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Book of Abstracts

3rd Annual International Future Education Conference

Tells 2024 Conference

•• TELLS

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Detailed Conference Programme

Day One: Tuesday 6th August 2024 – Project Internal Day

TIME	ACTIVITY	RESPONSIBLE OFFICE
10:00 – 5:00	TELLS Steering Board Meeting [For Only TELLs Steering Board Members]	Prof. Paul Birevu Muyinda

Day Two: Wednesday 7th August 2024

Opening Ceremony

TIME	ACTIVITY	RESPONSIBLE OFFICE
8:30 – 09:00	Arrival and Registration	Protocol and Organizing Committee
09:00 – 09:10	Anthems (Uganda, East Africa and Makerere University)	Eva Mirembe
09:10 – 09:15	Prayer	Harriet Nabushawo
09:15 – 09:35	Opening Remarks: Project Coordinators	Prof. Paul Birevu Muyinda and Prof. Ghislain Maurice N. Isabwe
09:35 – 09:40	Opening Remarks: Principal, College of Education, University of Rwanda	Prof. Florian Nsanganwimana
09:40 – 09:45	Opening Remarks: Principal, College of Education and External Studies, Makerere University	Prof. Anthony Muwagga Mugagga
09:45 – 09:55	Opening Remarks by Guest of Honor and Official Opening of TELLs Conference: Vice Chancellor	Prof. Barnabas Nawangwe
09:55 – 10:05	Official photo moment	Protocol and Organizing Committee
10:05 – 10:50	Keynote: Generative AI and the Future of Education: An Open University Perspective.	Prof. John Domingue, The Open University of UK
10:50 – 11:20	Coffee/Tea Brek	Protocol and Organizing Committee

Session I: 21st Century Soft Skills for Higher Education and Lifelong Learning Session Chair: Dr. Harriet Nabushawo	
11:15 - 12:15	Using Case Scenarios to Foster Critical Thinking Skills among Graduate Students at Gulu University. Gloria Lamaro, Joseph Kimoga, Dianah Nampijja, Frank Reichert

	Integration of 21st-Century Soft Skills in Trade Subjects for Nigerian Secondary Students and its Impact on Entrepreneurial Aspirations. OYETORO Oyeboode Stephen
	Navigating Lifelong Learning: Clarifying Definitions and Driving Action. David Onen
	“ <i>You do not belong to this course; you are displaced</i> ”. Lived Experiences of Students with Visual Impairment in studying in public universities in Uganda. Dianah Nampijja, Leah N. Sikoyo, Michael Walimbwa, Betty Akullu Ezati
Session 2: Micro Credentials and Micro-degrees Session Chair: Dr. Stella Achen	
12:15 – 12:45	Unlocking the Future of Learning: Micro Credentials and Micro Degrees in Education. Mourine Akasuka
	Micro Credentialing Guidelines for Lifelong Skills Development of Working Adults in Kampala City, Uganda. Katagwa Rogers
Session 3: Technology Enhanced Pedagogical Models Session Chair: Prof. Paul Birevu Muyinda	
12:45 – 13:30	Using Contextualized and Proximity-Rich Videos to enhance Learner Autonomy in Navigating Learning Management Systems. Harriet Mutambo Nabushawo & Richard Kajumbula
	Applicability of Blended Learning Pedagogical Model at Makerere University: Arthur Mugisha
	Technology-Enabled Learning: Is it the “Technology” Or the “Learning” that matters? Moving towards a Balanced E-Learning Approach: Fred Ssemugenyi & Garry Sali
13:30 – 14:30	Lunch Break Protocol and Organizing Committee
Session 4: Technology Enhanced Pedagogical Models Session Chair: Prof. Nicholas Itaaga	
14:30 – 16:00	Digitalization of Education is a Requirement of the time: Murodjon Botirov
	Strategic Utilization of ChatGPT in Teaching and Learning: Nakayiza Hellen Raudha
	Determining eLearning Teacher Support Requirements: A Systematic Literature Review: Mirembe Eva, Rehema Baguma, Ghislain Maurice N. Isabwe, Paul. B. Muyinda
	The Opportunities and Challenges in using ICT in Teaching and Learning in Rwanda: A Review of Literature: Jean Baptiste Mushimiyimana, Wenceslas Nzabalirwa, Alexandra Lazareva, Irene Ndayambaje
	Applicability of ADDIE Model in Analysis of Content Resources for Blended Learning in Universities: Case of Bachelor of Science External at Makerere University. Arthur Mugisha, Betty Akullu Ezati, Alexandra Lazareva, Michael Walimbwa, Godfrey Mayende
	Designing and Implementing an Interactive Technology Enhanced Learning (TEL) Module to Improve Workplace Safety among Custodians at Makerere University. Sunday Seezi, Godfrey Mayende, Dianah Nampijja

Session 5: Digitalization, Digital Inclusion and Gender in Higher Education

Session Chair: Dr. Irénée Ndayambaje	
16:00 – 17:00	Comparative Readiness of the Genders for Participation in Case Study of Relative Access to Technology Programme in Kogi State Universities, Nigeria Femi Daniel
	Employability and the Digital Job Market for Individuals with Disabilities and Special Needs in Uganda: Baluku Louis
	Digitalization, Digital Inclusion, and Gender Equality in Secondary Education in Cameroon: Taku Catherine Arrey-Ngang
	Digital Experiences of Students with Visual Impairment at Makerere University: Opportunities and Challenges Nuwe John Paul

Day Three: Thursday 8th August 2024

TIME	ACTIVITY	
8:30 – 09:00	Arrival and Registration Protocol and Organizing Committee	
Session 6: Technology Enhanced Pedagogical Models Session Chair: Prof. Mathias Mulumba		
9:00 – 10:00	Synergizing Student Engagement in Online Distance Education Programs at Makerere University: A Community of Inquiry Approach Tumwesigye T. Jimmy, Paul B. Muyinda, Anthony M. Muggaga	
	An Ecosystem for Telecommuting in Higher Education Institutions in Uganda: Emily Bagarukayo, Benedict Oyo, Gilbert Maiga, Irene Arinaitwe	
	Investigating Digital Assessment Challenges at the University of Rwanda. Olivier Habimana, Mathias Nduwingoma, Ghislain Maurice Norbert Isabwe, Irene Ndayambaje, Dany Kamuhanda, Leon Ndabomvura, Beatrice Yanzigiye, Jean Claude Byungura	
	Lecturers' Self-Efficacy as a Determinant to the students' Engagement in an Online Learning Environment: A Glance from the University of Rwanda-College of Education, Rwanda: Irénée Ndayambaje, Mathias Nduwingoma, Beatrice Yanzigiye, Olivier Habimana	
Session 7: Policies and Practices on the Use of Artificial Intelligence in Education Session Chair: Prof. Ronald Bisaso		
10:00 – 11:00	Mathematical Techniques Vs Artificial Intelligence - A Correlative Study on AI Engineering Students. Prof. J. Jebaraj	
	Assessment in the face of Artificial Intelligence. Michael Walimbwa	
	Artificial Intelligence Augmenting Man: Principles and Policies Towards a more Interactive, Immersive, Engaging and Personalised Educational Experience. Paul Nsubuga	
	Artificial Intelligence Technology Use for Plant Identification and Classification: Contextualizing Acceptance and Use/Non-Use Concerns of Picture this App. John Bukenya, Paul Birevu Muyinda, Ghislain Maurice Nobert Isabwe, Godfrey Mayende, Fred E.K. Bakkabulindi, James Kalema	
11:00 – 1:30	Coffee/Tea Break	Protocol and Organizing Committee
Session 7: Policies and Practices on the Use of Artificial Intelligence in Education		

