

EMERGENCE OF AI IN THE UGANDAS EDUCATION SECTOR: THE PAST, CURRENT & FUTURE

AIED WEBNAR-

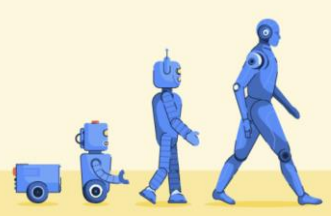
THEME: THE BENEFITS, CHALLENGES, AND RISKS OF APPLYING AI IN TRANSFORMING EDUCATION IN AFRICA

John Okuonzi

Director ICT & Services

Kyambogo University

21-23/NOV/2023

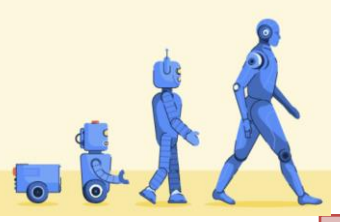


Content

1. AIED-submersion
2. AI-Candidates
3. AI-Perceptions in Uganda
4. AI-Enablers and current situation
5. AI-Research in Education
6. AI-Use cases
7. AI-Learning experiences
8. Challenges
9. Policy Brief
10. The Future and Conclusion

Voice-video based teaching & learning





AIED- The Submersion

1950-1980s

Radios, TVs debuting in education

1980s-1999

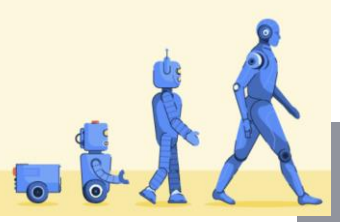
- Educational TV programmes
- AI theories, scientific papers and Movies
- Programming languages and problem solving

