



**MZUZU
UNIVERSITY**

DIRECTORATE OF REASERCH

NATIONAL REASERCH DISSERMINATION CONFERENCE

5-6 JUNE 2024

THEME

Research and Innovation:

A Catalyst for Social, Cultural and Economic Transformation

Mzuzu University

CODeL Complex

Luwinga Campus

CONFERENCE BOOKLET

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**PROGRAMME FOR THE FIRST MZUZU UNIVERSITY RESEARCH
DISSEMINATION CONFERENCE, 5-6 JUNE, 2024**

DAY 1

| Arrival of Participants | | | | |
|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Director of Ceremonies: Dr Precious Madula and Mr Mishek Banda | | | | |
| Resource Room | | | | |
| 08:00 - 09:00 | Registration | | | |
| 09:00 - 09:30 | Opening Ceremony (Remarks by Prof. Fanuel Kapute, DOR MZUNI; Prof. Wales Singini, VC MZUNI; Dr Andrew Jamali, NPC (Guest of Honour)) | | | |
| 09:30 - 10:00 | Keynote Address 1: Human Activity, environment degradation and climate change: Implications for research, policy and practice - Dr Elijah Wanda | | | |
| 10:00-10:05 | Briefing on SAVE Project | | | |
| 10:05-10:10 | Briefing on NORHED Project | | | |
| Group Photo | | | | |
| 10:10 - 10:30 | Health Break | | | |
| Breakaway Sessions | | | | |
| | Resource Room | Room A | Room B | Room C |
| | Humanities and Social Sciences | Environmental Sciences | Science, Technology and Innovation | Education |
| Chair | Dr Winner Chawinga | Dr Ivy Ligowe | Dr Nephtale Mumba | Dr Foster Gondwe |
| 10:30 - 10:50 | Richard Gadama, <i>Christian Environmental Stewardship, the Sabbath, and its Implications on Environmental Sustainability</i> | Temwa Chilanga, <i>Performance analysis of Zomba water users associations in rural water supply schemes</i> | Chimwemwe Mtegha and Wallace Chigona, <i>How Government Agencies Achieve Cybersecurity Capacity Building Outcomes Using the National Cybersecurity Capacity Building Framework: A Case of Malawi</i> | C.M Selemani-Mbewe, C. Long and S. van Putten, <i>An innovative pedagogy in primary education for effective continuous assessment implementation in Malawi</i> |
| 10:50 - 11:10 | Wezzie Mkwewe and Fiskani Ngwira, <i>Perception of Library Services among Nursing students at Ekwendeni College of Health Sciences Library</i> | Madalitso Mng'ombe, Eddie Mtonga, Brighton Chunga, Russel Chidya and Mphatso Malota, <i>Adaptive Neuro-Fuzzy Inference System for Predicting Conventional Wastewater 5-Days Biochemical Oxygen Demand</i> | Friday Masumbu, Anthony Mwakikunga, David Tembo and John Kamanula, <i>Determination of Heavy Metals and Anticancer Phytoconstituents in Selected Medicinal Plants Used by Traditional Herbal Practitioners to Treat Cancers in Malawi</i> | Chikumbutso H Manthalu, <i>Enhancing Student Access and Success in Stem-Related Programs in Malawian Higher Education</i> |
| 11:10 - 11:30 | Douglas Nyirenda, <i>Women, Nationalism and The Making of Independent Malawi: The Case of Nkhata Bay, 1940s-1966</i> | Richard Zidana, Victor Kasulo and Bryson Nkhoma, <i>Performance of public microcredit schemes: Experiences from National Economic Empowerment Fund clients in Lilongwe district, Malawi</i> | Master Chisale, Saul Mwale, Twalibu Tandwe, Yankho Chapeta, McLenelious Chimanya, Paul Munyenembe, Michael Nkosi, Billy Nyambalo, Jommo Ngonga, Yusuf Chikakuda, Pizga Kumwenda and Winfred Kayange, <i>Prevalence of Immunoglobulin (G (IgG) and M (IgM)) Against SARS-COV-2 and risk factors for positivity among students at tertiary education institution, Malawi: A case of Mzuzu University.</i> | Thokozani Bvumbwe, <i>Harnessing positivity towards e-learning programs: Quality Assurance Initiatives at Mzuzu University</i> |

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|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11:30 - 11:50 | Flywell S Simkonda, <i>Copyright issues in the new media era: the role of Malawi's intellectual property policy and copyright act in safeguarding the rights of creators in the digital age</i> | Allan Kaliwo, Victor Kasulo, Blessings Bandawe and Frank Mnthambala, <i>Utilization of tradition and scientific information in understanding climate change and adaptation by smallholder farmers: A case study of Phalula Extension Planning Area (EPA), Balaka district</i> | Zaithwa Katuwa and Hope Chamdimba, <i>Techno-economic Evaluation of Power Generation from Industrial Wood Waste at Raiply Limited in Limbe, Malawi.</i> | Mwaona Nyirongo, Lingsley Lupande and Precious Cimphangu, <i>Political Economy of Tertiary Education Financing: Analysis of Student Loans Policy in Malawi</i> |
| 11:50 - 12:10 | Eunice Chimberenga and Austine Phiri, <i>Support for Smallholder Farmers with Climate Change Information in Rumphi District: Role of Bolero Agriculture Resource Centre</i> | Chimwemwe Baloyi, Mabvuto Tembo and Winner Chawinga, <i>Analysis of factors affecting Women's Participation in Community Leadership in Traditional Authority Mabulabo, Mzimba District, Malawi</i> | Hope Chamdimba and Admore Chiumia, <i>Household Socio-economic Status and Adoption of Commercial Biomethane for Cooking at Lizulu Market in Ntcheu, Malawi</i> | Annie T. Chizengo-Thawani and Lester B Shawa, <i>Student Support in Distance Education and Study Circle Innovation in Malawi: A Case Study</i> |
| 12:10 - 14:00 | Lunch | | | |
| 14:00 - 14:40 | Pannel Discussion: Translating Research into Practice (Pannelists: Prof. Kapute (DoR, MZUNI); Dr Chomora Mikeka, Director of STI-MoE; Dr Sarah Tione (Directorate of Research, LUANAR) - Moderator: Dr Bright Chunga | | | |
| | Resource Room | Room A | Room B | Room C |
| | Humanities and Social Sciences | Health Sciences | Tourism, Hospitality and Management | Open, Distance and eLearning /Education |
| Chair | Mr Donald Malanga | Dr Pigza Kumwenda | Dr Michael Sepula | Dr Lydia Kishindo -Mafuta |
| 14:40 - 15:00 | Racheal Cham'mudzi and Austine Phiri, <i>Improving Access to Information through Library Marketing in a Private University in Malawi</i> | Eshanie A Office and Thomas Salimu, <i>Bacterial contaminants in stored blood and blood products at Zomba Central Hospital Blood Bank: Assessing the risk of post-transfusion sepsis</i> | Francis Muchemwa, <i>The impact of research output produced by tertiary institutions in Malawi. A case study of Mzuzu university</i> | Muyco Mhango, <i>Educators' Digital Competences for Effective Use of eLearning Management System at Mzuzu University: From TPACK Theoretical Perspective</i> |
| 15:00 - 15:20 | Enerst Longwe, <i>Africanising language and communication in policy to meet the needs of majority masses: a critical review of Malawi 2063 agenda</i> | Moses Nyasulu and Winner Chawinga, <i>Analysis of the factors that affect use of modern contraception among secondary school adolescent girls in Malawi: The Case of Karonga District</i> | Emmanuel Banda, Rodrick Katete and Francis Muchemwa, <i>Enhancing a holistic tourism Experience: Empowering Non-Tourism Stakeholders in the tourism value chain</i> | Nellie Mbano, <i>The use of science Textbooks in secondary schools in Malawi</i> |
| 15:20 - 15:40 | Colby Kumwenda, <i>The Missional Task of the Church in Environmental Conservation</i> | Blessed Kondowe, Racheal Ankunda and Suzgo Mzumara, <i>Chest X-ray Patterns and Clinical Outcomes of COVID-2019 patients at Queen Elizabeth Central Hospital, Malawi</i> | Zandivuta Kankhunja, Cecilia Ngwira, Rodrick Katete, <i>Understanding environmental responsible behaviours among tourists at World Heritage Sites: The Antecedent Effects of Motivation, Involvement, Place Attachment and Satisfaction</i> | Jonas Kalulu and Foster Gondwe, <i>Teachers' Experiences of Interactive Radio Instruction at Goliati Zone Primary Schools in Thyolo District, Malawi</i> |
| 15:40 - 16:00 | Jonas Zaithwa, <i>Episteme coloniality: deconolising English as a learning area in Malawian secondary school curriculum</i> | Zione Lameck, Jean Nyondo and Atipatsa Kaminga, <i>Prevalence of Metabolic Syndrome and Predisposing factors among professional drivers in Mzuzu and Lilongwe cities</i> | Zandivuta Kankhuni, Cecilia Ngwira and Geoffrey Mhango, <i>Influence of Domestic Tourist Motivations on Tourist Attitudes, Experience, Satisfaction and Behavioural Intentions in an Emerging Destination Context</i> | Limbikani Gama, George Chipeta and Winner Chawinga, <i>A literature review on electronic learning in Malawi public universities.</i> |

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|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16:00 - 16:20 | Harvey Chidoba Banda, Migrants and Medicines: The Interface of Migration and Traditional Medicinal Beliefs in Northern Malawi | John Kuyokwa, Claire van der Westhuizen, Katherine Sorsdahl and Chiwoza Bandawe, <i>Prevalence and predictors of alcohol use among Malawian adolescents living with HIV attending selected Anti-Retroviral Treatment clinics in Blantyre, Malawi</i> | Stan G Kaunda, <i>Organisational legitimacy dimensions: perspectives from African managers</i> | Lisnet Mwadzaangati, <i>What do we learn from teachers as they start to participate in lesson study?</i> |
| 16:20 - 16:40 | Limbikani Gama, Winner Chawinga and George Chipeta, <i>Seeking and using information in a hospital setting among health professionals in Malawi</i> | Lawrence Kachule, Tony Nyirenda and Felix Nyakwawa, <i>Promoters of treatment failure after intensive phase of first-line anti-tuberculosis treatment among new pulmonary tuberculosis patients in Lilongwe</i> | Rodrick Katete, Francis Muchemwa and Emmanuel Banda, <i>A look into how Cultural Diversity Management can enhance collaboration and effectiveness in academic institutions. The case study of Mzuzu University</i> | Davie C. Chirombo, <i>Investigating the Challenges that Science Teachers Face in Making Science Content Meaningful for Deaf and Hard-of-Hearing Learners.</i> |
| 16:40 - 17:00 | Wrap Up of Day 1 | | | |
| 17:00 - 17:30 | Refreshments | | | |
| 17:30 | End of Day 1 | | | |

DAY 2

| Resource Room | | | | |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 09:00 - 09:30 | Keynote Address 2 (Innovation) - Role of Science, Technology and Innovation (STI) in the Realisation of MW2063 – Prof. Chomora Mikeka | | | |
| 09:30 - 10:00 | Keynote Address 3 (Health) - Mitigation of Mental Health Problems in Academic Institutions - Dr Charles Masulani | | | |
| 10:00 - 10:30 | Health Break | | | |
| Breakaway Sessions | | | | |
| | Resource Room | Room A | Room B | Room C |
| | Humanities and Social Sciences | Environmental Sciences | Science, Technology and Innovation /Health Science | Education |
| Chair | Dr Wellman Kondowe | Dr Victor Kasulo | Dr Patrick Chikumba | Dr Foster Lungu |
| 10:30 - 10:50 | Ezilon Kasoka, <i>The Malawi Access to Information Act: An Effective Tool to Control Government Corruption</i> | Mary Namwanje, Godfrey Kubiriza, Margaret Masette, Esther Babirekere, Agnes Masawi, Jackson Efitre, Kashub Tumwesigye, Nathan Semwanga and Kumbukani Mzengereza, <i>Nutritional quality, shelf life and safety of plant-animal fortified complementary foods</i> | Stanley Ndebvu, Reuben Moyo, Vision Thondoya, Lloyd Chunga, Numeri Phiri, Lonjezo Ndebvu, MacPherson Matewere, Michael Zimba and Wesley Kondowe, <i>MILAB: A virtual science laboratory for Malawian secondary schools</i> | Paul Chiwaya, Elizabeth Kamchedzera and Louiss Saddick, <i>Sharing the Higher Education Promise Beyond the Few: Taking Stock of Under-Represented Communities of Student</i> |
| 10:50 - 11:10 | Moses Mkandawire and Hamis Abdullah, <i>Utilisation of electronic information resources by form four students at Mzuzu Government Secondary School in Mzuzu City</i> | Sèna Abigaïl Oussa, Wales Singini, Bob Jere and Benjamin Kondowe, <i>Bioeconomic modeling of purse seine (Chilimira) fishery in Nkhata Bay district Northern Lake Malawi</i> | Twalibu Tandwe, Master Chisale, Saul Mwale, Yankho Chapeta, McLenelious Chimanya, Paul Munyenyembe and John Kamanula, <i>Survey of medicinal plants used by local communities to treat viral respiratory illnesses with emphasis on Covid-19 related ailments in Rumphu District, Northern Malawi</i> | Anthony M Gunde, <i>Academic Freedom as A Social Movement: Visual Rhetorical Analysis of Images Used by University of Malawi's Academic Staff Union Protests Of 2011</i> |

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|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11:10 - 11:30 | Chimwemwe Kamanga, <i>The place of language in Internationalisation and Cooperation in the delivery of tertiary education: The case of Mzuzu University</i> | Daniel Hussein and Maarifa Mwakumanya, <i>Developing an early flood warning system in the Shire River Basin of Chikwawa District, Malawi</i> | Lawrence Kachule, Tony Nyirenda and Felix Nyakwawa, <i>Prevalence of treatment failure tuberculosis among newly bacteriologically confirmed pulmonary tuberculosis patients in Lilongwe</i> | Edister S. Jamu and Foster Gondwe, <i>Academic Talent Development During the Covid-19 Pandemic: Lessons in Institutional Resilience and Opportunities for Posturing to Engage with Mw2063</i> |
| 11:30 - 11:50 | Rhodrick Padoni, George Chipeta and Winner Chawinga, <i>Records management practices at M'mbelwa District Council in the Northern Region of Malawi</i> | Chamuka Tebulo, Joyce Njoloma, Robertson Khataza, Chipo Shisong, Isaac Nyoka and Rhett Harrison, <i>Understanding smallholder fall armyworm management strategies in Malawi and Zambia</i> | Bashir Hussein Joe Merico and Pizga Kumwenda, <i>Extensively-Resistant Salmonella Typhimurium DT 104 Isolated from Small-Scale Poultry Farms in Ntcheu, Central Malawi</i> | Tamara Mumba, Mtisunge Malemia, Leonard Umali, Sarah Khudze and Patrick Chikumba, <i>Towards Business Intelligence in Secondary Education in Malawi: Recommendations for Its Implementation from Management Perceptive</i> |
| 11:50 - 12:10 | Newton Banda, George Chipeta and Winner Chawinga, <i>Postgraduate students' perception of the quality of library services at the Malawi Institute of Management</i> | Gomi Gondwe and Brighton Chunga, <i>Assessing Water Availability Using Remote Sensing in South Rukuru and North Rumphu River Basin, Malawi</i> | Donald Malanga and Wallace Chigona, <i>Predictors of Community Health Workers, Continuance Intentions to Use mHealth in Malawi: User Expectation Perspective</i> | |
| 12:10 - 14:00 | Lunch | | | |
| | Resource Room | Room A | Room B | Room C |
| | Humanities and Social Sciences | Environmental Sciences | Health Sciences /Science, technology and Innovation | Environmental Sciences |
| Chair | Dr Serah Kasembeli | Dr Margret Mdolo | Dr Ellemess Phuma | Dr Mtafu Manda |
| 14:00 - 14:20 | Rachel Fiedler, <i>The National Charcoal Strategy and Gender Dimensions Among Zomba and Mzuzu City Charcoal Market Users</i> | Japhet Khendlo, Roodheer Beehary and Rajeshwa Goodary, <i>Geospatial Land Use Land Cover Change (LULC) trend analysis in Chikwawa District, Malawi</i> | Yamikani Ndasauka, Tilinao Lamba, Grivas Muchineripi Kayange, Elias Mwakilama, Princess Nyirenda, Efnita Banda, Docile Kalunga and George Chikhambi, <i>Efficacy of Interpersonal Psychotherapy in Groups (Ipt-G) in Treating Depression in Malawi: A Clinical Trial Study</i> | Timothy Nyasulu, <i>Waste Management in Ching'ambo and Masasa Locations in Mzuzu City: A Theological Reflection on the Environment and Human Responsibility</i> |
| 14:20 - 14:40 | Hamis Abdullah and Aubrey Chaputula, <i>Survival mechanisms under the new order? Resource mobilisation activities undertaken by University of Livingstonia and St John of God College of Health Sciences libraries</i> | Gomi Gondwe, Aimloss Banda, Willy Chipeta, Brighton Chunga, <i>Modelling Water Resources Availability for Rumphu River Sub Basin, Rumphu, Malawi</i> | Lawrence Kachule, Russel Chidya and Maynard Nyirenda, <i>Drivers of safe child faeces management by child caregivers in Falls Estate and Chinsapo 1 townships in Lilongwe.</i> | Frank Mnthambalaa, Christian Zurbruggb, Allan John Komakeche, Esther Lupafyad, Kostantin von Hoernere, Daniela Paguerof, Stefan Dienerb, Gift Chawandaa, Sheila von Hoernere, Dakishoni Laifolod and Florence Iwizac, <i>Sustainable Waste Management Using Black Soldier Fly and its Potential Impact on Smallholder Farming in Uganda and Malawi</i> |
| 14:40 - 15:00 | Aaron Khombe, <i>Salvaging Heritage in Soil Archives: Striking a balance between Development concerns and Heritage Preservation</i> | Zondiwe M Jere, Jim Chatambalala, Samuel Mwafulirwa and Richard Zidana, <i>Amidst neglect: Donkey (Equus asinus) production practices, Marketing and constraints in major production districts of Malawi</i> | Peter Phiri, Stanley Ndebvu, Reuben Moyo and Michael Zimba, <i>A Machine Learning-Based Water Parameter Estimation Model Using Synthetic Data</i> | Tirivanhu Tizifa and Victor Kasulo, <i>Investigating factors affecting open defecation free status sustainability in Mangochi: case of Traditional Authority Lulanga</i> |
| 15:00 - 15:20 | Medson Mwalughali-Mponda, <i>Museums of Malawi and the Safeguarding of Intangible Cultural Heritage</i> | Aimloss Banda, Brighton Chunga, Eddie Mtonga, <i>Analysis of Non-Revenue Water Component Specific Drivers in Lilongwe City</i> | Peter Phiri, <i>Heavy-Metal Ion Adsorption from Drinking Water Using Cowpea Shells</i> | James Gondwe, <i>Herding the town: Understanding human-cattle dynamics in Karonga Town, Malawi</i> |

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|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15:20 - 15:40 | | Edward Missanjo and Maggie Munthali, <i>Impact of Climate Variability on Forest Vegetation Zones in Malawi</i> | McPherson Mphande and Wyson Khomoliwa, <i>Assessment of physico-chemical quality of water supplied by Malamulo water supply, Makwasa, Thyolo, Malawi</i> | Louiss Sadick and Lucius Cassim, <i>Job Creation and Resilience to Rural Poverty in The Context of Rainfall Shocks. Does the Use of Climate-Smart Agriculture Practices Matter?</i> |
| 15:40 - 16:00 | | Aimloss Banda, Gomi Gondwe, Willy Chipeta, Brighton Chunga, <i>Analyzing sediment drivers using GIS and Remote Sensing in Nkhata River, Nkhatabay, Malawi</i> | | <i>Chamuka Tebulo, Joyce Njoloma, Isaac Nyoka and Fanwell Bokosi, Drivers supporting scaling up of fertilizer trees in Kasungu district, Malawi</i> |
| 16:00 - 16:20 | Wrapping up Day 2 and Closing the Conference | | | |
| | Closing Remarks: Mzuzu University Vice-Chancellor | | | |
| 16:20 - 16:40 | Refreshments | | | |
| 16:30 | End of Conference | | | |
| | NORHED SESSION (DAY 1, 5 JUNE 2024 15:00 – 14:00) Venue: Room D Chair: Dr Russell Chidya | | | |
| 14:40 – 15:00 | Tikhala Chakalamba, Prof. Fanuel Kapute, Dr. Kumbukani Mzenegeleza Perception of fishing communities on climate change, catch fluctuations and adaptive strategies: Karonga district. | | | |
| 15:00 – 15:20 | Mr. Jeremiah Nkowane, Dr Brighton Chunga, Prof Cosmo Ngongondo, Dr Patsani Kumambala Estimation of Small Hydropower Potential using the HBV Hydrological Model Tool | | | |
| 15:20-15:40 | Stella Chimkondenji Effects of land use and land cover change on sediment yield, runoff and water quality in north and south Rukuru River catchments | | | |
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INTRODUCTION

Mzuzu University was established by an Act of Parliament in 1997 as Malawi's second public university. However, the University only became fully operational in January 1999 when it admitted its first students. Education was the pioneering faculty at the time of opening. However, the University has steadily grown from a single Faculty of Education to six faculties (Education, Environmental Sciences, Health Sciences, Humanities and Social Sciences, Tourism, Hospitality and Management, and Science, Technology and Innovation).

The University is home to a number of research centres namely African Centre of Excellence in Diversity and Under-utilised Biodiversity (ACENUB), Water and Sanitation (WATSAN) and Testing Centre for Renewable Energy Technologies (TCRET). In terms of human capital, MZUNI boasts of having slightly over 200 academic staff. The faculties offer a wide range of academic programmes at both undergraduate and postgraduate levels. Research and innovation is a key component of these programmes, implying that there is a lot of new knowledge that is generated as part of the study process. Moreover, the faculties and centres, on their own and at times through collaboration with industry, carry out groundbreaking research that is disseminated through research conferences, technical reports, and journal publications. Part of the research output will be presented at this conference.

Pillar 3 of the Mzuzu University 2021-2030 Strategic Plan recognises Research, and Innovation as a strategic goal whose aim is to generate new knowledge and innovations needed for economic development of Malawi in line with Malawi 2063, MIP-1 2030, NESIP 2030, SDGs and AU 2063 by 2030. This is the reason why research and innovation has been imbedded in the programming of the University. The aim is to develop human capacity for research but also conduct research that will provide solutions to the challenges that affect the communities we live in and country at large.