Session Chair: Prof. Ghislain Maurice Norbert Isabwe		
11:30 – 2:30	Policies and Practices for Responsible Integration and Utilization of Generative Artificial Intelligence in Education: Ggaliwango Marvin	
	Developing a Chatbot to enhance Learner Support in navigating Learning Management System at Makerere University, Shallon Atukunda, Dianah Nampijja, Godfrey Mayende	
	Effect of Intelligent Tutoring System on Education. Sulaiman Umar S.Noma, Muhammed Garba, Hassan Suru, Ajayi Ebenezer Akinyemi	
	Enhancing Learning Management Systems Security: An explainable Ensemble Machine Learning Model for SQL Injection Detection. Raymond Sekyewa	
Closing Ceremony		
12:30 – 2:50	Closing Remarks: Prof. Buyinza, Deputy Vice-Chancellor – Academic Affairs, Makerere University	Prof. Muyinda
12:50 – 3:00	Anthems (Uganda, East Africa and Makerere University)	Eva Mirembe
13:00 – 4:00	Lunch & Departure	Protocol and Organizing Committee

Conference Abstracts

Session 1

Using Case Scenarios to foster Critical Thinking Skills among Graduate Students at Gulu University

Gloria Lamaro, Joseph Kimoga, Dianah Nampijja, Frank Reichert

In the evolving landscape of higher education, the advancement of critical thinking skills is essential for academic and professional success in the 21st century. Traditional teaching methods often fail to cultivate these skills effectively, highlighting the need for innovative pedagogical approaches. This study examined the effectiveness of case scenarios as a pedagogical tool to enhance critical thinking among graduate students. Grounded in critical theory informed by Habermas's critical inquiry, the research utilized qualitative methods, including semi-structured one-on-one interviews, focus group interviews, and document checks with graduate students, recent graduates, and lecturers. The study aimed to explore how case scenarios foster analytical reasoning, problem solving, and decision-making. Results revealed that case scenarios significantly improved students' ability to apply theoretical knowledge to practical situations. Participants reported notable enhancements in analytical skills, problem-solving abilities, and decision-making effectiveness. Furthermore, case scenarios promoted collaborative learning and linked academic concepts to real-world applications, effectively bridging the gap between theory and practice. This study contributes to the field by empirically validating case scenarios as an effective method for developing critical thinking skills. It integrates critical theory with educational practice, demonstrating how case scenarios can drive pedagogical innovation and address educational gaps. These findings are valuable for educators and policymakers, offering a framework for refining curriculum design and better preparing students for real-world challenges.

Keywords: Case Scenarios, Critical Thinking, Graduate Education, Pedagogical Innovation

Integration of 21st-century Soft skills in Trade Subjects for Nigerian secondary students and its Impact on entrepreneurial aspirations

OYETORO Oyebode Stephen

The focus of Stakeholders for education in the 21st century is that graduates of the school system should possess among other transversal skills otherwise known as soft skills that could enable them to prepare and align themselves to different opportunities in the world of work. Efforts are therefore geared towards ensuring that both curricula and non-curricular offerings

have these skills components embedded in them. One of such curricula offerings in Nigeria's senior secondary schools is the recently (circa 2011) introduced 34 trade subjects as entrepreneurship subjects. This study assessed the extent to which the 21st century (entrepreneurial) skills of creativity, planning, financial literacy, resource marshalling, managing ambiguity and teamwork are integrated into the five most implemented trade subjects (Marketing, Data Processing, Catering Craft Practice, Animal Husbandry and Book-keeping) in Southwestern Nigeria. It also assessed the relationship students' acquired entrepreneurial skills through the trade subjects have with their entrepreneurial intentions. These are to provide empirical information that could help in the renewal and strengthening of the trade subjects' curricula including implementation. The study is descriptive research that utilized the survey research technique. The sample comprised 841 senior secondary school students selected using a multistage sampling technique from 30 public senior secondary schools in 9 local government areas for om three states in Southwestern Nigeria. An instrument titled Entrepreneurship Competences Assessment Tool (ECAT) was used to collect data. Data collected was analyzed using frequent counts, correlation coefficient and binomial logistic regression. Results indicated that financial literacy was highly integrated into the Book-keeping curriculum only. The competencies of creativity, planning and marshalling of resources are moderately integrated into four curricula viz.: Marketing, Data Processing, Catering Craft Practice and Animal Husbandry while financial literacy, managing ambiguity and teamwork are least integrated into these four curricula. Results also showed that each of the entrepreneurial skills is significantly correlated with the entrepreneurial intentions of the students when entrepreneurial knowledge is not controlled for ($0.33 \leq x \leq 0.43$, correlation significant at 0.01 level). Each of the skills also correlated significantly with entrepreneurial intentions when entrepreneurial knowledge was controlled ($0.26 \leq x \leq 0.36$, all p values equal 0.00). Results further indicated that the logistic regression model was statistically significant $\chi^2(6) = 184.22$, $p < 0.05$. The model explained 27.7% (Nagelkerke R^2) of the variance in students' entrepreneurial intentions and correctly classified 72.7% of cases. Creativity contributed most to the prediction of entrepreneurial intentions ($\beta = 0.12$, $p = .00$) while managing ambiguity contributed least to the model ($\beta = 0.02$, $p = .44$). The conclusion from the study is that deliberate efforts should be made to include more financial literacy, managing ambiguity and teamwork related contents in the trade subjects curriculum.

Keywords: 21st-century soft skills, curriculum development, entrepreneurial intentions, senior secondary school students, entrepreneurship subjects

Navigating Lifelong Learning: Clarifying Definitions and Driving Action

David Onen


In contemporary society, lifelong learning is widely acknowledged as crucial for personal fulfillment and societal advancement. However, despite this acknowledgement, there remains significant ambiguity surrounding its precise definition, particularly among scholars and policymakers. This research sought to address this ambiguity by conducting a thorough examination of the historical evolution and current interpretations of lifelong learning, drawing on a diverse range of scholarly sources. Additionally, the study delved into complex issues such as variations in learning experiences beyond formal education and disparities in access to education. Through the critical review of the literature, the study revealed the multifaceted nature of lifelong learning, advocating for a more inclusive understanding. Introducing a novel framework that embraces diverse learning contexts and incorporates insights from psychology and sociology, the study advocates for equitable opportunities for all individuals. Besides, it provides practical recommendations for educational institutions to translate these theoretical insights into actionable strategies. By enhancing effectiveness and accessibility in lifelong learning endeavours, this study aims to catalyse progress towards individual empowerment and societal cohesion.

Keywords: Lifelong Learning, Definition Clarification, Educational Equity, Interdisciplinary Integration, Policy Implementation.

“You do not belong to this course, you are displaced”. Lived Experiences of Students with Visual Impairment in studying in public universities in Uganda.