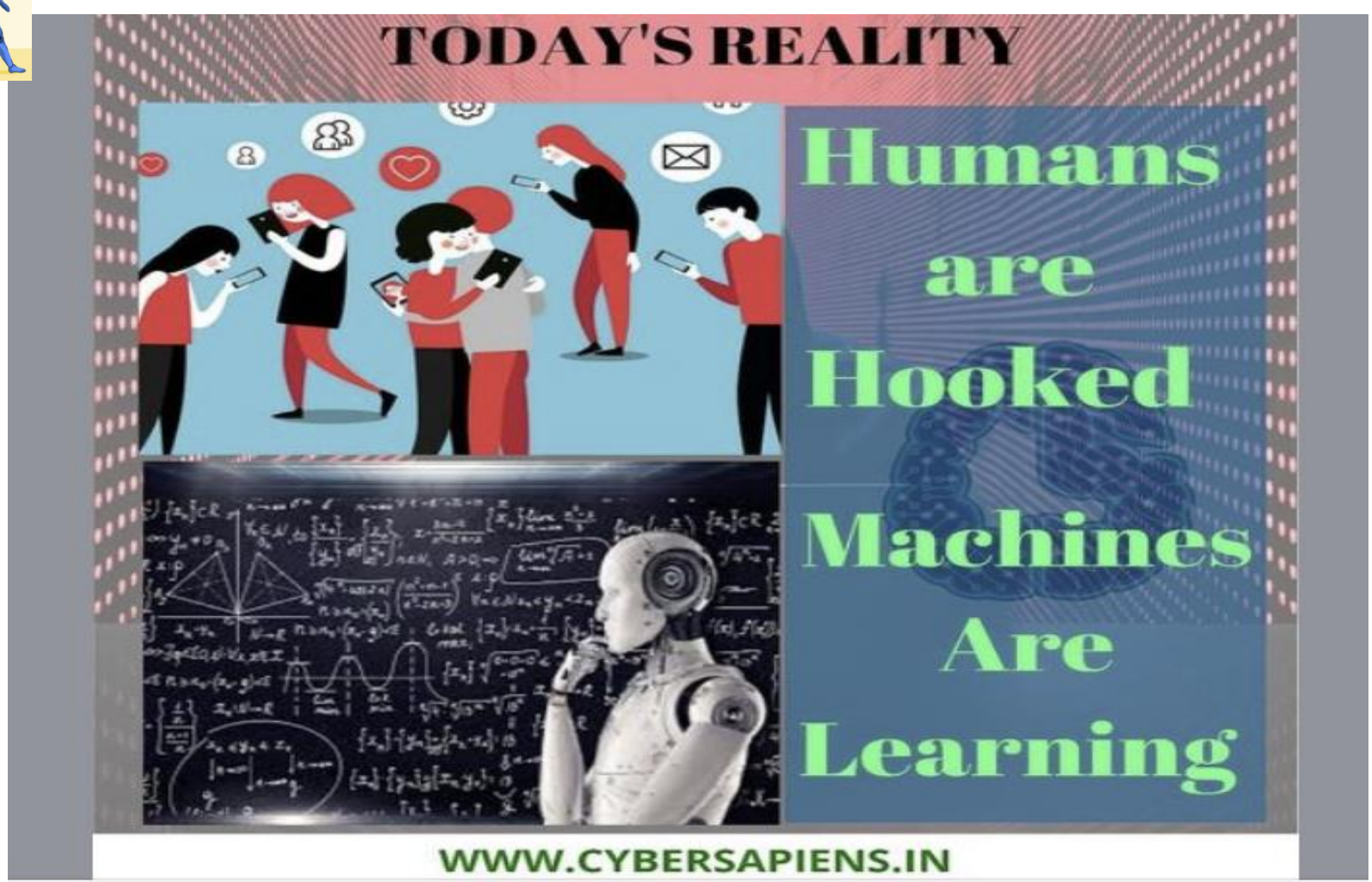
2000-2015

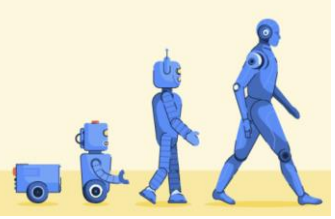
- ANI-Machine Learning, Natural Language processing
- AGI-Machine Intelligence-smart as humans
- Learning management systems

2016-2023

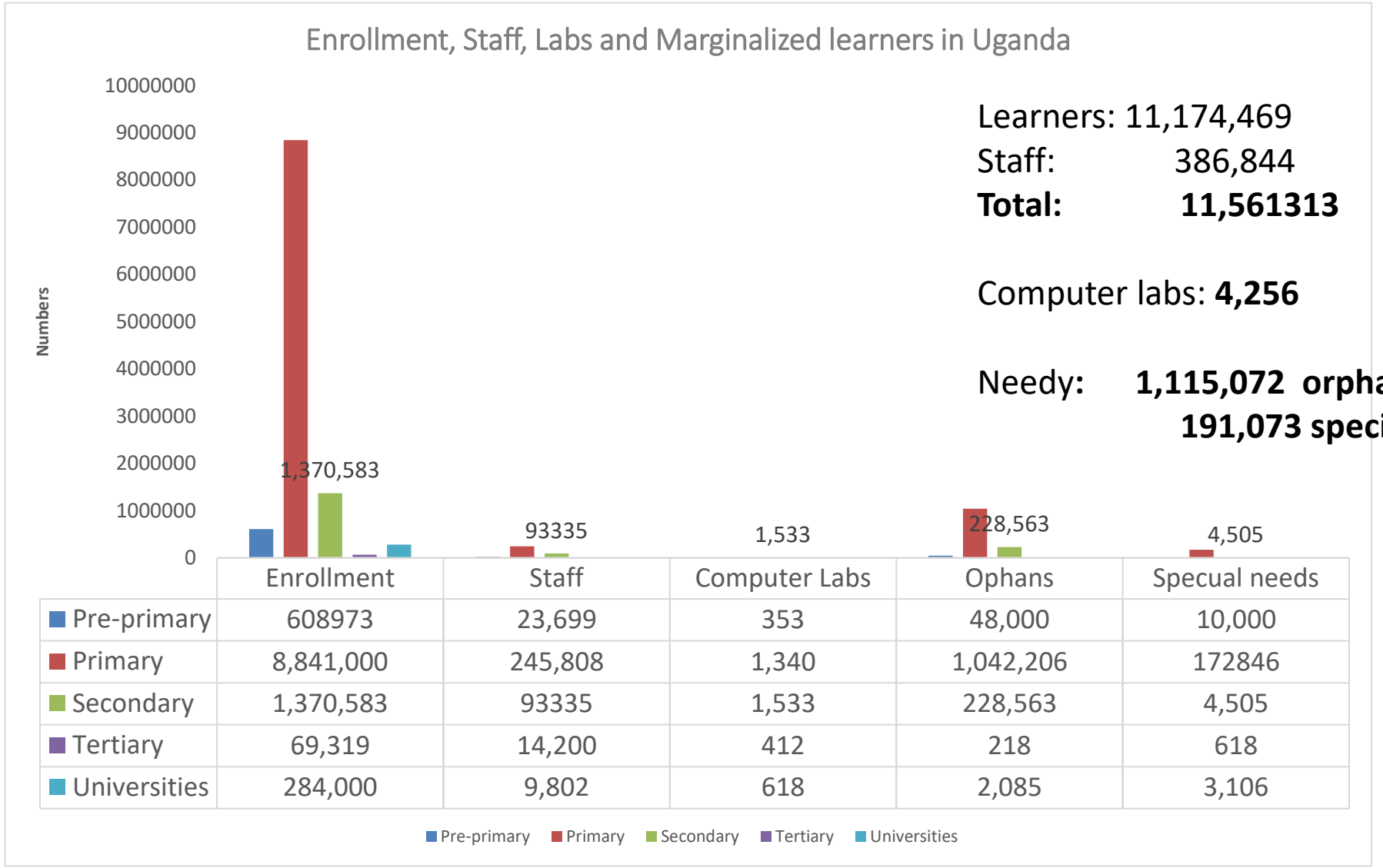
ASI-Machine Intelligence with machine consciousness, ChatGPT