This is the First National Research Dissemination Conference that Mzuzu University has organised under the theme: *Research and Innovation: A Catalyst for Social, Cultural and Economic Transformation*. Below is detailed list of the sub-thematic areas:

i. Science, Technology and Innovation

- New advances in pure and applied mathematics

- Promoting renewable energy technologies
- ICT, Data Science and new innovations
- Biological sciences
- Chemistry and its applications
- Physics and its applications

ii. Environmental Sciences

- Agrisciences
- Urban and Regional Planning
- Estate Management
- Fisheries and Aquaculture
- Forestry
- Environmental Management
- Geosciences
- Water, Sanitation and Hygiene
- Waste Management and Recycling
- Climate Change, Adaptation and Mitigation

iii. Humanities and Social Sciences

- The role of linguistics, literature and creative arts in national development
- History, Heritage and Economic Development in Malawi
- Security and Public Sector Governance
- Religion and Environmental Conservation
- Information services for development
- Communication for Sustainability

iv. Health Sciences

- Innovative approaches and interventions to strengthen health delivery
- Healthcare access, delivery and outcomes
- Health technology and digital transformation
- Maternal, newborn, child and adolescent health
- Communicable and non-communicable diseases
- Biomedical and Health Informatics

v. Tourism, Hospitality and Management

- Sustainable tourism
- Tourism planning and development
- Cultural heritage tourism
- Transport and aviation
- Service quality and management in the hospitality industry
- Entrepreneurship
- Sports management

vi. Open, Distance and eLearning

- eLearning
- Student support
- Self-learning materials
- Copyright
- Open Educational Resources

vii. Education

- Education and Development
- Education, Society and Culture
- Critical Thinking and Reasoning Education
- Science, Technology, Engineering and Mathematics (STEM) Education
- Language Education
- Inclusive and/or Special Needs Education

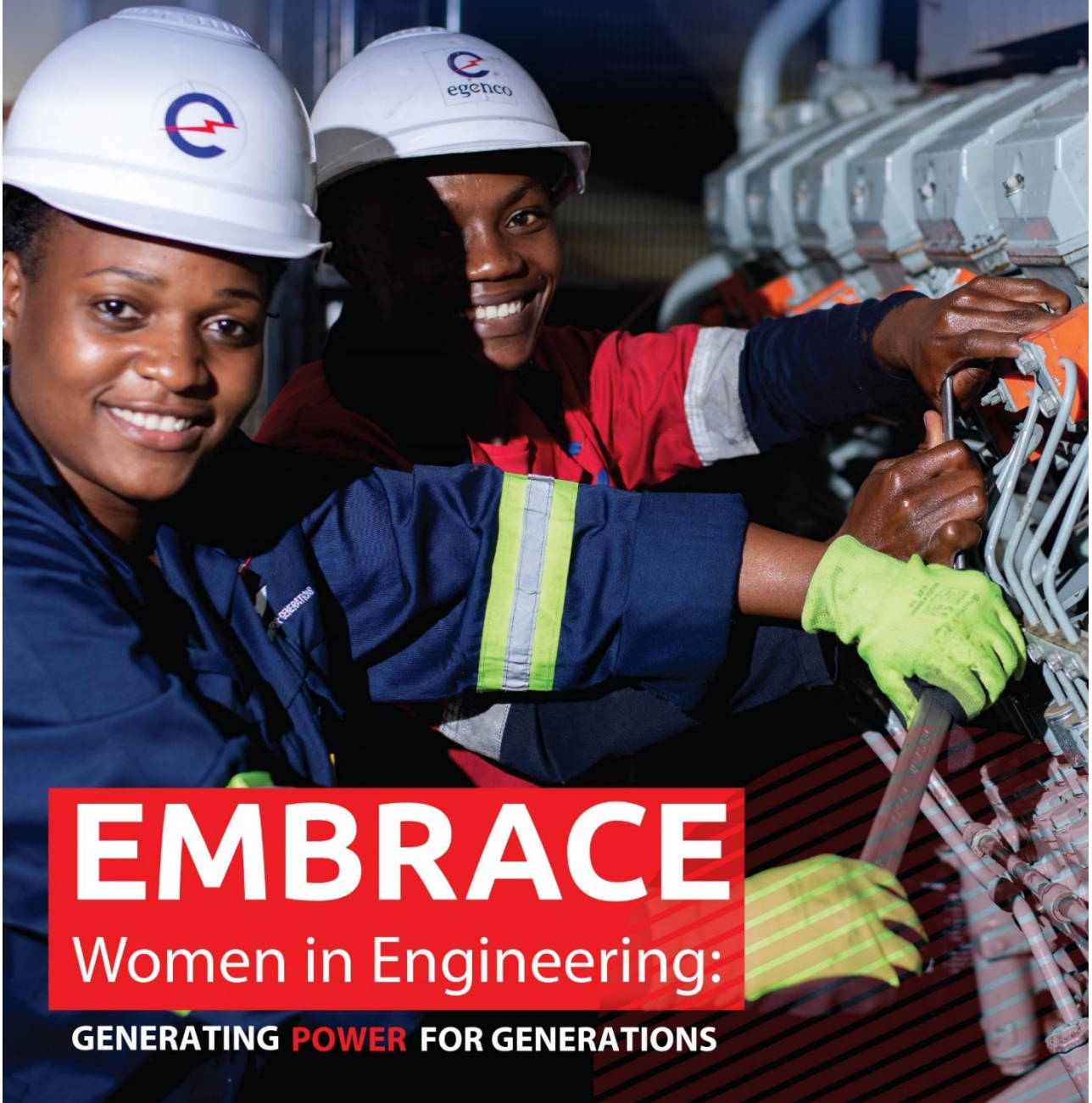
It is expected that academics, scholars and practitioners in various fields will share their findings, engage in serious discussion and also network. Such engagements will lead to sprouting of new ideas, professional growth, influence policy development and enhance good practice.

The logo for egenco, featuring the word "egenco" in a white, lowercase, sans-serif font. A red lightning bolt graphic is integrated into the letter "e".

egenco

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FOREWORD

Welcome to Mzuzu University's first Research Dissemination Conference! The need to share the results of scientific research work with a wider audience is crucial to the advancement of science and technology.

Dissemination helps to ensure that the results from research work are widely available and accessible to other researchers and practitioners. This is important because it enables others to build upon the work that has been done, and to develop new ideas and innovations based on the findings of the research. This can lead to new discoveries and breakthroughs, and help to drive the field forward. Another key benefit of dissemination is that it helps to increase the visibility and impact of research findings. By publishing the results of research in peer-reviewed journals or presenting them at conferences, researchers can reach a wider audience and generate more interest in their work. This can help to raise the profile of the research and its authors, and increase the chances of securing future funding or collaborations. In addition, dissemination can also help to increase the impact of a research work by bringing the results to the attention of practitioners, policymakers, and the public. This can help to ensure that the research is used to address real-world problems, and that it has a direct and tangible impact on society. Finally, dissemination is also important because it helps to ensure that scientific results are used effectively. By sharing the results with others, researchers can help to build partnerships, collaborations, and networks that can help to drive the field forward. This can help to ensure that the results are used in the most effective way possible, and that they have the greatest impact on society.

The Mzuzu University Research Dissemination Conference is part of fulfilling the university's *mission statement* which is to provide high quality education, **training, research** and complimentary services to meet the technological, social and economic needs of individuals and communities in Malawi and the world. We have deliberately selected scientific presentations that respond to the university's *vision* of becoming a premier provider of tertiary education, **adaptive research** and outreach in Malawi and the world. The Directorate of Research at Mzuzu University is anchoring the Dissemination conference with the overarching aim that hinges on the university's 3rd Pillar of its 2021-2030 Strategic Plan which is *Research and Innovation*.

The conference has gathered research papers from a wide coverage of thematic areas such as Open Distance and eLearning (OdeL); Education; Tourism, hospitality and management; Health

sciences; Humanities and Social Sciences; Environmental Sciences; Science, technology and innovation.

Lastly, we would like to extend our appreciation to the conference organizing team and indeed those who supported this conference with resources such as the Electricity Generation Company (EGENCO) Malawi and the Tobacco Control Commission (TCC).



Prof Fanuel Kapute PhD

DIRECTOR OF RESEARCH



The Tobacco Commission

We promote tobacco production and marketing to develop the Malawi economy.

We are also proud to be part of other processes aimed at economic transformation for Malawi.

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SCIENCE, TECHNOLOGY AND INNOVATION

Science, Technology and Innovation is one of the thematic areas that was selected for the conference. The theme was chosen because of the role it plays in the social-economic development of any country. Malawi aspires to get out of poverty and become one of the upper-middle income countries in the short to long term hence this area is very pertinent. Papers that will be presented under this theme fall under the following areas:

- New advances in pure and applied mathematics
- Promoting renewable energy technologies
- ICT, Data Science and new innovations
- Biological sciences
- Chemistry and its applications
- Physics and its applications



MZUZU UNIVERSITY

CALL FOR ABSTRACTS

National Research Dissemination Conference

5th – 6th June 2024

Mzuzu University, OdeL Complex, Luwingu Campus.

ABSTRACT SUBMISSION

| | |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Names of author(s) and email addresses | Dr. Lawrence Luhanga dr.luhanga@gmail.com |
| Affiliation(s) | DMI-St. John the Baptist University, Mangochi |
| Title of paper | Analysing Call Setup Success Rate: A Comparative Study of two major network service providers in Malawi |
| Sub-theme | Operational efficiency and service quality in emerging telecommunications markets: A case study of Malawi. |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: The study was initiated to explore the actual evaluations of the Call Setup Success Rate (CSSR) for Mobile Operator A and Mobile Operator B in third quarter of 2019 to bring to the fore the service quality and operational efficiency of the two leading telecom operators in Malawi. We chose to utilise historical data to inform and lay the foundation for future studies. |

Methodology/Approach: The study used datasets from MACRA and utilised a quantitative approach. The data had to be subjected to cleaning and standardization before descriptive and inferential statistical analysis was applied to summarise the CSSR performance. These included more elaborate call setup assessment details and trend and comparative analyses of the performance of the two operators. Inferential statistical analysis was used to test for significant differences between the performance of Mobile Operator A and Mobile Operator B. Descriptive statistical techniques were employed to summarise the CSSR performance.

Findings: The analysis found that the CSSR for Mobile Operator A, except for one month, was significantly higher than the one for Mobile Operator B ($p < 0.05$), indicating inconsistency in performance. Any other operator month over a month has proved performance stability, i.e., above 90%. This may be indicative of a firm operational framework supporting call setup success. The use of inferential statistics allowed for the conclusion that the differences in performance between the two operators are statistically significant and not due to chance.

Discussion: Hence, these results could be an indication that the telecommunication industry in Malawi is competitive and, as such, both Mobile Operator A and Mobile Operator B are at par in providing quality services. The slight edge to Mobile Operator A might be due to differences in network management or technology deployment.

Recommendations: For further improvement of CSSR, it further requires that both operators continue investment in network improvement and modernising their technologies. Exploration of strategies for Mobile Operator B in identifying opportunities for optimisation could further benefit from Mobile Operator A. It, therefore, calls for continuous monitoring of the CSSR for sustainable service quality improvement. In the new World of AI, telcos could also benefit more and reduce costs by implementing AI tools in their various pipelines.

Conclusion: The present study has highlighted the role of CSSR in accessing telecommunication service quality by drawing a minute comparison of the performance of Mobile Operator A and Mobile Operator B on CSSR. It

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| | <p>represents operational effectiveness and service quality in the telecommunication industry in Malawi.</p> <p>Originality/Value: This paper, therefore, contributes to the literature through the analysis of CSSR among Malawi's leading telecom operators. It stresses the role of operational efficiency toward better experiences and satisfaction of the customers with pragmatic insights to be given to the concerned industry stakeholders and policymakers.</p> |
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| Affiliation(s) | ¹ Invegrow Limited, P.O. Box 31617, Nangula Estate, Lilongwe, Malawi ² Malawi University of Science and Technology, P.O. Box 5196, Ndata Farm, Thyolo, Malawi ³ Department of Chemistry, Mzuzu University, P/Bag 201, Luwingu, Mzuzu 2, Malawi ⁴ Centre of Excellence in Neglected and Underutilised Biodiversity, Mzuzu University, P/Bag 201, Luwingu, Mzuzu 2, Malawi |
| Title of paper | Development of a liquid chromatographic method for determination of cannabinoids in <i>cannabis sativa</i> cultivars growing in Malawi |
| Sub-theme | Chemistry and its application |
| Paper type | Research paper |

Abstract (not more than 350 words)

Purpose: In 2020, seeking to diversify its economy beyond tobacco, Malawi joined a growing movement in Africa and worldwide by legalizing the cultivation, processing, and research of *Cannabis sativa* for medicinal and industrial purposes. Cannabis contains many compounds of pharmacological and industrial relevance, but the group of most interest is the cannabinoids. Determination of cannabinoids in Cannabis plants primarily relies on chromatography techniques, with Liquid Chromatography (LC) emerging as the preferred method because it can detect and quantify cannabinoids in their acidic and neutral forms. However, most existing LC methods have limitations, such as the inability to achieve chromatographic resolution of crucial cannabinoid pairs like CBGA/CBG, THC/CBC, and THCA/CBN, which hold significant therapeutic and industrial benefits. The absence of a modified and validated method for resolving critical cannabinoid pairs impedes adherence to regulatory requirements, hindering market access for Malawian-grown Cannabis. To this effect, a fast, accurate, and robust HPLC method coupled to UV/DAD was developed to identify, separate, and quantify cannabinoids in *Cannabis sativa* cultivars growing in Malawi.

Methodology/approach: The research followed a quantitative approach in which experiments were employed. The method was developed by changing different chromatographic conditions. Validation was done using guidelines provided by ICH. Two *Cannabis sativa* samples (THC-type and CBD-type) were purposively sampled and applied on the newly developed method in which drying and grinding of Cannabis samples were done. Then ultrasonication extraction was performed, followed by dilutions. Extracts were analysed with HPLC-UV/DAD. Mobile phases consisted of 0.1% formic acid in acetonitrile and 0.1 % formic acid + 10 mM ammonium formate in water, applied in a 14-minute gradient mode. During method development, a two-way ANOVA test was employed to investigate the effects of ammonium formate concentration (0.00 - 20.00 mM) and pH (3.00 - 3.30) on retention time. An independent t-test then compared the average cannabinoid content between two different Cannabis cultivars.

Findings: During method development, two critical findings were established. The new method has shown significant improvement over previous methods in its ability to separate cannabigerolic acid (CBGA) from cannabigerol (CBG) which were co-eluting at the same time. The new method also boasts a significantly faster run time (14 minutes) compared to most existing HPLC-DAD methods, which typically exceed 30 minutes. The method has further fulfilled the criteria in terms of linearity ($R^2 > 0.999$), and the % RSD for intra-day and inter-day precision for all eight cannabinoids varied from 0.0095 (CBD) to 0.0809% (CBGA) and 0.031% (CBD) to 0.083% (CBDA), respectively. The accuracy of recovery for calibration standards was greater than 90%, and for all cannabinoids, all system suitability tests were within acceptable limits.

Discussion: The linearity of the method was found to be between 0.9995–0.9998, with high correlation coefficients indicating strong relationships between concentration and responses. The method showed reliable and consistent results, with recoveries ranging from 94.68% to 103.20%. Three system suitability factors were tested, indicating excellent baseline separation

and better column efficiency. The CBD-type sample showed a CBD-dominant profile with high CBDA content while the THC-type sample showed a THC-dominant profile with high THCA content. A significant improvement over previous methods lies in its ability to separate cannabigerolic acid (CBGA) from cannabigerol (CBG). Prior methods often suffered from co-elution of these two crucial cannabinoids (Backer et al., 2009; Sedán et al., 2023). Compared to previous methods, this new method offers a broader range of detectable cannabinoids. It allows for the analysis of nine cannabinoids, surpassing prior studies by Aizpurua-Olaizola et al. (2016) (8 cannabinoids), Sedán et al. (2023) (5 cannabinoids), Mudge et al. (2017) (8 cannabinoids), and Backer et al. (2009) (7 cannabinoids).

Recommendations: The method is highly recommended for routine analysis of cannabinoids in various matrices, including cannabis flowers, cannabis-infused cosmetics, foods, and medicines. The method's efficiency and accuracy can significantly improve quality control practices within the Cannabis industry. For increased standardization and public safety, full adoption of this method by relevant government regulatory bodies (CRA, MBS, and PMRA) is strongly recommended. This adoption would be particularly valuable for forensic purposes and quality control testing within the regulatory framework.

Conclusion: Notably, this method achieved baseline resolution ($R > 2.0$) for all nine cannabinoids, including cannabigerolic acid (CBGA) and cannabigerol (CBG), which were previously reported to co-elute at the same retention time. The newly developed method has significantly shortened the total analysis time (14 mins) over long times (30 mins) as in previous reported methods. This method achieves baseline resolution for all nine cannabinoids within 14 minutes, demonstrating its efficiency for the analysis of a large number of Cannabis samples.

Originality/value of contribution: This method successfully separated all nine cannabinoids, including cannabigerolic acid (CBGA) and cannabigerol (CBG). Separating these two cannabinoids has been a challenge in previous methods, but this new method achieved a baseline resolution for all nine.

Keywords: Cannabis* Cannabinoids * HPLC* UV/DAD



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| <p>Affiliation(s)</p> | <p>Mzuzu University</p> |
| <p>Title of paper</p> | <p>Geospatial Land Use Land Cover Change (LULC) trend analysis in Chikwawa District, Malawi</p> |
| <p>Sub-theme</p> | |
| <p>Paper type</p> | <p>Research Paper</p> |
| <p>Abstract(not more than 350 words)</p> | <p>Purpose: This study aims at comprehensively assessing and quantifying the patterns, extent and dynamics of Land Use and Land Cover (LULC) changes over a period of 44 years, namely from 1979 through 2023.</p> |

Methodology:

The study utilized Landsat satellite images from 1979, 1995, 2009, and 2023, projected in the Malawian Local Coordinate system using Esri ArcGIS Software. Composite multispectral band images were created using a composite band combination. Image registration corrected distortions to a 10m resolution. Four classification methods were employed: IsoData, Maximum likelihood, Support Vector Machine Learning, and Random Forest. Assessment metrics included Kappa Coefficient, Producer and User Accuracy, and Overall Accuracy. Changes in land classes were evaluated using Spearman rank correlation coefficient in MATLAB.

Findings: Random Forest classification yielded the highest accuracies, with yearly Kappa-C values ranging from 82% to 90% and Overall Accuracy values from 88% to 93% between 1979 and 2023. Forest, vegetation, and water bodies decreased by 21%, 3%, and 0.3% respectively, while built-up areas and bare land increased by 22% and 16%. Spearman rank correlation coefficients showed weak to strong relationships: $\rho=-0.4$ for water, $\rho=0.96$ for vegetation, $\rho=1$ for built-up area and bare land, and $\rho=-1$ for forest, indicating significant reduction in forest cover replaced by built-up areas and bare land.

Originality/Value of contribution: This study is based in Malawi, employing four classification methods and statistical analysis, enriches environmental protection knowledge, aiding land management decision-making.

Conclusion and Recommendations: Malawi has lost 159,399 hectares of forest cover, seen through extensive bare land and built-up areas. Urgent action is needed, with data-driven decisions, policy reforms, and community-based conservation programs, crucial for preserving forest land for Malawi and globally, including resilient land use and urban planning.

Key words: GIS, Maximum Likelihood Classification, Support vector Machine Learning, Random Forest, Land use Land Change.



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| Affiliation(s) | Biological Sciences Department, Mzuzu University, P/Bag 201, Luwunga Mzuzu 2 |
| Title of paper | Prevalence, Community Knowledge and Risk Factors Associated with Gastro-intestinal Helminth Parasites of Dogs in Mzuzu City |
| Sub-theme | Biological sciences |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: The current study assessed the prevalence, risk factors associated with and community knowledge on gastro-intestinal helminthic parasites in fecal samples of dogs that come to Mzuzu veterinary clinic for different treatments. Methodology/approach: Faecal samples (100) from randomly selected adult and young dogs were examined for gastrointestinal helminthes using flotation and sedimentation techniques. Dog owners (60) from where faecal samples were collected and key informants (8) were interviewed to collect data on risk factors and community knowledge on the helminthic parasites. |

Findings: Four parasite species were identified with an overall prevalence of 78%. *Dipylidium caninum* (40%) was the most prevalent parasite followed by *Ancylostoma caninum* (32%) and *Toxocara canis* (21%) while the least prevalent was *Trichuris vulpis* (7%). Risk factors like dog's dipping frequency showed significant association ($\chi^2=3.71$; $P=0.05$) with gastrointestinal helminthes infection in dogs. *Tricuris vulpis* and *Ancylostoma caninum* showed a significant association ($\chi^2=4.62$; $P=0.03$ and $\chi^2=3.79$; $P=0.05$ for *Trichuris vulpis* and *Ancylostoma caninum*, respectively) with deworming and dipping frequencies, respectively. *Toxocara canis* was significantly associated ($\chi^2=7.47$; $P=0.02$ and $\chi^2=6.01$; $P=0.01$) with dog keeping and feeding management systems, respectively. The results on community knowledge demonstrated 73.5% (n =100) of the respondents were not aware of the zoonotic potential of dog helminthes parasites.

Discussion: This shows high likelihood that the community could get infected with these helminthic parasites in the study area.

Recommendations: Hence the researchers recommend that all stakeholders should put in place strategies to monitor and control the transmission of these helminthic parasites in Mzuzu city. So one-health approach should be prioritised.

Conclusion: This research established high prevalence of gastro-intestinal helminthic parasites in dogs and its associated risk factors while the community showed knowledge gaps on zoonotic potential of these gastrointestinal parasitic disease-causing agents.

Originality/value of contribution: original and managed to establish the high prevalence and associated risk factors of gastrointestinal parasites in Mzuzu city and informed all stakeholders to be vigilant on monitoring and control.

Keywords: Gastro-intestinal helminthes, community knowledge, prevalence, public health, risk factors, zoonotic parasite



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| <p>Affiliation(s)</p> | <p>Mzuzu University Biological Sciences</p> |
| <p>Title of paper</p> | <p>Medicinal plant species locally used to treat viral respiratory diseases with emphasis on COVID-19 in Rumphi District, Northern Malawi</p> |
| <p>Sub-theme</p> | <p>Biological Sciences</p> |
| <p>Paper type</p> | <p>Research Paper</p> |

Abstract (not more than 350 words)

Purpose: The aim of this study was to document the medicinal plant species utilized by local inhabitants for the treatment of respiratory ailments, specifically COVID-19, while simultaneously evaluating the perceived recovery rate among participants who used these plants in Rumphi District.

Methods: A semi-structured questionnaire was employed to systematically collect data on plant species from 100 key informants and 87 herbalists, adhering to established methodological techniques. A sample size of 100, determined using an online sample size calculator, was utilized to assess the Seroprevalence of Anti-SARS-CoV-2 among local inhabitants. The detection of SARS-CoV-2 IgG/IgM antibodies was conducted through the Abbott Panbio™ SARS-COV-2 IgG/IgM/Rapid Test, employing 5ml fingerprick blood samples. Plant species data was subjected to plant species fidelity index while the Seroprevalence of Anti-SARS-CoV-2 was subjected to descriptive statistics.

Findings: The study revealed that among the 75 documented plant species, 32 were specifically employed for managing COVID-19 symptoms. These plants were ranked according to their fidelity level, wherein *Eucalyptus sp* (11.2), *Citrus sp* (10.5), *Cassia sp* (3.2), *Zingiber officinale* Roscoe (3.2), and *Plumbago sp* (3.2) emerged as the most commonly utilized. Among the 52 respondents, 28 (53.8%) individuals tested positive for IgM/IgG antibodies, with 82% demonstrating recovery subsequent to treatment with plant-based remedies.

Discussion: The study underscores the importance of integrating traditional knowledge of medicinal plants into contemporary healthcare practices in managing COVID-19 in Rumphi District. Further research into the identified plant species and their therapeutic properties holds promise for expanding treatment options and improving healthcare outcomes in communities where access to conventional medical resources may be limited.

Conclusion: The study documented plants used for treating respiratory tract infections and COVID-19 by the local communities in Rumphi. There was high recovery rate (82%) of participants who took the herbal medicine in this study.