Dianah Nampijja, Leah Sikoyo, Michael Walimbwa and Betty Akullu Ezati

Access and inclusive participation of Students with Visual Impairment (SVIs) in higher education in low-income countries like Uganda continues to be a challenge despite their increasing enrolment in universities and other higher education institutions. Albeit government efforts to support the teaching and learning of such specialised learners, SVIs, still struggle to be meaningfully integrated into university education. This paper reports on the lived experiences of Students with Visual Impairment studying at two public universities in Uganda. A qualitative interpretive case study design that employed semi-structured interviews, Focus Group Discussions and non-participant observations were used to generate data from 43 SVIs from Makerere University and Kyambogo University. Overall, the students’ narratives of their lived experiences show how the two university communities were supportive in terms of social



support from peers and staff when requested. Additionally, the students commend the availability of specialised policies concerning allowances, availability of guides, and extra time during the examination as key support systems that sustain their participation in university education. However, students reveal negative experiences including a lack of specialized orientation into the university environment, inaccessible and inappropriate study spaces, inadequate access to specialized equipment like assistive devices, and minimal staff awareness and sensitivity to their special learning needs. The classroom environment was rather unfavourable with some lecturers not being supportive. In a practical computer class session, one SVI narrated how one lecturer exclaimed, ‘you do not belong to this class, you are displaced’, a clear exclusionary mentality of such learners to being part of the digitalised learning spaces. Given the limited support systems, most students relied on their guides and kind sighted peers to navigate around the university environment and to write and read learning materials and examinations which deprived them of dignity and independence. From the student’s perspectives, these narratives were perceived as not supportive of their inclusive participation and meaningful integration into university education. Considering that learners vary in the ways they learn and demonstrate what they are learning, the study concludes about the low level of public universities' preparedness to support inclusive learning that nurtures SVI independence. The digitalised learning support systems in both universities were limited, yet their deliberate integration would support learner independence. Thus, the study recommends universities to be creative and innovative to provide for multiple means of representation, expression and engagement in teaching, learning and assessment processes to promote inclusive education for all learners. Similarly, mainstreaming disability issues into university structures and processes to ensure a holistic support system, with a central coordinating disability unit would enable SVIs to achieve an inclusive and equitable university quality education for all.

Keywords: Lived experiences, university education, inclusive learning, Students with Visual Impairment, public universities

Session 2

Unlocking the Future of Learning: Micro credentials and Micro degrees in Education

Mourine Akasuka

Adaptability and lifelong learning are critical in today's dynamic educational environment, so the introduction of micro credentials and micro degrees represents an innovative development. As envisioned for the Conference on Future Education 2024, this abstract explores the sub-theme of "Micro credentials and Micro degrees" in the larger context of future-ready education technology for learning communities. Micro credentials concisely incorporate specific skills and competencies, offering a flexible and accessible avenue for learners to acquire targeted knowledge. They represent a departure from traditional academic structures, catering to the evolving needs of industries and learners alike. By focusing on discrete skill sets, micro credentials empower individuals to tailor their learning journey, fostering a culture of continuous upskilling and reskilling. Complementing micro credentials, micro degrees provide a more comprehensive educational experience within a condensed timeframe. These programs offer a curated curriculum, often in specialized fields, designed to equip learners with the expertise needed to thrive in rapidly evolving industries. Through the integration of interactive technologies and adaptive learning methodologies, micro degrees facilitate immersive and engaging educational experiences, transcending geographical barriers. The integration of micro credentials and micro degrees into educational frameworks indicates a paradigm shift, democratizing access to quality education and redefining traditional notions of academic achievement. Leveraging advancements in education technology, including artificial intelligence and block chain, these micro-credentials offer verifiable and stackable credentials, enhancing their credibility and applicability in the professional sphere. Furthermore, the collaborative nature of micro credentialing platforms fosters vibrant learning communities, facilitating peer-to-peer interaction and knowledge sharing. By fostering a culture of collaboration and innovation, these platforms transcend geographical boundaries, creating a global ecosystem of learners and educators. As we explore the dynamics of the future educational landscape, micro credentials and micro degrees stand as beacons of innovation, empowering individuals to embrace lifelong learning and adapt to the evolving demands of the workforce. This abstract sets the stage for an in-depth exploration of the transformative potential of micro credentials and micro degrees within the context of future-ready education technology for learning communities.

Keywords: Micro credentials, Micro degrees, Future-ready education, Lifelong learning, Education technology, Skill acquisition, Industry relevance, Adaptive learning, Block chain, Credentialing, Learning communities, Collaboration, Innovation.

Micro Credentialing Guidelines for Lifelong Skills Development of Working Adults in Kampala City Uganda

Katagwa Rogers

This study established micro-credentialing guidelines for lifelong skills development of working adults in Kampala City Uganda. It was guided by three specific objectives namely: (i) to establish micro-credentials on offer in selected institutions in Kampala District; (ii) to analyze the micro credentialing delivery system, and (iii) to establish guidelines to be followed in the accreditation of Micro credentials. The researcher located the study in an interpretive paradigm and adopted a qualitative approach using case study design to aid the processes of data collection and analysis. The Micro credentials on offer in the selected Institutions in Kampala district were either online or in-person micro credentials. These included among others: quantitative data analysis, oral communication, software repair and networking programming just to mention but a few. The micro-credential delivery system varied from institution. In some institutions they were delivered theoretically while in others they were delivered practically. An institution wishing to become a micro credentialing institution should register with the Ministry of Education and Sports, developing a micro credential curricula, train its facilitators on delivering micro credentials virtually or in-person, putting in place infrastructure for delivering micro credentials, develop robust quality assurance system and put in place authentic assessment tools. The findings underscored the role of micro-credentials as bite-sized, specialized learning modules offering practical, specific skills tailored to industry needs. Through diverse delivery methods and adherence to accreditation guidelines, institutions aim to equip learners with relevant competencies and enhance their employability. The study highlighted the importance of industry collaboration, continuous professional development for facilitators, and leveraging technology to improve the delivery and accreditation systems of micro-credentials. The study recommended that institutions should align micro-credential with industry needs, delivery systems made flexible and accommodative, institutions should adhere to quality assurance standards and accreditation guidelines and finally develop micro credential courses which are cost-effective.

Session 3

Using Contextualized and Proximity-rich Videos to Enhance Learner Autonomy in Navigating Learning Management Systems.

Harriet Mutambo Nabushawo & Richard Kajumbula

Makerere University eLearning Environment (MUELE), a Moodle-based Learning Management System (LMS), was commissioned in 2009 as a tool for teaching and learning. This novel online platform was designed to support eLearning by enabling access to learning materials as well as facilitating interaction between students and lecturers and among fellow students. However, despite the numerous advantages of MUELE as an interactive online teaching and learning platform, it remains underutilised by students due to inadequate user knowledge and skills to navigate the platform. Following a Human-centred research approach with Distance Education students, it was revealed that students require more sensitization and training on the use of the platform for teaching and learning. Video instructional materials were therefore developed to offer the much-needed step-by-step audio-visual guidance in navigating MUELE. Using qualitative research approaches to data collection and analysis, this study describes the perceptions and experiences of Bachelor of Agriculture and Rural Innovation (BARI) students towards using instructional videos in navigating the MUELE platform. The focus was on the affordances of the video in terms of clarity, simplicity of language, visibility, audibility, speed and duration of the video. The study findings indicated that the step-by-step guidance using instructional videos helped students acquire knowledge and skills to navigate the MUELE platform. This was evidenced by the number of students who were able to log into MUELE and navigate following the guidance of the instructional video. Many reported that the video was excellent in terms of clarity of instructions, simplicity of the language and visibility of what was being demonstrated. The study, therefore, concluded that the utilisation of instructional videos was an effective method of training students because it enabled continuous guidance whenever necessary amidst limited training sessions for e-learning uptake.