TODAY'S REALITY
Humans are Hooked
Machines Are Learning
WWW.CYBERSAPIENS.IN



AI-Candidates in Uganda



	Enrollment	Staff	Computer Labs	Ophans	Specual needs
Pre-primary	608973	23,699	353	48,000	10,000
Primary	8,841,000	245,808	1,340	1,042,206	172846
Secondary	1,370,583	93335	1,533	228,563	4,505
Tertiary	69,319	14,200	412	218	618
Universities	284,000	9,802	618	2,085	3,106

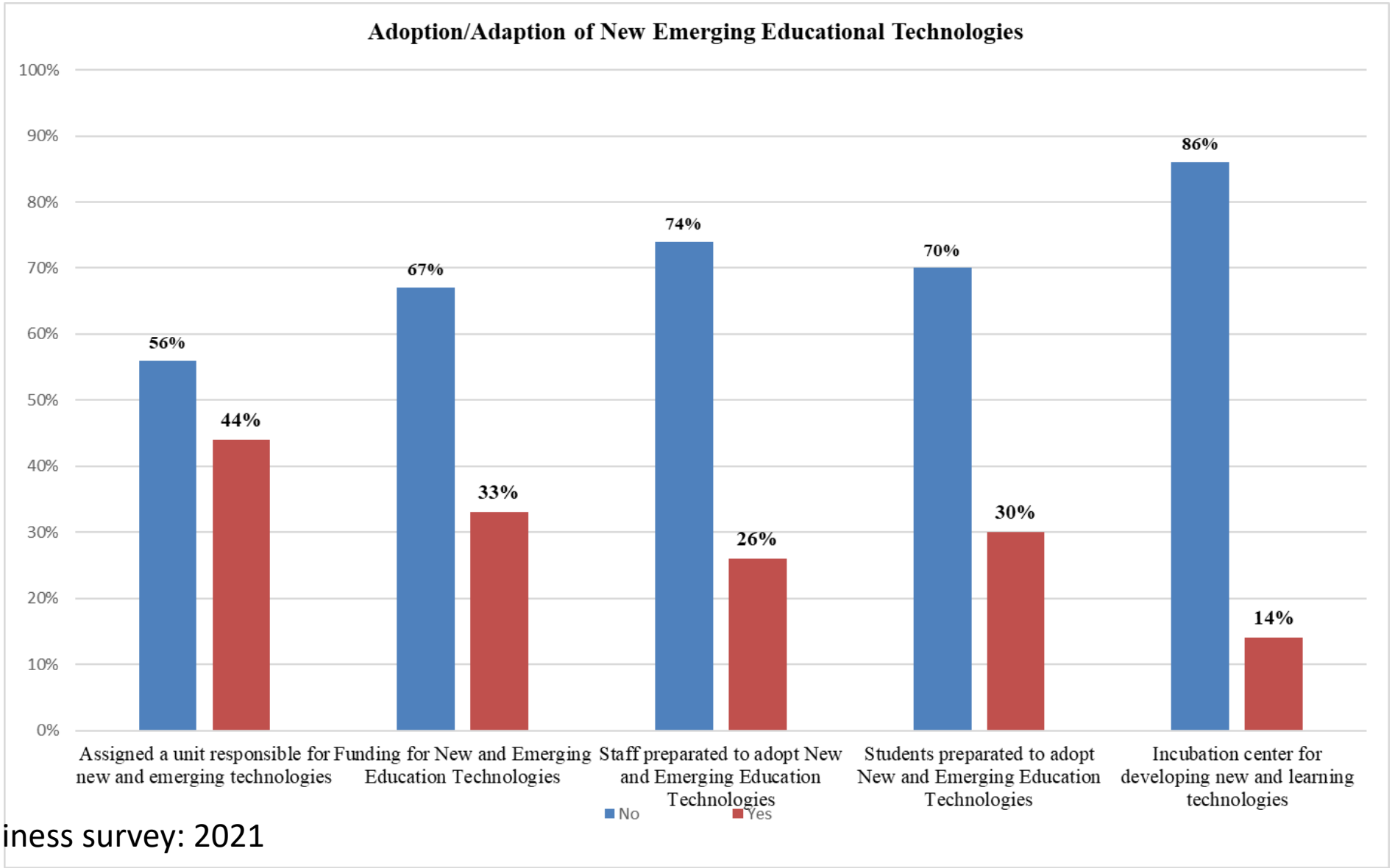
Learners: 11,174,469
Staff: 386,844
Total: 11,561313

