemes. The findings coefficient of determination (R square) of 0.420 indicated that the model explained only 42% of the variation or change in the implementation of e-learning. Organizational Learning Culture is ($t=5.690$, $P<.05$). The study findings indicate that organizational learning culture significantly influences the implementation of e-learning in TVET institutions in Uasin Gishu County. Therefore, TVET institutions should consider strengthening and bundling all the determinants of organizational learning culture using a policy framework to enhance their synergy in the implementation of e-learning in the teaching of electrical and electronic engineering.

Keywords: Organizational; Learning culture; e-learning

Models and Structures for Dual Technical and Vocational Education Training: A Comparative Review Study of the German, Swiss and Austrian Models and their Potential Lessons for Kenya

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Abstract

Technical and Vocational Education and Training (TVET) systems are essential for equipping individuals with practical skills, enhancing employability, and fostering economic growth. In Kenya, efforts have been made to strengthen the TVET sector by implementing the National Policy on Technical and Vocational Education and Training. However, challenges such as negative perceptions of TVET and limited resources persist. To address these challenges, a comparative study of successful Dual Technical and Vocational Education Training (DT-VET) models in Germany, Switzerland, and Austria was conducted to draw lessons for Kenya. Germany's dual apprenticeship system combines theoretical training in vocational schools with practical training in companies. Switzerland emphasizes practical learning and cooperation between companies and training centres, while Austria integrates apprenticeship and school-based learning, recognizing prior experiences. The study identifies key success factors, including strong industry partnerships, industry-driven curricula, and effective quality assurance mechanisms. It also highlights challenges such as gender imbalances in apprenticeships and negative perceptions of vocational education. To tackle these challenges, potential solutions were proposed, including the promotion of industry collaboration, development of region-specific curricula, enhanced gender equity, integration of digital skills, and investment in TVET infrastructure. In conclusion, the study suggests key areas for improvement in Kenya's TVET system, such as advocating collaborative approaches, diversifying the curriculum, and promoting gender inclusivity. By adopting best practices from successful DT-VET models, Kenya can strengthen its TVET system; empower its youth, and foster sustainable economic growth.

Keywords: TVET, Dual Training, apprenticeship, collaborative approach

Challenges of Mainstreaming Inclusivity and Assistive Technologies in TVET Institutions

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Abstract

Inclusivity involves providing equal access to opportunities and resources for individuals who might otherwise be excluded or marginalized, such as those with physical or intellectual disabilities. Assistive technologies are products or equipment designed to enhance learning, working, and daily living for persons with disabilities. This study aimed to identify the challenges of mainstreaming inclusivity and assistive technologies in Technical and Vocational Education and Training (TVET) institutions. The study was guided by three objectives: to identify these challenges of mainstreaming inclusivity and assistive technologies in (TVET) institutions, to explore avenues for mainstreaming inclusivity and assistive technologies in (TVET) institutions, and to propose possible solutions to the challenges of mainstreaming inclusivity and assistive technologies in (TVET) institutions. To address these objectives, both quantitative and qualitative research methods were employed, using a descriptive research design. The target population consisted of 230 individuals, from which a sample of 66 respondents was selected to complete online questionnaires. Purposeful sampling was used to choose 40 trainers from technical and vocational colleges, 15 trainers from technical training institutes, and 12 trainers from national polytechnics. The findings, analyzed and presented in tables, pie charts, and bar charts, revealed that challenges included insufficient funds, minimal sensitization, lack of policies for persons with disabilities (PWDs), and low enrollment of PWDs in institutions. The research primarily recommends that the government allocate more funds to support PWDs mainstreaming. By addressing these challenges, stakeholders in TVET institutions can promote inclusivity through the development of effective policies for inclusive education.

Keywords: Mainstreaming, Assistive Technologies, Inclusivity.

Predictive Modeling of Unemployment Using Machine Learning Techniques**Caleb Jumbe^{1*}**¹The Eldoret National Polytechnic, P.O. Box 4461-30100, **ELDORET - KENYA.*****Corresponding Author Email:** dv.caleb@gmail.com**Abstract**

This paper examines the challenges posed by unemployment and the advantages of integrating industry practices with educational systems to mitigate unemployment and enhance job prospects for graduates. It discusses the benefits of aligning industrial processes with academic curricula to improve course marketability, skill management, university admissions, and job security. The implementation requirements and considerations for governments, private organizations, industries, and educational institutions adopting this transformative educational approach are also outlined. Through a comprehensive review of existing systems, the paper compares the influence of education on the job market in Kenya and Africa with that in Western countries, India, China, and other parts of Asia. The proposed model's potential impact on job market dynamics and skill diversification over the next decade is analyzed. Additionally, short-term and long-term research challenges and open issues related to the adoption of an industrial-academic model versus competency-based systems are identified. The paper addresses the following questions: 1. Why do certain courses require specific grades? For example, why is an A (plain) required to become a doctor or neurosurgeon? 2. Why do some courses have significantly higher intakes than others? The primary focus is to explore ways to balance vacancies across various courses and distribute high grades more evenly, ensuring that every course can attract students with high academic achievement.

Keywords: Unemployment; Educational System; Government; Private Organizations; Job Dynamics

Barriers to Book Reading Among TVET Students in North Rift Counties of Kenya**Ernest Kipkorir Kurgat^{1*}**¹The Eldoret National Polytechnic, P.O. Box 4461-30100, **ELDORET - KENYA**.***Corresponding Author Email:** ernestkgt@gmail.com**Abstract**

In spite of the critical role played by Technical and Vocational Education and Training in fostering economic development in Kenya, book reading habits among TVET students remain alarmingly low. The study sought to explore the barriers that hinder book reading among TVET students and propose potential interventions to address these challenges. The study used a mixed-methods approach and collected data from TVET institutions across the North Rift region in Kenya. The findings revealed several key barriers: limited access to relevant and up-to-date reading materials, a predominant focus on practical skills over theoretical knowledge, insufficient library facilities, and a lack of encouragement from both instructors and peers. Additionally, socio-economic factors significantly impact students' ability to engage in reading activities. The influence of digital media and the preference for online content over traditional books also emerged as a significant factor. To address these challenges, the study proposes several interventions. Enhancing library resources and facilities within TVET institutions is crucial, along with integrating digital libraries to provide wider access to reading materials. Encouraging a reading culture through book clubs, reading competitions, and collaboration with local communities can foster a more supportive environment. Additionally, incorporating reading assignments and discussions into the curriculum can help balance the focus between practical and theoretical learning. Financial support and time management workshops may also aid students in overcoming socioeconomic barriers. By identifying and addressing these barriers, this study aims to promote a culture of reading among TVET students in Kenya, ultimately contributing to their academic success and overall personal development. The proposed interventions offer a roadmap for policymakers, educators, and stakeholders to enhance the educational experience and outcomes for TVET students.

Keywords: TVET, Book Reading, Barriers, Interventions, Student Engagement, Educational Resources.

Implementation Status of Recognition of Prior Learning by TVET Providers in Kenya**Langat, K.^{1*}; Masai, L. K.¹; Mulinge, J. M.¹; Kemei, M.¹**¹Technical and Vocational Education and Training Authority, P.O. Box 35625-00100,**NAIROBI-KENYA.*****Corresponding Author Email: otta.osawa@tveta.go.ke****Abstract**

Recognition of Prior Learning (RPL) has been practiced in Kenya mainly by the National Industrial Training Authority (NITA) and Kenya Accountants and Secretaries National Examination Board (KASNEB) since the 1960s and 1970s, respectively. However, many competencies acquired in Kenya through informal and on-the-job training remain unrecognized. Kenya therefore has a large population with diverse skills and competencies but without formal recognition. This study aimed to determine the status of awareness and implementation of RPL by the TVET providers in Kenya. The study employed a descriptive research design and targeted all accredited TVET institutions (2565). Stratified and simple random sampling was employed to obtain a sample of 248 institutions for this study. A questionnaire, with structured, open and closed-ended questions was used for data collection. The data was analyzed using SPSS and Excel. The study found that the majority of the respondents were aware of the existence of RPL but most of them were not conversant with its implementation and the implementation level was relatively low. The results showed that the most preferred skill areas for RPL certification were; Masonry/Building Technology, Electrical Installation, Tailoring and Dress Making, Hairdressing and Beauty Therapy, and Motor Vehicle Mechanics. Housekeeping Accommodation and ICT were the least preferred trade areas for RPL certification. Most of the RPL providers offered certification at Level 3 followed by Level 2. The majority of institutions had not been accredited as RPL centers and a large proportion had not established internal quality assurance systems.