Applicability of Blended Learning Pedagogical Model at Makerere University

Arthur Mugisha

Blended learning pedagogical model became dominant at Makerere University during Covid-19 and was prioritized to-date as a flexible delivery model for lecturers in the Fifth Generation. Blended Learning (BL) allows use of face-to-face and virtual-learning with the technological affordances for learners and faculty in universities. Since BL prioritization with use of MUELE as a one-support-center, no study had been undertaken to evaluate applicability of BL pedagogical model on undergraduate students at Makerere University. A study was undertaken to evaluate learners' readiness and satisfaction on the applicability of BL pedagogical model

at Makerere University. The cross-sectional research design with qualitative and quantitative approaches was adopted. Evaluation data was collected from 370 randomly selected students following multi-stage sampling and four key informants from management. The data was collected using a questionnaire on undergraduate students and an interview guide on management. The evaluation indicated that students use smartphones and laptops with loaded internet data bundle to connect on MUELE and participate on BL pedagogical model. Facilitators mainly use laptops connected to internet to support BL model. The learners' readiness on BL pedagogical model was through sharing of information on social media platforms especially WhatsApp by peers and lecturers at the university. The Zoom, MUELE (Big Blue Button) and Google Meet were the most widely used technologies to support BL model of anytime anywhere for learners at university. The learners were satisfied with peer-to-peer interaction on discussion forums, lecturer-learner support through guidance, feedback on e-tivities like courseworks, group work and practical work. Learning (knowledge, skills and attitudes) entailed theoretical and practical lessons supported with downloads of learning resources. The study recommended; conducting lectures and grading of tasks on MUELE as a one-technological-support-center for learners and faculty, receiving of feedback on e-tivities and semester examination grades accelerated learners' satisfaction on BL pedagogical model in this digital generation.

Key Words: Blended Learning, Blended Learning pedagogical model, Applicability of BL, Makerere University Electronic Learning Environment 'MUELE'

Technology-enabled learning: Is it the “technology” or the “learning” that matters?

Moving towards a balanced e-learning approach

Fred Ssemugenyi & Garry Sali

Although the importance of technology in teaching and learning processes cannot be overemphasized, the debate on whether online educators are capable of guiding learning from lower levels of remembering and understanding to higher levels of analyzing data, evaluating information, and creating knowledge is still very much in evidence. Motivated by this debate, we chose to re-evaluate the state of online education at PNGUoT with much focus on negotiating space between technology and learning for improved e-learning experiences. Three major findings emerged from this study; (1) both “technology” and “learning” are important, but technology is simply an aid, not a subset of learning, (2) online learning requires new pedagogies and epistemology, and (3) digital technology will continue to advance in higher education (HE), our willingness to embrace it notwithstanding. The study concludes that a focus on *technology* than *learning* is a false dichotomy; while limited expertise to critically evaluate how learning can progress effectively with technology being used as an enabler is an early implementation hurdle.

Session 4

Digitalization of education is a requirement of the time

Botirov M.T., Abdumanonov A.A.

Digitalization, digital inclusion and gender are important topics in the context of modern technological and social changes. Digitalization describes the process of converting various aspects of life and activity into digital format, including work processes, education, medicine and many other areas. This ensures efficiency, increases information availability and improves resource management. The introduction of digital technologies is aimed at ensuring equal access to digital technologies for all segments of the population: access to the Internet, digital skills and technologies which are crucial in the life of modern society [1-5]. One of the main factors driving the digital divide is socioeconomic status. People from low-income families often do not have the financial means to purchase digital devices, as well as reliable internet. As a result, people with low incomes may not be able to keep up with digital educational innovations and miss out on learning opportunities. Another factor influencing the digital divide is geographic location. Rural areas, especially in developing countries, often lack the necessary infrastructure to provide reliable internet access. Moreover, even urban areas can experience inequalities in Internet access due to uneven distribution of resources. This further exacerbates the digital divide and limits equal access to digital education [2, 5]. Age is another factor contributing to the digital divide. Older adults, especially those who did not grow up with digital technology, may have difficulty adapting to the rapidly changing digital landscape. To bridge this generation gap, digital literacy programs and support for older people need to be developed.

Gender equality - in the context of digitalization, implies that men and women should have equal opportunities to access digital resources and technologies, as well as equal opportunities to develop digital skills. In developing countries and where religion plays a larger role, gender inequality is more pronounced. Accordingly, men have more access to modern technologies and devices than women. Despite progress, research shows that there is a "digital gender divide" - women often have less access to technology and ICT training. Addressing the digital divide and ensuring equal access to digital education is critical to creating a more inclusive and equitable society. Government, educational institutions and organizations need to work together to develop strategies to promote digital inclusion. This includes providing low-cost or subsidized digital devices and internet access to people from low-income communities. In addition, it is necessary to invest in the necessary infrastructure to provide reliable internet access in rural and underserved areas [1, 4].

Promoting programs and initiatives to improve digital literacy also plays an important role in bridging the digital divide. These programs should target people of all ages and backgrounds and equip them with the necessary skills to work effectively in the digital world. Key engagement points: Digital skills development programs must be gender-sensitive to ensure women keep up with technological advances. Digitalization opens up new opportunities for entrepreneurship and employment, especially for women who may face barriers in traditional sectors. Policies need to be developed and implemented to reduce the gender digital divide, improve legal frameworks including funding programs to improve access to digital education, and encourage women to pursue careers in technology and related fields. In conclusion, the digital divide and unequal access to digital education are pressing issues that need to be addressed. By recognizing and understanding the factors that contribute to these inequalities, we can work to create more inclusive technology education. Efforts must be made to ensure equal opportunities for access to digital technologies and education for all people, regardless of their socio-economic status, geographical location, gender and age. The need to develop comprehensive policies aimed at improving digital literacy learning infrastructure, reducing the cost of technology and internet access, and highlighting the importance of collaboration between government agencies, educational institutions and other stakeholders to create a more inclusive digital inclusion ecosystem . Gender equality in the context of digitalization , which can help create a fairer and more equal society where every person has an equal opportunity to realize their potential in a rapidly evolving technological world.

Strategic Utilization of Chatgpt in Teaching and Learning

Nakayiza Hellen Raudha

ChatGPT is an advanced language model developed by OpenAI with great promise in revolutionizing education, teaching, and learning processes. Its capabilities as a virtual tutor and teaching assistant fosters personalized and inclusive learning environments. By leveraging the power of NLP, ChatGPT can transform skills training in a more accessible and effective way for learners. This paper provides an in-depth understanding of ChatGPT's architecture, workings, and its specific applications in the education sector. It particularly provides insight into proper utilization of ChatGPT for teaching and learning, its risks, opportunities and challenges. It provides a research and practical strategic direction on applications of ChatGPT for teaching and learning most especially for developing economies like Uganda.

Keywords: Digital Education, Teaching and Learning, ChatGPT, Large Language Models (LLMs).

Determining the requirements for integrating the insights from LA into teacher support in eLearning: A Systematic Literature Review

*Mirembe Eva, Assoc. Prof. Rehema Baguma, Assoc. Prof. Ghislain Maurice N. Isabwe,
Assoc. Prof. Paul.B. Muyinda*

The rapid adoption of eLearning in Higher Education Institutions (HEI) in Uganda highlights the pressing need to implement effective mechanisms for teachers support in eLearning environments. Teacher support encompasses a broad spectrum of assistance, encouragement and guidance designed to enhance teaching practices and learning outcomes. Despite the critical need for support in eLearning success, there remains a significant challenge in addressing the needs of teachers. Globally 50% of new teachers exit the profession within the first five years, with a significant portion experiencing various challenges in their profession, including inadequate support in areas such as professional development, classroom management resources, and teaching effectively. While substantial research has been directed towards supporting students in the eLearning environment, there is scarcity of research focused on supporting teachers specifically.

Additionally, existing interventions aimed at supporting teaching are often generic, complex and lack sufficient involvement of teachers with the design and testing phase.

This research employs a systematic literature review approach to analyze and compare Learning Analytics interventions designed for teacher support between 2018 and 2024. The review seeks to determine how these interventions have addressed the challenges faced by teachers in eLearning and identify any gaps in the current approaches.