Recommendations: The study recommends further studies on efficacy, cytotoxicity, crude drug safe dosages, levels of bioactive compounds and

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| | <p>development of plant-based drugs for the treatment of COVID-19 and related illnesses.</p> <p>Value of contribution: The study has implications for policy and practice. Its recommendations, if acted upon, would lead to the safe use of herbal medicines, drug discovery for COVID-19 and related illnesses in Malawi.</p> <p>Keywords: medicinal plants, herbal medicine, seroprevalence, COVID-19, Rumphi</p> |
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| Names of author(s) and email addresses | Angel P. Chidalimba (PDVC 0319) Email address: chidalimba@gmail.com |
| Affiliation(s) | Mzuzu university |
| Title of paper | Relative abundance, habitat distribution, and infection rate of schistosomiasis vector snails at Bwanje Valley Irrigation Scheme in Dedza district, Malawi |
| Sub-theme | Science, Technology, and Innovation; Biological Sciences |
| Paper type | Research paper |
| Abstract(not more than 350 words) | <p>Purpose: A cross-section study was conducted to assess the risk of schistosomiasis transmission to the human population and inform public health interventions</p> <p>Methodology/approach: Purposive sampling was used to record snail habitats with evidence of human-water contact activities before snail collection. By simple random sampling, snails were collected from each habitat using scoop nets and put in perforated plastic bottles. Shell morphology and identification keys were used to identify snails as used in previous studies. Descriptive statistics were used to estimate infectivity and the relationship between snail abundance and environmental parameters. Snails were individually put in a beaker with water, and exposed to sun to shed cercaria. Cercariae were identified by Microscopy, habitats were mapped using Quantum GIS.</p> |

Findings: 385 snails were collected from eight randomly distributed sites. *Bulinus globosus*(n=362,94.0%) was most abundant compared to *Bulinus pfeifferi* (n=14,4.0%) and *Bulinus africanus* (n=9,2.0%). Only 104 *Bulinus globosus* were shedding cercaria (27.01%). *Bulinus africanus* (n= 14,0.0%) & *Biomphalaria pfeifferi* (n=9, 0.0 %) were not shedding. Vegetation cover (0.791), lentic water (0.89), and pH (0.923) positively correlated with snail abundance

Discussion: Snail abundance and infectivity showed active transmission of schistosomiasis. The 27.01% infectivity may be under-scored due to seasonality and failure of the shedding method in detecting prepatent snail infections. Vegetation cover, neutral pH, and lentic water were believed to favor snail fecundity. Environmental cleaning should be prioritized to control snails and cut schistosomiasis transmission circle.

Recommendations: We recommend vector control, health education, and age-inclusive mass drug administration.

Conclusion: 385 (*Bulinus globosus*, *Bulinus africanus*, and *Biomphalaria pfeifferi*) were collected. Only *B. globosus*(n=104) were shedding cercaria giving a 27.01% infection rate. The presence of infected snails indicates an active transmission.

Originality/value of contribution: The study has evidence-based information to inform policies.

Keywords: Snail abundance, habitat distribution, Infectivity, Bwanje Valley Irrigation Scheme, Schistosomiasis.



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| Affiliation(s) | University of Malawi |
| Title of paper | Assessing Reliability of Computer Adaptive Testing in College Entrance Communication Skills Examinations in Malawi. |
| Sub-theme | Science, Technology, and Innovation |
| Paper type | Research Paper |
| Abstract | Purpose: Admission into tertiary institutions in Malawi is very competitive considering the limited capacity of higher education institutions. Admission procedures vary by institution; some offer entrance examinations, while others do not. Nevertheless, college entrance examinations provide a standardized and objective measure of the academic level of students from diverse educational backgrounds. Likewise, it is a crucial instrument for predicting a student's success in college. In Malawi, institutions administer entrance examinations using paper and pencil. This method of delivery is seen to provide unreliability results among other challenges (Kalender, 2017). Hence, this research assessed the reliability of computer-adaptive testing as an alternative to paper-based testing. |

Methodology/approach: The study took a quantitative approach with a quasi-experimental design. Data was collected from a sample of the 2022 DCE and NCE scripts of the paper-based test and the Live CAT administration. The item parameters and characteristics were examined to determine the quality of the paper administered. Then, theta estimates from CAT administration were compared to those from paper-based tests. Finally, Pearson moment correlation was used to assess the linear relationship of CAT to PBT estimations.

Findings and Discussion: The results indicate that Paper-based entrance exams are of moderate quality. Additionally, it shows that the scores obtained from CAT are more precise than those from PBT. Similarly, with a correlation statistic of 0.717, CAT appears to be a reliable alternative to PBT.

Conclusion: Test delivery method in entrance examinations affect the college selection process. The advent of computers thus enable implementation of computer adaptive tests which seem to be a reliable alternative and offer practical advantages over conventional methods.

Recommendations: Research suggests that tertiary institutions should consider adopting computer adaptive tests as a potential solution to ensure the reliable selection of students into college without necessarily abolishing entrance examinations.

Originality/value of contribution: Malawi Agenda 2063's priority area 3: industrialization, calls for a redesigned education system to promote research, science, technology, and innovation. Computer adaptive assessments are viewed as a missing crucial component in tertiary education selection criteria.

Keywords: Computer adaptive testing, Test delivery method, Item response theory, tertiary institutions admission criteria.



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| Affiliation(s) | Mzuzu University / Pwani University |
| Title of paper | Developing an Integrated Flood Early Warning System model in the Shire River Basin of Chikwawa District, Malawi |
| Sub-theme | ii. Environmental Science: Geosciences |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: The study was conducted in the Shire River Basin (SRB) of Chikwawa District, Malawi in 2021-2022. It was designed to assess how flood prediction was currently being done in the SRB to make recommendations for improvement.</p> <p>Methodology/approach: This study adopted a qualitative methodology with a 2019 Tropical Cyclone case study design. It employed various data collection methods such as 8 gender-disaggregated Focus Group Discussions. Key informant interviews were conducted with 6 Malawi government officials, 4 NGO representatives and 8 community elders above 60 years old.</p> |

A meeting lasting one day was also held with stakeholders that included a meteorologist, hydrogeologist, zoologist, and botanist.

Findings: The SRB Indigenous FFS is far more sophisticated than the Scientific FFS with respect to the types of indicators used to predict floods. Whereas the SFFS only measures meteorological information, the IFFS assesses data from three other sources, in addition to meteorology: celestial bodies, plants, and animals.

Discussion: We believe that, in Malawi flood forecasting failed to prevent property damage, human displacement and death in 2019 because only the SFFS was used. Community members have the skills and information necessary to contribute effectively to the development of an integrated flood forecasting system.

Recommendations: This FFS would be more sensitive to flood prediction than the current SFFS because of its ability to identify and interpret subtle environmental changes, some of which, like plant overproduction, begin far in advance of any SFFS sensors registering an impending flood. The inclusion of IFFS indicators and including the people who use them to participate in the design and delivery of an integrated FFS would improve the credibility of the system among local residents.

Conclusion: When the two FFSs are integrated, they provide more relevant information to local residents. This would be a more effective community response to flood warnings.

Originality/value of contribution: The integrated system has a community-based component that collects information from local residents who live in the basin year-round and brings it to FFS developers in a systematic fashion.

Keywords: Chikwawa District, Flood forecasting, Indigenous and Scientific knowledge, Model, Shire River Basin



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| Affiliation(s) | Malawi University of Business and Applied Sciences, School of Science and Technology, Department of Computer Science and Information Systems |
| Title of paper | ICT Usage in Secondary Education Management in Malawi: The Case of Shire Highlands Education Division |
| Sub-theme | Education – STEM Education |
| Paper type | Case Study |
| Abstract (not more than 350 words) | <p>Purpose: Literature emphasises on the understanding and mastering ICT skills and concepts as part of the core of education alongside reading, writing and numeracy. In Malawi, NESIP 2020-2030 promotes the use of ICT enabled pedagogy and some indicators include ICT as a tool in providing education services. Although the use of ICT in education is promoted at all levels, in secondary schools, hinderance to usage of modern technologies still exist. Much have been discussed on ICT in Education in relation to teachers, students (learners) and technologies. In addition, the education managers need</p> |

modern technologies for their day-to-day work particularly in data management and communication. Hence, this paper aims at analysing how ICTs are used in the secondary education management in Malawi.

Methodology/approach: This is a case study using Shire Highlands Education Division (SHED) in which qualitative interpretive methods were adopted. Data was collected through interviews, observation, online questionnaire and artefact examination. The data analysis was done in four key steps – immersion in the data, coding, creating categories and identification of themes.

Findings: The secondary education management is in two levels – the education division office and secondary schools. SHED is very keen to make sure that ICT usage by its staff grows. SHED has desktop computers (i3 to i7) in each office with the access to local area network (LAN) and Internet. They have Windows 10/11 with Microsoft Office 2013/2019. Printers are available in 9 out of 13 offices. Some secondary schools have computer laboratories (20%), internet connectivity (13%), desktop computers (37%), printers (68%) laptops (62%) and smartphones (100%). Even other schools (18%) offer Computer Studies in Forms 1 to 4. However, there is lack of expertise in terms of installation, management and maintenance of these ICT facilities.

Recommendations: For successful and sustainable ICT implementation, these are key recommendations: (1) digital skills and computer maintenance training; (2) ICT rehabilitation; (3) enhancement of local ICT expertise and support; and (4) establishment of strong partnership with other institutions for support.

Conclusion: The expectation is that an active participation and initiatives of education divisions and schools are required to enhance ICT implementation. However, due to financial and expertise constraints among other factors, they cannot afford on their own to implement ICT initiatives. Hence, partnerships with other institutions are required.

Originality/value of contribution: Effective ICT use in secondary school management practices.

Keywords: ICT for Education, ICT Infrastructure, Local ICT Expertise, Secondary Education Management

ENVIRONMENTAL SCIENCES

Environmental Sciences is a broad discipline of study. It is therefore no wonder that this thematic area received the largest number of abstracts. The conference will host presentations that fall within the following disciplines:

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- Environmental Management
- Geosciences
- Water, Sanitation and Hygiene
- Waste Management and Recycling
- Climate Change, Adaptation and Mitigation



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Mzuzu University, OdeL Complex, Luwingu Campus.

ABSTRACT SUBMISSION

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| Affiliation(s) | Mzuzu University, Faculty of Environmental Science, Department of Fisheries and Aquatic Science |
| Title of paper | The effect of replacing fish meal with Yellow meal worm (<i>Tenebrio molitor</i>) on growth , feed utilization and survival rate of <i>Coptodon rendalli</i> and <i>Oreochromis shiranus</i> |
| Sub-theme | Aquaculture Nutrition |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: To investigate the effect of replacing fish meal with yellow mealworm on fish growth performance, feed utilization, and survival rate. Problem statement: Malawi's heavy reliance on fish as a primary protein source, coupled with the increasing demand due to population growth, highlights the importance of sustainable aquaculture practices. However, the industry faces challenges, particularly regarding the affordability and availability of fishmeal, a key component in aquafeeds. While aquaculture has shown promising growth in recent years, the majority of fish farmers in Malawi are small-scale that face challenges in accessing commercially |

formulated feeds due to high costs. The high cost is attributed to the expensive nature of key ingredients, such as fish meal and soya bean meal, which are the main protein sources in aquafeeds. Thus, this study delves into the complexities of this issue, examining the impact of fishmeal scarcity and high prices on fish production and the profitability of aquaculture in Malawi. By exploring alternative protein sources such as yellow mealworms, this research aims to provide insights into sustainable and cost-effective solutions to enhance aquaculture practices, improve food security, and promote economic development in Malawi.

Methodology/approach: Four experimental diets were formulated by substituting fish meal with insect meal (*Tenebrio molitor*) at different inclusion rates: 0%, 5%, 10%, and 20%. *Oreochromis shiranus* and *Coptodon rendalli* were utilized as experimental subjects and housed in carbon fiber tanks. The experimental design encompassed both completely randomized design (CRD) and factorial design methodologies. Throughout the 58-day experimental period, fish were fed to satiation and data collection was done every fortnight.

Findings: The findings of the study indicated that substituting yellow mealworm had no significant difference ($P > 0.05$) on different parameters such as weight gain, specific growth rate, survival rate, and feed utilization. Furthermore, the Length-Weight relationship fitted in the linear regression model as *Oreochromis shirsanus* and *Coptodon rendalli* both show negative allometric growth ($b < 3$)

Discussion: The study findings indicate that both fish meal and yellow mealworms (YLMW) are comparable in terms of their growth patterns in the fish. The growth parameters observed in the study suggest similarities between the two feed types, implying that they may possess similar amino acid profiles. This similarity in growth parameters suggests that yellow mealworms could serve as a viable alternative to fish meal in fish diets, offering a comparable nutritional composition that supports fish growth and development. Additionally, the ranges of Feed Conversion Ratios (FCR) observed, falling between 1 and 2, are consistent with results obtained from similar research studies, further reinforcing the reliability of the findings.

Recommendations: The recommendations from this study include utilizing yellow mealworms (YLMW) as a substitute in aquafeed, with a suggested substitution level of up to 20%. Both *Oreochromis shiranus* and *Coptodon rendalli* fish species can be successfully raised in aquafarms using YLMW as a protein source. The findings support the consideration of yellow mealworms as a viable alternative to fishmeal in fish feed, as they do not compromise overall feed utilization and growth performance.

Originality/value of contribution: To ensure affordable and nutritious feed options are consistently accessible year-round.

Keywords: yellow meal worm (*Tenebrio molitor*), *Oreochromis shiranus*, *Coptodon rendalli*, Fish meal, Aquaculture



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| Title of paper | Assessment of Pesticide Residues in Surface and Groundwater Sources from Tea-Growing Areas in Mulanje, Malawi |
| Sub-theme | Environmental Management; Water, Sanitation and Hygiene; Waste Management and Recycling |
| Paper type | Research paper |

**Abstract(not
more than 350
words)**

Purpose: To assess the level of pesticide residues in surface and groundwater sources within the tea-growing regions of Mulanje during both dry and rainy seasons.

Background: Malawi's tea industry adopted an integrated pest management approach (IPM). However, the industry struggles with widespread and illicit pesticide use by local farmers. This study assessed the extent of pesticide residues in surface and groundwater within the tea-growing regions of Mulanje during both dry and rainy seasons.

Methodology/approach: Levels of alpha-cypermethrin, cypermethrin, and deltamethrin were determined using Gas Chromatography-Mass Spectrometry (GC-MS) and glyphosate, s-metolachlor, and terbuthylazine by Liquid chromatography-mass spectrometry-mass spectrometry (LC-MS/MS). The water samples ($n = 72$) in triplicates were systematically collected in dry and rainy seasons from the upstream and downstream of the Ruo River passing through the tea estates. The pH, electrical conductivity (EC), total dissolved solids (TDS), temperature, dissolved oxygen (DO), and Total Suspended Solids (TSS) were measured using standard methods. The human health risk assessment was evaluated using the hazard quotient.

Findings and Discussion: In the dry season, surface and groundwater exhibited varying levels: pH (6.66 – 7.71), EC (26 – 227 $\mu\text{S}/\text{cm}$), TDS (17 – 135 mg/L), TSS (0.47 – 26.9 mg/L), temperature (24.5 – 26.5°C), and DO (4.09 – 6.69 mg/L). In the rainy season, corresponding ranges were observed: pH (5.65 – 7.55), EC (8 – 243.67 $\mu\text{S}/\text{cm}$), TDS (5 – 148 mg/L), TSS (178 – 316 mg/L), temperature (23.0 – 25.0°C), and DO (3.43 – 4.86 mg/L). The levels of s-metolachlor ranged from below detection to 13.324 $\mu\text{g}/\text{L}$, while cypermethrin ranged from below detection to 1.137 $\mu\text{g}/\text{L}$ for both seasons. Although these concentrations fell below the 300 $\mu\text{g}/\text{L}$ guideline for Australia, they exceeded the European Union's 0.100 $\mu\text{g}/\text{L}$ limits. Groundwater exhibited lower pesticide levels compared to surface water. The risk assessment of human health for chronic exposure to surface and groundwater in the rainy season revealed some level of risk for cypermethrin and s –

metolachlor. The presence of s-metolachlor and cypermethrin residues in the surface and groundwater increased the risk of adverse environmental and public health effects.

Conclusion and Recommendations: There is a need for frequent monitoring of the surface and groundwater in the tea estates to ensure that the contamination limits are within the WHO regulations for drinking water. Furthermore, there is a need to promote Integrated Pesticide Management practices in the area to prevent pollution of water bodies.

Originality/value of contribution: Implementation and improvement of pesticide usage and management to prevent pollution and contamination of surface and groundwater resources.

Keywords: *Gas Chromatography-Mass Spectrometry; Integrated pest management; Mulanje; Pesticide residues; Risk assessment; Tea*



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| Title of paper | Evaluation of strategies used in fall armyworm management by smallholder farmers in Malawi and Zambia |
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|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sub-theme | Environmental Sciences |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: The rapid spread of Fall armyworm (FAW, <i>Spodoptera frugiperda</i> J.E. Smith) in sub-Saharan African region since 2016 remains significant challenge for improving agricultural productivity especially for cereal staple crops like maize. Although the immediate reaction of governments has been to invest in chemical pesticides, control methods based on agronomic management would be more practical, affordable by resource-constrained smallholders and minimize risks for health and the environment. Nonetheless, through the conventional way of defining adoption decisions as one-time survey decisions, many scholars have failed to understand inconsistencies in adoption decisions and dis-adoption of such practices. Hence, the paper aimed at evaluating the drivers of adoption and intensity of using local control technologies against FAW in agro-based systems in Malawi</p> <p>Methodology/approach: The study was conducted in 12 landscapes across 6 selected districts in Malawi and Zambia. Panel data for FAW management strategies in Malawi and Zambia was collected in five agricultural seasons by the project funded by NORAD. An unbalanced panel data set is compiled for surveys undertaken in 2017/2018, 2018/2019, 2019/2020, 2020/2021 and 2021/2022 agricultural seasons in order to understand variation in the occurrence of FAW and farmers management strategies applied in different seasons and different regions. The surveys in 2017/2018, 2018/2019, 2020/2021 and 2021/2022 covered farmer management strategies of all six districts for both Malawi (Lilongwe, Salima and Thyolo districts) and Zambia (Chongwe, Kawambwa and Kazungula districts), while the 2019/2020 survey covered three districts from Zambia. Farm households included in the survey were using a multi-stage sampling technique. Purposive sampling was used to select six districts across as wide a range of agroecological conditions as possible. Next within each district two paired landscapes were selected one with relative low tree cover and one with high tree cover from the variation in</p> |

tree cover available within each of the selected districts. Within each landscape, 15 farmers were (self-)selected to participate in a trial of agroecological approaches to FAW management. In each village a further four farmers were selected randomly from the census list of households. Thus, a total of 75 farmers were sampled per landscape. A total of 4,675 observations—roughly 900 distinct farmers in each round—are based on five survey rounds. The data was analyzed using A Triple Hurdle model where Seemingly Unrelated Multivariate Probit and Tobit models employed in the first, second and third hurdle, respectively. The application of the triple hurdle model was used in this study to control endogeneity of awareness and how it influences adoption of FAW management strategies. Before the model was employed, the data was matched for each household over 5-year period and the household that tried the FAW strategies were not included in the adoption stage. The data was subjected to several tests including heteroskedasticity, endogeneity as well as multicollinearity problem.

Findings: The study found that farmers awareness, household land ownership, conservation agriculture, household practice agroforestry, maize/legumes intercropping, crop rotation, maize area, quantity of fertilizer and FAW overall impact positively influenced adoption and intensity use of local control technologies against FAW infestation in Malawi

Recommendations: The current interventions put in place by farmers to tackle FAW infestations are providing positive outcomes, but successful management of the pest will require more actions, including enhancing capacity building among community leaders such as lead farmers to enhance the adoption and intensity use of FAW management strategies.

Conclusion: Overall, we find significant factors influencing adoption and extent of adoption of FAW management strategies.

Originality/value of contribution: Evaluation of strategies used in FAW management by smallholder farmers in Malawi and Zambia would provide requisite knowledge for State and non-State actors to promote the integration of traditional technologies against FAW in cropping systems.

Keywords: FAW management strategies, adoption, triple hurdle, Malawi, Zambia



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| Title of paper | Spatial Heterogeneity of Water Quality from Urban Self-Supply Water Sources in Mzuzu City, Malawi |
| Sub-theme | WASH (Water, Sanitation and Hygiene) |
| Paper type | Research paper |

Abstract (not more than 350 words)

Purpose: To assess the interplay between topography, settlement patterns and water quality in Mzuzu City

Background: Shallow wells are vital for urban and peri-urban areas in northern Malawi, where self-supply water coverage stands at 30.1%. Despite global recognition of the interplay between topography and water quality, there is a notable gap in the contextual understanding of these dynamics in Mzuzu City, Malawi. As a dynamic urban hub, Mzuzu faces ongoing water accessibility and quality issues, underscoring the need for targeted research into the spatial correlation between topography and water quality.

Methodology/approach: This study employed mixed-methods research design. Field visits helped to collect water samples from shallow wells and analyse their quality both onsite and in the laboratory. Calibrated meters and Standard methods were used to determine Dissolved Oxygen (DO), pH, temperature, turbidity, Electrical Conductivity (EC), Total Dissolved Solids (TDS), nitrate (NO_3^-), calcium (Ca), magnesium (Mg), hardness, Faecal Coliform (FC), and Faecal Streptococci (FS) in self-supply water sources. Using GIS techniques, self-supply water sources were mapped, and topographic data gathered with GPS devices. Overlaying shape files from the Northern Region Water Board provided context on water tap coverage versus self-supply sources. Leveraging ArcMap and QGIS, spatial analyses were done, revealing correlations between water quality, topography, and settlement patterns. Kernel density analysis revealed spatial variations in self-supply water sources (97 shallow wells and 1 borehole) with a lower density (≤ 5) in formal settlements of Kaning'ina and a higher density (> 25) in informal settlements of Luwinga, Chiputula and Zolozolo.

Findings and Discussion: The majority of the samples ($>70\%$, $n = 22$) were contaminated with FS (0–800 cfu/100ml) and FC (0–220 cfu/100ml). Physico-chemical quality ranges obtained were: 3.50–7.73 mg/L (DO); 5.27–8.20 (pH); 2.37–317.33 NTU (turbidity); 52–559.33 $\mu\text{S}/\text{cm}$ (EC); 24–267.33 mg/l (TDS); 0.09–6.37 mg/l (NO_3^-); 8–75.20 mg/l (Ca); 4.20–31.70 mg/l (Mg) and 37.70–288.30 mg/l (hardness). The t-test showed strong evidence suggesting that the mean values in the self-supply water sources were significantly different ($p < 0.05$) from the hypothesized Malawi Standards 733:2005 limits.

Positive correlations ($r^2 > 0.50$) were observed between EC and NO_3^- , as well as FS and FC, in urban informal wards. Moran's I test revealed that self-supply sources in the lowlands were contaminated by FC and FS through percolation accelerated by highlands. Positive Moran's I values for Luwinda (0.24), Zolozolo West (0.51) and Chiputula (0.51) ($p < 0.05$) indicated a positive association of topography with contaminated self-supply water sources. Proximity analysis showed mean distances of 17.50, 17.50, and 15.00 m in the urban informal settlements of Luwinda, Zolozolo West and Chiputula, respectively. Notably, the urban formal settlement exhibited a unique pattern with a 30.60m mean distance, displaying negative global spatial autocorrelation ($-0.33, p > 0.05$).

Conclusion and Recommendations: There is a need for context-specific interventions in urban planning, resource management, and tailored strategies for households using self-supply water sources, addressing urgent non-compliance with water quality standards to prevent waterborne diseases.

Originality/value of contribution: Implementation and improvement of water supply in peri-urban and urban areas in Mzuzu City.

Keywords: *Mzuzu City; Self-supply water sources; Settlement patterns; Topography; Water quality*



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| Title of paper | Assessment of Effectiveness of the Water Treatment Methods and Storage Used in Lodges at Chigwirizano in Lilongwe, Malawi. |
| Sub-theme | WASH (Water, Sanitation and Hygiene) |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: To assess the effectiveness of water treatment methods and storage facilities used in lodges at Chigwirizano in Lilongwe Background: Groundwater sources are commonly used in many developing countries worldwide. In Malawi, lodge owners prefer shallow wells and boreholes to piped water. However, the water quality and effectiveness of the |

treatment methods and storage methods used at the lodging facilities are not well documented. This study assessed the effectiveness of water treatment methods and storage facilities used in lodges at Chigwirizano in Lilongwe.

