



AFRICAN ENGINEERING EDUCATION FORUM (AEEF 2026)

Theme :

Artificial Intelligence (AI) for Engineering Education: Innovation and
Solutions for Resource-Constrained Environments

Thème :

« Intelligence Artificielle pour les Sciences de l'Ingénieur : Innovation et Solutions
pour les Environnements sous Contraintes »

BOOK OF ABSTRACT *LIVRE DES RESUMES*

Faculty of Science,
University of Douala, Cameroon

| Dates: 08th-11th June 2026 |





TABLE OF CONTENTS

PRESENTATION OF AEEF'2026	3
BRIEF OVERVIEW OF THE HOST INSTITUTION	4
THE ORGANIZING COMMITTEE.....	5
General Co-Chairs	5
Scientific Committee	5
Program Committee	5
International Advisory Board	6
Local Organizing Committee	6
ACTIVITIES SCHEDULE	8
KEYNOTES	10
PANELS.....	14
CONTRIBUTIONS	16
POSTERS.....	22



PRESENTATION OF AEEF'2026

Artificial Intelligence (AI) is revolutionizing various sectors globally, including education. In developing countries, educational institutions often face significant challenges such as limited access to quality teaching resources, inadequate infrastructure, and a shortage of skilled educators. The major challenge confronting academics in Africa is to produce with limited resources global engineers that espouse attributes found in the notions of innovation, entrepreneurship and sustainability. AI presents unique opportunities to address these issues. In this context, **African Engineering Education Association (AEEA)** intends to organize, for the sixth edition, a forum under the theme " Artificial Intelligence (AI) for Engineering Education: Innovation and Solutions for Resource-Constrained Environments."

This Forum is to provide a platform for engineering educators, professional organizations and industry leaders from all over the world in general and the African Region in particular to discuss and proffer solutions to common problems in engineering education with emphasis on the application of Artificial Intelligence (AI) in engineering education.

The Forum will critically examine approaches to teaching, learning and curriculum structures that would advance engineering education in resource-constrained environments like African nations. It is anticipated that the Forum will foster exchange of information, links and collaboration between member nations on the one hand and the rest of the world on the other.



BRIEF OVERVIEW OF THE HOST INSTITUTION

The Faculty of Science (FS) at the University of Douala, founded in 1993, is hosting the sixth edition of the African Engineering Education Forum.

Currently headed by Dean Professor Marie-Joseph NIDA-NTAMACK, it trains students in various academic programs. It comprises seven (7) teaching departments offering eight (8) academic programs: Biochemistry (BCH), Animal Biology (BOA), Plant Biology (BOV), Chemistry (CHM), Computer Science (INF), Mathematics (MAT), Physics (PHY), and Earth and Environmental Sciences (STE).

The Faculty of Science also offers professional training programs, including:

- Master's in Information Technology Methods for Business Management (MIAGE);
- Master's in Quality, Safety, and Environment (QSE);
- Master's in Epidemiological Sciences (SEP);
- Master's in Chemical and Pharmaceutical Industry (ICP);
- Master's in Biotechnology, Diet, and Nutrition (BDN);
- Master's in Analysis and Quality Control in Microbiology and Toxicology (ACQMT);
- Bachelor's in Production, Conservation, and Processing of Agricultural Products (AGRI-PRO);
- Bachelor's in Computer Science for Decision Support and Applications (LIDA);
- Bachelor's in Laboratory Techniques (LT);
- Bachelor's in Medical Microbiology (LMIM);
- Professional University Studies Diploma (DEUP) in Computer Engineering and Decision Support (GID);
- Professional University Studies Diploma (DEUP) in Medical Microbiology (MIM).

In addition to academic and professional programs, the Faculty of Science hosts two specialized training centers: the Center for Atomic, Molecular and Quantum Physics (CEPAMOQ) and the Petroleum and Mining Training and Research Center (PETROMINES).



THE ORGANIZING COMMITTEE

Under the patronage of the Rector of the University of Douala: **Prof. Magloire ONDOA**

General Co-Chairs

Prof. Raymond Houe Ngouna, Chairman	Tarbes University of Technology, France
• Prof. Marie-Joseph Nida-Ntamack	Dean FS, University of Douala, Cameroon
• Prof. Justin Moskolaï Ngossaha	FS, University of Douala, Cameroon