The findings of this review indicate that while many interventions have successfully targeted learner designers, tracking students' performance and achieving learning outcomes. They have not holistically addressed the usability problems of these Learning Analytics. These usability problems hinder the effective integration of Learning Analytics tools in eLearning teaching practices, limiting teachers from making data based decisions.

Therefore, this research uses Human-Centered Design (HCD) principles to establish the requirements for integrating Learning Analytics into teacher support in an eLearning environment. This will result in the design of La tools that are more effective and efficient in supporting teaching tasks.

The Opportunities and Challenges in Using ICT in Teaching and Learning in Rwanda: A Review of Literature

*Jean Baptiste Mushimiyimana, Wenceslas Nzabalirwa, Alexandra Lazareva, Irene
Ndayambaje.*

Teaching and learning is a multifaceted process influenced by numerous factors. In today's world, ICT is indispensable for enhancing the accessibility of teaching-learning materials and content. Rwanda, aiming to become a knowledge-based economy, has heavily invested in ICT infrastructure, devices, and personnel training. However, challenges persist, such as low internet penetration, limited human resources for Science, Technology, and Innovation due to the low output of scientists from academic institutions, and insufficient conversion of research into commercial applications. Additionally, there are issues with project governance, societal awareness of ICT benefits, and a lack of ICT culture. The Ministry of Education also faces difficulties as computers are supplied without additional maintenance funds, leading to costly repairs by private technicians. Providing ICT tools should come with adequate maintenance funds and government-paid technicians. Furthermore, sufficient budgets for teacher and student ICT training should be allocated, and the National Information and Communication Infrastructure (NICI) should expand its training centers nationwide. To address these issues, recommended actions include enhancing regulatory and technical capabilities for emerging technologies, developing comprehensive ICT project and capability frameworks, and increasing budgets for ICT infrastructure and literacy to ensure equitable access and awareness.

Key Words: Challenges, ICT infrastructure, opportunities, teaching and learning

Applicability of ADDIE model in Analysis of Content Resources for Blended Learning in Universities: Case of Bachelor of Science External at Makerere University.

*Arthur Mugisha, Betty Akullu Ezati, Alexandra Lazareva, Michael Walimbwa, Godfrey
Mayende*

This study was on applicability of ADDIE model in analysis of content resources for Blended Learning (BL) at Makerere University. The study analyzed the current content resources and strategies for improving content resources for BL on Bachelor of Science External (B.Sc.) at Makerere University. The qualitative research design and interpretivism paradigm were adopted to explore opinions of respondents for this study. The multi-stage sampling method with purposive technique was used in selection of thirteen students, five lecturers from various subject combinations and a program coordinator. Interview data was analyzed in Atlas ti. to create the quotations and memo of network view for findings. The analysis stage of ADDIE


model involved determination of instructional goals by understanding the competency gaps through which academic progress is catered for within the intended learning outcomes both in Biological and Physical sciences to address the needs in society. Target audience considered; gender, learners' experiences, learning interests, geographical location, motivation for learning, economic status, language proficiency, learners' abilities and intimate pattern for applicability in BL. Required resources were; smart phones and laptops to access the internet-based content resources, artificial intelligence such as Chat GPT for learning, and digital learning using conversational tools like; zoom, WhatsApp, Google Meet and TikTok. The well-designed lecture theatres, smart rooms and multimedia studios facilitate the preparation of content resources fit for BL. Strategies were; understanding of marital status of learners, experiences, motivation to pursue a course, and use of excellent search engines such as refseek.com, worldcat.org, link.springer.com and bioline.org.br to support designing of content resources for BL. Conduct continuous professional development programs for lecturers and orientation of learners with the support of a cross-cutting course, buy your own device policy at subsidized price from pre-qualified vendors like Stanbic at Makerere University and adoption of MUELE to build effective BL solutions for universities.

Keywords: ADDIE model, Content Resources, Bended Learning, Bachelor of Science External

Designing and Implementing an Interactive Technology Enhanced Learning (TEL) Module to Improve Workplace Safety among Custodians at Makerere University

Sunday Seezi, Godfrey Mayenda, Dianah Nampijja

Workplace safety is critical for custodians who perform essential but potentially hazardous tasks. Traditional training methods may not effectively address their specific safety needs. Technology Enhanced Learning (TEL) presents an innovative solution by providing interactive, accessible, and engaging training tailored to their requirements. The primary objectives of this study are to explore the workplace safety needs of custodians at Makerere University, design an interactive TEL module that facilitates on-the-job learning, and implement the TEL module to evaluate its effectiveness in improving workplace safety. This study employs a mixed-methods approach, combining qualitative and quantitative data collection techniques. Data was gathered through surveys, interviews and observational methods. A stratified random sampling method was used to select participants to ensure diverse representation. Thematic analysis was conducted on qualitative data to identify recurring themes and patterns, while quantitative data was analyzed using statistical methods to measure the impact of the TEL module. The findings revealed that custodians face significant workplace



safety challenges, including electrical safety, emergency response procedures, ergonomics, equipment safety, security awareness and communication skills. The designed TEL module addressed these needs through interactive content, simulations, and knowledge acquisition through discussion forums. Preliminary implementation results indicated improved custodians' knowledge, skills, and attitudes towards workplace safety. The interactive TEL module demonstrated potential as one of the effective tools for enhancing workplace safety among custodians at Makerere University. By addressing their specific safety needs through tailored, engaging, and accessible training, the TEL module contributes to a safer work environment and better preparedness among custodians. Further research is recommended to refine the module and expand its application to other contexts and institutions.

Keywords: Workplace safety, Technology Enhanced Learning (TEL), interactive learning, eLearning.

Session 5

Comparative Readiness of the Genders for Participation in Case study of Relative Access to Technology Programme in Kogi State Universities, Nigeria


Femi Daniel

The last three (3) decades have witnessed increased attention being paid to women and their advancement in all spheres of life especially in their access to education. Even now, women still appear to lag behind in certain areas of participation in socioeconomic, political, and educational programme in spite of making about 50% or more of the population of Nigeria. The issue of underrepresentation especially of women in Technology and Engineering (TE) education programme especially has attracted some attention. The future of education is in emerging technologies and adaptable learning strategies founded on applied science and technology. In the future education, no gender must be left behind. This study will be designed to compare the enrolment of the sexes in some TE courses in four (4) public universities in Kogi State of Nigeria. The sources of data will be the current university record of students enrolled in ten (10) engineering and technology programmes. I examine the other avenues students of both gender have for using the technologies outside the regular formal classroom learning setting. The Technologies Skills Acquisition Questionnaire (TSAQ) will be used to collect data on other means of acquiring skills for using modern technologies for students admitted between 2019/2020 and 2022/2023 academic sessions. The ratio of male versus female students' enrolment in each of the courses will be compared. Similarly the ratio of students across the various TE courses will be compared using appropriate statistics. Finally, the combine effect of gender and skill acquisition in modern technologies on student enrolment in the TE will be determined. The implication of the findings for education, gender & technology usage in higher education will be highlighted and pertinent conclusions will be drawn. **Keywords:** Gender, TE, Technologies, university, access

Employability and the Digital Job Market for Individuals with Disabilities and Special Needs in Uganda

Baluku Louis

This study explored the intersection of employability and the digital job market for individuals with disabilities and special needs in Uganda. In recent years, advancements in technology have presented opportunities for greater inclusion and accessibility in the workforce. However, individuals with disabilities often face unique challenges in accessing employment opportunities, including barriers related to education, skills development, and societal attitudes.