Keywords: Recognition of Prior Learning; Implementation; Skill Areas

**Role of Guidance and Counseling in Responsiveness towards Alcohol and Drug Abuse
in TVET Institutions in Kenya**

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Abstract

Alcohol and Drug abuse increasingly has become a major problem in Kenya. The major concern has been the ever-rising drug abuse among youths especially, in learning institutions. Guidance and counselling in TVET institutions have been playing a vital role, in assisting trainees to overcome different challenges experienced during their learning. The purpose of this study was, to find out the role of guidance and counselling in responsiveness towards alcohol and drug abuse in TVET institutions in Kenya. The study was guided by the following objectives: to find out the prevalence rates of drug abuse and commonly abused drugs among trainees, to find out some of the challenges associated with alcohol and drug abuse and to investigate the role of guidance and counselling in addressing alcohol and drug abuse. The population of the study consisted of 3,500 trainees and 10 staff in the G&C department at Siaya Institute of Technology. The sample was identified using random sampling techniques. The sample used in the study was 240 trainees and 10 G&C staff and a pilot study of 56 participants was carried out in Laikipia North TVC and Kipipiri TVC to test the reliability of the instruments. A questionnaire consisting of both structured and open-ended questions was given to respondents and data obtained was analyzed by use of descriptive using frequencies, means and standard deviations and inferential statistics using Pearson Correlation Coefficient. Findings from the study revealed that G&C plays a vital role in creating awareness and sensitization, carrying out campaigns against alcohol and drug abuse and providing guidance and counselling to trainees who experience addiction problems. The study recommended that there is a need for TVET institutions to strengthen various Guidance and Counseling departments in their institutions to help combat this rising menace.

Keywords: Guidance and Counseling; Alcohol and Drug Abuse, TVET Institution

The Impact of TVET on Income Growth and Employment of Trainees**George Oboo^{1*}**¹Department of Liberal Studies, Ramogi Institute of Advance Technology***Corresponding Author Email:** oboojabande@gmail.com**Abstract**

After the introduction of human capital theory, education and training are regarded as an instrument for enhancing human capital; and it developed into the concept of TVET, Technical and Vocational Education and Training. The existing studies are conflicting on the effectiveness of TVET. Some scholars argue that TVET stimulates economic growth, improves employment and wages of workers, and reduces poverty. However, due to the occupation-specific characteristics of skills developed from TVET, other scholars argue that the effectiveness of TVET lasts only for short periods. This study aims to find the factors of TVET that can be effective in matching skills and jobs. This study uses the data collected from the Kenya Life Panel Survey (KLPS), which is a longitudinal dataset of 7,527 respondents from 2003 to 2019. The data includes education, health, socioeconomic, demographics and other outcomes from students of primary schools in western. Kenya. This study used the panel data studies to find the short-term and long-term effects of TVET. This study finds that unemployed trainees have higher employability in the short run than employed trainees. According to the result of this study, however, trainees without work experience and training experience have a higher income growth rate in the short run compared to experienced trainees. It contradicts the assumption of TVET in that work-related experience strengthens the individual's skill and thereby reflected in higher income. This study explained the findings can be attributable to a mismatch between skill and job and the limitation of training at the individual level. Also, this study suggests recommendations for future research.

Keywords: Income growth; Employability; Trainees; TVET.

Digital Technologies for CBET Implementation in TVET Institutions in Kenya for Employability

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Abstract

This paper explores the extent to which digital technologies and in particular video learning have been employed as active learning tools in Competency-Based Education and Training (CBET) curriculum implementation in Technical and Vocational Education and Training (TVET) institutions in Kenya. The study was inspired by related studies elsewhere which point to the challenges of employing more innovative instructional strategies in TVET institutions despite the emphasis on the same. Some studies suggest that the pressure to incorporate new technology in teaching and learning is not always matched with adequate training and support. The introduction of CBET in Kenya has come with the call to apply active learning strategies in its implementation to enhance skills acquisition among technical education trainees which is its sole principle. The objective of the study was therefore to establish the extent to which these strategies have been employed in the TVET institutions and the factors determining their application. The study was conducted among trainers and trainees at Nyandarua National Polytechnic at the beginning of this year and was descriptive in design. Both qualitative and quantitative approaches were employed for data collection and analysis. Data was collected through questionnaires which were administered online for the trainees and self-administered for the trainers. The theory of constructivism and the cognitive theory of multimedia learning guided the study. The trainers and trainees were sampled from all the nine academic departments in Nyandarua National Polytechnic where at least one trainer in all departments reported to have used video in teaching, a claim that was corroborated by the responses from the trainees. 88% of trainees confirmed to have used video in learning while 90% of trainers affirmed using video in teaching. These positive observations came amidst myriad challenges that were cited by both trainers and trainees as impeding the use of video learning in the institution. The study thus concluded that significant effort had been made to apply digital technologies as innovative instructional strategies in TVET institutions in Kenya. However, their employment is still engulfed in myriad challenges that need to be addressed to fully realize the benefits of digital instructional strategies which have been documented including increasing employability.

Keywords: Digital Technologies; Video Learning; Active Learning Strategies; CBET; Curriculum Implementation; TVET Institutions.

Assessment of Impacts of Dual Training on the CBET Implementation Process**Joshua Ochieng Oduor^{1*}**

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Abstract

This paper explores the assessment of the impacts of dual training on the Competency-Based Education and Training (CBET) implementation process. The objectives of the study are firstly, to determine the level of competency acquired through dual training, and secondly, to assess the benefits of dual training in the context of CBET implementation. The methodology employed in this research involves a mixed-method approach, combining qualitative and quantitative analyses. Data was collected through surveys, interviews, and document analysis from participants engaged in dual training programs within CBET frameworks. The study sample includes trainers, trainees, employers, and policymakers involved in vocational education and training programs. The findings reveal significant insights into the level of competency attained by trainees through dual training initiatives. Through practical learning experiences in both educational institutions and workplace settings, trainees exhibit enhanced skills, knowledge, and competencies relevant to their chosen vocational fields. This indicates a positive correlation between dual training and skill acquisition, highlighting the effectiveness of this approach in preparing individuals for the workforce. Moreover, the study assesses the broader impacts of dual training on the CBET implementation process. It identifies several benefits, including improved alignment between education and industry needs, increased employer engagement and satisfaction, enhanced employability of graduates, and greater efficiency in skills development. These findings underscore the importance of integrating dual training into CBET frameworks as a means to address the skills gap, promote economic development, and foster sustainable growth. The paper concludes with recommendations for policymakers, educational institutions, and employers to further leverage the benefits of dual training within CBET initiatives. Emphasizing the importance of collaborative partnerships, curriculum flexibility, and continuous evaluation, these recommendations aim to optimize the implementation of dual training programs and maximize their positive impacts on skills development and workforce readiness.

Keywords: Competency Based Training; Trainers; Trainees; Dual Training; Knowledge; Skills; Employee Engagement

Science Anxiety and Performance in Secondary School Biology in Bungoma County,
Kenya

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Abstract

Biology has a lot of relevance in everyday life because it helps people understand themselves and the environment, especially with the advent of anthropogenic climate change. This can affect positively sustainable development and adaptive resource management. Students and teachers towards learning and teaching science subjects exhibit Science anxiety. It is a product of low self-efficacy. Some research on science anxiety supports the Social Cognitive Theory. Self-efficacy is the major construct emerging from this theory. Biology plays a key role in environmental conservation - which today inclines a lot towards climate change mitigation and adaptation, and other sectors of the economy. However, the secondary school students' performance in Biology in the Kenya Certificate of Secondary Education (KCSE) in Bungoma County has been steadily low. This study aimed to investigate the influence of science anxiety on the performance of students in Biology. Nine (9) secondary schools were randomly selected for study out of 139 schools in Bungoma County. Three hundred and sixty (360) form three students were randomly selected for the study. Questionnaires were used as instruments for data collection. Class Mark lists were used to measure the performance of students from Form 1 to Form 3 at the time of the study. Data collected were analyzed using descriptive statistics. The study established that boys perform better than girls in Biology. The study found that boys had a relatively more positive attitude in Biology than girls. Girls were found to have a higher level of science anxiety in Biology compared to boys. The findings of the study will be of fundamental importance to policymakers and educationists regarding Biology education in particular and Science education in general.

Keywords: Science Anxiety; Biology; Biology Education; Learner Factors; Performance.

Analyzing the Effectiveness of Industry-Driven Curricula in TVET: Case of the Kisii National Polytechnic, Kenya

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Abstract

Industry-driven curricula in TVET are gaining attention for bridging the skills gap between educational institutions and labour market demands. Kisii National Polytechnic exemplifies this approach, offering curricula tailored to industry needs to enhance graduate preparation. This study examined the impact of industry-driven curricula on student employability, skill acquisition, and alignment with industry needs, using Kisii National Polytechnic as a case study. The study employed a mixed-methods approach, combining quantitative data on employment rates with qualitative insights from interviews with educators, students, and industry stakeholders. This highlights the advantages and limitations of integrating industry input into the TVET program. A stratified random sampling procedure was used to choose 30 students from several departments at Kisii National Polytechnic, guaranteeing representation across all fields of study. Furthermore, purposive sampling was employed to choose 30 educators and 20 industry stakeholders for in-depth interviews. The findings show that industry-driven courses at Kisii National Polytechnic boost job preparation and practical skills among graduates, with 80% of students reporting better employability and 87% of employers expressing enhanced satisfaction with recent graduates' skill levels. The report identifies potential impediments: 62% of educators highlight the difficulty of continually updating curricula to reflect industrial changes, while 58% of institutions cite challenges in incorporating practical training due to insufficient resources. The study recommends enhancing industry-education collaboration to keep TVET programs responsive to evolving industry trends and technological advances. Promoting long-term partnerships between Kisii National Polytechnic and industry will create a dynamic, adaptive TVET system that meets the needs of students, businesses, and workforce development.