Methodology/approach: A mixed-method research design was used where water samples were collected from boreholes and shallow wells in 9 purposively selected lodges in Chigwirizano. Standard methods were used to analyse selected physico-chemical and microbiological water quality parameters namely Turbidity, Total Dissolved Solids (TDS), Electrical Conductivity (EC), Temperature, calcium (Ca), sodium (Na), magnesium (Mg), potassium (K), and Fecal Coliforms (FC). Samples were not collected from storage tanks because no lodge was found to treat the water in the storage tanks. Qualitative data were collected through interviews with lodge owners and workers ($n = 20$) guided by unstructured questionnaires. The data was analysed using SPSS (V.20.0) and Excel (2016).

Findings and Discussion: Results revealed that all the sampled lodges use untreated water from boreholes and shallow wells in their compounds. Except for Turbidity (0.8–41.3 NTU), and FC (13–498 cfu/100 mL), the majority of the TDS (393–1056 mg/L), EC (567–1447 μ S/cm), Temperature (29.9–31.1 °C), Ca (21.1–38.5 mg/L), Na (30–126 mg/L), Mg (12.9–29.2 mg/L) and K (2.3–12.7 mg/L) were within the recommended limit set by the WHO (2017), and MBS (MS 733:2005). Undesirably, all the water sources were contaminated with faecal matter, hence not safe for direct consumption.

Conclusion and Recommendations: The study recommends on-point treatment of the water sources used in the lodges. Furthermore, there is a need to strengthen the regulations and periodic monitoring of the illegal water supply used in lodges and other households in urban and peri-urban areas to prevent waterborne diseases.

Originality/value of contribution: Implementation and improvement of water treatment and supply in lodging facilities in Malawi

Keywords: *Boreholes; Lilongwe; Lodges, Shallow wells; Water quality*



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| Title of paper | Modelling of Climate Variability on Forest Vegetation Zones in Malawi |
| Sub-theme | Environmental Sciences – Climate Change, Adaptation and Mitigation |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: A study was conducted to evaluate the influence of climate variability on forest type and forest living biomass in Malawi.</p> <p>Methodology/approach: The assessment was conducted based on five climatological zones of Malawi (Shire valley, Shire Highlands, Lake shore, Central, and Northern areas). Three scenarios were used in the assessment. Namely: Near-century (2011–2040), mid-century (2041–2070), and end-century (2071–2100). Projections for future precipitation and temperature were developed using the 20 Global Scale General Circulation models (GCMs). The GCMs were used in concurrence with two Representative Concentration pathways (RCP4.5 and RCP8.5). The data was analysed using Holdridge Life Zone and GAP Formind modified models.</p> |

Findings and Discussion: The results show that three forest vegetation zones will be observed from the near century to the end of the century. Namely: dry forest, very dry forest, and thorn woodland forest. Under near-century climate conditions, two forest vegetation zones are occurring: dry forest and very dry forest. Under mid-century climate conditions, thorn woodland forests will emerge, and dry forests will disappear in the end-century. There will be a significant decrease in the forest living biomass ($1000 \text{ kg ha}^{-1} \text{ yr}^{-1}$) from the near century to the end century. The study has demonstrated that future climate change will be conducive to the growth and expansion of very dry forest vegetation zone, which causes positive effects on reforestation planning and adaptive strategies.

Conclusion and Recommendations: Therefore, the study suggests the following as some possible strategies to adapt to climate change: promotion of natural regeneration of tree species, promotion of tree site matching, production and promotion of new tree seed varieties; and seed banking for drought-resistant tree species.

Originality/value of contribution:

Contributes towards climate change adaptation and mitigation

Keywords: Adaptation, Climate Change, Vegetation Zone, Forest Biomass, Climate Condition



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| Affiliation(s) | Mzuzu University |
| Title of paper | Analysis of Non-Revenue Water Component Specific Drivers in Lilongwe City |
| Sub-theme | Water, Sanitation and Hygiene |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: Lilongwe Water Board (LWB), one of the water utility companies in Malawi, whose water losses are as high as 40%, employed network rehabilitation techniques in their 2015 to 2020 strategic plan to reduce the then water loss levels from 38.9% to 28%. However, network rehabilitation activities have been proving futile in dealing with the problem. The study therefore aimed to analyze NRW component-specific drivers for LWB in Lilongwe City</p> <p>Methodology/approach: It followed a quantitative approach to determine the level of contribution by each NRW component on total NRW and to investigate the main drivers for each NRW component for LWB. One-month data on System Input Volume (SIV) and consumption maintained by the LWB for two District Metered Areas (DMAs) (SZA1 and SZD3) was used to assess NRW trends. The two DMAs were purposively sampled based on the traceability of</p> |

their pipe networks. Flow measurements at the entry points of the DMAs by loggers was used to determine real losses through Minimum Night Flows (MNF) analysis. Historical data on physical characteristics of the distribution system was also used. The data collected was analysed mainly using Fixed Effects Regression and the feedforward backpropagation Artificial Neural Network based Improved Garson algorithms. To analyse data using the Fixed Effects model the assumptions of homoscedasticity of residuals, linearity and independence of errors were observed. While for the Artificial Neural Network, assumptions such as independence and identical data distribution were also observed.

Findings: The water balance framework for the two DMAs confirmed that post-rehabilitation NRW (38.95%) is still above the 28% target which was set by the Lilongwe Water Board in their 2015-2020 strategic plan. The water loss components analysis showed that Apparent Losses (AL) (21.18%) are higher than Real Losses (RL) (16.85%) and Unbilled Authorized consumptions (UAC) (0.92%). Components specific analysis showed maintenance works as the main driver for UAC, while accounting errors, illegal connections and customer non-payments drove AL. Background leakages and bursts, connection density, type of pipe materials and population density were the main RL drivers

Conclusion: In conclusion, this study reveals that while there is a slight reduction in RL, AL are the main contributor to NRW due to illegal connections, customer non-payment and accounting errors. It also reveals that due to the network still being dominated by old pipes, there are more background bursts and leaks

Recommendations: It recommends the need for targeted interventions to address the identified drivers and NRW to meet the LWB's goals and global standards. It also recommends that rehabilitation activities should run simultaneously with activities aimed at the reduction of other forms of water losses

Originality/value of contribution: The study adds value to the body of knowledge in NRW management through detailed and target specific interventions.

Keywords: *Apparent Losses, Artificial Neural Network, DMA, Garson Algorithm, Non-revenue water, Real Losses*



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| Affiliation(s) | Mzuzu University |
| Title of paper | Analyzing sediment drivers using GIS and Remote Sensing in Nkhata River, Nkhatabay, Malawi. |
| Sub-theme | Climate Change, Adaptation and Mitigation |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | Purpose: To analyse key drivers contributing to sediment loads in Nkhata River catchment in Nkhata Bay. Methodology/approach: GIS and Remote Sensing tools and techniques were used to analyze sedimentation at the outlet of the Nkhata River. Primarily, land use and land cover change detection techniques were employed. Parameters such as soil characteristics, climatic factors, as well as land use changes were assessed. Shifts in specific climate variables were statistically analysed and the results were augmented with the remotely sensed soil characteristics of the catchment between 2013 and 2023. |

Findings and Discussion: The results of the landuse change detection analysis showed significant changes to land uses. From 2013 to 2023, the built-up area in Nkhatabay catchment increased from 659.57 to 832.80 hectares, taking up quite a substantial land which was previously covered in vegetation. Noteworthy is the northwestern part of the catchment which has been significantly converted from vegetation to human settlement hence transformed to build environment area.

With regard to soil characteristics, it was observed the average Hydraulic Conductivity for the top layer was 38.1 cm/h and 23.48 cm/h in the second layer depicting high water movement capacity. However, the Available Water Content (AWC) in the top layer, exhibits a value of 0.098, indicating that soils in Nkhatabay Catchment have a lower water retention capacity. The characteristics suggest that while the soils have the ability to transmit water effectively, they may not effectively retain it. This scenario can have implications for water availability to plants and may contribute to faster runoff and potentially increased sedimentation in the Nkhata River.

Results also indicate shifts in precipitation patterns. The period from 2017 to 2022 exhibited an increase in very wet and extremely wet months compared to 2011-2016. This suggests a shift towards more intense and erratic precipitation events.

Recommendations: There is a need for targeted intensification of erosion control measures and vegetative cover restoration in critical zones such as the flat area in the northwestern part of Nkhatabay catchment, to stabilize soils and reduce sedimentation risks. Additionally, the promotion of soil and water conservation practices to catchment communities considering precipitations shifts hence the need to enhance water retention and reduce the likelihood of rapid runoff.

Conclusion: The comprehensive assessment of sedimentation processes in the Nkhata River catchment has provided very important insights into the intricate interplay of environment and human-induced factors influencing the observed increase in sediment deposits at the outlet of the river. Key findings from the

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| | <p>research highlight changes in land cover, soil properties, and climatic conditions that collectively contribute to alterations in hydrological dynamics.</p> <p>Originality/value of contribution: Addressing sediment loads help safeguard water infrastructure used by NRW intake hence promoting water security amidst climate and human induced change plus inherent geographical vulnerabilities.</p> <p>Keywords: GIS and Remote sensing, land use, land Cover, Soil and Water Security.</p> |
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ABSTRACT SUBMISSION

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| Affiliation(s) | Mzuzu University |
| Title of paper | Modelling Water Resources Availability for Rumphi River Sub Basin, Rumphi, Malawi. |
| Sub-theme | Climate Change, Adaptation and Mitigation |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | Purpose: To assess water availability trends in Rumphi River Sub Basin for scenario planning regarding reliability of water source for domestic water supply in Rumphi. Methodology/approach: Soil and Water Assessment Tool (SWAT) model was used to assess the current water availability in the catchment. The assessment was based on several variables including existing land uses and cover, water demand (uses), soil type, climatic conditions, and topography. The SWAT model is capable of simulating a wide range of hydrological processes, including surface runoff, groundwater flow, evapotranspiration, |

infiltration, and stream flow hence comprehensively analyses water availability dynamics within designated catchment.

Findings and Discussion: The SWAT model analysis for the Rumphi Sub basins within the South Rukuru Catchment yield crucial insights into the dynamics of water availability in the region. Notably, the study identifies a distinct seasonal trend in stream flows, with the lowest discharge levels in both South Rukuru and Rumphi rivers consistently occurring from July to October. Coinciding with this period of reduced stream flows are higher temperatures ranging from 18 to 30 degrees Celsius, indicating a potential correlation between diminished water availability and elevated temperatures. The observed low stream flows during these critical months highlight a concerning water scarcity issue within the catchment.

Furthermore, the study highlights a gradual decline in stream flows (for Rumphi River) within the target sub basins. While this decline is noted to be small, it emphasizes the importance of adopting sustainable water resource management practices to mitigate potential long-term consequences. As such, catchment conservation practices being done at a larger scale, targeting mainly the sub-basins would bear more fruits on water availability in the area as compared to the current coverage.

Conclusion: The study depicted the seasonal variability in stream flows and its correlation with elevated temperatures, emphasizing the need for a holistic understanding of climate-hydrology interactions. The observed decline in stream flows and limited coverage of catchment conservation areas highlight the necessity for reassessing and potentially enhancing existing conservation measures to address water availability issues effectively.

Recommendations: There is a need to enhance conservation efforts for to cover a more extensive area within the sub basins. This will ensure a more comprehensive approach to addressing water availability concerns. Additionally, the Integrated Water Resource Management approach must be practically applied in context to develop and implement strategies for managing both hydrological dynamics and climatic influences. This approach will enhance resilience to the observed seasonal variability in stream flows.

Originality/value of contribution: Assessing water resource availability in a particular catchment area (sub basin) is critical for utility companies to ascertain the continuance supply of water to the public. The assessment also helps in planning for alternative water sources or water treatment techniques in cases of decline in quantity and quality respectively.

Addressing sediment loads help safeguard water infrastructure used by NRW intake hence promoting water security amidst climate and human induced change plus inherent geographical vulnerabilities.

Keywords: Modelling, water availability, simulation and water supply.



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5th – 6th June 2024

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| Title of paper | Evaluation of knowledge, attitude, practices and effectiveness of menstrual hygiene interventions in rural schools from Lilongwe, Malawi. |
| Sub-theme | WASH (Water, Sanitation and Hygiene) & Healthcare access, delivery and outcomes |
| Paper type | Research paper |

Abstract (not more than 350 words)

Purpose: To evaluate knowledge, attitude, practices and effectiveness of menstrual hygiene interventions in rural schools from Lilongwe, Malawi

Background: Menstrual hygiene management (MHM) is associated with the menstrual process in women and adolescent girls who face cultural and financial challenges in rural areas of many developing countries. As part of the pilot study, we assessed the sustainability and effectiveness of the approaches and lessons learned from the MHM project intervention in rural areas of Lilongwe, Malawi.

Methodology/approach: Rural primary schools ($n = 4$) were purposively selected where an MHM intervention was implemented in Lilongwe, Malawi. The study employed a mixed-method research design. Assessments and data collection were performed through surveys of learners, literature reviews, key informant interviews (KIIs) ($n = 90$), and 20 focus group discussions (FGDs). The study participants involved in the surveys and interviews included boys ($n = 40$) adolescent girls ($n = 100$, 11–19 years; grades 5–8), teachers ($n = 4$), mother groups ($n = 4$), and community leaders ($n = 90$) from the selected schools.

Findings and Discussion: All the schools had water sanitation and hygiene facilities and latrines (45% improved, 54% ventilated improved pit latrines – VIPs) that promoted menstrual hygiene for adolescent girls. However, two of the schools studied (50%, $n = 4$) did not have separate washrooms for changing sanitary materials. There was a slight increase in latrine coverage in Kabuthu zone communities (90% at baseline versus 93.4% at midterm). However, the coverage dropped to 85.7% at the final evaluation, which was attributed to too much rain received in the area that damaged most of the latrines. There was a significant reduction ($p < 0.05$) in the number of girls failing to attend classes due to menstruation (70% at baseline versus 14% at final evaluation). Furthermore, the project resulted in the majority of girls (94.4%) having access to school. There was a strong uptake and adoption of sanitary products (reusable pads and menstrual cups) among adolescent girls of all age groups. The study has demonstrated that the inclusion of key stakeholders such as health workers, parents, mother groups and community leaders promoted the uptake and sustainability of reusable pads and menstrual cups and MHM interventions and programs.

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| | <p>Conclusion and Recommendations: The MHM project implementation improved adolescent girls' education in the area. The inclusion of boys in the health education talks addressed issues of stigma and discrimination. The study, therefore, calls for comprehensive training on MHM and hygiene education to remove discrimination and harmful cultural practices.</p> <p>Originality/value of contribution: Implementation and improvement of adolescent girls' MHM and WASH in schools and their education</p> <p>Keywords: <i>Education; Lilongwe; Menstrual hygiene management; Menstrual health and hygiene; Water sanitation and hygiene</i></p> |
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| Affiliation(s) | Mzuzu University |
| Title of paper | Barriers and enabling factors to water, sanitation and hygiene access among female sex workers in Lilongwe District– Malawi |
| Sub-theme | Water Sanitation and hygiene (WASH) |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: To investigate the barriers and enabling factors to water, sanitation, and hygiene access among female sex workers in Lilongwe district.</p> <p>Methodology/approach: A mixed-method approach was utilised in this study. An interviewer-administered questionnaire was used to collect relevant data. The data was collected in the Female sex workers drop in centres under Pakachere institute of Health in Lilongwe district. Quantitative Data was analysed using SPSS version 2.3 and qualitative data was analysed using Nvivo and thematic analysis.</p> <p>Findings: This study observed a persistent lack of access to WASH among female sex workers. The study revealed that 39% (1118/298) of the</p> |

participants, used unprotected wells as their main source of drinking water, 69% (162/298) reported sharing their latrines and 91.6 % (273/298) had no hand washing facilities. Additionally, 53.9% of the participants suffered from diarrhea in the past 3 months. Furthermore, the study unlocked Key barriers to access to WASH services among FSWS, including inadequate knowledge, stigma and discrimination, and lack of policies. Moreover, the study also identified enabling factors to WASH access comprising individual perceived susceptibility community empowerment, and enforcement of bylaws.

Discussion: The study highlighted challenges to accessing both WASH infrastructure and practice in the marginalized female sex worker population, which were largely perpetuated by a lack of resources, skills, and social norms. Additionally, there were acute stigma and discrimination services at community and healthcare facility levels.

Recommendations: There is a need for advocacy in addressing structural barrier such as stigma and discrimination that affects access to WASH services among the vulnerable populations. Additionally, there is a need to develop guidelines on WASH inclusion for vulnerable populations at the District level to ensure that no one is left behind.

Conclusion: There were more WASH-related illnesses among the FSWs which was attributed to WASH barriers and low level of access to WASH services. Therefore, a multifaceted approach targeting all stakeholders is required in the planning and implementation of WASH intervention to enhance the enabling factors and address the barriers among the FSW

Originality/value of contribution: This paper will help policy makers to understand and address the needs of the female sex and ensuring workers in WASH services thereby ensuring that no one is left behind in WASH programming.

Keywords: Female sex workers, Barriers, Enablers, Water sanitation, and hygiene



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| Affiliation(s) | Tikhala Chakalamba, Masters candidate in Department of Fisheries and Aquatic science, Mzuzu University. |
| Title of paper | Perception of fishing communities on climate change, catch fluctuations and adaptive strategies: Karonga district. |
| Sub-theme | Aquatic science |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: The main purpose of this study was to examine the perceptions of fishing communities on the linkage between climate change and fish catch fluctuation and their coping strategies in Karonga District. Methodology/approach: The study used both primary and secondary data. Primary data was collected between January and February 2024 from fishers, local fishery conservation groups, and village management structures using a household survey, focus group discussion guide and key informant checklist. The study sites and participants were selected using purposive sampling and |

snowballing techniques. A total of 311 fisher households made up the sample size, which comprised Ngara (177), Chipamira (76) and Chiondo (58) fishing communities. The Statistical Package for Social Science (SPSS) and Excel were used to analyze the data.

Findings: The study findings showed that fishers (97%) were aware of climate change, and 90% had experienced extreme climate events during their stay in Karonga. The majority (95%) of the respondents acknowledged climate change impacts on the fisheries ecosystem. Before the 21st century, species such as *Copadichromis spp*, *Opsaridium microlepis*, and *Oreochromis tilapia* were abundant in fisher’s catch compared to now, illustrating the effects of climate variability. Most (88%) of the fishers noted a decrease in fish catches, which impacts their livelihood negatively, and 97% reported having coping mechanisms for low fish catch. This study showed that fishermen adjust to climate change in various ways. A binary logistic regression model was applied to estimate the association between explanatory variables such as age, education, gender, years in the community, income, access to meteorological forecasts and the output-dependent variable of whether fisher’s choice to adapt or not adapt. According to the study, fishers are aware of changes in fish stocks and their causes, including the impact of climate change, which prompts fishing communities to develop various adaptive livelihood strategies and management practices. However, some coping mechanisms adopted by fishers—such as fishing during the closed season, fishing in sanctuaries, borrowing money, and increasing fishing hours—are detrimental to the fishery and unsustainable. Therefore, there is a need for diverse and sustainable income-generating activities.

Keywords: Perception; Climate change; Lake Malawi; Fish catches; Coping strategies



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| Affiliation(s) | Mzuzu University |
| Title of paper | Drivers of safe child faeces management by caregivers in Falls Estate and Chinsapo 1 townships in Lilongwe. |
| Sub-theme | Environmental Science- Water, Sanitation and Hygiene |
| Paper type | Research Paper- Oral Presentation |
| Abstract (not more than 350 words) | <p>Purpose: To assess the extent knowledge, attitude and practices by care givers towards safe child faeces management in Chinsapo 1 and Falls Estate townships in Lilongwe urban.</p> <p>Methodology/approach: The study used a quantitative design where a Kobo collect digitized questionnaire was employed to collect household-based sociodemographic data from 247 child caregivers, through simple random sampling, in Chinsapo 1 and Falls Estate township in Lilongwe urban in April 2023. Frequencies and percentages of sociodemographic variables were explored in descriptive analysis while odds ratio and chi-square test of independence in IBM SPSS version 27 were analysed to ascertain association among knowledge,</p> |

attitude, and practices with safe child faeces management, with level of significance set at <0.05 , Odds ratio (OR) of >1 , 95% confidence interval.

Findings: 46% of child care givers demonstrated poor knowledge on child faeces disposal, 34% of child care givers had good knowledge on health threats posed by child faeces. Child care giver's knowledge of proper child faeces disposal ($p=0.014$), correct knowledge of rinsing a child after defecation ($p=0.0177$), good attitude child faeces health threats ($p<0.0001$), good attitude on disposal of child faeces in an open environment ($p<0.0001$), good attitude on child potty training ($p<0.0001$), household outside toilet location ($p=0.0001$), out of toilet location care giver's handwashing facility after visiting the toilet ($p<0.0001$), improved water source for handwashing after child anal cleansing by care givers (OR=2.0, $p=0.0126$), television, radio and newspaper as child care giver's access to hygiene information ($p=0.0180$) were associated with child caregiver's safe management of child faeces.

Discussion: Child care givers play a crucial role in managing child faeces at household level. The study revealed child care giver's good knowledge, attitude and practices as drivers towards safe management of child faeces. Findings are consistent with similar studies done in Ethiopia.

Recommendations: Authorities to plan and conduct community health awareness on child faeces management in order to sustain gain made over time.

Conclusion: Good knowledge, attitude and practice by child care givers influence safe child faeces management at household level.

Originality/value of contribution: Improved household child care sanitation

Keywords: child care giver, safe child faeces management, knowledge, attitude and practice



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| Title of paper | Utilization of tradition and scientific information in understanding climate change and adaptation by smallholder farmers: A case study of Phalula Extension Planning Area (EPA), Balaka district |
| Sub-theme | Comparative analysis of traditional knowledge and scientific approaches in Climate Change information utilization for adaptation strategies among Smallholder Farmers |
| Paper type | Research paper |

Abstract (not more than 350 words)

Purpose: The study aimed at assessing utilization of climate change information in understanding climate change and adaptation by smallholder farmers by reviewing tradition and scientific channels of climate change information, established potential synergies on the use of tradition and scientific climate change information and determined factors that influence farmers' preference on tradition or scientific climate change information.

Methodology/approach: The study involved purposively selecting 15 key informants and 300 smallholder farmers through random sampling. Primary data came from the survey and secondary data from the department of Climate Change and Meteorological Services. STATA 17 analyzed data using descriptive statistics and logistic regression to determine communication channels and preference factors, and thematic/content analysis explored synergies

Findings: The results showed that majority of farmers agreed to the change in climate such as alteration in seasonality. Radio (68.7%) was the dominant channel for disseminating climate change information. There was coexistence of modern science and indigenous knowledge with promising synergies between tradition and scientific climate information. Majority (54.33%) of farmers preferred scientific information over traditional information (45.67%). Factors such as sex, accuracy, timeliness, accessibility, and language of climate information influenced farmers' choice to a source of climate information.

Discussion: The study concludes that radio, a widespread mass communication tool, holds dominance due to its broad coverage. Smallholder farmers can enhance climate adaptation by integrating traditional and scientific knowledge. This combination boosts resilience and understanding, influencing effective adaptation to climate change's impact.

Recommendations: The study recommended increasing public awareness through mass media like radio and formal documentation of traditional climate information to preserve it. Furthermore, policymakers should integrate indigenous climate information into modern scientific policies.