Scientific Committee

Prof. Bernard Archimède, Chairman	Vice President in charge of Research, Tarbes University of Technology, France
• Prof. Ruben Mouangue	Director, National Advanced School of Engineering, University of Douala, Cameroon
• Prof. Ado Adamou Abba Ari	Director, Institute of Fine Arts and Innovation, University of Garoua, Cameroon
• Prof. Paul Dayang	Faculty of Science, University of Maroua, Cameroon
• Prof. Jean Louis Fendji	EGCIM, University of Ngaoundere, Cameroon
• Prof. Paulin Melatagia	Faculty of Science, University of Yaounde I, Cameroon
• Prof. Hamidou Halidou	Faculty of Science, University of Yaounde I, Cameroon
• Prof. Apollinaire Batoure Bamana	UIT, University of Ngaoundere, Cameroon
• Prof. Norbert Tsopze	Faculty of Science, University of Yaounde I, Cameroon
• Dr. Ezekiel Dangbe	UIT, University of Ngaoundere, Cameroon

Program Committee

Prof. Franklin Tchakounte, Chairman	University of Ngaoundere, Cameroon
• Prof. Donatien Moulla Koulla	University of Garoua, Cameroon
• Prof. Roger Tagne Wafo	University of Douala, Cameroon
• Dr. Asside Christian Djedouboum	University of Moundou, Chad
• Dr. Maximilien Onana Ndzana	University of Douala, Cameroon



International Advisory Board

Prof. Funso Falade, Chairman	President, African Engineering Education Association (AEEA), University of Lagos, Nigeria
• Engr. Refilwe Buthelezi	President, Federation of African Engineering Organization (FAEO)
• Prof. Adagbonyin Obiaz	President, African Engineering Deans Council (AEDC)
• Prof. Hans Hoyer	Secretary-General, IFEEES, Executive Secretary, GEDC
• Prof. Mohamed Essaaidi	ENSIAS, Mohammed V University, Morocco
• Prof. Driss Ouazar	Academy Hassan II of Science and Technology, Morocco
• Dr. Abdelilah Kadili	President, Tamkine Foundation, Morocco
• Prof. Alfred Ngowi	Vice-President, AEEA – Southern Africa
• Prof. Raymond Houe Ngouna	Vice-President, AEEA – Central Africa
• Prof. Aisa Jadi	Vice-President, AEEA – North Africa
• Prof. Henry Alinaitwe	Vice-President, AEEA – East Africa
• Prof. Efe Ikponmwosa	Secretary-General, AEEA
• Dr. Yashin Brijmohan	Chairman, African Engineering Education Council (AEEC)
• Prof. Wang Sunyu	Director, Institute of Education, Tsinghua University, China
• Dr. Jacqueline El-Sayed	Executive Director, American Society for Engineering Education (ASEE), USA
• Prof. Yacob Astatke	Morgan State University, USA
• Prof. C. A. Bolu	Pan Atlantic University, Lagos, Nigeria
• Engr. Martin Manuhwa	Chair, WFEO Engineering Capacity Building Technical Standing Committee
• Maria Larrondo Petrie	Florida Atlantic University, USA
• Dr. Esther Matemba	Engineering Education Research Network, Tanzania

Local Organizing Committee

Prof. Samuel Bowong, Chairman	Faculty of Science, University of Douala, Cameroon
• Prof. Armand Tsimi	Faculty of Sciences, University of Douala, Cameroon
• Dr. Rodrigue Djeumen	Faculty of Sciences, University of Douala, Cameroon
• Dr. Yannick Malong	National Advanced School of Engineering, University of Douala
• Dr. Bertrand Mbama Engoulou	Faculty of Sciences, University of Douala, Cameroon
• Dr. Myriam Djoukwe Tapi	Faculty of Sciences, University of Douala, Cameroon
• Mr. Yves Jonathan Ndje	Faculty of Sciences, University of Douala, Cameroon
• Mr. Pierre Mobarra	Saint-Jerome Catholic Institute of Engineering, Douala, Cameroon
• Mr. Martial Tekinzang	Saint-Jerome Catholic Institute of Engineering, Douala, Cameroon
• Mr. Kevin Fonkoua Tantang	ESTLC, University of Ebolowa, Cameroon
• Mr. Ali Ynsufu	Faculty of Sciences, University of Douala, Cameroon
• Ms. Léonce Thérèse Pidy Pidy	Faculty of Sciences, University of Douala, Cameroon
• Ms. Erika Leslie Kouamouo	Faculty of Sciences, University of Douala, Cameroon
• Mr. Bernard Maillard Kamga	Faculty of Sciences, University of Douala, Cameroon
• Mr. Adamou Mfopou	Faculty of Sciences, University of Douala, Cameroon
• Mr. Basile Ewane Ndema	Faculty of Sciences, University of Douala, Cameroon