Keywords: Industry-Driven Curricula; Skills, Employability.

Non-Cognitive Skills for Lifelong Learning in Curriculum Development: A Systematic Literature Review

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Abstract

The key tenets of lifelong learning involve a long-term approach to learning with the view of equipping learners with knowledge, skills and attitudes. Unlike the traditional learning system, lifelong learning attempts to achieve a balanced approach by nurturing cognitive and non-cognitive skills. Cognitive skills are entrenched in motor skills, knowledge acquisition, reasoning, and memory while non-cognitive skills are associated with patterns of behaviour. The key objectives of this review were to identify the non-cognitive skills required in curriculum development and evaluate their impact on academic achievement, educational attainment, socio-economic and individual development, and psychological development. Electronic databases (n=4) were subjected to the following keywords search “*Non-Cognitive Skills*”, “*Non-Cognitive Skill and academic achievement*”, “*Non-Cognitive Skill and Educational attainment*”, “*Non-Cognitive Skill and Social development*”, “*Non-Cognitive Skill and individual achievement*” and “*Non-Cognitive Skill and Psychological development.*” From this search, 100 records were identified and screened. The exclusion criterion was based on the study’s objective and date of publication; out of which 72 records from the year 2000 to date were selected for this review. The key non-cognitive skills in life-long learning identified were personality traits, motivation, self-concept, grit, growth mindset, motivation, teamwork, leadership skills, self-control, grit, self-efficacy, social competence, resilience and coping. Non-cognitive skills influencing academic achievement and education attainment were the big five personality traits, motivation, self-concept, grit and growth mindset; for socio-economic and individual development were motivation, teamwork, leadership skills, self-control, grit, self-efficacy and social competence; for psychological development were self-efficacy, grit, self-control, resilience and coping. In closing, non-cognitive skills are pivotal in the process of acquisition of wholesome learning. From this review, gaps were identified in the areas of nurturing, assessing and incorporating non-cognitive skills in curriculum development which require further research.

Keywords: Non-Cognitive Skills, Lifelong Learning, Curriculum Development

Introduction of Dual Vocational Education and Training in Kenya: Perception of Selected TVET Institutions and Companies

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Abstract

The dual vocational education and training (VET) model integrates in-company training with vocational school education. Despite its significance, in improving the job placement of graduates, data has shown that the instruction model's implementation in Kenya is suffering from inadequate involvement of relevant stakeholders. The purpose of this study was to establish the perceptions of key stakeholders regarding implementation at introduction of the dual VET model in the country. The study aimed to meet the following research objectives: To establish the perception of trainees on the introduction of dual training in selected TVET institutions in Kenya; to determine the perception of trainers on the introduction of the dual VET model within selected TVET institutions in the country; to establish the perceived involvement of companies in the implementation of the dual VET model in Kenya; and to determine the perceived involvement of the government in the implementation of the dual training program. The study was grounded in social learning theory, social constructivism, and socio-cultural theory. A quantitative research approach was employed using a descriptive survey design. A purposive sampling of 144 participants from Busia, Bungoma, Kitale, and Kisumu counties completed a self-administered, closed-ended questionnaire. Analysis was conducted using descriptive statistics for frequencies, percentages, means, and standard deviations, and inferential statistics to establish correlations and predict stakeholder opinions using socio-demographics, including age and gender. Using a Likert scale (1 = strongly disagree, 5 = strongly agree), trainees reported generally positive perceptions (M = 3.91) of the dual training model's introduction. Trainers' views were moderately positive (M = 3.22). The trainees (M = 4.23) and trainers and supervisors (M = 3.53) expressed positive views on company involvement. Government involvement received moderately positive views from trainees (M = 3.72) and trainers/supervisors (M = 3.78). Regression analysis revealed potential links between respondents' demographics and perceptions, with varying significance. For instance, older trainers and supervisors were less likely to believe that training followed the plan ($p = 0.009$) but more likely to believe the training matched industry needs ($p = 0.032$). The study concludes that while trainees, trainers, and supervisors generally hold positive views on introduction of the dual VET model, continued engagement is necessary due to some reservations. Based on the findings, the study, therefore, recommends developing policies and regulations that will foster accountability among all relevant stakeholders of the Dual VET in the Kenyan TVET system.

Keywords: TVET, Perceptions, Dual Vocational Training, Employment, In-Company

**Empowering Climate Solutions through STEAM Education: A Case of Sigalagala
National Polytechnic**

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Abstract

Addressing the urgent challenge of climate change requires innovative solutions and a workforce equipped with relevant competencies. This abstract examines the role of STEAM (Science, Technology, Engineering, Arts, and Mathematics) education in developing these competencies, focusing on how targeted educational strategies can address the problem of inadequate climate change mitigation and adaptation strategies. Current educational frameworks often fall short in preparing students to tackle complex, interdisciplinary problems such as climate change due to a lack of integration between STEAM disciplines and insufficient emphasis on practical problem-solving skills. To bridge this gap, a comprehensive STEAM-based curriculum is proposed, designed to enhance critical thinking, creativity, and technical proficiency. This curriculum integrates scientific knowledge with technological tools, engineering principles, artistic creativity, and mathematical analysis to create a multifaceted approach to climate solutions. For instance, by combining environmental science with data analytics and creative design, students can develop innovative technologies and strategies for sustainable practices. The solution lies in restructuring educational programs to foster interdisciplinary learning and real-world application. This approach not only equips students with the technical skills needed for climate science and technology but also encourages innovative thinking and effective problem-solving. By focusing on STEAM education, we can cultivate a new generation of researchers and innovators capable of developing actionable strategies for climate change mitigation and adaptation, ultimately contributing to more effective and sustainable environmental solutions.

Keywords: Climate Change; Workforce; Science; Technology; Engineering; Mathematics

An Assessment of Influence on Uptake of Technology and Innovations by Introduction of CBET Curriculum in Kenya

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Abstract

Competence-based education and training (CBET) approach has improved the quality of education and training. Kenya TVET has adopted this outcome-based approach since the year 2022. CBET curriculum development, assessment and performance standards are built on a clearly defined framework of exit outcomes based on national standards driven by industry needs as opposed to the traditional approaches. Occupational Standards (OS) refer to a set of information about outcomes of learning against which learners' performance can be judged in assessment; standards can also form the end-point of learning programs in CBET, OS is the crucial basis in curriculum design, instruction-learning and assessment. Knowledge, skills and attitudes (KSA) are integrated KSA are always integrated into the learning process. KSA are assessed as an integrated whole. From these and other integrated CBET principles, the purpose of the study was to test the effect and effectiveness of the approach on the uptake, use of technology & innovations and job readiness by fresh CBET graduates. Questionnaires were randomly administered to 600 respondents from a target population of 1980 involved in CBET training and learning. It was found that adoption of CBET curriculum increased innovations in both industry and within the institutions allowed seamless school-work transition. Industry plays important role in guidance on bridging the skills gaps.

Keywords: Competency-Based Education; Curriculum Development; Occupational Standards; Knowledge; Skills

Tertiary Trainees Problems in Speaking English and the Strategies they Use to Enhance their Speaking Skills in Daily Communication at Eldoret National Polytechnic, Kenya

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Abstract

In Kenya, English is a medium of instruction, taught as a subject and daily communication. It is therefore not understood why learners having undergone basic education for 12 years their oral communication would not be free of difficulties given the many years of exposure. This study sort to determine the oral language difficulties and how their speaking skills could be enhanced. The objectives of the study were to: evaluate common mistakes in the use of oral English among trainees of the Eldoret National Polytechnic, find out the challenges of oral common mistakes made by trainees while speaking in English to the competence of trainees of The Eldoret National polytechnic and Determine strategies trainees use to enhance their speaking skills in daily communication in The Eldoret National polytechnic. This study was guided by Stephen Krashen's theory, known as the Monitor Model or the Input Hypothesis. Using the mixed method design, incorporating both qualitative and quantitative the study investigated the strategies tertiary trainees use to enhance their speaking skills in daily communication. The target population of the study was 1331 trainees and 9 communication skills trainers of 10 academic departments at The Eldoret National Polytechnic. The sample size of the study was 308 which was determined using the Yamane sample size determination formula. A stratified sampling technique was used to sample students from different departments while the 9 trainers were sampled purposively. Data was collected by use of questionnaires and interviews. The instruments were tested for validity and reliability before being administered. Data was analyzed by both inferential and descriptive statistics aided by the SPSS version 24, while qualitative data was presented thematically and in narration. The study found that the trainees lack the correct vocabulary to use (F-value = 6.354, $p < .001$), misappropriate tenses, misuse pronouns, do not understand the correct subject-verb agreement (F-value = 2.689, $p < .006$), have difficulties in making interrogatives and negative statements (F-value = 5.105, $p < .001$) due to poor language background. The study concludes that the trainees filter what to learn which results in low self-esteem and demotivation in recognizing their true potential in the courses they are undertaking. Most of them considered fluency in speaking English as a carrier opener even to the outside world. The communicative aspect of English should be embraced by all trainers taking consideration the abilities of the trainees.