Conclusion: Research emphasizes radio as a rich source of climate information for smallholder farmers. Modern science coexists with tradition. Challenges persist; policy gaps noted. Study aids targeted communication strategies for climate adaptation.

Originality/value of contribution: This study's originality lies in exploring climate information use among smallholders, emphasizing traditional-scientific coexistence, identifying preference factors, guiding effective communication, and advocating indigenous-modern synergy for resilient agriculture and policy-integrated climate strategies, filling a research gap.

Keywords:

Climate Change, Information, Tradition, Scientific and Small holder farmers



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| Title of paper | Feasibility Assessment of Hybrid Rainwater-Greywater Reuse System for Sustainable Water Management at Mzuzu University, Malawi. |
| Sub-theme | WASH (Water, Sanitation and Hygiene) Waste Management and Recycling |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: To assess the feasibility of a hybrid rainwater-greywater reuse system for sustainable water management at Mzuzu University, Malawi Background: Greywater reuse (GWR) and rainwater harvesting (RWH) are possible substitutes and sources of water for household and irrigation purposes. However, the integration of RWH and GWR and assessment of the water quality are not well documented in Malawi. This study assessed the |

feasibility of a hybrid rainwater-greywater reuse system and design for sustainable water management at Mzuzu University, Malawi.

Methodology/approach: A mixed methods research design was adopted. The selected physio-chemical and microbiological parameters were determined to assess the safety of the water of the hybrid system. AutoCAD and Q-GIS were applied in digitizing the rooftops of the selected buildings to estimate volumes of rainwater that can be harvested. The GW samples were collected from kitchens, laundry and bathrooms, while RW samples ($n = 15$) were collected from roofs of selected buildings around the Mzuzu University campus. Standard methods were used during sample collection, storage and analyses of Fecal coliforms (FC), pH, total dissolved solids (TDS), electrical conductivity (EC), turbidity, magnesium (Mg), sodium (Na) and sulphates (SO_4^{2-}), and Nitrates (NO_3^-). Compliance with Malawi Standards (MS) and World Health Organization (WHO) water quality guidelines was determined.

Findings and Discussion: About half of the parameters (50.7) comply with MS539 (2013) and WHO (2013) with ranges pH (3.44 – 7.60), EC (3.83–148.7 $\mu\text{S}/\text{cm}$), TDS (3.025–157.3mg/L), Turbidity (2.83 – 1007 NTU), NO_3^- (0.002–3.6 mg/L). The results showed that potable water consumption can be reduced by 46% and wastewater generation can be minimized by 55%. Implementation of RWH and GWR systems in the Mzuzu University Campus will generate important economic benefits for the institution.

Conclusion and Recommendations: The feasibility of the hybrid rainwater-greywater reuse system at Mzuzu University indicates promising potential. Future studies should consider assessing the adoption rate, technological efficiency measures and user behaviour. The design considerations, including proper storage capacity, treatment methods, and efficient distribution networks, are critical for successful implementation.

Originality/value of contribution: Implementation and improvement of water treatment and supply at Mzuzu University.

Keywords: *Malawi; Mzuzu university; greywater; rainwater; recycling*



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| Affiliation(s) | Mzuzu University, Chitedze Research Station, Reserve Bank of Malawi, MwAPATA Institute. |
| Title of paper | Amidst Neglect: Management and Marketing Practices of Donkeys (<i>Equus Asinus</i>) in Malawi |
| Sub-theme | Environmental Sciences (Agri-Sciences) |
| Paper type | Case study |
| Abstract | <p>Purpose: This study was conducted to ascertain characteristics of donkey farmers, production and marketing practices in Malawi.</p> <p>Methodology/approach: The case study was conducted in high donkey populated districts of Dowa, Lilongwe and Dedza. A total of 168 households were randomly selected for this study. Data was collected using a semi-structured questionnaire and key informant interview guide. Descriptive statistical analysis was performed with SPSS 26 statistical package.</p> |

Findings: The study found that the average age for donkey farmers was about 42 years, the majority (92.2) of the households were male headed and married (92.3%). It was observed that most (55.4%) of the household heads attained primary school education, majority (92.9%) were engaged in farming as their main occupation. None (0%) of the donkey farmers has ever attended donkey production and marketing training. The study further found that majority (93%) farmers sourced donkeys through buying, majority (95%) kept local breeds and were kept in houses with a mud floor (72%), wall made of wood (74%) and roof made of thatched grass (72%). The farmers use free range system (95%) and most (88%) feeding on grass. The study further found that donkey feed is mostly plenty in May (71%) scarce in January (51%). The study revealed that the major challenge on donkey health condition are sores (89%). About 50% of famers sell their donkeys mostly to farmers (89%) at price ranges of K50,000 to K80,000 for foal, K130,000 to K250,000 for colt and K 180,000 to K 300,000 for jack or janny.

Recommendations: The study recommends that donkey farmers be trained in feed formulation, parasite and disease management, production practices to improve their knowledge and skills for increased donkey productivity and marketing. This can be done through introduction of programs on donkey farming promotion and organizing farmers into groups. There is also need for introduction of study breeding program to avoid future genetic crush due to inbreeding which is being practiced. There is need to commercialize donkey farming and formalize donkey marketing so that the farmers can access better markets.

Conclusion: The study concludes that although donkeys contribute to improved economic livelihoods of farmers in the study areas, its productivity is challenged by a number of factors including limited skills and knowledge breeding, feeding, parasite and disease control, and unstructured market.

Originality/value of contribution: The paper contributes to donkey literature and inform programming of donkey welfare and production.

Keywords: Donkey (*Equus asinus*), Management practices, Donkey farmers, Marketing, Malawi



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| Affiliation(s) | Mzuzu University, University of Malawi, Lilongwe University of Agriculture and Natural Resources |
| Title of paper | Estimation of Small Hydropower Potential using the HBV Hydrological Model Tool |
| Sub-theme | Water and Energy |
| Paper type | Review |
| Abstract (not more than 350 words) | <p>Purpose: This paper reviews the application of a conceptual hydrological model in improving the estimation of stream flow for small hydropower and other water resources projects in data-scare regions.</p> <p>Methodology/approach: A systematic review was employed to investigate the origin, versions, and application of the hydrological models in estimating stream flows in a water resources project.</p> <p>Findings: Previous studies have shown that the value of hydrological models provides a robust and accurate measure of stream flows for the planning of</p> |

hydropower and water resources projects in data-scarce areas. The scaling of such simulations needs to be carefully studied. The application of an integrated methodological approach on the use of regional FDCs, linear regression, and GIS tools to estimate flows and potential head of hydropower for the ungauged sites is a novelty in the Kabompo River Basin (Ndhlovu and Woyessa, 2022). It has shown promising results in developing countries (Hamududu and Killingtveit, 2016)

However, a study by Nonki *et al.* (2021) performed a runoff-rainfall model using HBV – Light in the Upper Benue River Basin in Cameroon, the performance varied from good to the marginal band of uncertainty. This suggests that the model had some limitations in accurately simulating stream flows.

Discussion: Several studies have recommended the use of hydrological models and a few have indicating some limitations as outlined in the review paper.

Recommendations: The use of hydrological models in hydropower planning and operation is highly recommended to increase reliability and confidence.

Conclusion: The HBV hydrological model contributes to the preliminary assessment of a hydropower project coupled with remote sensing in the tropics to some extent

Originality/value of contribution: the study will inform planners and utilities in the country to re-engineer their processes in the planning and operations and plants.

Keywords: Hydrological Modelling, HBV, Hydropower, Streamflow



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| Title of paper | Perception of fishing communities on climate change, catch fluctuations and adaptive strategies: Karonga district. |
| Sub-theme | Aquatic Sciences |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: The main objective of this study was to examine the perceptions of fishing communities on the linkage between climate change and fish catch fluctuation and their coping strategies in Karonga District. Methodology/approach: The study used both primary and secondary data. Primary data was collected between January and February 2024 from fishers, local fishery conservation groups, and village management structures using a household survey, focus group discussion guide and key informant checklist. |

The study sites and participants were selected using purposive sampling and snowballing techniques. A total of 311 fisher households made up the sample size, which comprised Ngara (177), Chipamira (76) and Chiondo (58) fishing communities. The Statistical Package for Social Science (SPSS) and Excel were used to analyze the data.

Findings: The study findings showed that fishers (97%) were aware of climate change, and 90% had experienced extreme climate events during their stay in Karonga. The majority (95%) of the respondents acknowledged climate change impacts on the fisheries ecosystem. Before the 21st century, species such as *Copadichromis spp*, *Opsaridium microlepis*, and *Oreochromis tilapia* were abundant in fisher’s catch compared to now, illustrating the effects of climate variability. Most (88%) of the fishers noted a decrease in fish catches, which impacts their livelihood negatively, and 97% reported having coping mechanisms for low fish catch. This study showed that fishermen adjust to climate change in various ways. A binary logistic regression model was applied to estimate the association between explanatory variables such as age, education, gender, years in the community, income, access to meteorological forecasts and the output-dependent variable of whether fisher’s choice to adapt or not adapt. According to the study, fishers are aware of changes in fish stocks and their causes, including the impact of climate change, which prompts fishing communities to develop various adaptive livelihood strategies and management practices. However, some coping mechanisms adopted by fishers—such as fishing during the closed season, fishing in sanctuaries, borrowing money, and increasing fishing hours—are detrimental to the fishery and unsustainable. Therefore, there is a need for diverse and sustainable income-generating activities.

Keywords: Perception; Climate change; Lake Malawi; Fish catches; Coping strategies

HUMANITIES AND SOCIAL SCIENCES

Humanities and Social Sciences is another thematic area that attracted a large number of submissions. Paper presented fall under the following sub-thematic areas:

- The role of linguistics, literature and creative arts in national development
- History, Heritage and Economic Development in Malawi
- Security and Public Sector Governance
- Religion and Environmental Conservation
- Information services for development
- Communication for Sustainability



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| Names of author(s) and email addresses | Precious Lungu lunguprecious@gmail.com or malled0622@my.mzuni.ac.mw |
| Affiliation(s) | Mzuzu University (Postgraduate Student) |
| Title of paper | Deception and impersonation in fake Facebook accounts: A forensic linguistic analysis. |
| Sub-theme | The role of linguistics, literature and creative arts in national development |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: To detect deception and impersonation in two fake Facebook pages that bear the name Pemphero Mphande using a linguistic approach. The specific objectives of the study were: (i) to detect linguistic deception in fake Facebook pages; and (ii) to analyse the impersonation features of the fake Facebook pages.</p> <p>Methodology/approach: The study adopted the Text-Linguistic Analysis Approach as its Theoretical Framework in analysing the data. The study employed the qualitative research approach and/or design where two texts were analysed. The data constituted two fake Facebook accounts that bore the name Pemphero Mphande and was analysed thematically following the research objectives. Thus, it involved discourse/content textual analysis. The</p> |

study opted for Pemphero Mphande's pages because he is one of the famous social media influencers currently, hence his Facebook page is easily susceptible to cybercrime by scammers. Secondly, it was easier to get ethical clearance from Pemphero for the study.

Findings: the findings show that both fake Facebook accounts were created and run by the same person, based on the consistency of language mistakes and stylistics used. It was also observed that the two texts aimed at deceiving unsuspecting victims through impersonation and language manipulation.

Discussion: the two Facebook accounts (texts) had a lot of linguistic pointers of deception and impersonation that the author of the texts used to achieve their goal. Such linguistic pointers included hasty generalisations, ambiguities and/or vagueness of expressions, constant use of intensifiers to give the targeted victims a sense of urgency, and linguistic incompetence.

Recommendations: The study recommends that responsible law enforcement agencies should take action to curb the proliferation of cybercrime committed through language manipulation, in this case, Facebook platforms.

Conclusion: According to the Text-Linguistic Analysis Approach, these features are commonly used in deception to achieve a certain goal that lies within craftily constituted texts. Hence, linguistic deception and impersonation were identified due to the striking shortfalls of linguistic competence that manifested in the texts.

Originality/value of contribution: the study will help law enforcement agencies easily detect fake Facebook accounts and bring the suspects to book because impersonation on social media is a form of cybercrime within the laws of Malawi. The study will equally help the public avoid falling victim to deception and impersonation, especially in this digital era.

Keywords: deception, impersonation, Facebook, Pemphero Mphande, cybercrime.



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| Names of author(s) and email addresses | Rachel NyaGondwe Fiedler drfiedler11@gmail.com |
| Affiliation(s) | Mzuzu University, P/Bag 201, Luwinda Mzuzu |
| Title of paper | The National Charcoal Strategy and Gender Dimensions among Zomba and Mzuzu City Market Charcoal Users. |
| Sub-theme | A Theological Reflection |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: The purpose is to show how gender perspectives among Zomba and Mzuzu City Market Charcoal Users can broaden the National Charcoal Strategy.</p> <p>Methodology/approach: Qualitative data was collected using ethnographic methods, especially participant observation and intensive conversations with market charcoal users. Data were analysed using an interdisciplinary gender inequality theory from a theological perspective. This was augmented with grounded theory where concepts of the participants guided the development of themes of the paper. The paper is part of the Nagel Institute research that was cleared by the Mzuzu University Research Ethics Committee.</p> <p>Findings: The paper records the following findings: 1. Men are not only producers and traders of charcoal and firewood. More men and boys use charcoal</p> |

outside the households than women and girls. 2. Men and boys have less opportunities to use alternative sources of energy because they often operate in spaces where there is limited infrastructure conducive to the use of alternative sources of energy. 3. The charcoal and firewood burners used by men and women in city markets use more charcoal than those used by women and men in the households.

Discussion: The National Charcoal Strategy is instrumental in decreasing deforestation. However, the Strategy promotes gender inequality as it excludes men as utilisers of charcoal for cooking and heating. It promotes gender bias where men and not women are mainly linked to production and trading of charcoal and firewood. The strategy focusses more on regulating use of charcoal at household level because of gender stereotype that cooking is for women while men earn money for the home. Again, the Strategy focusses on law enforcement on charcoal production and marketing and excludes users, mostly women who form the bulk of the charcoal users in the households. There is need to consider balanced gender perspectives in the interventions promoted in the NCS as a way forward in conserving forests in Malawi.

Recommendations: There should be gender-differentiated content for the sensitisation of sustainable charcoal usage for city charcoal users. The National Charcoal Strategy should include licencing of all city charcoal users.

Conclusion: The Strategy should include licensing of charcoal at production, marketing points as well as for all users and broaden the strategy to all users and not only household users.

Originality/value of contribution: It is a contribution on broadening the National Charcoal Strategy to include charcoal users other than those at household level.

Keywords: National Charcoal Strategy, Gender-differentiated data, Charcoal production, alternative Energy, deforestation.



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| Names of author(s) and email addresses | David Kumwenda ¹ , *, Mavuto Tembo ² , Chrispin Mphande ² , Vincent Nundwe ¹ , Thokozani Andrew Chazema ¹ Email: * davidkumwenda441@yahoo.com |
| Affiliation(s) | ¹ Transformative Community Development Programme, Mzuzu University, Mzuzu, Malawi ² African Centre of Excellence in Neglected and Underutilized Biodiversity, Department of Agrisciences, Mzuzu University |
| Title of paper | Enhanced active citizens' participation in community policing in Malawi using Information and Communication Technology |
| Sub-theme | Security and Public Sector Governance |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: The study analyzed policing activities citizens do through Information Communication Technology at Muloza, Malawi-Mozambique border. Methodology/approach: Exploratory sequential mixed method approach was used. A structured questionnaire was administered to 432 randomly sampled respondents using Yamene's (1969) formula covering 10 locations of Muloza |

each with average of 43 randomly sampled participants. Quantitative data was analysed using SPSS version 20.

Findings: ICTs have greatly enhanced citizens' participation because they accorded real-time updates, responses, and capacity to access prompt assistance virtually. There is wide formal and non-formal communication with authorities and increased social cohesion, collective efficacy and community guardianship improving prevention of crime and arresting of suspects.

Originality/value of contribution: ICTs have allowed wide formal and non-formal participation of citizens, hence social media may be vehicle for igniting investigations.

Keywords: neighborhood-patrol, ICT applications, digital-participatory-surveillance-monitoring, mobilize.



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| Names of author(s) and email addresses | Harvey C. Chidoba Banda Email: banda.h@mzuni.ac.mw/ harveybanda2002@gmail.com |
| Affiliation(s) | Mzuzu University |
| Title of paper | Migrants and Medicines: The Interface of Migration and Traditional Medicinal Beliefs in Northern Malawi |
| Sub-theme | Labour Migration |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: To understand the role of traditional medicine in labour migration from Malawi to other countries such as South Africa.</p> <p>Methodology/approach: Complementarity of sources: oral sources, archival sources and secondary sources. Oral sources: oral interviews with labour migrants; potential migrants and former migrants; also interview with healers and key informants such as chiefs.</p> <p>Findings: Local medicine plays a pivotal role during labour migration process between Malawi and South Africa. In fact, use of local medicine is part and parcel of the labour migration process.</p> <p>Discussion: Most studies have examined the role of bio-medicine during the labour migration process, however, this study examined the role played by local</p> |

medicine: it shows that there are various uses of local medicine by labour migrants, viz: curing various illnesses or diseases; securing jobs; gaining favours from employers at the work place; and overcoming deportations and xenophobia in the destination country.

Recommendations: The Ministry of Health (under the Malawi Government) should orient healers on better ways of processing and storing local medicine, and should liaise or negotiate with the destination countries for safe passage (into the destination country) of processed local medicine.

Conclusion: This study shows how labour migrants deal with health problems and problems at their work places, especially in the destination countries, in this case South Africa.

Originality/value of contribution: the study contributes to the historiography of labour migration and sheds light on the nexus between labour migration and traditional medicine in Malawi.

Keywords: labour migration; migrant; healer-migrant; traditional medicine; bio-medicine



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| Names of author(s) and email addresses | Hamis Lak Abullah (MLIS), Abullah.h@mzuni.ac.mw Aubrey Harvey Chaputula (PhD LIS), chaputula.a@mzuni.a.mw |
| Affiliation(s) | Mzuzu University Library and Learning Resources Centre |
| Title of paper | Survival mechanisms under the new order? Resource mobilisation activities undertaken by University of Livingstonia and St John of God College of Health Sciences libraries. |
| Sub-theme | Digital transformation in information, archives and records management |
| Research paper | Research paper |

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| <p>Abstract (not more than 350 words)</p> | <p>Purpose: The purpose of the study was to investigate resource mobilisation activities that were being undertaken at University of Livingstonia’s Kaning’ina Campus and St John of God College of Health Sciences libraries.</p> <p>Methodology: Data was collected through interviews that were conducted with librarians and finance officers. The data collected was analysed using NVIVO.</p> <p>Findings: Findings indicated that the two institutions carry out a number of resource mobilisation activities that have brought in financial and material resources. The effective resource mobilisation activities were grant proposal writing, printing, photocopying and binding and these were rated most effective because two academic libraries witnessed increased resources, increased infrastructure and networking with communities and organisations. The study further revealed that there were some challenges that were affecting resource mobilisation, and suggestions were made on how the challenges could be tackled.</p> <p>Conclusions: The study concludes that two private academic libraries are effectively implementing resource mobilisation activities though with challenges.</p> <p>Originality: The paper is key in informing libraries to understand how they can effectively conduct resource mobilisation activities using the Resource Dependence Theory Framework</p> <p>Keywords: resource mobilisation, private academic libraries, resource dependence theory</p> |
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| Names of author(s) and email addresses | Rhodrick Andrew Padoni ¹ , George Theodore Chipeta ² , Winner Dominic Chawinga ³ rhodrickpadoni@gmail.com ¹ , gchipeta5@gmail.com ² , winnchawinga@gmail.com ³ |
| Affiliation(s) | 1. Lecturer, Department of Information Sciences-Mzuzu University 2. Associate Professor, Department of Information Sciences-Mzuzu University 3. Associate Professor, Department of Information Sciences-Mzuzu University |
| Title of paper | Hybrid records management practices at M'mbelwa District Council in the Northern Region of Malawi |
| Sub-theme | Information services for development |
| Paper type | Research paper |
| Abstract | Purpose: This study aimed to investigate hybrid records management practices at M'mbelwa District Council in the Northern Region of Malawi. Methodology/approach: This was a mixed methods study that adopted a pragmatic paradigm and convergent parallel design. The study used a sample size of 44 comprising 9 top, 17 middle, 16 clerical levels staff, records officer, and management information systems officer. Data was collected using structured questionnaires, interview, observation, and document analysis guides. Quantitative data was analysed using SPSS, while qualitative data was analysed thematically. |

Findings: The study found that both paper and electronic records were created at M’mbelwa District Council which included minutes, emails, reports, staff appraisals, and receipts. Most Council employees store paper records in their offices using files, folders, shelves, and drawers. For e-records, the most used storage facilities were computers, flash drives, and Integrated Financial Management Information System. The Council did not have records retention and disposition schedule, and records management policy. However, there was a positive relationship between records management and government service delivery at the Council. Nevertheless, personnels’ skills in records management practices ranged from moderate to poor. Some ICT and non-ICT infrastructure were available. However, top management support towards records management activities was not adequate.

Discussion:

Business transactions fully captured as records are sources of information that must reliably inform Council’s strategic decision-making. Usage of disintegrated paper and electronic records storage facilities and the absence of a records management policy at the Council means that management of records is being done without any form of guidelines.

Recommendations: The study recommends that M’mbelwa District Council should consider developing a records management system and policy, developing records management into a full department with its budget vote, and recruiting professionals to manage the council records.

Conclusion: The study concludes that records management practices at M’mbelwa District Council are not properly organised.

Originality/value of contribution: The operationalisation of Access to Information Law in 2020 means that Malawian citizens have the right to access information from public institutions including district councils. The availability of reliable information can only be a product of a sound records management regime. The study intended to suggest strategies that could be used to improve records management practices to enhance effective local government administration.

Keywords: Records, records management, public records, district council, Records Continuum Model



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| Names of author(s) and email addresses | Wezzie Mkweu, wezziemkweu@gmail.com , Fiskani Ngwira, fiskangwira@gmail.com |
| Affiliation(s) | Mzuzu University, Department of Library and Information Science |
| Title of paper | Perception of Library Services among Nursing students at Ekwendeni College of Health Sciences Library |
| Sub-theme | Information services development |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: This study was conducted to primarily to investigate the perception of library services among level three nursing students at Ekwendeni college of Health Sciences (ECOHS). Specifically, the study aimed at finding out the library services provided and used at the ECOHS, to ascertain if users are satisfied with the library services at ECOHS and to determine the challenges faced by the students in using library services at ECOHS.</p> <p>Methodology/approach: The study adopted case study and survey research design in which both qualitative and quantitative data were collected to answer research questions. The study population comprised fifty-nine (59) nursing student and one library staff at Ekwendeni College of Health science. Data were collected as follows: firstly, a questionnaire was sent to fifty-nine level three nursing students and data was also collected through an interview with</p> |

library staff. Questionnaire results were quantitatively analysed and presented in terms of frequency tables and graphs. Interview results were analysed thematically.

Findings: The study found that Ekwendeni college of Health Science has different library services namely: provides memberships to the library, loan entitlements, circulation services, reference services, current awareness services, readers' services, Internet services and e-resources services and reprographic services. The study found that nursing students used library services. The study also revealed that a majority of nursing students used circulation services the most amongst the library services. The study also revealed that students were satisfied with the library services. The findings showed that the key challenges faced by nursing students when accessing library services; slow internet, electricity black-out, lack of computers, lack of promotion of library services for use by librarians, lack of awareness of library services, inability to interact with library staff in order to get assistance and limited library space.