PROGRAM



ACTIVITIES SCHEDULE

Complex of Professionalization

Day 1: June 8, 2026

- 09:00 - 18:00 Welcoming and Seattle-in of Speakers and Attendee

Day 2: June 9, 2026

- 07:00 - 09:00 Registration Desk
- 07:00 - 09:45 Welcome Speech
- 09:45 - 10:00 Arrival of the Rector
- 10:00 - 10:30 Opening Ceremony
- **10:30 - 11:00 Keynote 1** - Teaching AI under Constraint: Rethinking Engineering Education for Frugal, Resilient, and Locally Grounded Innovation – **Prof. Dr. Habil. A. A. Ari Ado**
- 11:00 - 11:30 Group Picture, Interviews, and Networking Session
- **11:30 - 12:00 Keynote 2**: Continental Prosperity in Africa through Engineering Education: Impact of Artificial Intelligence – **Prof. Funso Falade**
- 12:00 - 13:00 **Lunch Break**
- **13:00 - 13:30 Keynote 3**: AI-Driven Innovation for Engineering Education in Resource-Constrained Environments – **Prof. Tsopze Norbert**
- 13:30 - 16:00 Oral Presentations (ID Paper: 1, 2, 3, 4, 5)
- 19:00 - 21:00 **Dinner**

Day 3: June 10, 2026

- 07:00 - 08:45 Welcome of Attendees + Registration Desk
- 08:45 - 09:00 Recap Day 2 & Announcements
- 09:00 – 10:00 **Panel Discussion 1: Research, Artificial Intelligence and the Future of Engineering Education in Africa**
 - **Moderator**: Mr. Ndje Yves
 - Dr. Djeumen Rodrigue
 - Dr. Malong Yannick
 - Mr. Ewane Basile
 - Mr. Fonkoua Kevin



- **10:00 - 10:45 Keynote 4:** Training Journalists in the Age of AI: Between Ethical Challenges and Pedagogical Opportunities – **Prof. Baba Wamé**
- 10:45 - 11:00 **Coffee Break & Networking**
- **11:00 - 11:45 Keynote 5:** Rethinking Teaching and Learning Approaches under the Age of AI Affinity - **Prof. Dayang Paul**
- 11:45 – 12:30 Oral Presentations (ID Paper: 6, 7, 8, 9, 10)
- 12:30 - 13:30 **Lunch Break**
- 13:45 - 15:00 **Panel Discussion 2:** AI and the Future of Engineering Education in Africa
 - **Moderator:** Prof. Tchakounte Franklin
 - Mr. Manga William
 - Dr. Noumsi Vigny
 - Dr. Mfogo Saphir Volviane
 - Prof. Mvondo Meka Manuella
- 15:00 - 15:30 **Coffee Break & Networking**
- 15:30 - 19:00 Douala Maritime Museum Visit

Day 4: June 11, 2026

- 07:00 - 08:45 Welcome of Attendees + Registration Desk
- 08:45 - 09:00 Recap Day 3 & Announcements
- **09:00 - 09:30 Keynote 6:** Responsible and Context-Aware Integration of AI in African Engineering Education – **Prof. Houe Ngouna Raymond**
- 09:30 - 10:30 **Sponsors' Session** (ISDM, Dare To Be Women Tech, Sparte Robotics, Bedara Sarl, Intel Afrique Cameroun, DARHIDI Sarl, Tera Africa, Labo Academy, etc.)
- 10:30 - 11:30 **Panel Discussion 3:** From Research to Impact: Building Africa's Innovation Ecosystem
 - Moderator: Prof. Mvogo Ngono Joseph
 - Prof. Batoure Bamana Apollinaire
 - Dr. Kouam Christian
 - Mr. Kamfo Hyacinthe Duclair
 - Mr. Tchatseu Frank
- 11:30 - 11:45 **Coffee Break & Networking**
- 11:45 - 13:00 **Poster Session**
- 13:00 - 14:00 **Lunch Break**
- 14:00 - 15:00 **Awards & Closing Ceremony**
- 15:00 – 15:30 **Group Picture & Final Interviews**



KEYNOTES



Talk 1 - Continental Prosperity in Africa through Engineering Education: Impact of Artificial Intelligence

Prof. Funso Falade
President, AEEA, Nigeria

Continental prosperity is the vision of an economically integrated, developed, and stable continent. It encompasses a high standard of living, poverty reduction, job creation, improved education and healthcare, and sustainable development for all citizens across the continent. Engineering education is a catalyst for change. It promotes national and regional prosperity by developing skills to create innovative products and processes, drive economic growth, solve societal challenges in sustainable ways, and foster technological advancement. The continent of Africa can achieve immense prosperity through engineering education if member nations, individually and collaboratively, make strategic investments in engineering capacity and infrastructure, which constitute the most direct path to national or continental prosperity. Artificial intelligence (AI) plays a crucial role in driving continental prosperity through engineering education in different ways. These include enhancing education systems, shaping the future workforce, and stimulating innovation. AI can also contribute significantly to economic growth, technological advancement, and overall societal well-being.