Computer labs: **4,256**

Needy: **1,115,072 orphans**
191,073 special needs

Source: https://www.education.go.ug/wp-content/uploads/2019/08

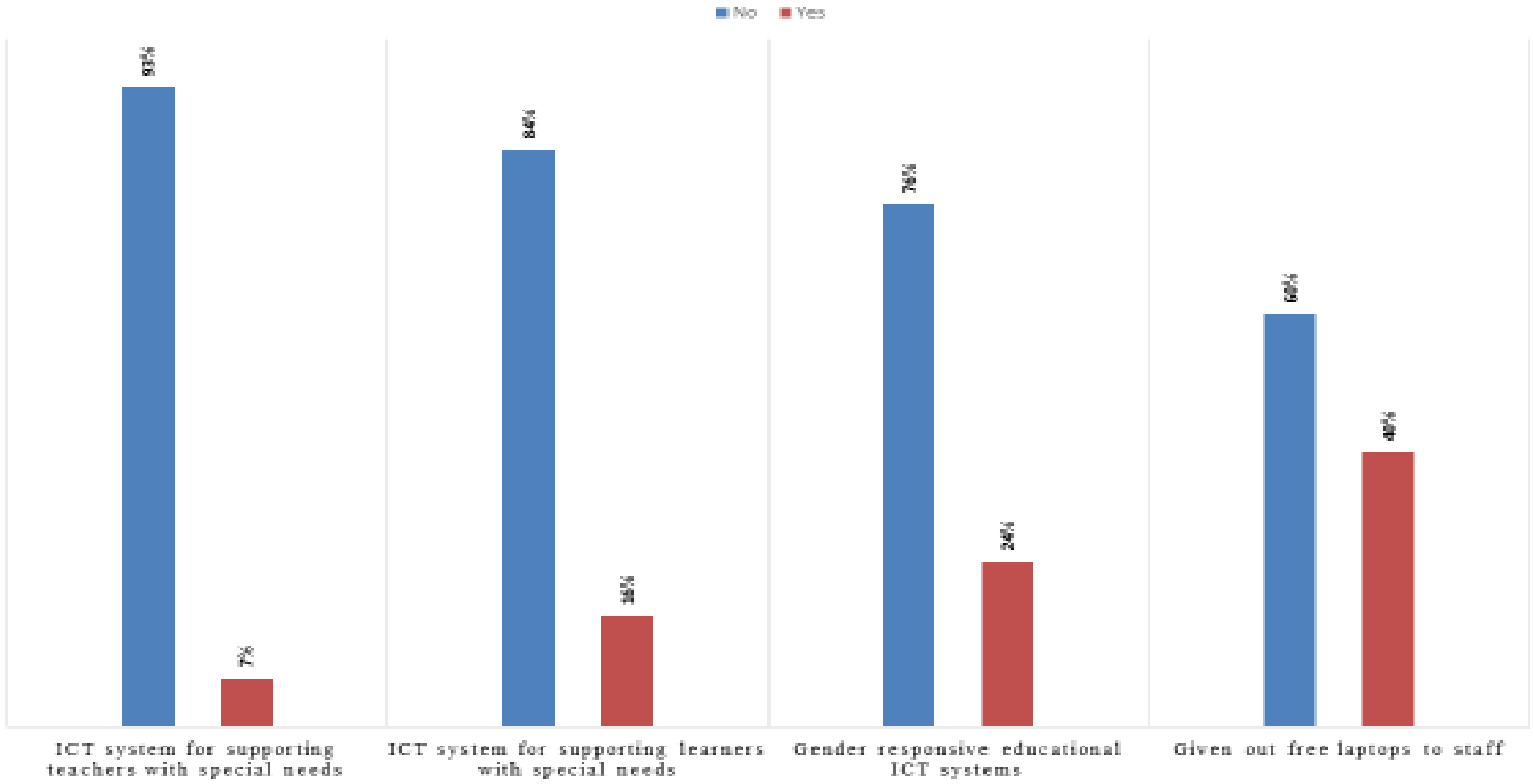
Digital Access and Usage - Secondary Level