Recommendations: The study recommends Ekwendeni College of Health Sciences should increase the library space in order to accommodate more students and provision of training to students on library services available and how to use the library. It is anticipated that results of the study may help librarians understand the impact of library services to nursing students at Ekwendeni College of Health Sciences and beyond.

Originality/value of contribution:

Based on recommendations some of the problems identified will lead to advancement of better library service provision in Malawi and beyond.

Keywords: Library, Library services, Ekwendeni College of Health Sciences, Perception, Students



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| Names of author(s) and email addresses | Ezilon Kasoka ¹ (MA, B.Ed) kasokaebm@gmail.com and ekasoka@acbmw.org (+265) 999 660 014 |
| Affiliation(s) | Anti-Corruption Bureau, Senior Corruption Prevention and Compliance Officer |
| Title of paper | The Malawi Access to Information Act: An Effective Tool to Control Government Corruption |
| Sub-theme | Security and Public Sector Governance |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: International organizations like the World Bank, the United Nations, and non-state actors like Transparency International (TI) have encouraged countries to adopt Access to Information (ATI) laws. Such laws are believed to increase transparency and thus combat corruption. This study examines the recently introduced Malawi ATI Act to determine its effect on the control of public sector corruption in the country.</p> <p>Methodology/approach: Primary data was obtained from Information Officers; information requesters (citizens, journalists); and the representatives of Malawi Human Rights Commission (oversight body) and Ministry of Information (policyholder). Secondary data was obtained from government documents, media</p> |

articles and investigative reports, journal articles, and indices and reports. Data was analyzed through qualitative content techniques (including thematic) to determine level of awareness, utilization and empowerment of citizens by ATI Act and effectiveness of the government agencies in implementing the Act.

Findings: Empirical data revealed low levels of awareness, utilization of the ATI Act, transparency and accountability among public officials. They fail to proactively disclose data in their custody and to provide the information requested by citizens. The Commission and the Ministry have not effectively implemented the ATI Act, including failure to develop and publish guidelines and submit reports to Parliament.

Discussion: The ATI Act in Malawi has a positive impact on the control of government corruption. However, the substantial impact is yet to be realized as the law has not been adequately implemented and enforced. In addition, the ATI Act need to be accompanied by other accountability measures such as the sanctioning of public officials whose involvement in corrupt practices has been exposed.

Recommendations: The study recommends a robust awareness campaign targeting citizens and public officials, the development of necessary tools such as guidelines and manuals, proper training of public officials concerning the Act, the digitalization of information held by public institutions, and proactive disclosure of information.

Conclusion: The ATI Act has not yet fully made public bodies more transparent and accountable. In addition, it has not increased trust or fully rooted itself within the citizens.

Originality/value of contribution: The study is the first to focus on the ATI Act with its impact on enhancing transparency, accountability, citizen empowerment, and control of public sector corruption in Malawi. It adds to the knowledge of the role of the ATI Act in preventing corruption.

Keywords: Corruption, transparency, accountability, access to information, citizen empowerment



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| Names of author(s) and email addresses | Jamu Nyirenda, PhD jkbnyirenda@yahoo.com |
| Affiliation(s) | Mzuzu University |
| Title of paper | A mixed bag of identities: The British indirect rule policy in colonial northern Malawi, 1933 to the early 1950s |
| Sub-theme | History, Heritage, and Economic Development in Malawi |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: This paper discusses the British indirect rule policy in colonial northern Malawi from 1933 to the early 1950s. Notably, the paper analyses the colonial interaction with various African ethnic groups in northern Malawi during that period.</p> <p>Methodology/approach: This paper relies on archival and written secondary sources.</p> <p>Findings: The paper finds out that the British indirect rule policy in colonial northern was meaningless among Tonga-speaking people because, traditionally, they were not used to a communal life under chiefs as per the wishes of the colonial administrators while the Ngonde saw no problem with it. Yet for the Ngoni, indirect rule was an opportunity for them to acquire their</p> |

social identity and self-government status, while the Tumbuka felt it would help them revive their lost political identity by rallying behind the Chikulamayembe chieftainship.

Discussion: The paper argues that the British indirect rule policy was not uniformly accepted in the region by the major ethnic groups. The paper, thus, observes that African ethnic groups portrayed different identities when the British implemented the policy.

Recommendations: The paper recommends that there is a need to have an extensive understanding of how the British indirect rule policy contributed to multiple identities in colonial northern Malawi which might have a bearing on the present times.

Conclusion: The paper concludes that the British indirect rule policy produced a mixed bag of identities in colonial northern Malawi.

Originality/value of contribution: This paper adds significantly to the growing historical understanding of the complexities involved in identities by using the experiences of colonial northern Malawi as a case study, and in so doing, expanding the broader debates on the history of identities.

Keywords: British; Indirect rule; Colonial northern Malawi; Ethnic groups; Identities.



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| Names of author(s) and email addresses | Manasseh Nyangulu mnyangulu@unilia.ac.mw |
| Affiliation(s) | University of Livingstonia, Laws College |
| Title of paper | Oral Literature and dissemination of Maternal and Antenatal/Postnatal health issues in Livingstonia-Rumphi health centres |
| Sub-theme | The Role of Linguistics, Literature and Creative arts in National development |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: The study focusses on the usage of oral songs as a means of transmitting maternal, antenatal and postnatal health messages in some of the rural hospitals in Livingstonia-Rumphi health centres</p> <p>Methodology/approach: The study targeted the following rural health centres in Livingstonia-Rumphi area: Gordon Memorial hospital, Lura, Mhuju and Chinyolo. In the study, lead singers in maternal/postnatal clinics in the four health centres selected were engaged to record such songs because most of the women were inhibited by the researcher’s presence in such sessions. In total, eight songs were collected and transcribed for analysis. The eight songs selected were sung in all the health centres visited and therefore met the</p> |

selection criteria for analysis. In my analysis of such songs, I have engaged Julia Kristeva theory of abjection especially on the role of language and discourse in casting out others deemed to be out of sync with new social or world order. Kristeva has associated the abject with “all that is repulsive and fascinating about bodies and, in particular, those aspects of bodily experience which unsettle singular bodily integrity: death, decay, fluids, orifices, sex, defecation, vomiting, illness, menstruation, *pregnancy and childbirth*” (79-80).

Findings: From my analysis, it was noted that some of the songs are satirical and caricature women and their spouses who do not follow best health practices.

Discussion: The oral songs analysed have the potential of deterring others from attending such sessions in public hospitals because of the way the messages are presented.

Recommendations: The paper strongly recommends that elements that engender the construction of the “abject other” in the songs should be eliminated.

Conclusion: The results confirm previous studies that have pointed out that language, if not carefully used, has the potential to cast out others in texts.

Originality/value of contribution: Besides significantly departing from the usual way literature is studied, the paper adds to the body knowledge that brings together the intersection of oral literature and health especially maternal and antenatal/postnatal health issues.

Key words: Oral songs, dissemination, maternal, antenatal/Postnatal, abject other



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| Names of author(s) and email addresses | Medson Mwalughali-Mponda, Jr. medsonmwalumponda@gmail.com |
| Affiliation(s) | MA (African History and Heritage) student, Mzuzu University |
| Title of paper | Museums of Malawi and the Safeguarding of Intangible Cultural Heritage, 1957-2022 |
| Sub-theme | History, Heritage and Economic Development in Malawi |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | Purpose: This study proposes to examine the role the Museums of Malawi has played in safeguarding Intangible Cultural Heritage (ICH) of Malawi since its establishment in 1957. ICH, refers to the ‘living heritage’ of people. UNESCO believes that cultural heritage is not limited to monuments and collection of objects. It also includes our traditions, beliefs and customs. This study also endeavors to ascertain whether the adoption of the 2003 UNESCO Convention for the Safeguarding of Intangible Cultural Heritage is a decolonial approach to post ethnographic Museums of Malawi, particularly with regard to the issue of presentation and interpretation of ICH. |

Methodology/ Approach: Adopting a historical approach, this study utilised both primary and secondary sources of information, and most importantly exhibition analysis. Purposive sampling strategy will be employed to identify the key informants in this study, ranging from curators and directors at the Chichiri Museum in Blantyre, UNESCO representatives to Malawi, and officers from the Department of Arts and Crafts to some cultural players who have benefited from the technical assistance provided by the Museums of Malawi in the course of safeguarding their ICH.

Originality/Value of contribution: It is hoped that the findings from this study shall assist both the Museums of Malawi and UNESCO to reflect on the effectiveness of the existing proposed practices for safeguarding ICH as expounded by the 2003 UNESCO Convention. The findings from this study shall also provide the cultural practitioners with useful hints on the appropriate safeguarding practices for their ICH in the face of growing modernization and globalization. Ultimately, this research constitutes a contribution to the underrepresented domain of museums and heritage in Malawi.

Keywords: Intangible Cultural Heritage; Safeguarding; UNESCO 2003 Convention; Museums of Malawi.



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| Names of author(s) and email addresses | Aaron Khombe akhombe@gmail.com |
| Affiliation(s) | Mzuzu University MA Student, Department of Museums and Monuments |
| Title of paper | Salvaging Heritage in Soil Archives: Striking a balance between Development concerns and Heritage Preservation |
| Sub-theme | History, Heritage and Economic Development in Malawi |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: to call for the creation of a critical mass to demand for the screening of the soils before permanently land transforming activities are executed.</p> <p>Methodology/approach: This research uses a historical approach to uncover the past through use of archaeological sources. Environmental and Social Impact Assessment reports of development projects have been used to assess their sensitivity to the soil archives. Oral interviews purposively executed were also done with developers, government officials and consultants. Besides, primary and secondary sources of information have been utilised to assess the historical record.</p> <p>Findings: Drawing on two case studies of development projects in Lilongwe as methodology this paper argues that if heritage professionals do not step in to</p> |

call for screening of development areas for their layers of the rich past, Malawi stands to lose out in learning about its distant past. Malawi is developing at a very fast rate. The soil archives are being disturbed and covered under concrete eternally burying and disturbing the archaeological record.

Discussion: Malawi history based on oral and some written sources makes reference to the remote past to as far as the interaction of the Batwa with the Iron Age migrants. Palpable evidence of the existence of the earlier peoples and their affluence is revealed through studies in soil archives. The layers in the soil archives have buried treasures for any caring heritage professional to peep into the prehistoric past. Advances in prehistoric methods and its interdisciplinary nature put to light the paleo environments from the Lower Pleistocene when the first homo species appear on the scene and how these people interacted with it. This is a realm that is out of reach for study through other methods of studying history. However, Malawi just like other countries in the world are developing fast thereby covering the soil archives under tons of concrete. In most cases, the heritage treasures are disturbed, destroyed and immortally hidden from history by blind excavations for development foundations and extraction of various resources.

Recommendations: This paper recommends that a critical mass of historians, archaeologists and heritage professionals be established that should demand the protection of the soils archives in face of development activities.

Conclusion: Since people appeared on the evolution trail, they have always been artistic exploiting their environment for their survival. As such, they have left numerous footprints for our use to enter into their world if we dare to care. The recovery of Malawi's past as it were before the Iron Age era is evidence enough to prove that our history has a longer stretch into the remote past.

Originality/value of contribution: This paper makes a contribution to our understanding of how archaeological methods can be employed to rescue Malawi's heritage in the midst of development projects.

Keywords: soil archives, archaeology, heritage, history, Lilongwe, development



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| Affiliation(s) | Mzuzu University |
| Title of paper | Postgraduate students' perception of the quality of library services at the Malawi Institute of Management |
| Sub-theme | |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: The purpose of this study was to examine postgraduate students' perception of the quality of library services at the Malawi Institute of Management (MIM).</p> <p>Methodology/approach: The study was underpinned by the LibQUAL model, a popular customer-centred service quality assessment tool for academic libraries. The study followed a positivist paradigm in which quantitative approaches were utilised. Data was collected from 139</p> |

postgraduate students using an adapted LibQUAL+ questionnaire. Statistical Package for Social Sciences (SPSS) version 22 was used to analyse data.

Findings: The findings of the study indicated that postgraduate students to a large extent had positive perceptions of the library services provided at the Malawi Institute of Management (MIM). The results show that the majority of postgraduate students were satisfied with the adequacy of printed resources, the availability of modern equipment, and also easiness of locating materials from library shelves. On the contrary, postgraduate students were not satisfied with information skills training; adequacy, and accessibility of electronic resources. The study also established that postgraduate students perceived MIM library staff positively with regards to their friendliness and caring, willingness to help, their readiness to respond to users' queries, and instilling confidence but poorly in giving individualised attention to users. Further, this study found that the MIM library environment was highly regarded by postgraduate students because of quietness of its space, sufficient lighting, adequate opening hours, comfortable chairs, and desks. MIM Library environment was however found wanting with regards to having no space to cater for group discussions and learning.

Conclusion and recommendations: The results obtained from the present study showed that postgraduate students were generally satisfied with the quality of services provided by MIM library. An improvement quality of information literacy training; library website, discussion rooms, and library staff may satisfy users expectations.

Originality/value of contribution: This study is first study to be conducted at MIM and its findings reveal areas which requires action of decisions makers in order to improve library service quality.

Keywords: Library service quality; Library service assessment; LibQUAL, Users' perception; Users' satisfaction.



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| Affiliation(s) | Mzuzu University, Department of Information Science. |
| Title of paper | Utilisation of electronic information resources by form four students at Mzuzu Government Secondary School in Mzuzu city |
| Sub-theme | |
| Paper type | Research Paper |
| Abstract(not more than 350 words) | <p>Purpose: The purpose of the study was to investigate utilisation of electronic information resources by form four students at Mzuzu Government Secondary School.</p> <p>Methodology/approach: The study was quantitative in nature and statistical data was collected using questionnaire</p> <p>Findings: The study findings demonstrated that electronic resources are available for use by form four students at Mzuzu Government Secondary School and the available e-resources are e-books for the syllabus with 39%. The study</p> |

further revealed that students use e-resources for studies with 43%. The major challenge was shortage of computers while other challenges were library restriction, technical problems and inadequate teachers to train students.

Discussion: The study revealed that teachers play a crucial role on awareness of the e-resources to students, the availability of e-resources at Mzuzu Government Secondary school is in contrast with much of literature. Lastly the study confirms the literature that lack of advanced searching skill, navigation problems, library staff are indifference, poor internet connectivity, technological constraint, lack of ICT skills and erratic power are some of the challenges faced by students in accessing e-resources.

Recommendations: The study recommends that enough computers be supplied at Mzuzu Government secondary school, the computer laboratory should be open to all students, more teachers should be allocated to teach end user computing and information literacy, end user computing should be compulsory and information literacy should also be a compulsory subject from the first year and introduction of e-resources in school libraries should be adopted by government.

Conclusion: The study established that electronic information resources at Mzuzu government secondary school are utilised by form four students.

Originality/value of contribution: the study will help Mzuzu Government Secondary School Management to take steps that will help in facilitating learners access to learning resources made available for their improved performance, it will also help decision makers in the education sector to prioritise e-resources in school libraries in order to enhance research skills among secondary school learners and finally the study will add literature to the body of knowledge in the field of Library and Information Science

Keywords: Utilisation, e-resources, availability, school library



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| Title of paper | Support for Smallholder Farmers with Climate Change Information in Rumphi District: Role of Bolero Agriculture Resource Centre |
| Sub-theme | Information Services for Development |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: The purpose of the study was to explore the role of Bolero Agriculture Resource Centre (ARC) in the provision of climate change information to smallholder farmers in Rumphi District</p> <p>Methodology/approach: The study was underpinned by the constructivism paradigm. The study adopted a qualitative approach with a case study design. The population of the study was 30 comprising of Borero Agriculture Resource Centre (ARC) Staff and Rural Smallholder Farmers within Bolero Extension Planning Area</p> |

(EPA). A purposive sampling technique was adopted to select the EPA and smallholders for the study. The sample size of 30 was determined using a census approach. Data collection instruments were semi-structured interviews and focus group discussions. The instruments were subjected to peer checking to ascertain the correct use of language and level of items. Ethical clearance was sought from the Mzuzu University Research Ethics Committee (MZUNIREC). Data was analysed using NVivo 12 to generate themes and sub-themes.

Findings: The major finding of the study was that Bolero ARC offers different types of climate information sources to smallholder farmers such as pamphlets, leaflets, posters, booklets and television programmes. The study also revealed that smallholder farmers were aware of the climate change information sources at Bolero ARC despite the challenges of insufficient climate change information sources, language barriers and limited access to the ARC which impacted on use of information sources.

Conclusion and recommendations: Bolero ARC plays an important role in supporting smallholder farmers in Rumphi District with climate change information. Therefore, the government, donors and well-wishers should support the centre with additional climate change information sources in all formats and in local language to enhance access and use of information for agricultural activities.

Originality/value of contribution: The study contributes to the rare body of knowledge on the provision of climate change information to smallholder farmers in Rumphi district in Malawi. Cognisant of the fact that the Malawian economy is agrarian, this study offers valuable lessons and insights to smallholder farmers, the Department of Agriculture and Extension Services, donors, and the general public on the importance of climate change information in agricultural productivity in the era of climate change.

Keywords: Climate Change Information, Agriculture Resource Centre, Smallholder Farmers, Rumphi District, Malawi



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| Affiliation(s) | Senior Lecturer, Mzuzu University, Malawi, |
| Title of paper | Improving Access to Information through Library Marketing in a Private University in Malawi |
| Sub-theme | Information Services for Development |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: To explore the marketing of library services at Deayang University in Lilongwe to raise awareness and improve access to library services and products.</p> <p>Methodology/approach: The study was underpinned by the AIDA model. The study adopted a mixed methods approach with a social survey design. The population of the study was 504 (500 library users and 4 library staff members). Convenience and Purposive sampling methods were adopted. The sample size of 217 was determined using a sample size table by Krejcie and Morgan Sample Size Table (Krejcie & Morgan, 1970). Due to the impact of the COVID-19 pandemic and the impending closure of the University, the study adopted a</p> |

sample of 54 representing 50 library users and four (4) library staff. Questionnaires and interview guides were used to collect data. Ethical clearance was sought through the Mzuzu University Research Ethics Committee (MZUNIREC). Data was analysed using Statistical Package for Social Science (SPSS) version 20.0 for quantitative data and thematic analysis for qualitative data.

Findings: The major finding of the study was that all library users at Deayang University were aware of the library services and products offered and that the institution is one of the few libraries in Malawi that market its products and services and this process is done through posters, flyers, social media platforms, positive word of mouth and other tools of marketing.

Conclusion and recommendations: The library at Deayang University can properly market its services and products. This capacity can be enhanced with adequate funding and well-trained library staff that can improve the image of the library among its clients through formal and informal interactions. The library should improve the effectiveness of the existing marketing tools such as posters, the university website and friends

Originality/value of contribution: The study is significant in the sense that the findings can be utilized in decision-making by library management to improve the visibility and usability of library services and products. The study also contributes significantly to the global discussion on the marketing of library services in the era of the COVID-19 pandemic.

Keywords: Library, Library Services, Library Products, Library Marketing, Deayang University Library



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| Title of paper | Environmental Sustainability and Christian Stewardship and its Implication |
| Sub-theme | Religion and environmental conservations |
| Paper type | Conceptual paper |
| Abstract (not more than 350 words) | <p>Purpose: This study aims to investigate the intersection of environmental sustainability and Christian stewardship, exploring how principles of stewardship within Christian theology can inform and influence practices related to environmental conservation and resource management.</p> <p>Methodology/approach: The research employs a multidisciplinary approach, integrating theological analysis with environmental science and ethics. The study begins with a comprehensive review of biblical and theological literature on stewardship, examining key passages and interpretations related to human responsibility for the Earth. It then conducts a comparative analysis of Christian teachings on stewardship with contemporary environmental discourse, identifying areas of convergence and tension. Additionally, empirical data are collected through surveys or interviews to explore the perspectives of Christian</p> |

communities on environmental issues and their understanding of stewardship obligations. The study also examines case studies of environmental initiatives within Christian organizations to assess practical applications of stewardship principles. Finally, ethical frameworks are employed to evaluate the implications of integrating Christian stewardship with environmental sustainability efforts, considering questions of justice, equity, and intergenerational responsibility. Through this interdisciplinary methodology, the research seeks to provide insights into how Christian theology can inform and enrich discussions on environmental stewardship in both religious and secular contexts.

Findings: Biblical Foundation of Stewardship: The study reveals a rich theological basis for stewardship within Christian scripture, emphasizing humanity's role as caretakers of God's creation. Key passages from the Bible underscore themes of responsibility, stewardship, and dominion over the Earth, providing a framework for understanding human interaction with the environment.

Integration of Christian Values and Environmental Ethics: Findings suggest that Christian stewardship principles align closely with many environmental ethics, emphasizing notions of accountability, respect for creation, and the inherent value of all living beings. This integration offers a compelling basis for advocating environmental sustainability within Christian communities.

Challenges and Tensions: The research identifies tensions between certain interpretations of Christian theology and contemporary environmental issues, such as debates over resource extraction, climate change denial, and anthropocentric attitudes towards nature. These tensions highlight the complexity of reconciling religious beliefs with environmental imperatives.

Community Perspectives and Practices: Empirical data from surveys or interviews indicate varying levels of awareness and engagement with environmental issues among Christian communities. While some demonstrate strong commitments to environmental stewardship, others exhibit apathy or

skepticism towards sustainability efforts, reflecting diverse interpretations of stewardship within religious contexts.

Role of Christian Organizations: Case studies of environmental initiatives within Christian organizations reveal the potential for religious institutions to lead in promoting environmental sustainability. Examples include creation care ministries, eco-theology programs, and community-based conservation projects, illustrating how Christian values can drive practical action for environmental stewardship.

Ethical Implications and Responsibilities: Ethical analysis highlights the moral imperative for Christians to address environmental degradation and climate change, emphasizing principles of justice, solidarity, and intergenerational equity. The study underscores the ethical obligation to care for creation and mitigate harm to vulnerable communities affected by environmental degradation.

Interfaith Dialogue and Collaboration: Finally, the research emphasizes the importance of interfaith dialogue and collaboration in addressing environmental challenges. By recognizing common values across religious traditions and fostering cooperation on shared environmental goals, there is potential for broader impact and collective action towards sustainability.

Conclusion: The discussion on environmental sustainability and Christian stewardship underscores the profound interconnectedness between faith, ethics, and ecological responsibility.

Originality/Value of Contribution: This research offers a novel interdisciplinary approach by bridging theological analysis with environmental science and ethics. By synthesizing insights from diverse fields, the study provides a holistic understanding of the intersection between environmental sustainability and Christian stewardship, offering fresh perspectives on how religious beliefs can inform ecological practices.

Keywords: Stewardship, Environmental sustainability, Environmental problem, Religion



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| Title of paper | Seeking and using information in a hospital setting among health professionals in Malawi |
| Sub-theme | Information services for development |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: The study investigated the information behaviour of health professionals at one of the three biggest hospitals in Malawi.</p> <p>Methodology/approach: A descriptive survey design was used. Ninety-four health professionals participated in the study. SPSS was used for descriptive analysis to generate frequencies and percentages.</p> <p>Findings: Personal and professional development constituted the major information need among all the health professionals. Health professionals used books and colleagues as sources of information, but many preferred to use</p> |

websites, rather than print resources. The challenges that affected their information behaviour included, inadequate information resources, limited access to the internet and e-databases, and lack of information literacy skills.

Discussion: The study revealed various information needs of health professionals and their preferred information sources. Health professionals need adequate library and information services with both print and digital resources and support from information professionals. Nevertheless, use of the hospital library was very low among health professionals.

Recommendations: Health professionals should view the library as the most reliable and desirable place for information support, with library staff who can advise and appraise information, particularly from the internet. The study also recommends Hospital authorities should provide information literacy education to health professionals to enable them to retrieve relevant information.