Talk 2 - Teaching AI Under Constraint: Rethinking Engineering Education for Frugal, Resilient, and Locally Grounded Innovation

Prof. Ado Adamou Abba Ari
Director of the Institute of Fine Arts and Innovation, University of Garoua, Cameroon

As artificial intelligence becomes central to engineering practice, its teaching remains largely shaped by assumptions of abundant resources, high-performance computing, large datasets, and persistent connectivity. However, in many parts of Africa and other resource-constrained regions, engineers must design systems under radically different conditions.

This keynote argues for a paradigm shift in engineering education: from resource-intensive AI training to constraint-driven, frugal, and context-aware learning models. It introduces the concept of “frugal AI education”, where students learn to design intelligent systems using low-cost hardware, limited data, and energy-efficient computation.

The talk explores how emerging approaches such as embedded AI, edge computing, and distributed systems can be integrated into engineering curricula through project-based learning, open hardware platforms, and community-driven innovation labs. It also highlights the importance of aligning pedagogy with local challenges, particularly in agriculture, environment, and infrastructure. Beyond technical skills, the keynote emphasises the need to cultivate engineers capable of co-designing with communities, maintaining systems locally, and innovating under constraint. It ultimately proposes a vision for engineering education that is inclusive, resilient, and rooted in local ecosystems, preparing a new generation of engineers to build sustainable AI solutions where they are needed most.



Talk 3: AI-Driven Innovation for Engineering Education in Resource-Constrained Environments

Prof. Tsopze Norbert

University of Yaounde I, Cameroon

Resource-constrained environments like ours is characterized by limited laboratory infrastructure, unreliable internet access, low ratio ratio of teachers to learners, low parents literacy and restricted access to updated learning materials; and faces systemic barriers to producing and transferring knowledge. This talk examines the transformative potential of Artificial Intelligence in reshaping pedagogical practices and operational models across resource-constrained educational settings. Firstly, it will focus on the key challenges that AI models face, including data poverty, algorithmic bias in low-resource contexts, lack of infrastructure, lack of teacher preparedness, financial constraints, language barriers. Secondly, whilst taking into account the realities of the local context, the talk explores how some AI frameworks can help to mitigate these challenges. This include frugal AI for resource reduction, adaptive tutoring systems for personalizing learning pathways, generative AI for simulation, AI-assisted assessment and feedback for reducing faculty workload, At the end, it presents a few ideas demonstrating how AI can facilitate the democratization of education, shifting the focus from passive content absorption to active, iterative and ethical design-based learning., shifting from the exclusive education to inclusive



Talk 4 - Training Journalists in the Age of AI: Between Ethical Challenges and Pedagogical Opportunities

Prof. Baba Wame

University of Yaounde II, Cameroon

Artificial intelligence is reshaping journalistic practices, from automated content and fact-checking to data analysis. How, then, should journalism education evolve to prepare students for newsrooms that are increasingly augmented by AI? This contribution explores three pedagogical axes. First, AI as a learning tool: we will show how students can use text generators and verification assistants to gain efficiency while developing a critical eye toward their biases and limitations. Second, AI as an object of investigation: training future journalists to decode the algorithms behind news recommendations, deepfakes, and content personalization, thereby strengthening their digital literacy. Third, AI as a pedagogical simulator: chatbots can act as sources, opponents, or audiences, enabling realistic role-playing scenarios and individualized feedback. Ethical questions will also be addressed: how far can AI assist without replacing human judgment? How can dependency be avoided while preserving the ethics of verification? Feedback from a master's program in journalism will illustrate both benefits (time saved on repetitive tasks, access to large datasets) and necessary precautions (transparency, supervision, source diversity). We therefore reject the two symmetrical pitfalls: blind enthusiasm and sterile distrust. The ambition is not to mold technicians of AI, but to cultivate journalists capable of engaging with these tools while preserving their professional sovereignty intact. The question, then, is not technical: it is ethical and reflexive. To collaborate, yes, but without relinquishing agency.