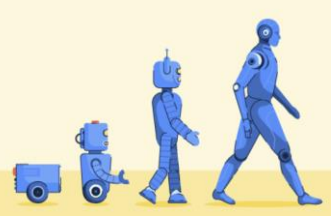
DATC-eReadiness survey: 2021

ICT Awareness and Inclusivity

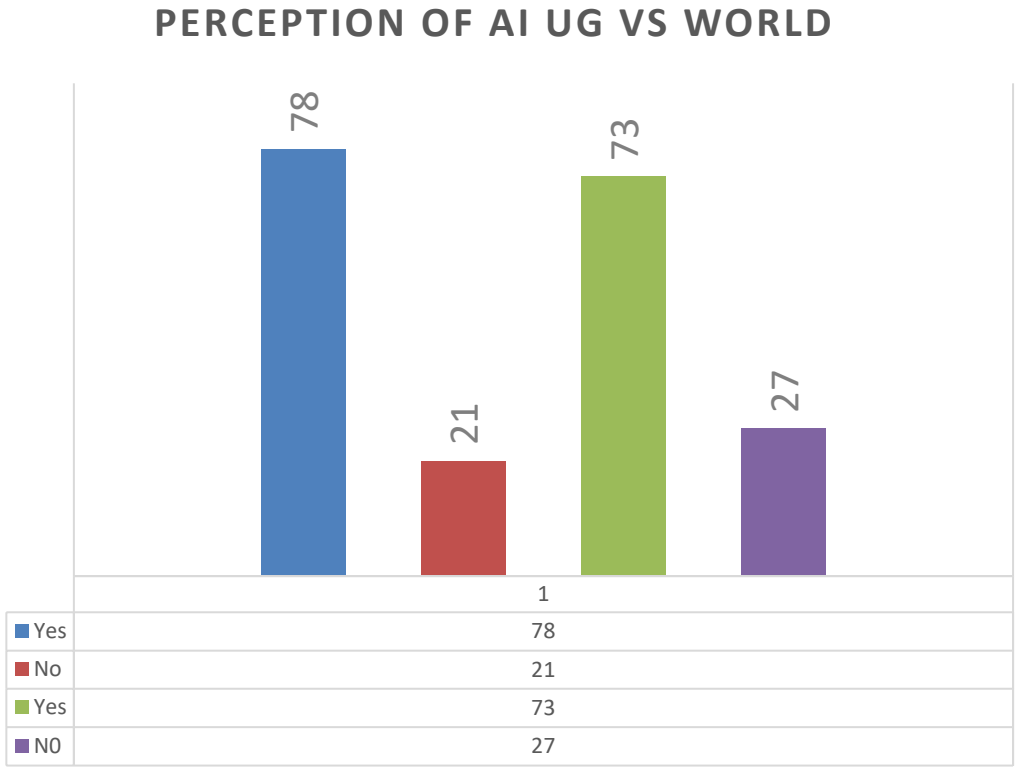
Inclusivity Practices in schools



DATC-eReadiness survey: 2021



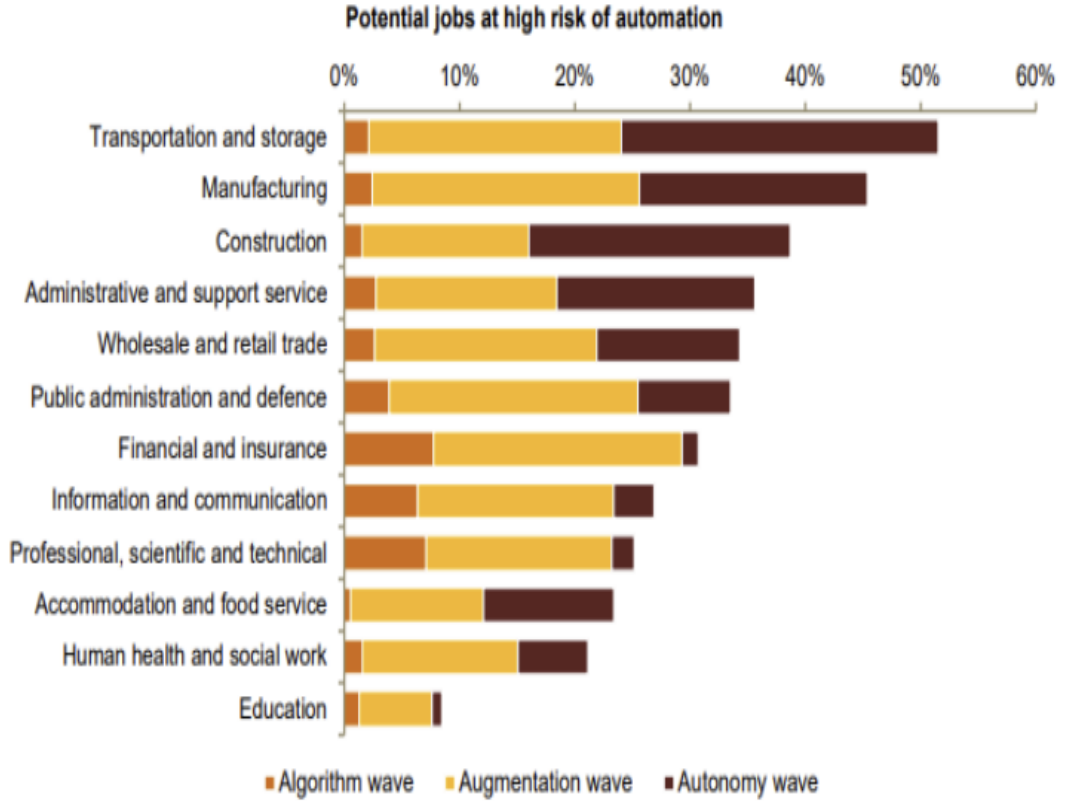
What do Ugandans think about AI?