This paper examined the current landscape of the digital job market in Uganda and evaluated the extent to which it caters to the needs of individuals with disabilities. Additionally, it investigated the initiatives and policies aimed at promoting the employability of this demographic group, including vocational training programs, assistive technologies, and workplace accommodations. By analyzing existing literature, policies, and initiatives, this study identified gaps and opportunities for enhancing the inclusion of individuals with disabilities in the digital job market in Uganda. Recommendations for policymakers, employers, educators, and disability advocacy organizations are provided to promote greater access to employment opportunities and improve the overall socio-economic well-being of individuals with disabilities in the country.

Digitalization, Digital Inclusion, and Gender Equality in Secondary Education in Cameroon

Taku Catherine Arrey-Ngang

In Cameroon, there is a huge gap between male and female teachers in the use of technological products and digital tools. This is because female teachers and even female students have been subjected to think that ICT and the use of digital tools is a men's domain. Just like in other African countries, social and deep-rooted gender stereotypes have thwarted women and girls' interest in becoming part of the countless opportunities accessible through digital technologies for personal and professional development. Women are still fewer among decision-makers in the digitalization sphere. In this light, female educators are deprived of their right to voice whenever digitization is mentioned because they either are not vest with the concepts, or are too petrified to venture into this area of teaching. And even though digitalization is not gender neutral, women in education still shy away from it. This paper scrutinizes existing barriers to gender equality in digitalization and how the Cameroon Government can develop gender-responsive digital initiatives and policies amongst female teachers. It argues that achieving gender equality in information and communication technology (ICT) in particular, and digitalization processes in general, is not simply about guaranteeing women's access to digital tools and employment opportunities in ICT and in the Science, Technology, Engineering and Mathematics (STEM) fields. Gender equality in digitalization necessitates ensuring that all voices are heard, including those of women and ICT experts. This paper therefore calls for greater attention to gender equality and women's empowerment in the digital age in Cameroon. It also finds ways to dismantle gender stereotypes and other barriers so that women benefit

equally from the opportunities offered by digitalization. We need an active involvement of women and female educators in the digital world.

Key Words: Digitalization, Digital Inclusion, Gender Equality, Stereotypes

**Digital Experiences of Students with Visual Impairment at Makerere University:
Opportunities and Challenges**

Nuwe John Paul

The rapid transition to digital learning in higher education presents both opportunities and challenges for students with visual impairment. This paper explores the current digital experiences of students with visual impairment at Makerere University, focusing on the devices and tools they use, the opportunities of these tools for academic work and the challenges they encounter while using these tools. Following the Universal Design for Learning (UDL) framework, which advocates for accessible and inclusive education, this study employed qualitative methods such as interviews and focus group discussions to gather data from twenty (20) undergraduate students with visual impairment- eight (8) of whom were blind and twelve (12) had low vision. Thematic analysis was used to analyze the data. The study findings revealed that students with visual impairment primarily used WhatsApp, Zoom, JAWS, Talkback, Email, and Makerere University E-Learning Environment (MUELE) on their phones and personal laptops. These tools were the most helpful in accessing course materials and communicating with lecturers and peers. In addition, significant challenges of using these tools were identified which included; inaccessible course materials and tools, inadequate digital training, and limited financial and technical support. The study recommends implementing pre-university digital skills assessment programs and comprehensive digital skills training programs to enhance the academic experiences of students with visual impairment.

Keywords: Students with visual impairment, Universal Design for Learning, Digital experiences, Accessibility, Digital tools and devices

Session 6

Synergizing Student Engagement in Online Distance Education Programs at Makerere University: A Community of Inquiry Approach

Tumwesigye T. Jimmy, Paul B. Muyinda, and Anthony M. Muggaga

Online distance education is critical in transforming the modern education landscape, offering increased opportunities and convenience for multiple learners to access high quality education in the world. Unlike the traditional in-person educational programs where learners have an opportunity to engage with their teachers and peers physically, student engagement has remained a challenge in implementing online distance education programs. Synergizing student engagement in online distance education requires application of collaborative technology-enhanced pedagogical models that can leverage increased involvement and participation in online learning activities. Based on responses of 283 students from distance education programs at Makerere University, this paper evaluates the potential of the community of inquiry model in predicting student engagement in online distance education programs. The community of inquiry theoretical framework is composed of three interrelated elements namely: cognitive presence, social presence, and teaching presence. Descriptive and inferential data analysis was done using the statistical package for social scientists (SPSS) tools. The results revealed that the community of inquiry significantly and positively predicts student engagement. This implies that the community of inquiry model is a critical factor in synergizing student engagement in online distance education programs through employment of strategies that promote critical thinking and problem-solving (cognitive presence), collaboration and sense of community (social presence), and adequate design, facilitation and direct instruction of learning (teaching presence).

Key Words: Student engagement, distance education, online learning, social presence, cognitive presence, teaching presence.

An Ecosystem for Telecommuting in Higher Education Institutions in Uganda

Emily Bagarukayo, Benedict Oyo, Gilbert Maiga, Irene Arinaitwe

The COVID-19 pandemic caused massive disruptions with organizations opting to retain employees for critical activities by telework. Uganda placed restrictions on human movement. Decongesting workspaces and social distancing are the new reality across organizations including Higher Education institutions. The subsequent lockdown measures have pointed out the need for innovative ways to support working remotely. The study aimed at developing an ecosystem for telecommuting to further the core mandate of teaching and learning, research

and knowledge transfer between the higher education sector, partners and stakeholders. The field results showed flexibility in the work schedule amongst others as one of the outstanding benefits of working from home. Learning Management Systems, Communication platforms, Human Resource systems, attendance and scheduling systems were observed as some of the tools to aid telecommuting. The results also indicated high productivity when telecommuting and furthermore showed that people are not aware of the policies for telecommuting. The results of this study are a basis for the development of an ecosystem for telecommuting in Higher Institutions of Learning. The solution is an innovative secure, transparent, ecosystem using blockchain technologies to provide a digital identity for secure transparent exchange of documents during telecommuting. With telecommuting, employees can work remotely using online systems. Makerere University was the selected case studies in partnership with Gulu University. **Key words:** telecommuting, COVID-19, ecosystem

Investigating Digital Assessment Challenges at the University of Rwanda

Olivier Habimana, Mathias Nduwingoma, Ghislain Maurice Norbert Isabwe, Irénée

Ndayambaje, Béatrice Yanzigiye¹

The University of Rwanda (UR) has adopted digital assessment to improve upon traditional paper-based methods. This study explores the challenges UR teachers and learners face regarding digital assessment and proposes solutions for increased adoption. A mixed-methods approach using interviews and questionnaires gathered data from academic managers (n=11), staff (n=136), and learners (n=1,360) across UR campuses. Both faculty and learners reported technical and logistical challenges. Faculty encountered difficulties using digital assessment tools due to inadequate training, user interface complexity, and challenges in creating and marking assessments. Learners faced several issues including lack of regular feedback on their work, digital tools' usability problems, lack of training and limited awareness about digital assessment. These challenges highlight the need for easy-to-use tools, comprehensive training, and awareness programs to maximize the benefits of digital assessments. The study recommends continuous competence development in using digital tools for teaching, learning and assessment, investing in more usable tools, providing reliable internet access, and equipping teachers with high quality digital media devices and technical support. Further on, the study suggests developing inclusive assessment strategies, and faculty training on detecting potential academic dishonesty, especially in digital educational environments.