Talk 5 - Rethinking Teaching and Learning Approaches under the Area of AI affinity***Prof. Dayang Paul*****University of Maroua, Cameroon**

Writing reports, preparing teaching materials, checking treatment protocol for a disease, farming some specific crops, looking for a husband or wife etc., all these activities are given to AI. For all these activities, we hope and trust AI to deliver a quick and best reply. There is a need for frugal, responsible and resilient use of AI tools. Nowadays, the tendency is that people are more willing to trust AI tools than interacting with humans. Defining a framework and training teachers and learners are therefore necessary and important. Our contribution entitled “Rethinking teaching and learning approaches under the area of AI affinity” will address the baseline for a responsible use of AI tools in education. There is an urgent need to empower and train teachers and learners by making them more responsible and creative in the area of AI.



Talk 6 - Responsible and Context-Aware Integration of AI in African Engineering Education***Prof. Houe Ngouna Raymond*****Tarbes University of Technology, France**

Artificial Intelligence is reshaping engineering education globally. Yet, its integration in African contexts must be approached responsibly, contextually, and sovereignly. AI systems learn from documented and digitized histories; when local knowledge remains orally transmitted or underrepresented in global datasets, risks of epistemic invisibility and bias amplification emerge. At the same time, infrastructural constraints, economic dependency, and governance gaps shape the feasibility and direction of AI adoption. This keynote demystifies the technical foundations of AI, clarifying how data distributions, optimization objectives, and deployment conditions influence model behavior. It examines structural constraints specific to resource-limited environments and analyzes systemic risks operating at algorithmic, cognitive, institutional, and epistemic levels. Particular attention is given to the role of Digital Humanities in documenting and structuring locally grounded engineering knowledge, thereby expanding the representational foundations upon which AI systems learn. Rather than advocating uncritical adoption, the keynote argues for a balanced integration strategy that builds upon strong scientific foundations already present in engineering curricula. It further emphasizes that the development of responsible and sovereign AI ecosystems cannot rely solely on technological advances, but requires sustained collaboration between engineering sciences, social sciences, humanities, and policy actors to jointly address issues of governance, inclusion, cultural representation, and societal impact. In this perspective, international and institutional funding initiatives play a critical role by enabling interdisciplinary research, capacity building, infrastructure development, regional cooperation, and the long-term structuring of locally grounded AI innovation ecosystems aligned with African realities and aspirations.



PANELS



Panel 1 - Research, Artificial Intelligence and the Future of Engineering Education in Africa

- Mr Ndje Yves (**Moderator**)
 - Dr. Djeumen Rodrigue, University of Douala
 - Dr. Malong Yannick, University of Douala
 - Mr. Ewane Basile, CENADI - Douala
 - Mr. Fonkoua T. Kevin, University of Ebolowa
-



Panel 2 – Artificial Intelligence and the Future of Engineering Education in Africa

- Prof. Tchakounte Franklin (**Moderator**)
 - Prof. Mvondo Meka Manuella, University of Yaounde I
 - Dr. Noumsi Vigny, University of Douala
 - Dr. Mfogo Saphir Volviane, University of Dschang
 - Mr. Manga William, ISST La Sapience, Yaounde
-



Panel 3 - From Research to Impact: Building Africa's Innovation Ecosystem

- Prof. Mvogo Ngono Joseph (**Moderator**)
 - Prof. Batoure Bamana Apollinaire, University of Ngaoundere
 - Dr. Kouam Christian, ASTA-SUP, Douala
 - Mr. Kamfo Hyacinthe Duclair
 - Mr. Tchatseu Frank
-



CONTRIBUTIONS



Paper 1 - Self-Evolving Engineering Curricula: A Reinforcement Learning Approach to Align Academic Training with Industry Demands in Developing Countries

Kouamouo Ndangang L. E.¹, Moskolai Ngossaha J.¹, and Ayissi Eteme A.²

⁽¹⁾ University of Douala, ⁽²⁾ University of Ngaoundere, Cameroon

Abstract - In developing countries, engineering education faces a structural crisis characterized by a widening gap between academic curricula and labor market needs. Traditional revision processes, hindered by administrative inertia and a lack of real-time data, fail to keep pace with rapid technological shifts. To address this issue, this paper proposes a self-evolving curricular framework based on Reinforcement Learning (RL). The academic program is modeled as a sequential decision-making process that dynamically adjusts pedagogical structures through a multi-criteria reward function integrating employability trends, academic performance, and industrial alignment. The content of this paper corresponds to an initial exploration of self-evolving curriculum systems in engineering education. Simulation results demonstrate a 45% improvement in skills-to market fit and a projected 35% increase in employability. This model establishes a sustainable, data-driven mechanism for modern academic governance.