Keywords: English; Speaking Skills; Communications Skills; Low Self Esteem; Demotivation

Influence of Individual Factors on Effective Adoption of E-Learning in Kenyan Technical Training Institutions: Case of The Kisii National Polytechnic, Kenya

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Abstract

In developed countries, e-learning has transformed traditional education into a more adaptable and effective learning environment. But in technical colleges, e-learning is still underutilized and in its early phases of development. Therefore, in developing nations like Kenya, comprehending the crucial elements influencing technology adoption and acceptance is of utmost importance. The purpose of this study was to look into the various individual factors that have contributed to the limited success of e-learning in Kenyan technical training institutes. Kisii National Polytechnic (KNP) was used as a case study. A stratified sampling strategy was used to get data from a sample size of 63. An online questionnaire was used as the data-gathering tool. Descriptive statistics was used in data analysis. The research was carried out in July and August of 2021. There were 63 respondents who had registered on the KNP Learning Management System (LMS). Female respondents made up 23.81% of the overall number of respondents on LMS. The attendance rate for LMS training was 74.60%, indicating that the majority of KNP departments had participated. When it came to restricting reasons for using the LMS, internet connectivity (43%) was ranked very low, access to computers was ranked very low (47%), inadequate training was ranked very high (32.0%), and insufficient incentives (38.0%) was ranked high by respondents. Individual factors such as computer literacy were strongly connected to the length of time spent using the LMS, the frequency with which it was used, and the adoption of the LMS. LMS adoption was found to be strongly adversely linked with computer phobia and age. As a result of the findings, adequate computer literacy training, integration of e-learning into the TVET strategic plan, improvement of institution ICT infrastructure and the provision of incentives should be addressed to promote adoption.

Keywords: E-learning, Individual factors, Effective adoption

Influence of Teacher Preparation in Teaching Oral Skills in English Language in Public Primary Schools in Ainabkoi Sub-County, Uasin Gishu County

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Abstract

Language is the art of expressing ideas through random signs and symbols. It serves as a communication tool. Majority of public elementary schools place less emphasis on teaching oral skills and more on teaching reading and writing because these latter two abilities are more important for examination in Kenya. The purpose of this study was to investigate teacher preparedness in teaching English language oral skills in Primary Schools in Ainabkoi Sub-County, Uasin Gishu. The study was guided by the following objectives: the role of preparation in teaching oral skills in public primary schools in Ainabkoi Sub-county; to find out the types of learning aids used to teach oral skills in public primary schools in Ainabkoi Sub-county; to find out the mode of assessment of mastery of oral skills in public primary schools in Ainabkoi Sub-county and to find out classroom strategies used to teach oral skills in public primary schools in Ainabkoi Sub-county. The study adopted descriptive research design and was done in selected primary schools in Ainabkoi sub-county. The study targeted 99 head teachers and 322 Primary school teachers of English – Grade 4 to 6. Pilot study was carried out in Moiben Sub County to enable validity and reliability of research instruments to be determined. Quantitative data was obtained and analyzed using descriptive statistics and inferential statistics was used to understand relationships between different variables. The study findings indicated there was a positive linear effect of the role of preparation of professional records in teaching oral skills ($\beta_1=.436$, $p=0.030$). Teacher preparation on types of learning aids used to teach oral skills has a positive and significant effect on oral skills ($\beta_2=.379$, $p=0.041$). Teacher preparation on mode of assessment of mastery of oral skills was found to have a positive and significant effect on Oral skills ($\beta_3=.101$, $p=0.035$). The study concluded that a well-prepared teacher who understand learning objectives, use diverse methods, provide ample practice, and offer constructive feedback. Teachers are prepared to use various learning aids effectively, with a high level of confidence in authentic assessment. A proactive approach to planning and implementing activities that promote oral proficiency, including diverse teaching methods, supportive learning environments, constructive feedback, and adapting teaching strategies to accommodate different learning styles. The recommendations in the study emphasize the importance of investing in professional development programs for teachers in order to effectively teach oral skills. These programs should focus on learning objectives, diverse teaching methods, practice opportunities, and constructive feedback. It is also important for teachers to have access to learning aids and resources. Authentic assessment methods should be encouraged, and teachers should collaborate to share best practices and innovative strategies. These recommendations aim to create a culture of continuous improvement and support teachers in meeting diverse student needs.

Keywords: Language; Teaching Oral Skills, Teaching English Language; Learning Aids

Recognition of Prior Learning (RPL): A Life Changer to Informal and Non-Formal Sector Technicians?

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Abstract

Human-kind are always learning, everywhere and throughout their lives. However, learning that takes place outside the formal education and training system is often not well understood or valued. Although the government of Kenya like the rest of the world has increasingly recognized the value of informal and non-formal learning, there are still millions of qualified personnel in the informal and non-formal sectors who have refined skills but lack certification. This calls for an extensive and intensive Recognition of Prior Learning (RPL) on various market-driven courses. RPL is a process of identifying, documenting, assessing and certifying formal, non-formal and informal learning outcomes against formal education and training standards. At the Nyeri National Polytechnic, we have championed RPL in the region and so far we are approaching 1000 graduates in various programmes. Recognition of all types of learning has resulted in benefits in the labour market, formal education and training and financially and in terms of self-esteem. Thus, RPL has provided an opportunity for people to acquire qualifications or credits towards a qualification or exemptions (from all or part of the curriculum, or even exemption from an academic prerequisite for entering a formal study programme) without going through a formal education or training programme.

Keywords: Recognition of Prior Learning, Skilled Experts, Certification

Effects of Online Learning on Student's Academic Performance in Public Secondary Schools in Langat Sub-County, Nairobi County, Kenya

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Abstract

This study seeks to examine effects of online learning on students' academic performance in public secondary schools in Langata sub-county, Nairobi County. The following research questions will guide the research: How does access to digital devices affect the academic performance of students in public secondary schools in Langata Sub-County? To what extent do digital device affect students' academic performance in Langata Sub-County public secondary schools? What challenges did schools face in implementing online learning in Langata Sub-County public secondary schools? What strategies can be implemented to address challenges faced in online learning by schools in Langata Sub-County public secondary schools? This study will be anchored on Skinner's Behavioural Learning Theory. The study will use convergent parallel mixed method design, a combination of quantitative and qualitative designs. Descriptive survey design will be employed for quantitative design while phenomenology will be used for the qualitative design. The target population of the study will comprise 24 schools, 750 form three students, 240 teachers and 24 principals. The sample size will be 225 from three students, 7 schools, 72 teachers and 7 principals. The study will use probability sampling (simple random and systematic) and non-probability sampling (purposive sampling). Questionnaires, interview guide and focused group discussions will be used for data collection. Content validity will be used to validate research instruments while split half technique will be used to establish the reliability of quantitative instruments. The trustworthiness of qualitative instruments will be established. Instruments will be validated by employing a split-half approach. Quantitative data will be analyzed using descriptive statistics and reported in percentages, table form, pie charts and bar graphs while qualitative data will be analyzed in the form of themes and reported in narrative form and direct quotes. Ethical considerations will be followed from the beginning of the research study to the end. The findings of the study may be useful to students, teachers, principals, policymakers and researchers interested in incorporating digital devices in learning.

Keyword: Online Learning; Skinner's Behavioural Learning Theory; convergent parallel mixed method design

**Enhancing Vocational Skills Development: An Exploration of the Impact of Skills
Competitions on TVET Trainees in Kenya**

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Abstract

This study explores the impact of skills competitions on vocational skills acquisition and development among TVET trainees in Kenya. It particularly investigates how skills competitions impact Trainees' engagement, motivation and confidence building leading to employment. This study borrows heavily from Constructivism, Social Learning, and Experiential Learning theories, all of which emphasize active, collaborative, and real-world learning experiences. The study employed a mixed research approach which combines both qualitative and quantitative methods, allowing for a comprehensive and nuanced exploitation of the research questions. A semi-structured interview guide based on the mediating factors, continuous learning, industry relevance, and feedback loops outlined in the conceptual framework was developed and administered to government officials and other relevant stakeholders. A structured survey questionnaire based on the input, process, output, and outcome factors outlined in the conceptual framework was also developed. Likert-scale questions to measure levels of motivation, engagement, confidence, skills development, and perceived employability were included to obtain trainee responses. Results were obtained and analyzed to capture underlying information that answered the objectives of the study. It was found that skills competitions significantly impacted on the motivation, engagement, confidence building and relevance to industry skills training that led to gainful employment. The competitions also improved industry involvement as well as more effort from trainers while preparing trainees for competitions.

Keywords: Skills competitions, TVET trainees, Vocational skills development, Employability.

TVET Community Outreach Programmes in Enhancing Sustainable Competency Skills: A Case of TVET Institutions in Kenya

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The positional paper aims to outline the need to employ a community outreach approach in TVET training to enhance sustainable competency skills. The community outreach approach involves a collaborative partnership between learning institutions and the community on certain aspects, and problems facing them. Examples of outreach programmes include training SMEs on financial literacy, teaching small-scale farmers on modern weed controls, and using ICT technologies to monitor food crop storage. The study will employ a qualitative approach as part of the methodology. Desktop research was used to obtain secondary data related to the themes of the study. Data collection was guided by having a checklist to ensure relevant data is collected and reviewed. For many years TVET institutions have been providing training for industrial and job markets which may represent a mismatch to what the society needs. Students wait until the end of the module and stage to go for attachments in industries, factories or institutions. There are few instances in which the students are exposed to the community learning environment. Competency skills are what society requires to solve their daily problems. There are several benefits that institutions can benefit by employing community outreach programmes as part of their curriculum. Experimentalism philosophy states that curriculum is based on facts and learning experiences obtained practically. Learners can fully solve problems by visiting the community and through competency skills learnt they can be able to advance their skills to them. In return, they will be able to gain more experience and address the gap existing between training needs and societal needs. The negative implication of focusing on industrial and job market types of training is a huge number of unemployed youth. If students would have focused on solving society's needs through community outreach methodologies it is then easy to start their businesses. The positional paper therefore recommends that TVET institutions should start outreach programmes as part of their training to complement attachments and training visits.