Dystopian View

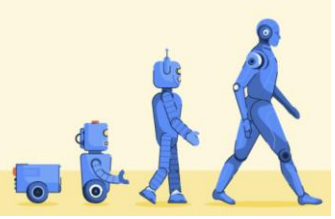
78% of Ugandans surveyed in a recent global poll said they would not feel safe while only 21% said they would feel safe

Source: Lloyd's Register Foundation 2022



Source: PwC, 2018

How can we prepare the next generation for the potential job loss risks?



AI-Enablers & Current Situation

The youth dividend: Tiktok, You-tube, games, mobile devices,

30% Internet Access

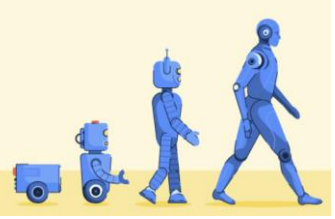
Government/ Private actors/Media



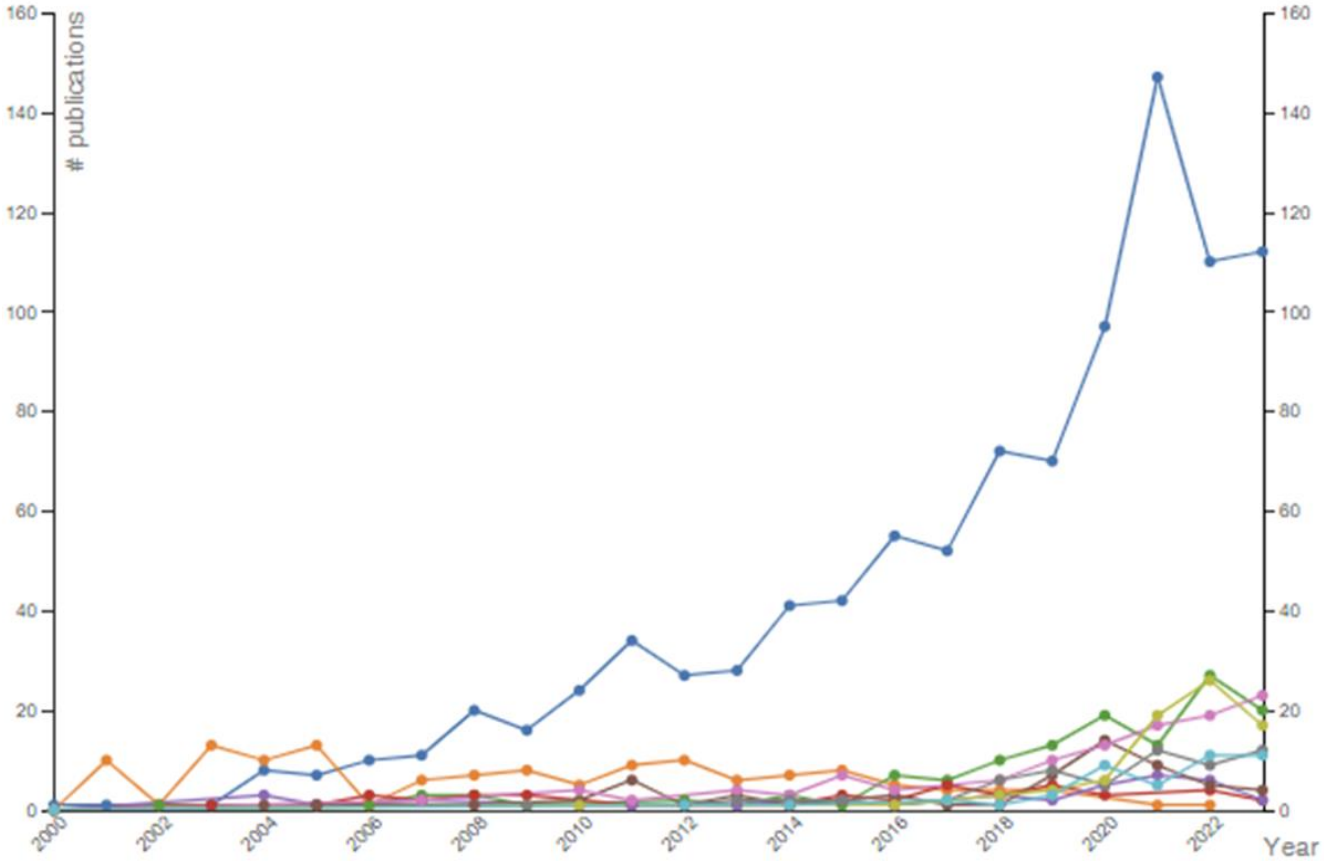
4.3% access Social Media Platforms

AI-Research, Innovations and use cases

Covid 19: 15 Million out of school for 2years. Several Private & International Schools adopted distance learning