Paper 2 - Malloum: An SMS-Based Generative AI Tutoring System for Contextualized Learning in Low-Connectivity Environments

Touza Isaac

University of Maroua, Cameroon

Abstract - Limited internet connectivity continues to constrain access to digital learning resources across many low- and middle-income countries, particularly in Sub-Saharan Africa. While generative artificial intelligence has demonstrated strong potential for personalized tutoring, most existing systems assume reliable broadband access and smartphone availability. This paper presents Malloum, an SMS-based generative AI tutoring system designed to deliver contextualized, curriculum-aligned pedagogical support in low-connectivity environments. Malloum enables students to submit academic questions via standard SMS to a dedicated short code. The system integrates a backend orchestration layer with a hierarchical prompt architecture leveraging a state-of-the-art generative language model. A multi-layered prompting strategy combines a system-level pedagogical role definition, contextual curriculum injection aligned with the Cameroonian national syllabus, and user-level query input. An educational database including validated exam banks, reference materials, and structured student profiles enhances response accuracy, personalization, and pedagogical alignment. To address SMS-specific constraints, the platform implements structured micro-explanations, intelligent compression algorithms, automatic message concatenation, and adaptive bilingual output (French/English). An empirical evaluation conducted with 1,000 secondary school students in the Far North Region of Cameroon demonstrates an average improvement of 40% in academic performance using a pre-test/post-test design. Malloum provides a scalable, costaware, and culturally contextualized framework for AI-driven education, offering a practical pathway to narrowing the digital divide in secondary education systems.



Paper 3 - Déterminants d'appropriation des outils numériques mobiles et d'intelligence artificielle dans l'enseignement secondaire

Biboum A. D. and Essono L.

University of Douala, Cameroon

Abstract - The appropriation of mobile digital tools (MDNs) and Artificial Intelligence (AI) in secondary education represents a significant lever for transforming teaching practices and developing professional skills. However, their appropriation by teachers remains limited. This study analyzes the factors influencing the appropriation of mobile digital tools and AI by secondary school teachers in Cameroon. It employs a quantitative methodological approach with 261 teachers, based on structural equations modeling, to examine the relationships between adoption, emotions, and appropriation. The results show that ease of use, compatibility, usefulness, and social influence are dimensions of adoption that significantly influence appropriation. Furthermore, pleasure and relief are the dimensions of emotions that reinforce the appropriation of MDNs. Therefore, emotional and contextual dimensions must be integrated into teacher training and support policies to optimize the appropriation of these tools.



Paper 4 - Adaptive Hypermedia Architecture for Inclusive Digital Learning in Sub-Saharan Africa: An Open Dynamic Learner Model Grounded in the Munich Reference Meta-Model

Manga Ndongkon M., Ebode Atangana P. D., and Nguimeya Tsofack B.

University of Yaounde I, Cameroon

Abstract - Digital learning platforms deployed across Sub-Saharan Africa predominantly rely on monolithic Learning Management System (LMS) architectures structurally incapable of accommodating the cognitive, linguistic, and infrastructural diversity of learners. Empirical evidence drawn from six representative African higher education institutions reveals that the average effective LMS utilisation rate does not exceed 29% of total student enrolment, despite documented institutional deployment. This structural underperformance reflects three persistent architectural deficiencies: static learner profile modelling, dependency on stable broadband connectivity, and exogenous data governance misaligned with local learner realities. To address this tripartite gap, this paper proposes an autonomous adaptive hypermedia architecture grounded in the Munich Reference Meta-Model (MRM), whose central component the Open Dynamic Learner Model (OLM) operates via a Deep Knowledge Tracing (DKT) inference engine in Edge AI mode, ensuring asynchronous personalisation in degraded-connectivity environments. Three falsifiable hypotheses are formulated and evaluated through a simulation protocol on the Open University Learning Analytics Dataset (OULAD). Results in all the modules of the dataset show: (H1) accuracy degradation below 5 pp under 60% connectivity dropout; (H2) a 65.93% MAE reduction in engagement prediction through cluster-based adaptation; and (H3) AUC-ROC = 0.79. For the LSTM-DKT mastery predictor, exceeding the 0.75 threshold. The previous results illustrating a single LSTM-DKT doesn't generalize well accross all the modules. These findings constitute a reproducible quantitative baseline for the proposed architecture. The primary research perspective is the full empirical validation of this approach within Sub-Saharan African university partner institutions, where field experiments will measure real impact on learner retention and educational equity.



Paper 5 - Hybrid SVM and CNN System for Cough Detection and Health 3 Classification

Mouomene Moffo F., Noumsi A. V., Mvogo Ngono, J., and Bowong Tsakou S.