Keywords: Outreach, Training, Competency Skills, Curriculum, Community

The Effect of E-Learning on Academic Performance of Technical Training College Students in Uasin-Gishu County: A Case Study of the Eldoret National Polytechnic

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Abstract

E-Learning has become increasingly popular in recent years, especially in the field of education. It refers to the use of electronic devices and technology to facilitate learning and teaching. Technical training colleges have also embraced this form of learning, as it offers various benefits such as flexibility, convenience, and access to a wide range of resources.

The general objective of this study was to establish the effect of e-learning on academic performance of Technical Training College students. The objective of the study is to establish the effect of e-learning on academic performance of technical training college students in Uasin Gishu county: a case study of the Eldoret National Polytechnic. The study had two Theoretical Framework; Constructivism Theory and Facilitation Theory (The Humanist Approach). This study adopted a descriptive research design using a case study while collection of data was through a case method. Target population in the study was the students of the Eldoret National Polytechnic. The study had 193 respondents in the Eldoret National Polytechnic. Stratified random sampling technique was applied to determine the sample of the population. Data was collected using structured questionnaires. The study concluded that in order to improve teaching effectiveness and academic achievement, higher education should consider aiming to develop e-learning teaching strategies that encourage greater engagement and also take into consideration the different learning styles found within the student body. The study recommends that critical factors such as institutional issue, management issue, pedagogical factors, technological issue, interface design issue, evaluation issue, and resource support issue and the factors within each issue have not yet been investigated with detail coverage. It further suggests that there is need to carry out detail research involving case studies based on survey questionnaires involving various learning institutions which will ultimately give a better understanding of impact of e-learning aspects within implementation process.

Keywords: E-learning, performance, technical training.

GENDER AND SOCIAL TRENDS

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Mainstreaming Gender in TVET Programmes through Female Role-Model Intervention for Sustainable Development

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Abstract

Women's enrolment in TVET institutions has increased over the years, but this does not mean that all forms of inequity have been addressed. Historically, women have been underrepresented in fields related to Science, Technology, Engineering and Math (STEM). Discrimination from instructors, employers and the community at large, and fewer prospects for employment and practical assignments discourage female students from enrolling and completing STEM courses. Female role models show promise for inoculating women against the harmful impact of stereotypes impugning their ability in STEM; thereby a promising method of increasing the number of women STEM graduates to meet the growing need for STEM professionals and close the gender gap in the professions. The effectiveness of role model sessions in terms of reducing gender stereotypes, increasing enjoyment and importance-related values as well as expectations of success and strengthening the direct effects of expectancies of success of girls' STEM choices will directly increase STEM enrolment and retention, as stipulated by the expectancy-value theory of motivation. The presence of female trainers and instructors in the departments during the course training and having female supervisors and mentors in the industry during attachment and internship are the first steps to undertake whenever possible, in addition to the female professionals providing mentorship and sharing testimonies of their journey towards success periodically during the study period. Women are significantly more motivated by same-gender role models as they provide evidence that success in the acquisition of technical skills is attainable, better represents a possible future and counteracts negative gender stereotypes. This will enable women to participate meaningfully in the labour market bridge professional gender gaps and ultimately contribute to applied research, science and technology for sustainable development.

Keywords: Mainstreaming Gender, Role Model, TVET, STEM, Applied Research

Assessment of Gender Mainstreaming Status in Kenyan TVET Institutions**Langat, K.¹, Osawa, W. O.^{1*}, Ambuli, M. A.¹, and Wato, U. B.¹**¹Technical and Vocational Education and Training Authority, P.O. Box 35625-00100,**NAIROBI-KENYA.*****Corresponding Author Email:** otta.osawa@tveta.go.ke**Abstract**

This study determined the status of gender mainstreaming in Kenyan TVET institutions based on trainee enrollment and the availability of gender support structures in TVET. The study used descriptive and qualitative research design. The target respondents were administrators from registered TVET institutions in the country. Stratified and simple random sampling techniques were applied in the identification of the 250 institutions that were included in this study. Data was collected using a questionnaire consisting of both structured and open-ended questions. A response rate of 85.2% was attained, which was sufficient to generalize the findings. The data was analyzed using advanced Excel and R - Programming software and presented in the form of tables and bar graphs. Additionally, a chi-square association test was conducted to determine the association between gender and the choice of course of study. The study found that there were a higher proportion of male trainees enrolled in STEM courses in public institutions and a higher proportion of female trainees enrolled in non-STEM courses in private institutions. The overall enrollment of male trainees was slightly higher than that of female trainees. The proportion of male teaching staff was higher than that of the female in most categories of institutions. Additionally, a higher proportion of public institutions had gender mainstreaming support structures compared to private institutions. Based on the findings, regular sensitization and advocacy on gender mainstreaming, and mobilization of resources to support infrastructure improvement were recommended.

Key Words: Gender Mainstreaming, Advocacy, Disaggregated, Inclusivity.

Effects of Crèches on Parenting Female Trainees' attendance, retention and Performance in TVET Institution in Uasin Gishu County, Kenya

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Abstract

This study explores the effects of Crèches on Parenting Female Trainees' retention, attendance and performance in Technical and Vocational Education and Training (TVET) Institutions in Uasin Gishu County, Kenya. As higher education increasingly recognizes the diverse needs of the trainees' populations, providing crèches has become a critical support service for female parenting trainees. This research was developed to examine how Crèches influences the retention and performance of parenting female trainees in TVET Institutions. The following objective guided the research: To establish the role of Crèches on female parenting trainees' attendance, retention and performance in TVET institutions in Uasin Gishu County. The current study adopted a survey design based on a sample drawn from across Uasin Gishu County used an explanatory research design and drew a sample of 184 respondents from a target population of 338 based on Krejci and Morgan's (1970) schedule. The researcher targeted the parenting female learners at The Eldoret National Polytechnic, Rift Valley Technical Training Institute and Ziwa Technical Training Institute. Data was collected using questionnaires and the researcher ensured the validity of data by carrying out a pilot study in The Kitale National Polytechnic. For reliability, Cronbach's coefficient Alpha was 0.83 which fell in the acceptable margin of more than 0.7. Data was analyzed both quantitatively and qualitatively with the help of SPSS software version 20. Data analysis and interpretation of the results from the study were presented in tables. The finding was that Crèches has a significant effect on trainee retention and regular attendance in TVET institutions. It was further found that crèches affect parenting female trainees' academic performance. Education Training institutions in the country to have sound support structures for parenting female trainees to ensure retention and completion. It is therefore wise for the management of TVET institutions to have crèches to ensure that there is retention, attendance and performance of parenting female trainees.

Keywords: Crèches; Parenting; Technical and Vocational Training; Female Trainees; Retention; Attendance.

**Gender Attitudes towards Biology Practical and the Influence on Academic
Performance in Biology Subject**

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Abstract

In the last few years, there has been a concerning decline in the performance of students in biology, leading to concerns about their ability to access courses that require satisfactory grades in the subject. Therefore, the current study sought to find out the students' attitudes towards biology practical work per school category and their academic performance in biology. A total of 23 biology teachers were purposively sampled and 245 students were randomly selected in the schools. The data were collected using a mixed method approach integrating both qualitative and quantitative data collection. The data collection tools were questionnaires, interviews and administering biology practical tests to students to determine their performance. In terms of the relationship between gender and attitudes towards biology practical work, female students demonstrated a higher inclination towards expressing positive attitudes compared to male students. Notably, school categories based on gender, ownership and administrative/academic characteristics demonstrated distinct attitudes and performance patterns. Practical test performance varied significantly across the school categories based on administrative/academic characteristics, with Extra-county schools showing the highest mean performance (9.23 ± 1.2), followed by County schools (6.88 ± 0.9), and Sub-county schools with the lowest mean performance (4.32 ± 0.6). These findings emphasize the need for targeted strategies to address attitudes and foster a conducive learning environment, ultimately improving overall academic performance in biology. These findings emphasize the need for targeted strategies to address attitudes and foster a conducive learning environment, ultimately improving overall academic performance in biology. Policymakers and educators can utilize these insights to implement effective interventions and support students in their biology education journey, paving the way for better educational outcomes.