Conclusion: Health professionals at MCH continue to face various challenges that hinder access and efficient use of information resources.

Originality/value of contribution: The study contributes to the literature and theory in information sciences in Malawi. Secondly, the study contributes to practice of health service delivery of health information services.

Keywords: Africa south, developing economies, health information needs, health professionals, information seeking behaviour, information sources

HEALTH SCIENCES

Health Sciences is another area that attracted a number of intriguing papers. Presentations to be made under this thematic area fall under the following:

- Innovative approaches and interventions to strengthen health delivery
- Healthcare access, delivery and outcomes
- Health technology and digital transformation
- Maternal, new-born, child and adolescent health
- Communicable and non-communicable diseases
- Biomedical and Health Informatics



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| Affiliation(s) | St Johns Institute for Health/Mzuzu University |
| Title of paper | Assessing Clinical teaching practices of nurse educators in maternal mental health at St Lukes and Ekwendeni Colleges of Health Sciences, Malawi. |
| Sub-theme | Health Sciences |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: To assess clinical teaching practices of nurse educators in maternal mental health at St Lukes and Ekwendeni Colleges of Health Sciences in Malawi. |
| | Methodology/approach: This explanatory sequential mixed method study was conducted at St. Luke’s and Ekwendeni Colleges of Health Sciences, using convenient and purposive sampling techniques. Data was collected through a survey, in-depth interviews, focus group discussions, and document reviews. Descriptive statistics, Fisher’s exact test, thematic and content analysis were used to analyze the data. |

Findings: Nurse educators implemented a few maternal mental health competencies in the nursing and midwifery technician education programme, such as documentation ($M = 4.55 \pm 0.595$), collaboration of care ($M = 4.27 \pm 0.78$), and referral ($M = 4.08 \pm 0.910$). Furthermore, nurse educators used a few teaching practices, like sharing clinical objectives ($M = 4.17 \pm 0.964$), encouraging students to develop individual objectives ($M = 4.51 \pm 0.680$), and orienting students to clinical objectives ($M = 4.39 \pm 0.728$). The Fishers Exact test revealed an association between the gender of students and the utilization of clinical teaching strategies (two-tailed p -value = 0.011).

Discussion: The study encourages nurse educators to teach all maternal mental health competencies and use student centredness strategies as emphasized in the Competency Outcomes and Performance Assessment model. This will enable students gain maternal mental health competencies and serve clients seeking mental health services.

Recommendations: The study recommends nurse educators to review nursing and midwifery technician curriculum by incorporating all the maternal mental health competencies, continuous professional development of nurse educators on student centredness strategies, and mobilization of resources to support student's learning.

Conclusion: The study established that nurse educators were teaching some of the maternal mental health competencies. However, all the maternal mental health competencies should be taught using student centredness teaching strategies to produce a competent nurse midwife technician.

Originality/value of contribution: The study has implications for policy, education and practice. Its recommendations, if acted upon, would lead to the formulation of relevant policies that were found to be lacking. Findings could also lead to effective teaching practices in maternal mental health.

Keywords: *maternal mental health, perinatal mental health, nurse midwife technician, clinical teaching, clinical education and nurse educator*



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| Title of paper | Predictors of Community Health Workers, Continuance Intentions to Use mHealth in Malawi: User Expectation Perspective |
| Sub-theme | Health Sciences |
| Paper type | Research paper |
| Abstract (not more than 350 words) | Purpose: This paper aims to model the predictors of continuance intentions to use mHealth among community health workers (CHWs) in Malawi. Cstock was used as a mHealth application used by CHWs to order medical supplies in village clinics. The study extends the expectation confirmation model to include effort expectancy and quality triads (system quality, information quality, and service quality). |

Methodology/approach: The study adopted a cross-sectional survey design. A survey questionnaire was used to collect data from 176 CHWs in three district health facilities (Chitipa, Rumphi, and Nkhatabay) in Malawi. The study used simple and stratified sampling techniques to select the research participants. Partial least squares to structural equation modelling (PLS-SEM) was used to analyse data.

Findings: The study found that effort expectancy, confirmation, satisfaction, and post-usage usefulness had a significant influence on CHWs' continuance intentions to use mHealth in Malawi. However, the unexpected results were that quality triads did not have a significant influence on the continuance intention towards mHealth. This was contrary to the established information system extant literature.

Conclusion: The study concludes that the surveyed CHWs in Malawi possess different expectation beliefs that impact their continuance intentions to adopt mHealth in Malawi.

Originality/value of contribution: The research demonstrates a powerful academic and practical base regarding the significance of taking into account users' expectations when deploying mHealth technologies.

Keywords: mHealth, Community Health Workers, PLS-SEM analysis, User Expectations, Expectation Confirmation Model, Malawi.



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| Title of paper | Covid-19 Vaccination Hesitancy among Malawians: A Scoping Review |
| Sub-theme | Communicable Disease |
| Paper type | Scoping Review |
| Abstract (not more than 350 words) | Purpose: This review's objective was to currently analyze COVID-19 vaccination hesitancy amongst Malawians. Methodology/approach: This scoping review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension for Scoping Reviews. An electronic database search was performed using CINAHL, OVID Medline, PubMed and Google Scholar for studies published between January 1, 2020, and July 10, 2023 on the topic of reluctance towards COVID-19 vaccine in Malawi. This paper included publications that explicitly mentioned COVID-19 vaccine hesitancy in Malawi. |

Findings: A total of seven articles were identified as meeting the inclusion criteria. Some of the eligible Malawian population's poor response to COVID-19 vaccination was due to hesitancy. Misinformation is primarily to blame for COVID-19 vaccine reluctance. COVID-19 Vaccines are viewed as dangerous or intended to cause harm such as the myth that the COVID-19 vaccine would cause infertility, severe disability and even death. The review revealed that some people choose not to receive vaccines due to religious convictions and beliefs. Some individuals also think that getting the COVID-19 vaccine could result in receiving a triple-six (666) mark from the devil. There were also reports that the COVID-19 vaccination is being considered experimental and ineffective

Discussion: The best chance of eradicating the COVID-19 pandemic lies in a successful vaccination campaign against the virus. There is still hesitancy among some of the Malawians over the use of COVID-19 vaccines that are readily available.

Recommendations: The Malawi government should focus on fear and misinformation regarding COVID-19 vaccination campaigns, using interventions, motivational interviews and individual sensitization. Traditional, religious and youth-led organizations should provide practical information on COVID-19 vaccine safety and efficacy.

Conclusion: Vaccine hesitancy is a growing problem that affects vaccine uptake. Vaccine hesitancy could derail global efforts to end the COVID-19 pandemic. Therefore, it is vital that the Malawi government and other stakeholders should understand why people are uncertain about receiving the COVID-19 vaccine.

Originality/value of contribution: This paper is one of the few studies on COVID-19 vaccination reluctance in Malawi. The findings may be applicable to other settings in developing countries.

Keywords: COVID-19, COVID-19 Vaccine Hesitancy, Scoping Review, Malawi



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| Affiliation(s) | Mzuzu University |
| Title of paper | Practices on Dispensing non-prescribed Antibiotics in Pharmacies and Drugstores located in Mzuzu city |
| Sub-theme | Healthcare access, delivery and outcomes |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: To assess the practices of pharmacy and drugstore personnel on dispensing antibiotics without prescription in Mzuzu city.</p> <p>Methodology/approach: This was a cross-sectional study which used non-probability convenience sampling technique. Mzuzu city was the site under study. All 9 registered pharmacies in Mzuzu and 13 drugstores out of 43, accredited by PMRA were assessed. Simulated clients deliberately purchased antibiotics from both pharmacies and drugstores in order to assess whether antibiotics were sold without a medical prescription, a practice which is prohibited by PMRA. A questionnaire-based interview was also conducted exclusively with pharmacy staff only since PMRA policy prohibits the stocking and selling of antibiotics in drugstores.</p> |

Findings: Antibiotics are mostly sold without prescription in most pharmacies and drugstores in Mzuzu city.

Discussion: Antibiotics could easily be purchased in Mzuzu city without a proper medical prescription. Antibiotics were sold for diseases which were self-limiting as well as those with a viral underlying cause. Half doses of antibiotics were also sold. Factors contributing to this practice included poor patient-provider communication, job security concerns among pharmacists, financial motivation and misconceptions about antibiotics among buyers.

Recommendations: Educational programmes on the negative impacts of antibiotic misuse on individuals, the nation and globally should be implemented by authorities to clear the misconceptions that people have on antibiotic use.

Conclusion: The malpractice was highly common in the drug outlets of Mzuzu city with different factors linked to it despite qualifications of these drug outlets and PMRA regulations on selling of antibiotics.

Originality/value of contribution: This study provides evidence-based recommendations for policy and regulatory actions to improve poor antibiotic dispensing practices, reduce morbidity and prevent mortality from infectious diseases. It also suggests avenues for further investigation into law enforcement regarding inappropriate antibiotic use and community knowledge and attitudes towards antibiotics.

Keywords: Antibiotics, Antimicrobial resistance, Medical prescription



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| Title of paper | Clinical teachers' experiences towards provision of feedback to nursing and midwifery students during clinical teaching |
| Sub-theme | Health Sciences |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: Provision of constructive feedback to nursing and midwifery students is an essential pedagogical tool during clinical teaching. Despite this, not much has been documented on experiences of clinical teachers as they engage in the feedback process during clinical teaching. This study explored the experiences of clinical teachers towards provision of feedback to nursing and midwifery students during clinical teaching in selected nursing training institutions in Northern Malawi.</p> <p>Methodology/approach: The study used a qualitative approach utilizing a phenomenological design. Twenty clinical teachers were conveniently</p> |

sampled from nursing training institutions and teaching hospitals in Mzimba North. Data was collected using in-depth interviews and was analyzed manually using thematic analysis.

Findings: Three main themes emerged namely feedback improves performance, giving feedback is challenging and perceived solutions to challenges.

Discussion: Feedback giving should be seen as an ongoing process of continuous improvement which requires commitment from both students and teachers as well as training institutions and teaching hospitals.

Recommendations: There is need to orient clinical teachers to the process of feedback prior to taking up responsibilities of clinical teaching as well as conducting on job training periodically. Additionally, allocation of necessary resources and support to facilitate feedback activities is important.

Implementing these recommendations can improve excellence in clinical teaching thereby contributing to the overall quality of healthcare delivery and patient outcomes.

Conclusion: The study underscores the pivotal role of feedback in enhancing performance within clinical education settings. It identifies challenges faced by clinical teachers and proposed solutions.

Originality/value of contribution: The study contributes new insights on feedback in clinical education. Identifying and addressing challenges faced by clinical teachers as well as shedding light on critical barriers to effective feedback practices. The proposed solutions offer practical strategies for improving feedback practices in clinical education.

Keywords: Feedback experience; Feedback challenges; Clinical teachers' feedback experiences; Feedback in clinical teaching.



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ABSTRACT SUBMISSION

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| Names of author(s) and email addresses | Mike Khunga, MPH mikekhunga@gmail.com ; Dr Francis Poitier Francis.Poitier@leeds.ca.uk |
| Affiliation(s) | University of Leeds, Leeds, UK |
| Title of paper | Evaluation of the implementation of community-based management of acute malnutrition (cmam) in Malawi |
| Sub-theme | iv. Health Sciences (maternal and child health) |
| Paper type | Research Paper. |
| Abstract (not more than 350 words) | <p>Purpose: The goal of this study was to review the implementation and effectiveness of the CMAM programme in Malawi</p> <p>Methodology/approach: This was a retrospective study which involved desk review/secondary data collection on CMAM governance, financing, community engagement and information. Published English materials was collected from Medline, PubMed, and Global Health supported by google scholar using key words from the title. Grey literature was obtained from the Ministry of Health-Malawi, UNICEF, WFP and NGOs implementing CMAM. For analysis, the study adapted the Integrated Community Case Management of Child Illness framework.</p> |

Findings: Malawi has strong governance mechanism to coordinate CMAM alongside local production of RUTF which effectively lower costs. However, implementation is challenged by inconsistency and insufficient funding, inadequate trained and motivated healthcare workers and limited data collection and monitoring. Overdependence on external support hampers scalability and sustainability while inadequate trained health staff leads to poor data collection and monitoring. Consequently, these challenges lead to suboptimal treatment of SAM and MAM cases, increased default rates and preventable mortality.

Discussion: In terms of governance there is a solid CMAM coordination structure at the national level however, weak inter-departmental convergence between DNHA and MoH at the subnational level leads to poor oversight and control of CMAM activities. Financing for CMAM in Malawi has consistently remained below 5% over years with donor shouldering 95%. These limited resources fail to meet the demand particularly procurement of RUTF and training of healthcare workers. CMAM relies heavily on untrained and poor incentive volunteers to carry on testing, admission, and referral. Volunteers are also not supplied with enough materials to timely collect and report data which delays critical decision making. Despite efforts to initiate local production of RUTF challenges such as aflatoxins in local ingredients and high costs for conducting external quality tests hinder its success.

Recommendations: The recommendation are to integrate CMAM into other health and nutrition interventions, use technology to collect and report CMAM data, increasing domestic finance and incentivizing local producers of RUTF.

Conclusion: This paper highlights areas of improvement in CMAM programming in Malawi.

Originality/value of contribution: This is an original research paper that provides valuable Malawi specific information for CMAM programmers and advocates.

Keywords: Malnutrition, nutrition, child, infant, mothers, Ready to Use Therapeutic Food (RUTF), Malawi Bureau of Standard (MBS)



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| Name of author and email address | Author: Stewart Soko E-mail address: Mafenistew@gmail.com |
| Affiliation(s). | Mzuzu University. |
| Title of paper. | Analysis of mutations within RNA polymerase β gene of <i>mycobacterium tuberculosis</i> in Blantyre. |
| Sub-theme. | Mutation distribution |
| Paper type. | Research paper. |
| Abstract | <p>Purpose: Tuberculosis is a chronic pulmonary infection that continues to wreak havoc among the worldwide population. The causative agent <i>Mycobacterium tuberculosis</i> has developed more resilient strains which have become resistant to treatment, all owing to mutations in different genes whose products are targeted by the therapies. Some of these mutations are occurring within the RNA polymerase beta gene, and more specifically in the rifampicin resistance determining region. The goal of this study was to determine areas within this region where mutations occur frequently that leads to the development of resistant phenotypes.</p> <p>Methodology: A cross-sectional study was conducted to collect data in relation to cases that reported resistance to rifampicin from five health facilities namely; Queen Elizabeth Central Hospital, DREAM Blantyre clinic,</p> |

Zingwangwa, Limbe and Ndirande health centers. A total of 171 cases were identified and analyzed for mutation distribution.

Findings: It was found that predominant mutations affected probe E site with 76.02%. The percentage of mutations affecting other regions were: Probe D (14.04%), Probe B (6.43%) and Probe A (2.33%). There were no observed mutations in probe C site. There were 2 mixed mutations with one affecting probes D and E and the other affected probes B and E sites.

Conclusion: Since the majority of mutations were found in probe E site at 76.02%, the study established that most of the rifampicin resistant cases being experienced in Blantyre possessed mutations in the same codon stretch (529 to 533) of the RNA polymerase gene.

Recommendations: The study recommends an emphasis on data backup among facilities, and implementation of effective awareness programs for the masses on adoption of healthcare seeking behavior (HSB). Furthermore, similar studies should be done in other areas around Malawi, which should incorporate sequencing technology to learn more about the codons and the amino acids they encode.

Originality/value of contribution: The study has provided baseline information on the distribution of mutations in RNA polymerase β gene of *mycobacterium tuberculosis*, being the first of its kind in Malawi. This can be used as basis for further studies in other areas as well including the use of sequencing technique for analysis.

Keywords: Gene, Mutation, RNA polymerase, Probe, Sequencing



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| Names of author(s) and email addresses | Lawrence Kachule ¹ , lawrencekachule@gmail.com Felix Nyakwawa ² , felixmn8@gmail.com |
| Affiliation(s) | Kamuzu University of Health Sciences- College of Medicine ¹ Family Health International 360 Malawi ² |
| Title of paper | Promotors of treatment failure after intensive phase of first-line anti-tuberculosis treatment among new pulmonary tuberculosis patients in Lilongwe. |
| Sub-theme | iv. Health Sciences- Communicable and non-communicable diseases |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | Purpose: To determine factors influencing treatment failure among newly bacteriologically confirmed pulmonary tuberculosis (TB) patients after two months of intensive phase of first-line anti-TB chemotherapy in Lilongwe urban. Methodology/approach: Retrospective cohort study, using retrospective data, was conducted at Bwaila Martin-Preuss urban TB/HIV clinic in Lilongwe in April 2021. Study enrolled, through simple random sampling, a total of 172 newly bacteriologically confirmed pulmonary TB patients, diagnosed either through direct smear microscopy or molecular Xpert MTB/RIF [®] assay of treatment cohorts between 2016 and 2017 and aimed at assessing an association |

among delay in treatment initiation and mycobacterial densities at initial diagnosis with treatment failure after two months of intensive phase of TB treatment. Variables were collected from GeneXpert® database and facility TB registers and entered into Epi infor. version 7.2.2.6 database. Chi-square test of independence, risk ratio and odds ratio data analysis were done in STATA version 14 software to ascertain existence of an association between dependent and independent variables, with level of significance set at <0.05, odds ratio (OR) >1, risk ratio (RR) >1, 95% confidence interval (CI).

Findings: Significant RR of 6.1, p-value <0.0001, 95% CI: [3.6-9.1] and OR of 24, p-value <0.0001, 95% CI: [7.13-77.88] of developing TB treatment failure among patient with delayed TB treatment initiation as compared to their counterparts with non-delayed TB treatment initiation after bacteriological confirmation. However, pre-treatment mycobacterial load did not demonstrate statistically significant outputs, RR of 0.49, p-value=0.32, 95%-CI: [0.11-2.00] and OR=0.45, p-value=0.31, 95%-CI: [0.09-2.08].

Discussion: The study significantly revealed that delays in initiating patients on first-line anti-TB treatment orchestrates the development of TB treatment failure. The findings are consistent with studies done in Ethiopia. Patient's initial mycobacterial densities did not demonstrate significant association with treatment failure.

Recommendations: Authorities to seal patient and health care system level gaps that contributes to delays in initiating bacteriologically confirmed pulmonary TB patients on first-line anti-TB treatment.

Conclusion: Robust care and treatment strategies for TB are key in reducing incidences of drug resistant TB.

Originality/value of contribution: Outcome to influence change in national guidelines for TB case management.

Keywords: sputum, bacteriological confirmation, pulmonary tuberculosis, treatment failure, drug resistance

TOURISM, HOSPITALITY AND MANAGEMENT

Papers to be presented under the sub-thematic area of Tourism, Hospitality and Management fall under the following areas:

- Sustainable tourism
- Tourism planning and development
- Cultural heritage tourism
- Transport and aviation
- Service quality and management in the hospitality industry
- Entrepreneurship
- Sports management



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| Affiliation(s) | ^{1,2,3} Mzuzu University, P/Bag 201, Luwina, Mzuzu 2, Malawi |
| Title of paper | Do public microcredit schemes enhance small-scale enterprise development? Perspectives of selected borrowers in Lilongwe, Malawi |
| Sub-theme | Entrepreneurship |
| Paper type | Research paper |
| Abstract (not more than 350 words) | <p>Purpose: Since 1980s, public microcredit schemes became a popular policy instrument for supporting growth of small-scale enterprises and microentrepreneurship in developing countries, including Malawi. Prior studies that assessed performance of these schemes were skewed towards serving institutionalists' interests at the expense of understanding welfare impact on borrowers. This paper assessed whether public microcredit schemes enhance beneficiaries' small-scale enterprise development.</p> <p>Methodology/approach: The study was qualitative and used a welfarist approach. Individual Q-sorting, followed by in-depth interviews, were conducted with 21 beneficiaries of National Economic Empowerment Fund</p> |

loans drawn from Nsaru, Kabudula, Mpingu, Nathenje, Nkhoma and Kawale sites. Q methodology was used to collect data and generate key themes.

Findings: Findings revealed that hidden costs, smaller loan sizes, absence of grace period, diversion of loan proceeds towards spending on household necessities and physical collateral requirements negate envisaged enterprise development claims of microcredit. The foregoing elements were found to be unfavourable to profitability goals of borrowers' enterprises.

Discussion: These findings showed consistency with other qualitative studies that focussed on assessing welfare objectives of microcredit in South Africa, Cambodia and India, but were inconsistent with quantitative studies that focussed on sustainability factors.

Recommendations: The paper calls for practical policy action directed at addressing these bottlenecks that alienate the very people who require financial inclusion or redesigning small-scale enterprise development financing framework.

Conclusion: Findings suggest potential failure of public microcredit to achieve the broader enterprise development objective, contrary to claims by microcredit proponents because access barriers that exist in conventional financial institutions were also prevalent in current microcredit schemes.

Originality/value of contribution: The study exposed new insights to challenge dominance of the institutionalist approach that pays skewed attention on quantitative metrics as the basis for determining success of public microcredit services. Instead, it advances the centrality of attending to anti-welfare issues that characterise administration of public microcredit services.

Keywords: public microcredit; Q methodology; NEEF; small-scale enterprises.



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| Names of author(s) and email addresses | Stan Gottlieb Kaunda sgkaunda@poly.ac.mw |
| Affiliation(s) | MALAWI UNIVERSITY OF BUSINESS AND APPLIED SCIENCES |
| Title of paper | Organisational legitimacy perception in a bifurcated public setting |
| Sub-theme | Tourism, Hospitality, Management |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | <p>Purpose: Determine the dimensions premising African manager’s perception of organisational legitimacy.</p> <p>Methodology/approach: Generated four meta-organisational categories arising from the categorising constructs of locus of ownership and origin of organisation as premised on the underlying Two-Publics theory. Varied types of organisations (e.g., cooperatives, government agencies, family-owned businesses) were included in the study. Upon likely saturation of responses, six respondents partook in the study from each of the four generated meta categories. Data was generated from the participants through in-depth interviews. Local managers in Malawi, Zambia, Zimbabwe partook in the study. Data was analysed by thematic analyses.</p> |

Findings: three distilled, crystallised dimensions of organisational legitimacy were determined: presence, enforcement of policies, rules, regulations in the HRM arena; presence, activation of organisational vision and core values; domestication of top management.

Recommendations: individual managers should, in their decision making and behaviour, aim to consistently live up to an organisation's touted values, vision. At the organisational level, organisations should take into consideration the effect on organisational legitimacy of deployment of expatriates. At the societal/industry level, it is critical that regulators: ensure HRM policies, rules, regulations are developed and activated by organisations (and not simply deployed as a symbolic element); the 'unnecessary' deployment of expatriates is minimised.

Conclusion: having a checkered legitimacy perception, legal rational organisations operating in Africa have, hence, a relatively higher incidence of malfeasance, malaise. Premised on values, logic emanating from the endemic, embraced endogenous primordial public three overriding dimensions of organisational legitimacy have been determined. Organisations incorporating, operationalising the dimensions will thus increasingly be perceived as legitimate by external and internal stakeholders in the African setting.

Originality/value of contribution: The study is original as it determines perception of organisational legitimacy amongst internal stakeholders/constituents of an organisation in contrast to extant literature that principally focuses on an organisation's external constituents (e.g., regulators, customers, the media, the judicial system). Additionally, the study is original as it is contextualised in a dyadic public setting- in contrast to the unitary public setting prevalent in the West- manifested by managers whose existential reality is reified by concurrently living in the opposing, contrasting settings of the formal, explicit legal rational organisation and the informal, implicit wider primordial public.

Keywords: Legitimacy; Organisational Categorisation; Top Management Team; Two-Publics Theory; Perception; Southern Africa.