University of Douala, Cameroon

Abstract - This study introduces a hybrid architecture designed to address the challenges of automated cough sound analysis by combining unsupervised detection with supervised classification. The system integrates a one class support vector machine (SVM) to identify and isolate cough events from raw audio streams without requiring labeled data, and a convolutional neural network (CNN) to classify the extracted cough sounds into three clinically relevant categories. The preprocessing pipeline is integral to the system's effective-

ness. The process involves the extraction of Mel-Frequency Cepstral Coefficients (MFCCs) enriched with temporal derivatives, followed by normalization through standardization and dimensionality alignment to guarantee compatibility with the CNN. These steps ensure that the spectral and temporal characteristics of cough sounds are accurately represented while reducing redundancy and enhancing separability in the feature space. Experimental evaluation demonstrates the reliability of this hybrid framework, achieving an accuracy of 93% and a corresponding F1-score of 0.91. These results underscore the system's resilience and capacity for generalization, even when confronted with noisy or heterogeneous data. The incorporation of One-Class SVM for unsupervised detection ensures that cough events are effectively isolated, while the CNN provides precise classification, making the system suitable for real-world applications. Beyond its clinical relevance, this work also holds pedagogical value for engineering education. It illustrates the integration of signal processing, machine learning, and system design in a coherent pipeline, serving as a practical case study for students and researchers. By integrating theoretical concepts with applied methodologies, the system illustrates how hybrid architectures can be utilized to address complex challenges in health monitoring. Overall, the proposed framework offers a reliable foundation for large-scale screening, clinical decision support, and educational purposes.



Paper 6 - Maize Disease Detection Using Deep Learning: A ResNet50 Approach for African Agriculture

Azongo N. A., Mouaji Njikam A. M., Khallilloulah I., and Moussa A.

Hamad Bin Khalifa University, Qatar

Abstract - Maize is vital staple crop for food security and industry supply chains in Sub-Saharan Africa. In Cameroon particularly, the National Institute of Statistics (INS) highlights a critical annual deficit of 600, 000 tonnes leading to the degradation of country's trade balance, a crisis heavily affected by devastating phytopathologies like Maize Lethal Necrosis (MLN) and Maize Streak Virus (MSV). Farm officers are very few and traditional diagnostic methods are too slow and costly, failing to prevent massive yield losses. To handle this economic and agricultural challenge, this work focuses on an automated diagnostic solution designed to preemptive disease, drive farmer awareness, and optimize crop yields through early anticipation. Using the open-source Lacuna Maize Dataset (15,349 field images collected by Nelson Mandela Institute of Technology in Tanzania), we apply a stratified splitting in the data and fine-tune a pretrained ResNet50 model integrated with a class-weighted cross-entropy loss function to ensure high sensitivity across all disease states. The Model achieves a 98% overall classification accuracy on an independent test set (1, 536 images), with per-class F1-score of 0.99 Healthy, 0.97 MLN, and 0.98 MSV. In order to bridge the gap between theory and field utility, the model is deployed into web application with inter-active chatbot, providing users with real-time predictions and actionable support, a pipeline that transforms field data into accessible and early-warnings tool to protect food security and economy.



Paper 7 - Explainable Neuro-Fuzzy Prediction of Fuel Overconsumption for Sustainable Vehicle Maintenance in African Road Transport

Djoukouo Talotsing M., Tjahe A. V., Feudjio Nguetack M. C., and Mtopi Fotso E.

University of Dschang, Cameroon

Abstract - Fuel overconsumption in road vehicles increases operating costs, environmental impacts and maintenance requirements, particularly in resource-constrained transport systems. This study proposes an explainable ANFIS-PSO framework for predicting vehicle fuel consumption from real-world engine and contextual data collected in Douala, Cameroon, through an embedded OBD-II acquisition system. The prediction task uses the four previous measurement instants to estimate fuel consumption at the next instant. The proposed model was compared with standard ANFIS, Random Forest, XGBoost and a multilayer perceptron neural network. According to the comparative evaluation, ANFIS-PSO achieved the best overall predictive performance, with an R^2 of 0.97146, highlighting the relevance of PSO based optimization for neuro-fuzzy fuel consumption modelling. Beyond prediction accuracy, the framework combines interpretable fuzzy rules with SHAP-based feature analysis to identify operating conditions contributing to high predicted consumption. This dual explanation strategy can assist maintenance engineers in prioritizing inspections and support more sustainable vehicle operation in African urban transport contexts.