Keywords: Attitude; Performance; School Category

Empowering Women through a Sustainable Blue Economy**Fredrick Oluoch Orwa^{1*}**¹The Kisumu National Polytechnic, P.O. Box 143-40100, KISUMU-KENYA.***Corresponding Author Email:** jakorwa33@gmail.com**Abstract**

Sustainable Blue Economy is the conservative use of water bodies (oceans, seas and inland waters) for economic growth and to improve livelihoods while preserving the ecosystem. Women play a crucial role in family growth and economic development. When empowered, families are sure of success, for instance, children are sure to progress in their education and available basic human wants unlike in the case of several men. Women play crucial roles in the blue economy, from fishing and aquaculture to marine conservation and research. Women's empowerment within the blue economy involves promoting gender equality, providing equal opportunities, and recognizing women's contributions. Several efforts have been made to empower women in this sector though several challenges have not been addressed. This study involves coming up with strategies on how to protect the interests of women as the key players in this sector. The study involves combined approaches including both quantitative and qualitative interviews and analysis for comprehensive recommendations. Quantitative data is obtained from women working in this sector in Wichlum Beach in Bondo, Siaya county. Qualitative interviews are conducted with key stakeholders including Wichlum BMU and KMFRI among others. The outcome of this study indicates that despite several efforts made to empower women in this sector, women still depend highly on men for productivity which at times exposes them to sexual immorality and exploitation. The study indicates that women should not only rely on fish mongering but can also engage in other related activities like tour guiding, fish cage management, extraction of water hyacinth for biofertilizer for use in the kitchen gardens and weaving of beautiful woven furniture among others, to make the system sustainable.

Keywords: Sustainable; Blue Economy; Ecosystem; Empowerment; Women.

Enhancing Women's Safety in Kenya: Adoption of Anti-GBV Clothing for Personal Security in the Face of Femicide and Gender-based Violence

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Abstract

In Kenya, women face persistent threats to their safety, with femicide and Gender-Based Violence (GBV) prevalent issues on the rise, especially during the Gen-Z protests. This paper explores an innovative approach to enhance women's security through the integration of practical protective features such as smart devices, anti-grip technology or tear-away design into their clothing. Targeting women across diverse socio-economic backgrounds, this initiative aims to provide practical and accessible solutions amidst existing challenges. Leveraging collaborative efforts between fashion designers, engineers, and technology experts, these devices not only serve as immediate response mechanisms but also facilitate data collection for monitoring and evaluation purposes. Despite the promising potential, the adoption of smart devices in anti-GBV clothing may face challenges in terms of affordability, technological literacy, and cultural barriers. This initiative seeks to empower women with effective tools for self-protection while advocating for systemic changes to combat GBV. Through rigorous evaluation and stakeholder collaboration, the integration of smart devices into clothing presents a promising avenue towards advancing women's safety and autonomy in Kenya.

Keywords: Safety, Adoption, Femicide and Gender-Based Violence, Anti- GBV- Clothing.

Profile of Tour Operators' Sustainable Environmental Practices and Visitor Choice Behavior in Narok County, Kenya

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Abstract

Tourism is the largest industry in the world in terms of earnings and employment generation. Visitor Choice behaviour is the process of choosing a product based on the distinctiveness of the travel experience, which is greatly affected by environmental degradation in destinations. Tour operators play a critical role in promoting sustainable environmental practices in destinations. The purpose of this study was to analyze tour operators' sustainable environmental practices and their influence on visitor choice behaviour in Narok County, Kenya. The study was informed by the resource-based view theory and the theory of planned behaviour. The design used was a mixed research design. The study population consisted of 176 tour operators, who have access to Narok County, and 397 visitors visiting attractions in Narok County. Questionnaires were issued to visitors and tour operator staff. Interviews were used to get information from high-ranking officials of tour operators and tourism officials. The Data was analyzed using the statistical package for social science, SPSS software version 20.0. The coefficient of tour operators' sustainable environmental practices had a positive and statistically significant effect on visitor choice behaviour ($\beta=.557$, $P<0.05$). The value of R square was .259, an indication that 25.9 per cent of visitor choice behaviour is explained by are caused by tour operators' sustainable environmental practices. The study concludes tour operators' sustainable environmental practices have a positive effect on visitor choice behaviour, thus a need to embrace the practices to achieve competitive advantage and conserve the environment.

Keywords: Profiling, Tour operators, Sustainable environmental practices, Visitor choice behaviour.

Assessing the Socio-Economic Implications of Sewer Line System Blockage: Insights for Sustainable Urban Development

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Abstract

Sewer line blockages present significant challenges to urban infrastructure, with profound socio-economic repercussions affecting public health, economic stability, and social equity. This paper offers a comprehensive assessment of these implications, providing insights for sustainable urban development. By reviewing existing literature, the study identifies primary causes of sewer line blockages, including improper waste disposal, ageing infrastructure, and inadequate maintenance. It examines both direct and indirect economic costs, such as emergency repair expenses, property damage, and healthcare costs, as well as broader social impacts, including increased disease risk and exacerbated inequalities in marginalized communities. Employing a combination of quantitative and qualitative methods such as cost-benefit analyses, case studies, and community surveys-the assessment provides a holistic understanding of the issue. The findings indicate that technological innovations, including IoT-based monitoring systems, green infrastructure solutions, and robust policy frameworks, are essential for mitigating the adverse effects of sewer blockages. Additionally, the paper underscores the importance of public education and community engagement in promoting proper waste disposal practices and supporting sustainable infrastructure initiatives. Ultimately, this study emphasizes the necessity for integrated and equitable approaches to urban planning and infrastructure management. By addressing the root causes of sewer line blockages and implementing sustainable development practices, cities can enhance their resilience, improve public health outcomes, and foster inclusive economic growth. The insights provided are intended to inform policymakers, urban planners, and stakeholders in their efforts to create more sustainable and livable urban environments.

Keywords: Sewer Line Blockages; Urban Infrastructure; Socio-Economic Implications; Public Health; Economic Stability.

Effects of Athletics Sport Competitive Events on the Performance of Para Athletes in Kenya

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Abstract

Competitive events are pivotal to the development and performance of para-athletes, spanning talent identification to elite performance. This study examined the effects of competitive event structures on the performance of Kenyan para-athletes. The research aimed to understand how competitive event approaches influence para-athlete outcomes. To achieve this, an exploratory case study was conducted involving twenty para-athletes selected from a larger population of sixty-six. In-depth interviews and observational data were collected, with validity and reliability ensured through a pilot study involving five para-athletes. Data analysis followed a Straussian grounded theory approach, involving open, axial, and selective coding to identify core categories and develop a theoretical framework. The study revealed a critical gap in competitive opportunities for Kenyan para-athletes, with participants reporting minimal exposure to such events. The research further demonstrated that the existing parasport governance framework significantly affects the nature and availability of competitive events. To enhance para-athlete performance, a strategic overhaul of the parasport structure and leadership is imperative. This includes fostering an environment conducive to increased competitive opportunities, aligning with the performance characteristics derived from the athlete brand image model: athletic expertise, competitive style, sportsmanship, and rivalry. Future research should focus on developing a robust parasport system to optimize competitive event accessibility and para-athlete performance.

Keywords: Competitive Event, Athletics Expertise, Competitive Style, Sportsmanship, Rivalry, Para Athlete, Grounded Theory

Reflecting on Kenya's Sustainable Development Journey**Enock Kiprono Ngeny^{1*}**¹Applied Sciences Department, The Eldoret National Polytechnic***Corresponding Author Email:** enockngeny@gmail.com**Abstract**

This paper dissects Kenya's significant strides in sustainable development, highlighting its progress in aligning national objectives with the Sustainable Development Goals (SDGs), Vision 2030 blueprint, and the broader Africa Agenda 2063. It delves into the medium-term development goals that have steered Kenya's policies and initiatives towards a sustainable and inclusive growth trajectory. Kenya's Vision 2030, the country's long-term development plan, envisions transforming Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. This blueprint is intricately linked with the SDGs, focusing on poverty eradication, gender equality, sustainable economic growth, and infrastructure development. Significant milestones include advancements in renewable energy, Kenya becoming a leader in geothermal energy production, and substantial investments in healthcare and education. Additionally, this paper examines how Kenya's strategies align with the Africa Agenda 2063, a strategic framework for the continent's socio-economic transformation over the next 50 years. Agenda 2063 emphasizes inclusive growth, sustainable development, and integration, aiming for a prosperous, peaceful, and integrated Africa. Kenya's regional trade, peace and peacekeeping initiatives, infrastructure development, and environmental sustainability policies reflect a commitment to these continental aspirations. Through a detailed analysis, Kenya's medium-term plans are explored, such as the Third Medium Term Plan (MTP III) 2018-2022, which operationalized Vision 2030 and prioritized the Big Four Agenda: manufacturing, universal healthcare, affordable housing, and food security. The paper will highlight key achievements under these pillars, addressing challenges and lessons learned. The Fourth Medium Term Plan (MTP IV) 2023-2027 themed Bottom-Up Economic Transformation Agenda (BETA) will also be examined. A comprehensive overview of Kenya's journey toward sustainable development will be provided, examining the interplay between national goals and continental frameworks. The importance of cohesive policies, robust governance, and international partnerships in achieving sustainable development and enhancing the quality of life for all Kenyans will be underscored. By reflecting on Kenya's progress, this discussion aims to inspire continued commitment and innovative approaches to sustainable development.