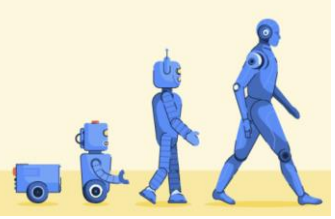
AI-Research & Developments



- Makerere University
- Uganda Episcopal Conference
- Mbarara University of Science and Technology
- Kyambogo University
- Kampala International University
- Gulu University
- Uganda Virus Research Institute
- Busitema University
- Centers for Disease Control and Prevention
- Ministry of Health

Use of AI for monitoring crop diseases and the effects of climate change





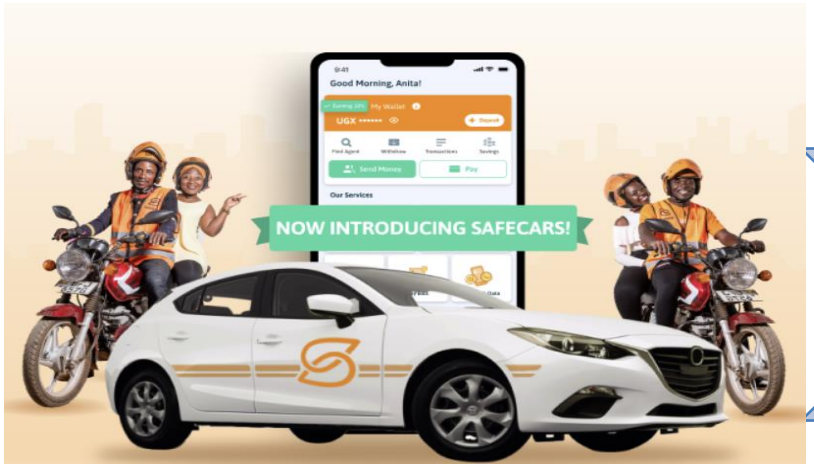
AI applications are leveraging mobile and digital technologies to expand access to financial services



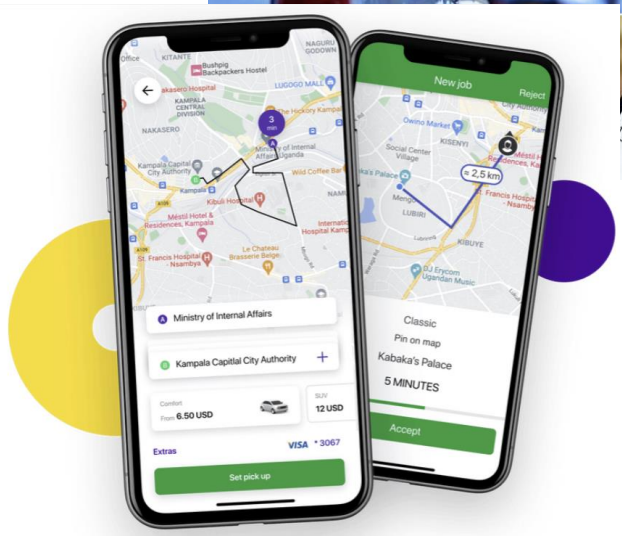




AI-in Business



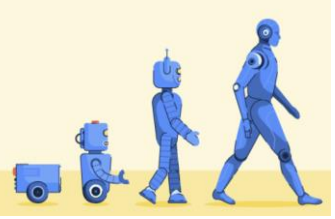
Safe Boda



Uber & Google maps Applications



Mobile Money Application





AI powered diagnosis of crop diseases.

REPRODUCTIVE HEALTH UGANDA

Reproductive Health Uganda (RHU) has developed an artificial intelligence (AI) chat bot, that works with Facebook messenger to close down on the knowledge gap

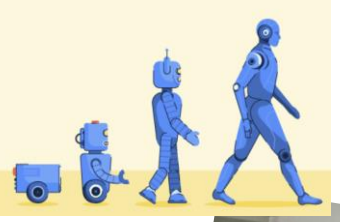
AI-in Health



Chatbot Health advisor



AI application developed by the Makerere AI Lab has automated the screening of blood samples for malaria, reducing diagnosis time from 30 to five minutes





Rural Learners





Urban Learners

AI-Trainings

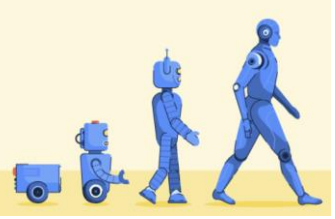




Huawei Uganda- Artificial Intelligence (AI) Training And Upskilling Of ICT Professionals



UNESCO-Training on the use of Artificial Intelligence in Disaster Risk Reduction in Uganda-2021



AI-based software has ben developed to detect from satellite images





Farmer Brian Chemase uses the Nuru ap in his potato field. (Photo: M. Korir/PlantVillage)