Paper 8 - Continental Prosperity in Africa through Engineering Education: Impact of Artificial Intelligence

Funso Falade

University of Lagos, Nigeria

Abstract - Continental prosperity is the vision of an economically integrated, developed, and stable continent. It encompasses a high standard of living, poverty reduction, job creation, improved education and healthcare, and sustainable development for all citizens across the continent. Engineering education is a catalyst for change. It promotes national and regional prosperity by developing skills to create innovative products and processes, drive economic growth, solve societal challenges in sustainable ways, and foster technological advancement. The continent of Africa can achieve immense prosperity through engineering education if member nations, individually and collaboratively, make strategic investments in engineering capacity and infrastructure, which constitute the most direct path to national or continental prosperity. Artificial intelligence (AI) plays a crucial role in driving continental prosperity through engineering education in different ways. These include enhancing education systems, shaping the future workforce, and stimulating innovation. AI can also contribute significantly to economic growth, technological advancement, and overall societal well-being.



Paper 9 - AI-Enabled Quality Assurance in Outcome-Based Engineering Education: A Functional Equivalence Framework for Digital and Resource-Constrained

Ranthekeg Jones Moloisane, Martin Claude Domfang, Adisa Ademola Bello, Ibukun Samuel Osunbunmi, Benjamin Elochukwu Anyaegbuna, Christian Amaechi Bolu, Tagwa Ahmed Musa, Yashin Brijmohan, Joseph Olufemi Dada and Nnenna Harmony Nwobodo-Nzeribe

Tshwane University of Technology, South Africa

Abstract - The rapid digital transformation of higher education has exposed fundamental limitations in traditional quality assurance (QA) systems, particularly within outcome-based education (OBE) frameworks. These systems rely on input-based proxies, such as infrastructure and contact time, that poorly represent digitally mediated learning. This misalignment is especially pronounced in resource-constrained African environments, where institutions must meet global accreditation standards despite infrastructural and capacity constraints, while continental and regional policies increasingly promote digital and AI-enabled quality mechanisms. At the same time, African universities are adopting artificial intelligence (AI) and learning analytics for student support and teaching enhancement. They are developing learning analytics policies, yet these data-rich practices remain weakly integrated into formal QA and accreditation processes.



Paper 10 - Agile Aerospace Engineering Education: GenAI to Navigate Resource Constraints

Piwai N. Chikasha and Kemlall Ramdass

University of South Africa, Pretoria, South Africa

Abstract - The traditional paradigm of aerospace engineering education in emerging economies is currently trapped in some sort of "resource mirage", that is, an attempt to replicate heavily funded Western laboratory models, but within fiscally constrained environments. This mismatch typically creates a molecularly static curriculum which ultimately fails to respond to the real industrial needs of the Global South. This study addresses this dependency by proposing a Dual-Stream Agile Framework that shifts pedagogical focus from "molecular-level" course structures to "atomic" isomorphic mapping. By leveraging Generative Artificial Intelligence (GenAI) as a technical catalyst, this study demonstrates how high-rigor aerospace fundamentals can be hosted within the existing national industries. Validation of this framework was achieved through a high-density structural alignment analysis and a modified Delphi study involving aerospace subject matter experts. Results reveal a powerful consensus on both Industrial Relevance ($\mu=4.39/5.0$) and Academic Rigor ($\mu=4.22/5.0$), proving that localized application does not equate to academic dilution. The findings conclude that the integration of GenAI and atomic mapping allows African universities to leapfrog traditional infrastructural barriers and produce sovereign engineers capable of multi-domain problem-solving. This research provides a road-map for a resource-agnostic model of engineering excellence, positioning African aerospace education as a primary driver of national industrialization rather than a peripheral academic superiority, yet unable to contribute to development.



POSTERS



Poster 1 - Resilient Learning Analytics for Student Success Prediction in Developing Countries

Yann Brondon Foka Maghen

University of Douala, Cameroon



Poster 2 - Optimizing Semantic Segmentation Using Lite Attention ASPP U-Net Architecture for the Digitization of Hydraulic Infrastructure

Tchakam Duplex Cedric

University of Douala, Cameroon



Poster 3 - Integration Du Système Tutoriel Intelligent A L'enseignement De L'algorithme Au Secondaire

Patrice Tchana Minji

University of



Poster 4 - Real-Time Maize Disease Diagnosis

Azongo Neilla Audrey

ISSEA, Yaounde, Cameroon



Poster 5 - Self-Evolving Engineering Curricula: A Reinforcement Learning Approach to Align Academic Training with Industry Demands in Developing Countries

Leslie Erika Kouamouo Ndongang

University of Douala, Cameroon