OPEN, DISTANCE AND ELEARNING

The sub-thematic area of *Open, Distance and eLearning* captured the followings areas:

- eLearning
- Student support
- Self-learning materials
- Copyright
- Open Educational Resources



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| Affiliation(s) | 1, 2: Department of Information Sciences, Mzuzu University 3: Faculty of Humanities and Social Sciences |
| Title of paper | A literature review on electronic learning in Malawi public universities |
| Sub-theme | Open distance and e-learning |
| Paper type | Review |
| Abstract (not more than 350 words) | Purpose: The aim was to highlight some benefits and challenges of implementing a sustainable e-learning programme in higher education institutions. Methodology/approach: Methods for the review included a qualitative analysis of literature and employed the Bandara et al. (2011) framework and NVIVO 10.0 for windows for data analysis and management and incorporated the Preferred Reporting Items for Systematic Reviews and Meta-Analyses to help define the question, the inclusion and exclusion criteria, and the proposed methods, including a comprehensive search strategy. Sources for the review |

included research articles from databases such as Sage, Emerald, Science Direct and Elsevier.

Findings: The paper unearthed several benefits and challenges of online learning such as greater collaboration; resource sharing and interactivity; and access to quality education across physical borders. The study found that underdeveloped ICTs and power infrastructure are the most common impediments reported by many studies followed by the lack of an e-learning policy and lack of knowledge to use ICTs among students.

Discussion: Despite the few publications and sustainable e-learning research in Malawi, the review has found that technological, individual, financial and managerial challenges, impede the development of best practice standards for e-learning implementation.

Recommendations: The review has suggested recommendations of a sustainable e-learning programme to provide quality learning through technology. The paper provides further ideas for developing and implementing a sustainable e-learning program to provide quality learning through technology.

Conclusion: Electronic learning (e-learning) has become inevitable for higher education institutions during the Corona Virus pandemic. Implementing an e-learning system not only delivers higher education to a large population and reduces its high demand but also engages students and faculty staff irrespective of distance amidst difficult times. However, e-learning in HEIs in Malawi is not fully practiced, since, there are a lot of impediments.

Originality/value of contribution: The study unearths the challenges to e-learning in Malawi universities and provides a starting point on how universities can deal with the challenges. The study informs university administrators on the benefits of e-learning to increase access to higher education.

Keywords: E-learning; Distance education; Developing countries; Higher education institutions; Malawi



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| Affiliation(s) | 1. Malawi University of Business and Applied Sciences, Malawi 2. University of KwaZulu-Natal, South Africa |
| Title of paper | Student Support in Distance Education and Study Circle Innovation in Malawi: A Case Study |
| Sub-theme | Open, Distance and eLearning |
| Paper type | Case Study: Research paper |
| Purpose | The purpose of this paper is to disseminate knowledge for novice and struggling distance education institutions to tap on and learn from for an improved ODeL provision. |
| Methodology/approach | This paper stems from a larger project that explored the learning implications of distance secondary school teacher training in Malawi. Drawing on the conversation learning theory and phenomenology, the study focused on enactment of distance teacher training in relation to |

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| | three inseparable concepts of teaching, learning and student support as offered by Mzuzu University and Domasi College of Education then sole public providers. The study followed an interpretive qualitative design based on a case study strategy whose data were collected through semi-structured in-depth interviews with 2 administrators, 2 instructors, 5 distance student-teachers and document analysis. |
| Findings | The study uncovered a nascent innovative and effective student support strategy, study circle which appears to be a booster to students' satisfaction and retention. Further, the study revealed twofold results with one institution presenting good learning support practices while the other displaying inadequacy. |
| Discussion | Inadequacy revealed in the study mostly related to overwhelmed lecturers', professionalism, and pedagogical and andragogy skills while also touching on off-campus support. These points to lack of lucid student support services in one institution and diversity amongst higher education institutions in distance education enactment in Malawi. |
| Recommendations: | Based on the findings, recommendations are made to improve on learning support in the country's provision of student support. |
| Conclusion: | Student support is largely neglected despite being the heart of distance education. |
| Originality/value of contribution | The paper makes a continuous contribution to student support in Malawi and beyond based on research findings of a larger project that was done in Malawi few years back by Annie Tamara Chizengo-Thawani, supervised by Dr. Lester Brian Shawa (PhD). The paper has not been published anywhere by anyone. |
| Key words | Student support services, distance education, study Circles, Malawi. |



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| Names of author(s) and email addresses | Muyco Mhango <i>Email: mhangomuyco@gmail.com</i> |
| Affiliation(s) | MEd Student, Mzuzu University, Mzuzu, Malawi |
| Title of paper | Educators’ Digital Competences for Effective Use of eLearning Management System at Mzuzu University: From Technological Pedagogical Content Knowledge (TPACK) Theoretical Perspective |
| Sub-theme | Open, Distance and eLearning |
| Paper type | Research Paper |
| Abstract (not more than 350 words) | Purpose: As universities across the globe continue to deploy eLearning for teaching and learning, educators are required to possess digital competencies to enhance its successful adoption and implementation. Recently, Mzuzu University has implemented Moodle, as an eLearning Management System to respond to the Covid-19 pandemic. However, there is a paucity of literature that has been undertaken to understand the digital competencies of educators in delivering teaching via eLearning management systems at the University. Thus, the purpose of this study is to understand the digital competencies among educators using the eLearning management system at Mzuzu University. |

Methodology: Using the Technological Pedagogical Content Knowledge Framework (TPACK) as the theoretical lens, the study determined the level of technological, technological content, and technological pedagogical knowledge possessed by educators that were using the eLearning management system at Mzuzu University. The study adopted pragmatism as a research philosophical underpinning, employing a cross-sectional survey design. First data were gathered through the use of a survey questionnaire, distributed randomly to 50 educators that had access to eLearning system. Second, interview schedule was conducted with sampled instructors, ICT technicians and Center managers of Open and Distance eLearning. Quantitative data collected were analyzed descriptively using IBM SPSS, while qualitative data were manually analyzed thematically based on the objectives of the study.

Findings: The study found that the majority of instructors possess fair technological competences. They also had low level techno-content knowledge and basic techno-pedagogical skills which adversely affected their effective use of teaching via the eLearning management system.

Discussion: These findings demonstrate that improving the technological competencies of educators may enhance the effective use of eLearning management systems, thereby contributing to policy practice.

Conclusion: The study conclude that majority of instructors have limited digital competences which is affecting them to effectively use the eLearning Management system.

Recommendations: It is recommended that training programs should focus on areas of troubleshooting software-related issues, use of interactive visuals, multimedia editing software and course authoring tools among others.

Originality: The use of TPACK model in this study has also unpacked the theoretical explanation of the eLearning phenomenon in a developing country context like Malawi.

Key words: eLearning management systems, Information and Computer Technologies, digital pedagogy, digital competences, e-competences.

EDUCATION

The thematic area of Education will host papers under the following thematic areas:

- Education and Development
- Education, Society and Culture
- Critical Thinking and Reasoning Education
- Science, Technology, Engineering and Mathematics (STEM) Education
- Language Education
- Inclusive and/or Special Needs Education



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| Names of author(s) and email addresses | Nellie Mbanu |
| Affiliation(s) | University of Malawi |
| Title of paper | The use of science Textbooks in secondary schools in Malawi |
| Sub-theme | Education: STEM |
| Paper type | Conceptual paper |
| Abstract (not more than 350 words) | <p>Purpose: Textbooks are accepted as a useful instructional material, as they provide information and activities for learners. Most studies in the developing world focus on availability, accessibility and quality, as it is seen that making textbooks available has a significant impact on student achievement. In Malawi recently, science textbooks have been distributed to secondary schools, and the question is how are they being used by teachers and learners, in the classroom and outside. This study will examine the theory and practice of textbook use in general and suggest areas of study.</p> <p>Methodology/approach: It is, thus, proposed to study textbook use in schools by examining the teachers’ choice of textbook, the purposes for their use, the practice in the classroom and learners’ perceptions of the textbooks. A case</p> |

study approach will be used and will compare CDSS and Conventional schools. The study will use mixed methods of testing for readability and reading ability, frequency of use and ethnographic study, involving observations and interviews of use in the classroom.

Findings: N/A as not a research report

Discussion: One of the contentious issues on the use of textbooks is the apparent conflict with socio-constructivism which science education advocates. Textbooks seem to be limited as they transmit knowledge without considering learner's prior knowledge and reading is an individual activity. The question then is how can textbooks be used so that they adopt a socio-cultural perspective? In addition, science textbooks are difficult. It has been suggested that to overcome, this learner should use the textbooks as scientist do: to get background information to their problem, examine data, compare their findings with literature. Furthermore, it is important to help learners develop metacognitive skills to check their understanding.

On how teachers use the textbooks, studies have identified three hierarchical approaches: adhering, elaborating, and creating. Adhering refers to accepting textbooks as the authority; Elaborating refers to considering textbooks as a guide and Creating refers to using textbooks from a critical perspective accepting the limitations of the book and perceiving the potential to support them in designing what and how to teach.

Recommendations: Explore how teachers use textbooks to teach science in Malawi

Conclusion:

Originality/value of contribution:

A proposal to study the use of textbooks in science teaching

Keywords: textbook use, readability, socio constructivism



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| <p>Affiliation(s)</p> | <p>Education Foundations Department, School of Education University of Malawi</p> |
| <p>Title of paper</p> | <p>Enhancing Student Access and Success in Stem-Related Programs in Malawian Higher Education</p> |
| <p>Paper type</p> | <p>Research paper</p> |

Abstract (not more than 350 words)

Purpose: This paper analyses the demographics of students admitted into STEM-related programs, progression rates to the next academic year, and graduation rates in STEM programs at a public Malawian university.

Methodology/approach: Literature review and document analysis

Findings/Discussion: We argue that access to STEM programs in Malawian higher education needs to be more equitable. This will demand enhancing quality teaching and learning particularly in community day secondary schools which host the largest share of secondary school students in Malawi yet are the least represented schools in Malawian higher education. Furthermore, we argue that given the disadvantaged-ness of Community Day Secondary Schools, public universities should be mandated to establish STEM bridging programs to support students with disadvantaged educational and social economic backgrounds.

Originality/value of contribution: The paper offers insights into how equitable access to STEM-related study programs in Malawian higher education is cardinal in the pursuit of achieving the MW2063 that, among others, envisions an industrialized economy that will transform the livelihoods of the majority of Malawians beset by poverty

Keywords: access, success, STEM programs, inclusiveness, industrialization.



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| Affiliation(s) | University of Malawi |
| Title of paper | Teachers' Experiences of Interactive Radio Instruction at Goliati Zone Primary Schools in Thyolo District, Malawi |
| Sub-theme | Open, Distance and eLearning |
| Paper type | Case Study |
| Abstract | <p>Purpose: <i>Tikwere</i> Interactive Radio Instruction (IRI) is one of the Malawi government's efforts to improve teaching and learning conditions in primary schools. Meanwhile, although <i>Tikwere</i> stakeholders have been working cooperatively to ensure that the programme succeeds, the literature suggests that the <i>Tikwere</i> IRI programme is under-utilised. This study explores teachers' experiences of the programme to understand why the programme is under-utilized.</p> <p>Methodology/approach: The study followed an interpretative paradigm employing a qualitative case study design. Data was generated using interviews, classroom observations, and focus group discussions with 25 teachers of Goliati zone primary schools in Thyolo district. The Unified</p> |

Theory of Acceptance and Use of Technology (UTAUT) guided thematic data analysis and discussion of the findings.

Findings and Discussion: Through the lens of the UTAUT, the findings highlight teachers' concerns towards the *Tikwere* IRI programme, including inadequate broadcasting resources, insufficient recorded lessons, poor connectivity to access the programme, and lack of knowledge and skills to integrate IRI.

Recommendations: The study findings provide insights into the need to attend to teacher preparation in the domain of educational technology, including IRI. We also recommend research on other promising educational technologies in Malawi.

Conclusion: The *Tikwere* IRI programme seems to be under-utilized in the Goliati Zone largely because of the teachers' perceptions of the degree of ease associated with integrating the programme into their classroom instruction.

Originality/value of contribution: As educational technology gains prominence in Malawi, the findings reported in this case study advance the potential of UTAUT in explaining factors that can mediate successful implementation of educational technology interventions in the country.

Keywords: Interactive Radio Instruction; UTAUT; Tikwere; Malawi; Educational Technology



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5th – 6th June 2024

Mzuzu University, OdeL Complex, Luwingu Campus.

ABSTRACT SUBMISSION

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|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Names of author(s) and email addresses | Ken Ndala kndala@unima.ac.mw |
| Affiliation(s) | University of Malawi |
| Title of paper | Knowledge and skills for Human Development in Malawi: An Educational Planning Historical Overview: 1966-2022 |
| Paper type | Review |
| Abstract (not more than 350 words) | <p>Purpose: An analysis of the educational plans developed in Malawi since the 1960s is carried out to examine the trends in the development of knowledge and skills for social and economic development. The review emanates from the poor performance of Malawi in the world ranking despite plans being developed and resources being provided to the education sector.</p> <p>Methodology/approach: Educational plans were accessed electronically, and some through hard copies available in the University of Malawi library. The plans and the curricula developed are reviewed to assess their coherence and consistency in pursuing knowledge and skill development. How ‘critical thinking’ and ‘innovations’ in planning have been enhanced over the year is traced. The review is aligned with global educational plans that have guided knowledge and skills development since the 1960s.</p> |

Findings: The review shows that Malawi keeps on embracing global priorities in developing its educational plans, and to a greater extent, the plans tended to lean towards access and equity and less on practical aspect of critical thinking and innovation in knowledge and skills development for social and economic development. However, recently, educational plans have focused on knowledge and skills in line with what Human Development Indicators (HDI) measure.

Discussion: Knowledge and skill is generated in our classrooms but these are not translated into the social and economic development as measured by the HDI. Critical thinking, innovativeness is being advanced but these too are not linked to the challenges the country faces for the development in agriculture, industry and services which are key in measuring development of a country.

Recommendations: The educational plans should therefore be directional on the type of knowledge and skills the country needs in solving the challenges the country faces. Our curricula should not end at critical thinking and innovativeness but should enhance change of behaviour and enhance practices that are key in measuring HDI.

Conclusion: For effective performance of Malawi concerning HDI, this reveals a need for linking up knowledge and skills gained in schools to challenges faced by the country.

Keywords: Knowledge, skills, human development index, education plans



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| Affiliation(s) | Malawi University of Business and Applied Sciences, School of Science and Technology, |
| Title of paper | Towards Business Intelligence Implementation in Secondary Education in Malawi from Management Perspective |
| Sub-theme | Education – STEM Education |
| Paper type | Case Study |

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| <p>Abstract (not more than 350 words)</p> | <p>Purpose: Business Intelligence (BI) is beneficial to education institutions in developing countries, as the literature indicates its increasing use. However, secondary schools, which produce enormous volumes of data needed for decision-making, can also use BI. Higher education institutions like universities are where it is most commonly used. Secondary schools lack effective data integration, sharing, analysis, and visualisation that can be addressed by BI. Therefore, this study sought to investigate how BI can be utilised for effective data management in secondary education in Malawi, keeping in mind its challenges and cost.</p> <p>Methodology/approach: This is a case study using the Shire Highlands Education Division (SHED), in which qualitative interpretive methods were adopted. Data was collected through interviews, observation, an online questionnaire, and artefact examination. The data analysis was done in four key steps: immersion in the data, coding, creating categories, and identification of themes.</p> <p>Findings: SHED performs four key data management processes, namely data collection, storage, analysis, and dissemination, which require computers, the internet, and smartphones. SHED has adequate modern desktop and laptop computers with internet access and Excel for data analysis that provide opportunities for introducing BI. SHED also uses smartphones for collecting data from secondary schools through KoboCollect. However, SHED has inadequate data management and digital skills, ICT support, and a majority of paper-based processes.</p> <p>Discussion: Since data comes from multiple sources and formats, SHED needs an effective data analysis, visualisation, and sharing mechanism such as BI. However, BI is to be institutionalised for easy use, management, and sustainability. Local expertise needs to be built for ICT management and support.</p> <p>Recommendations: For successful and sustainable BI implementation, these are key recommendations: (a) BI to be implemented at SHED since it is where most data analysis is done; (b) using already existing technologies for BI components; and (c) enhancement of local ICT expertise and support.</p> <p>Conclusion: Secondary education divisions in Malawi, such as SHED, generate large volumes of data that require appropriate data management practices with the support of cost-effective ICT systems like BI that need to be institutionalised for sustainability.</p> <p>Originality/value of contribution: The potential of institutionalising BI in secondary education in developing countries.</p> <p>Keywords: Business Intelligence, Data Management, Institutionalisation, Local ICT Expertise, Secondary Education</p> |
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| Names of author(s) and email addresses | Uchizi Khoswe uchizikhoswe@gmail.com |
| Affiliation(s) | Malamulo College of Health Sciences |
| Title of paper | Cultural fears towards the use of e-learning (technology) amongst lecturers and students in medical institutions of higher learning post COVID-19 |
| Sub-theme | Education-Education, society and culture |
| Paper type | Case study approach |
| Abstract (not more than 350 words) | <p>Purpose: This paper aims to examine the perceived cultural fears that are there among students and lecturers in higher learning institutions towards e-learning.</p> <p>Methodology/approach: This study was a qualitative research with a phenomenological approach. Data was collected from 86 students (23 females and 23 males) and 14 lecturers (7 females and 7 males) from Malamulo College of Health Sciences, through focus group discussions and in-depth interviews. The students were sampled from all the programs offered at the institution (clinical medicine, biomedical laboratory science, public health and nursing and midwifery) who’s teaching and learning is being done both in class and online. Random selection on lecturers was done. These were</p> |

lecturers who provide online lessons. Thematic analysis was used to analyse the data in the study.

Findings: The results of data analysis indicated three major challenges; the first being phobia both for lecturers and students in the use of technology. Technology is often associated with advancing secular beliefs on human life. Being a medical institution, the technology used in lesson delivery initiates critical thinking which in the end gives students a feeling that everything is possible and human beings can play the role of God.

Secondly, blended learning is a new concept in teaching and learning. Traditionally, teaching and learning has been face-to-face from time immemorial. Therefore, the provision and delivery of relevant instructions through e-learning platforms is a challenge. As such, both lecturers and students feel that there is more to learning as done through online; as a result, students feel they are under leaning and this might affect their performance in the hospital setting.

Thirdly, lecturers and students expressed some mythical explanations as to how COVID-19 is contracted and it spreads. As a result of this, both lecturers and students question the numerous innovations that have also come with the pandemic.

Discussion: The post COVID-19 era has rapidly changed learning in institutions of higher learning in Malawi. Most institutions of higher learning have resorted into the use of both online and classroom learning (blended). Blended learning approach is believed to be one of the learning models that are considered more effective for learning in this new normal era. However, a literature review of several studies (Swan, 2017; Schmidt, et al 2016; Smith, 2011) show that online learning is not effective in some disciplines such as medicine, mathematics and engineering just to mention a few. Orlando and Attard (2015) stated that “teaching with technology is not a one size fits all approach as it depends on the types of technology in use at the time and also the curriculum content being taught” (p. 119).

Recommendations: The university should provide technical support for the students to be online especially those that have very little experience or no experience in technology.

Conclusion: The study concludes that while online learning can be a viable option in creating flexibility for the learners to take classes anywhere and at any time, but it fails to ensure that students are being equipped with knowledge and skills that are relevant, beneficial and enable them to exhibit best practice in their own future work endeavours.

Originality/value of contribution: At the onset of COVID-19 pandemic, most schools offered teaching and learning through online. Due to the innovations and discoveries in teaching and learning that were made during the lockdown, some schools haven't completely abandoned e-learning. They have rather come up with a new method of teaching and learning known as blended learning; a combination of e-learning and face-to-face interaction. This study will help to unearth how different cultures view some advancement in teaching and learning. Further to that, the study will also find out some cultural fears that have come about due to these advancements which can or have had an influence in the provision of health delivery services in Malawi post COVID-19.

literature.

Keywords:

E-learning, cultural fears, medicine, post COVID-19



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| Names of author(s) and email addresses | Lusungu Gondwe lgondwe@unilia.ac.mw |
| Affiliation(s) | University of Livingstonia, Laws Campus |
| Title of paper | The Efficacy of Using Learner-Centered Approaches in a Malawian Secondary School Inclusive Classroom: Scoping Review |
| Sub-theme | Inclusive Education |
| Paper type | Scoping Review |
| Abstract (not more than 350 words) | <p>Purpose: This research review examined the effectiveness of implementing learner-centred approaches in an inclusive secondary school classroom in Malawi, focusing on understanding the impact on student engagement, academic achievement and socio-emotional development</p> <p>Methodology: A systematic literature search was conducted using PRISMA (preferred Reporting Items for Systematic Reviews and Meta-Analysis) of electronic data on peer reviewed documents from ERIC and Google Scholar in order to identify key themes and findings.</p> <p>Findings: The reviewed data identified that teachers’ use of a variety of learner-centered methods such as cooperative learning, differentiated instruction, and inquiry-based learning positively influence student</p> |

engagement, academic achievement, and socioemotional development in inclusive classrooms in Malawi. However, challenges related to infrastructure, teacher training and cultural norms were found to be barriers to effective implementation of learner centred approaches.

Discussion: The findings revealed that there are a number of benefits of using learner-centered approaches in order to improve learning outcomes and promote inclusion in secondary classrooms in Malawi. These can be enhanced by removing systemic barriers and supporting teachers.

Recommendation/conclusion: Based on the findings of the review, the study recommends that there is need to invest in teacher professional development programs which focus on use of learner-centered approaches in an inclusive setup, improving infrastructure and resource availability to meet different learning needs, and promote a culture of collaboration in schools.

Originality/value of contribution: This review adds to the literature by gathering existing evidence on the effectiveness of learner-centred approaches in inclusive secondary classrooms in Malawi. It provides knowledge to educators, policy makers and researchers interested in promoting inclusive education.

Keywords: learner-centered approaches, inclusive education, scoping review.



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| <p>Affiliation(s)</p> | <p>University of Malawi</p> |
| <p>Title of paper</p> | <p>Sharing the Higher Education Promise Beyond the Few: Taking Stock of Under-represented Categories of Student in Malawi’s Public Universities</p> |
| <p>Sub-theme</p> | <p>Education and Development; Inclusive and/or Special Needs Education</p> |
| <p>Paper type</p> | <p>Conceptual</p> |

Abstract

Purpose: This paper examines access to public universities (PUs) in Malawi, with a special focus on categories of students which are under-represented or present invisible communities in higher education (HE) participation.

Methodology/approach: Theoretically, the paper is framed within Social Reproduction theory which views cultural capital, social capital, economic capital, and institutional practices as key drivers of under-representation of some categories of students in HE. Methodologically, the paper uses secondary data from the fifth integrated household survey (IHS5) and public university selection lists and a synthesis of available literature on HE in Malawi and other HE contexts. Quantitative data is analysed using descriptive and inferential statistical techniques.

Findings/Discussion: Results show that key under-represented categories of students in Malawi's PUs include students from government community day secondary schools (CDSSs), female students, students from low socio-economic status households and students with disabilities. This indicates that the dream for PUs in Malawi remains unattainable for some students. When compared with under-represented categories of students in other higher education contexts, the story of under-representation in PUs in Malawi reflects convergence where some under-represented categories of students are similar to those in other, HE contexts as well as divergence where these categories differ in higher education participation.

Originality/value of contribution: The paper has established that some categories of students are under-represented in Malawi's PUs. This calls for concrete actions by key players such as public universities and the government to ensure that public universities remain within reach of all students. To improve the situation of under-represented students, the paper, among other initiatives, recommends developing targeted outreach and preparatory programmes and reviewing PU admission policies and institutional practices.

Keywords: Higher Education; Access; Under-representation; Secondary Data