Keywords: Sustainable Development Goals; Middle Income; Blue Print; Regional Trade; Food Security

**An Investigation of Social Stratification on Implementation of Socio-Economic Policies
in TVET Institution. A Case Study in Kisii County, Kenya**

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Abstract

Technical, Vocational, Education and Training (TVET) focuses on providing lifelong skills that meet the needs of the work place, industry and self-employment. The importance of TVET is in the global agenda for development and refocusing education and training in the 21st Century. This study will sought to investigate individual and socioeconomic determinants of trainees' enrolment and participation in public TVETs in Kisii County, Kenya. The objective of the study will establish how socioeconomic status influenced trainees' enrolment and participation in public TVETs in Kisii County, Kenya and the research hypothesis that was tested stated that there is no significant relationship between socioeconomic status and trainees' enrolment and participation in public TVETs in Kisii County, Kenya. The study employed descriptive survey research design with a sample size 12 TVETs, 30 trainers and 331 trainees drawn from the target population of 24 public TVETs, 150 trainers and 2385 trainees from entire Kisii County. Data collection instruments to be used will be interview guide, questionnaires and document analysis guides. Data analysis will be analyzed qualitatively and quantitatively. Descriptive statistics which included frequencies percentages, means and standard deviations were generated and used in discussing the research findings. The findings showed there was a significant relationship between socioeconomic status and trainees' enrolment; there was a statistically significant mean difference between socioeconomic status and trainees' enrolment in public TVETs; there was statistically significant mean difference between income of parents, level of education of parents and occupation of parents and trainees' enrolment in TVETs.

Keywords: Social stratification, Implementation, socio economic policies.

**Kenya, a Drug-Free Nation from Alcohol and Drug Abuse: A Study of Employees at
Various Workplaces**

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Abstract

The study aimed to assess the extent of alcohol and drug abuse (ADA) among employees at various workplaces. The Cross-sectional study was conducted where both quantitative and qualitative data were collected. Cross-sectional studies are the best way to determine prevalence and are useful for identifying associations. A structured questionnaire with open and closed questions was used to generate quantitative and qualitative data. Given the nature of different workplaces, a self-administered structured questionnaire was recommended. 30% of the employees were sampled in every workplace. The survey employed systematic random sampling using the employee staffing register where every nth employee (nth = total population/sampled population) was interviewed. This sampling method ensured that employees in all cadres, regions or stations in a given workplace were covered in the sample. A self-administered questionnaire was used for employees who are literate while an interview schedule was used for employees with low literacy levels. Employees were encouraged to answer all questions truthfully. Given the nature of different workplaces, a self-administered structured questionnaire was employed. A self-administered questionnaire was used for employees who are literate while an interview schedule was used for employees with low literacy levels. Employees were encouraged to answer all questions truthfully. The findings of this study will be of paramount importance to the users of alcohol, managers of institutions, rehabilitation programs other stakeholders in this industry and most importantly to policymakers and implementation of programs and policies.

Keywords: Drug Abuse; Workplace; Employees; Self-Administered Questionnaire; Alcohol; Rehabilitation

**Perception of Trainees on Gender Equality in TVET Institutions. A Case Study of
Siaya Institute of Technology, Siaya County, Kenya**

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Abstract

Gender equality is a human right. Both men and women are entitled to live with dignity and have the freedom to make choices about their sexual and reproductive health and well-being. We believe that advancing gender equality is crucial in achieving sustainable development and reducing poverty. Fostering initiatives that empower women and seek to leverage their transformative potential to contribute to improving the health and productivity of families and communities and improve prospects for the next generation. (UNFPA, Prada 2023). The study aimed to determine the trainees' perception of Gender Equality in Siaya Institute of Technology, Kenya. The specific objectives are to identify the perception of trainees on the effects of GBV on Gender equality, to assess the role of male trainees in promoting gender equality, and to find suitable intervention measures to promote gender equality among trainees in TVET Institutions. This study will apply a descriptive survey and correlational design. The sampled population included 360 trainees from 10 departments. A questionnaire and interview schedule will be used to collect data and data collected will be analyzed using descriptive statistics. Qualitative data will be analyzed through thematic analysis. Data will be presented in tables, frequencies and percentages. Findings from the study suggest possible intervention measures to provide promote gender equality in TVET the Institutions.

Keywords: Gender Based Violence; Gender Equality; Gender Inequality; Trainees; TVET Institutions

Examining Strategies and Interventions to Promote Gender Equality and Social Inclusion in TVET Systems**Jacqueline Kidiya^{1*}**¹ Sigalagala National Polytechnic. P.O. Box 2966-50100 Kakamega, Kenya

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ABSTRACT

This paper explores strategies and interventions aimed at advancing gender equality and fostering social inclusion within technical and vocational education and training (TVET) systems. Despite progress in educational equity, gender disparities persist in TVET, limiting opportunities for women and other marginalized groups. The abstract examines the multifaceted challenges faced by these groups, including societal norms, stereotypes, and institutional barriers that hinder their access, participation, and success in TVET programs. Through a review of literature and case studies, the paper identifies promising approaches to address these challenges, such as gender-responsive curriculum development, inclusive pedagogical practices, targeted recruitment efforts, and provision of support services tailored to the needs of diverse learners. The role of policy frameworks and institutional mechanisms in promoting gender equality and social inclusion in TVET is also highlighted. It discusses the importance of integrating gender perspectives into TVET policies, promoting gender-sensitive learning environments, and fostering partnerships with stakeholders to advocate for systemic change. Additionally, the paper examines the significance of promoting positive attitudes towards gender diversity and implementing awareness-raising campaigns to challenge stereotypes and biases within TVET institutions and broader society. Data collection methods for this study include a comprehensive review of existing literature, analysis of policy documents and reports, and examination of case studies and best practices from diverse contexts. By synthesizing empirical evidence and insights from research, the paper aims to provide valuable insights into effective strategies and interventions for promoting gender equality and social inclusion in TVET institutions. Ultimately, the paper underscores the importance of creating inclusive learning environments that empower all individuals, regardless of gender or social background, to pursue and succeed in TVET pathways.

Keywords: Gender Equality, Social Inclusion, Strategies, Interventions, Promote.

ENVIRONMENTAL

CIRIS 2024

Assessment of Onshore Petroleum Spillages Preparedness in Kenya**Chepkirui Jenifer^{1*}**¹The Eldoret National Polytechnic, P.O. Box 4461-30100, **ELDORET - KENYA**.***Corresponding Author Email:** jennyrutttoh@gmail.com**Abstract**

Over the recent past, Kenya has been hit by escalating numbers of petroleum and LPG tanker incidents. This has been causing havoc of casualties, loss of properties and environmental degradation. Just to mention a few petroleum-related accidents, on Jan 31st, 2009 in the Sachangwan area, an Oil tanker exploded killing approximately 130 people. Another yet but tragic accident occurred on September 12th, 2011 in Nairobi Sinai slums which left around 120 people burnt to death as they were trying to siphon Oil from the Kenya Pipeline Company. The recent case in Mai Mahiu of an LPG tanker explosion and several vehicles were burnt to ashes causing environmental damage and loss of property. This study will analyse preparedness by petroleum industry stakeholders towards petroleum spillage preparedness, response and risk reduction. The study employed a descriptive research design. The study targeted 105 operational managers of registered top oil marketing companies in Kenya. A survey method will be applied to data collection. This study will use both primary and secondary data obtained from petroleum industry stakeholders and past literature. The analysis of the data was carried out using descriptive statistics and content analysis using a Statistical Package for Social Science (SPSS). The final report was documented to obtain the relevant findings.

Keywords: Petroleum; Oil Tanker; Accident; Stakeholder; Environment

Extraction and Characterization of Biomordant from *Acacia nilotica* and Banana Pseudo Stem Sap for Natural Dyeing of Leather

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Abstract

Leather dyeing is an ancient and essential process for enhancing the aesthetic appeal and durability of leather products. However, the conventional synthetic mordents used in leather dyeing often pose environmental and health concerns. As a result, there is a growing interest in developing sustainable and eco-friendly alternatives for mordanting processes. This study focused on the extraction and characterization of biomordants, derived from natural sources specifically tannins obtained from *Acacia nilotica* barks and banana pseudo stem sap, for application in the natural dyeing of leather. The biomordants were extracted using the simple aqueous method using a water bath at 75°C for one hour. The mordant was then characterized using FTIR to determine the functional groups present in the extract. Major peaks were observed in the region at 3278.39 cm⁻¹ for OH stretching vibration, 1590.99 cm⁻¹ for C=O stretching vibrations, and 1001.84 cm⁻¹ for C-O stretching vibration for the *Acacia nilotica* biomordant. For the banana pseudo stem sap, the characteristic peaks were observed at 3216.68cm⁻¹ attributed to the OH stretching, and 1605.45cm⁻¹ for C=O stretching vibration. These peaks clearly indicated the presence of tannins in the biomordant. The phytochemical screening of the biomordants was also done using the ferric chloride test to determine whether the tannins were present, the colour of the extract turned to dark green indicating the presence of tannins extracts used as the biomordant in this case. The presence of tannins in the extract was revealed by the FTIR spectra, suggesting that it could serve as a biomordant in leather dyeing.