Keywords: Assessment; Digital tools; ICT in education; e-assessment; online learning

Lecturers' self-efficacy as a determinant to the students' engagement in an online learning environment: A glance from the University of Rwanda-College of Education, Rwanda

Irénée Ndayambaje, Mathias Nduwingoma, Beatrice Yanzigiye and Olivier Habimana

The eruption of Covid 19 pandemic has boosted the use of online learning not just as an alternative to in-person instruction but as a means to expand learning opportunities, enhance students' engagement in the learning process as well as foster lifelong learning spirit. While so, it is observed that if not carefully handled, online learning might lead to less student engagement and thus they may end up not acquiring the desired competences. Using a descriptive survey research design, the present paper explored the extent to which the surveyed 74 Lecturers of University of Rwanda-College of Education demonstrate required levels of self-efficacy in the use of online technologies that are paramount for teaching-learning purposes. Findings predominantly indicate that Lecturers conduct online classes "sometimes" (55%); implying the frequency of online classes as a teaching approach remains low compared to in-person physical instruction. In terms of lecturers' confidence to conduct online classes using various platforms, WebEx gained less scores in regard to agreement (44%) whereas Google meet, Teams and Zoom were perceived more or less familiar. These lecturers seem less familiar with the usage of cloud storage. It is however encouraging to realize that lecturers expressed confidence in engaging individual students in online classes (81%) and navigating the internet resources (87%). Nevertheless, while a considerable portion of respondents agree that they can independently mark students' online activities (75%), fewer feel equipped to manage disruptive behaviours (37%) or assist students with technology difficulties (51%). Additionally, there is a notable split regarding the ability to download and compile marks from different online activities assigned to students, with a significant proportion expressing uncertainty or lack of proficiency (42%). The present study therefore recommends continuous support and capacity building so they can be empowered and thus positively impact students online learning through required engaging pathways.

Key words: Online learning, Technology, Lecturer

Session 7a

Mathematical techniques Vs Artificial Intelligence - A correlative study on AI engineering students

Prof.J.Jebaraj Ph.D

Recently the Artificial Engineering (AI) teaching institutions ignored mathematical techniques in their activities. In order to justify the application of mathematical techniques a study was conducted to determine the level of successful mathematical adaptability and usability behaviour among engineering & technical students. In this research, AI engineering students from engineering and technical colleges situated in Coimbatore city were chosen as the sample and given workshop for one month on mathematical techniques in AI engineering. After one month they were asked to answer a survey questionnaire containing 67 items with a five-point Likert scale based on adaptability and usability of mathematical modelling techniques in AI engineering. Descriptive statistics, such as mean, percentage, and standard deviation were employed to analyse the data. Regression coefficient was used to determine the relationship between the students' adaptability and usability of mathematics techniques. Scafee's post hoc test is used to find out where the difference occurs among AI engineering students. The findings showed there exists a positive relationship between adaptability and usability among AI engineering students. In conclusion, the students have a positive thought about adaptability and usability in initiating mathematical integration in to their curriculum. The implication was adaptability& usability were not critical factors for students in implementing mathematical techniques in to their engineering & technical education. For future research related to this study, it could introduce the variable study, such as feasibility, applicability, acceptability etc.

Keywords: adaptability, usability, mathematics techniques, AI engineering students, regression analyses, Scafee's Post hoc test.

Assessment in the Face of Artificial Intelligence

Michael Walimbwa

The advent of Artificial Intelligence (AI) has ushered in transformative changes across various sectors, including education. This research explores the evolving landscape of assessment in education in the face of AI, examining both the opportunities and challenges presented by these technological advancements. Traditional assessment methods have often struggled to provide personalized, timely, and equitable evaluations of student performance. AI offers solutions

through adaptive testing, automated grading, and predictive analytics, which enhance the precision and efficiency of assessments. This study delves into the various AI-driven tools and techniques that are reshaping how learning is evaluated, highlighting their impact on personalized learning, feedback mechanisms, and inclusivity. Additionally, the research addresses critical ethical considerations such as data privacy, bias, and the need for transparency in AI algorithms. By synthesizing current literature and presenting case studies from diverse educational contexts, this research provides a comprehensive overview of the state of assessment in the era of AI. The findings underscore the potential of AI to revolutionize educational assessments while also calling for rigorous ethical standards and robust implementation strategies to ensure that these advancements benefit all learners equitably.

Artificial intelligence augmenting man: Principles and policies towards a more interactive, immersive, engaging and personalised educational experience.

Paul Nsubuga

Fewer technologies have enjoyed more popularity and have quickly penetrated all spheres of our lives than Artificial Intelligence (AI). The education sector, which has immensely improved with technology, especially after COVID-19, has not been spared the surfeit reverberations of Artificial Intelligence. Artificial Intelligence promises a bright future in education, relieving students and teachers of numerous tasks and providing a more interactive, immersive, engaging and personalised education environment that will improve student motivation and results. However, these developments come with drawbacks. There are many concerns about streamlining policies that will mitigate the abuse and exploitation of AI. There are ethical concerns about the absence of a humane face in AI tools. We also have to look towards developing AI tools that do not forestall to replace human beings but augment our abilities. Hence, human-centred AI is the way forward to ensure that human creativity and rational development do not dissolve in digital human assistants. This paper will propose the need to build human capital in AI. I will go ahead and suggest policies that an institution could consider ensuring the most minor abuse possible of AI while not losing out on the advantageous benefits that come with it.

Keywords: Artificial Intelligence, Machine Learning, Human-centred, Tech-ethics.

Undergraduate Students' Intention to Use Artificial Intelligence Technology for Plant Identification: Validating the Research Instrument


John Bukenya, Paul Birevu Muyinda, Ghislain Maurice N. Isabwe, Godfrey Mayende, James Kalema

Use of Artificial Intelligence (AI) in plant taxonomy is an emerging scholarly field that has attracted less scholarly attention. To understand the predictors of undergraduate students' behavioural intention (BI) to use AI technology for plant identification, we developed a research instrument based on the extended unified theory of acceptance and use of technology (UTAUT2) and three additional BI predictors/constructs. Following a cross-sectional survey involving 500 respondents from basic and agricultural science faculties in five Ugandan public universities after one month of using AI applications (PictureThis) to identify plants, a self-administered questionnaire was administered. Data were analysed with structural equation modelling, partial least squares (SEM-PLS) using SmartPLS4 software. Confirmatory Factor Analysis showed student agreement with intention to use and intention to switch to AI applications, particularly PictureThis app (Eigenvalues > 1.00). Exploratory Factor Analysis gave a Bartlett's test of Sphericity of 0.001, indicating highly significant correlations among the independent variable (IV) constructs. Average Variance Extracted (AVE) values of above 0.5 for all constructs confirmed convergent validity. HTMT ratios of correlation of less than 0.9 for all IV constructs confirmed their independent influence on behavioural intention to use AI PictureThis app. Cronbach's alpha of above 0.70 for all constructs confirmed construct reliability. Composite reliability values of above 0.70 confirmed high reliability of the constructs. Value Inflation Factor (VIF) values of below 3.00 confirmed non-existence of multicollinearity and that all the ten IV constructs in the research framework could independently determine students' BI to use AI technology for plant identification.

Artificial Intelligence Technology Use for Plant Identification and Classification: Contextualising Acceptance and Use/Non-Use Concerns of PictureThis App

John Bukenya, Paul Birevu Muyinda, Ghislain Maurice Nobert Isabwe, Godfrey Mayende, Fred E.K. Bakkabulindi, James Kalema

Due to their limited experience and training in plant identification and classification techniques at undergraduate level, many undergraduate students lack the proficiency of identifying and classifying plants around them accurately. Whereas employers expect biology graduates to be skilled in field taxonomy techniques, student performance in this area is still poor, with many of them facing hardship to identify or classify unfamiliar plants. With the reduction in the



number of field taxonomy experts in universities and limited time allocation for practical taxonomy teaching, the patterns of student performance in plant identification and classification might not change soon. In order to improve student learning outcomes and competences in plant identification/classification, many students are turning to the use of artificial intelligence (AI) technology/apps, such as PictureThis to supplement their classroom learning experiences. Despite the great potential of PictureThis and other AI tools to improve student learning experiences, few university students have adopted the use of this technology in their day-to-day studies in biological and agricultural courses. In this paper, we seek to understand user concerns and issues around the use of PictureThis as an online organism identifier app for plants. We review studies on the Use of PictureThis App published in Open Access Journals available on Google Scholar and other databases during and after COVID-19 outbreak (2020 – 2024) (metanalyses, conceptual, theoretical, and empirical papers) with the aim of identifying user concerns of PictureThis app. These issues are examined in the lens of the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) in order to examine the predictors of student intention to use this AI technology as a learning tool. This review reveals that user attitude (performancy expectancy), ease of use and usefulness (effort expectancy), trust of identification accuracy, safety of use (perceived risk), use costs (price value), hedonic motivation, enabling resources (facilitating conditions), social influence and learning culture as some of the major use concerns of PictureThis app. It is thus recommended that developers of this technology should reflect on these issues with a view of improving the app's usability as a more robust online organism identifier tool. Important recommendations are made toward sustained scholarship in this virgin field of higher education.

Session 7b

Policies and Practices for Responsible Integration and Utilization of Generative Artificial Intelligence in Education.

Ggaliwango Marvin

The wide availability, seamless integration, user-friendly nature, appealing value proposition and potential for enhancing education experiences has escalated the integration and utilization of Generative Artificial Intelligence (GAI) driven Educational Technology (EdTech) innovative tools in Education. Unfortunately, those have disruptively come with risks like data imperialism, misinformation, bias, and unfairness among others. This has raised questions around the integrity of subjectification, qualification and socialization in Education, hence making it imperative to develop robust policies and practices to guide responsible integration and utilization of GAI in education contexts. Such policies include retooling and competency-based training of educators to redesign and co-create learning experiences using generative AI skills like prompt engineering and reinforcement learning based on localized and contextualized human feedback, among others.

This work is a critical analysis of various case studies on GAI with a focus on the policies and practices necessary for its responsible integration in educational contexts. It reveals the capabilities, limitations and risks of GAI in Education and highlights attention points around educational contexts and ethical concerns that require diverse comprehensive policy frameworks at international, national, and institutional levels to guide responsible integration and utilization of GAI in Education. The successful policies and practices point towards GAI transparency, accountability, fairness, privacy, inclusivity, etc as reflected in the UNESCO and OECD International guidelines. This analysis evidently reveals variations in national policies and practices arising from diverse educational contexts and technological capabilities, while institutional policies and guidelines point to prioritizing faculty re-training and establishment of supportive infrastructure for strategic curriculum integration to maximize the benefits of GAI.

With the exploration of trends and innovations that are disruptively shaping the future of AI in Education, this intersectional case-based study focused on identifying constraints and deriving benchmarks for successful implementations of GAI in higher education training and practices. It sheds light on policy recommendations aimed at fostering collaboration among stakeholders to ensure evidence-based strategic adoption, integration and utilization of GAI in education.

Keywords: Artificial Intelligence (AI), Generative AI, Responsible AI, Education Technology (EdTech), Policy and Practice;

Designing a Chatbot to Enhance Learner Support in Navigating Learning Management System at Makerere University

Shallon Atukunda, Dianah Nampijja and Mayende Godfrey

Learner support in blended learning is critical for student success and retention. However, compared to traditional face-to-face learning, online students often lack timely access to support services. Research shows that many online students struggle to navigate and use the MUELE LMS effectively (Olum et al., 2020), frequently requiring guidance and assistance. The main issue is that eLearning support staff may not always be available to address student queries, especially outside regular hours, leading to delays that reduce student independence and motivation, potentially increasing dropout rates. This study aimed to develop a chatbot to provide timely learner support for MUELE. Adopting a mixed-methods approach underpinned by Social Constructivism theory, the study developed the MUELE Conversational chatbot using Flask, a Python framework for building small web applications. This involved integrating NLP and ML techniques to enable the chatbot to understand and respond to a wide range of student queries, focusing on frequently asked questions about MUELE use. Preliminary results demonstrated a significant improvement in student satisfaction and engagement, with students benefiting from immediate access to information and support due to the chatbot's capabilities. The advanced NLP and ML algorithms ensure that the chatbot can continuously learn and adapt to student needs, providing a personalized learning experience. Based on our findings, we recommend adopting sophisticated AI tools and comprehensive datasets to sustain and enhance the chatbot's performance. Future work should explore additional features and broader applications of chatbot technology to further support online learning in various educational contexts.

Keywords: Natural Language Processing, Machine Learning, Learner support, LMS, Chatbot, AI

Effect of Intelligent Tutoring System on Education

Sulaiman Umar S.noma, Muhammed Garba, Hassan Suru, Ajayi Ebenezer Akinyemi

Intelligent Tutoring Systems (ITSS) are an area of artificial intelligence in education that supports personalized teaching and learning. ITS allows teachers/lecturers to provide customized educational materials to the students while they learn a particular domain of knowledge at their own desired time without human intervention. This research investigated the effect of ITS on the academic performance of students learning the concept of computer

programming through ITS and traditional/conventional methods. This was conducted by the fresh ND I students from the Department of Computer Science, Kebbi State Polytechnic, Dakingari, during the school year 2021-2022 at the treatment of 12 weeks. A quasi-experimental design was adopted to compare the performance of the experimental and control groups. One null hypothesis was tested at the 0.05 alpha level of significance using statistical procedures. The null hypotheses were rejected at $p\text{-val} = .026$. The findings revealed that the experimental group performed better with a mean = 39.00 than the control group with a mean = 33.23.

Keywords: Intelligent Tutoring System, Computer Programming, Education, Students, Quasi-experimental.

Enhancing Learning Management Systems Security: An Explainable Ensemble Machine Learning Model for SQL Injection Detection


Raymond Sekyewa

SQL injection attacks pose a significant security threat to Learning Management Systems (LMS) such as Moodle, potentially leading to unauthorized access, data manipulation, and system compromise. Traditional signature-based intrusion detection systems face limitations in detecting novel and obfuscated SQL injection attacks.

This paper presents the development and evaluation of an explainable ensemble machine learning model specifically designed for detecting SQL injection attacks in LMS environments, addressing the shortcomings of traditional detection systems. The proposed model integrates multiple machine learning algorithms, including decision trees, random forests, and gradient boosting, to enhance the accuracy, robustness, and interpretability of the detection system. The ensemble approach leverages the complementary strengths of individual algorithms, while the explainability component provides insights into the decision-making process, enabling security analysts and educational technologists to understand the rationale behind detection results.

The research involves collecting a comprehensive dataset of SQL injection attacks and normal web traffic within LMS contexts, training and evaluating the ensemble model, and analyzing the model's performance and explainability. To validate and refine the model, human-in-the-loop (HITL) practices will be incorporated, integrating expert feedback into the detection process.

The expected outcomes of this study include a specialized SQL injection dataset for LMS and an explainable SQL injection detection model that significantly enhances the security of LMS platforms like Moodle. By reducing false positives and providing actionable insights, the model



aims to aid security teams and researchers in understanding and mitigating threats effectively, thereby contributing to safer and more resilient educational technology infrastructures.

Keywords: *SQL Injection, Machine Learning, Ensemble Learning, Explainability, Human in the Loop, Learning Management Systems, Moodle*



Makerere University
College of Education and External Studies
Institute of Open Distance and eLearning