Keywords: Biomordant, *Acacia nilotica*, Banana pseudo stem sap, FTIR, Ferric Chloride

Environmental Conservation and Management for Continued Provision and Uptake of Herbal Medicines

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Abstract

Traditional medicine plays a critical role in the treatment of chronic life-threatening conditions and diseases. This skill addresses the critical importance of herbal medicine for emerging disease outbreaks and provides policy recommendations for more sustainable health alternatives. The kitchen garden kit has varied house plants scientifically selected for their rich nutrient contents with the least pest and disease problems. Vegetables, spices and herbs are delightfully easy to grow and provide pleasure for the taste and treat common diseases like diabetes, cancer, hypertension, gout, constipation etc. Conventional medicine approaches such as pharmacotherapy with many different drug medicines and biologics have been utilized across the world but still pose a challenge to the pandemic. Herbal preparations are made from whole plant, plant parts, and exudates, in a crude state in dried or fresh form and extracts. Preparation methods include infusion, decoction, maceration, distillation, fractionation, purification, and concentration. The herbs are formulated in different modern dosage forms, such as Tablets, Capsules, Topical creams, Gel, Ointments etc. The skill exploits internet technology to identify herbal plant species and their therapeutic uses. This innovative knowledge can be used to empower the community herbalists. I recommend that policy and decision-makers in respective counties at all levels need to:- Integrate explicit health nutritional requirements in pandemic response plans by ensuring full exploitation of plant parts through establishing industrial parks for processing herbal medicine, provide sufficient training to ensure high hygienic and safety standards, recognize, protect and promote the safety of all herbal professionals, and traditional herbalists, and that limited resources lead to priority setting and discriminatory access to such medication for sustainable development.

Keywords: Environmental Conservation; Herbal Medicines; Pharmacotherapy; Pandemic.

Use of Fortified Silt in Floor Tile Manufacture as a Conservative Measure in Agro-Forestry

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Abstract

Human activities contribute to the major factors that have contributed to climate change. Manufacturing factories emit deleterious gases which deplete the ozone layer thus affecting the climate. One of the human activities involved in manufacturing ceramic tiles, for instance, is the massive excavation of minerals like feldspar. This results in vast vegetation destruction and reduced evapotranspiration, affecting the hydrological cycle. It is against this background that this research paper seeks to address the problem by using locally available and affordable materials to address the problem. Wall and floor tile when used give protection to backing. Homemade Euphosilt floor tile is majorly made of silt from dams, lakes and river beds then moulded together with natural resin from the calendebrium plant. It's made to the standards of the market specifications. Various tests are carried out on the sample namely permeability test, crushing strength and fire test. The tests are done on the specimen and analyzed in detail to justify the relevance and applicability of this research paper. Drastic climate change has been experienced due to human and animal activities and natural erosion agents. Agents of soil erosion have greatly contributed to the siltation of rivers, lakes and dams. The utilization of silt as a bulk material for the manufacture of Euphosilt floor tile aiming to restore and improve the natural occurrence of the hydrological cycle is fundamental in addressing climate change. Indeed, modern ceramic tile manufacture has led to the massive destruction of vegetation and the entire ecosystem.

Keywords: Affordable housing, TVET role in industrialization, ecosystem. Climate change

**Relationship between Green Supplier Selection and Performance of Cement
Manufacturing Firms in Kenya**

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Abstract

Cement plays one of the most fundamental roles in construction, but it is also among the key drivers of climate change, responsible for 6 to 9% of global CO₂ emissions. This eulogizes the role of green supplier selection in pulling all levers of sustainable performance. However, there are mixed findings on the link between green supplier selection and organizational performance warranting further studies on the theme. Thus the current study was designed to Assess the relationship between green supplier selection and performance of cement manufacturing firms in Kenya. The stakeholders' theory guided this study with a positivist philosophy and descriptive research design. This study targeted 202 top and middle-level management staff of 8 cement manufacturing companies in Kenya. Taro Yamane's formula was used to calculate a sample size of 168 respondents after considering a non-response rate of 20%, to fulfil the requirements of the element of representation. The study collected quantitative data using a structured questionnaire. Piloting was done using 20 questionnaires in quarry manufacturing companies in Uasin Gishu County for purposes of ensuring the reliability and validity of the instrument. Factor analysis was used to investigate construct validity. The instrument's reliability was established using Cronbach's alpha coefficient to demonstrate internal consistency whose threshold is 0.7 and above. Data was analyzed using descriptive statistics such as frequencies, mean, standard deviation skewness kurtosis and inferential statistics through the use of Pearson's correlation, ANOVA and regression analysis using the statistical package for Social Sciences (SPSS) version 25. From the findings, green supplier selection explained (R squared =0.513) which is a 51.3% percent variation in the organizational performance of cement manufacturing companies. The study findings showed that green supplier selection has a statistically significant relationship with the performance of cement manufacturing firms in Kenya on $\beta_4= 0.541$ ($t = 11.512$; $p\text{-value} = 0.000$ which is less than $\alpha = 0.05$) implying that green supplier selection results in the statistically significant performance of cement manufacturing firms in Kenya. The finding of this study advocates for the use of quality, capacity and environmental criteria in green supplier selection for the sustainable performance of cement manufacturing companies. This argumentation is further underpinned by the stakeholder theory. Cement manufacturing companies should strengthen their use of key performance indicators (KPIs) related to environmental sustainability and supplier performance, such as carbon footprint reduction, waste diversion rates, and supplier compliance with green procurement criteria to enhance their performance to enhance a green economy and maximal performance for the realization of Vision 2030.

Keywords: Green Supplier Selection, Performance; Cement Manufacturing



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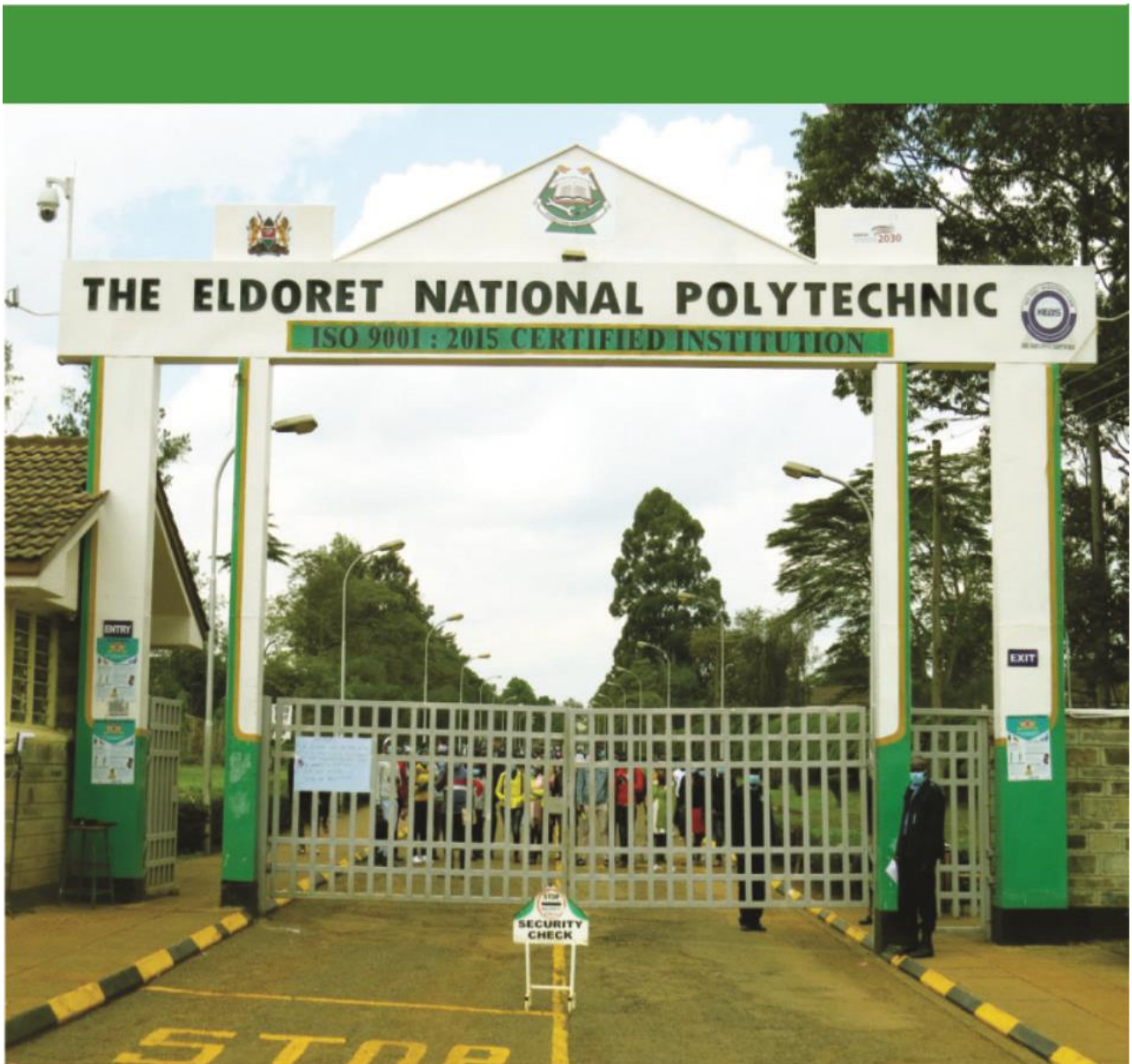
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