Ai-in Agriculture



AI powered Farmshield helps farmers to collect real time feedback about the crops in the farm



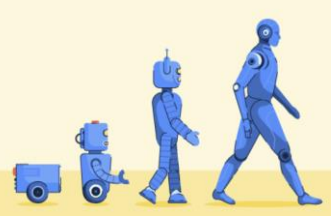
EO Imagery and AI to Improve Agriculture in Uganda



AI powered monitoring of the farm animals



Stepwise AI Application to improve quality of coffee

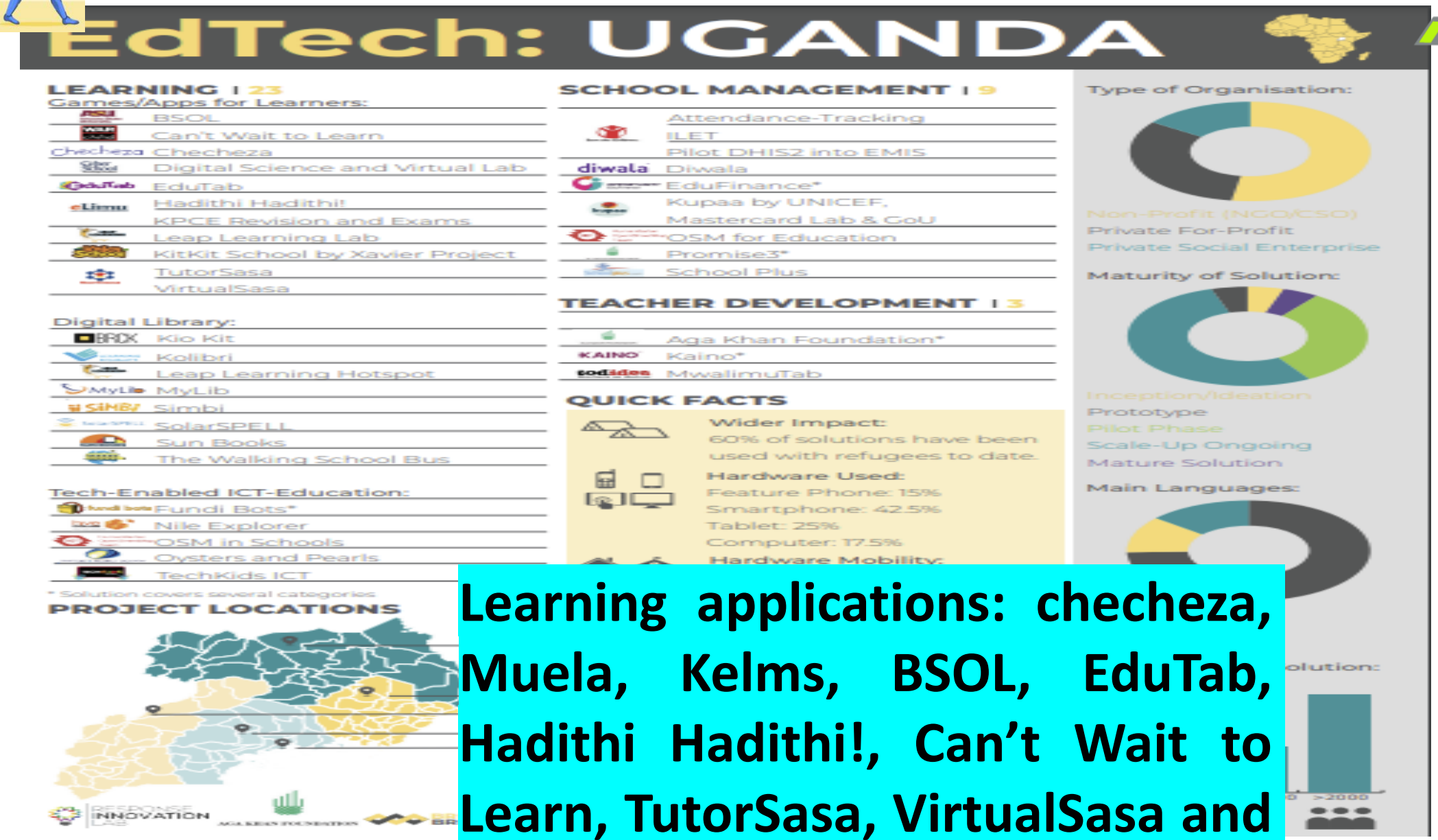


Usage of new emerging

technologies in pedagogy	Freq	%age
Refresher training for continuous professional development	29	28.4
Inclusivity	21	20.6
New technologies should be aligned with country's priorities	17	16.7
Make new technologies affordable	12	11.8
Incubation centers for creating and adopting new technologies	11	10.8
Revise school policies/ regulated use	8	7.8
Maintenance and sustainability	4	3.9
Total responses to this Variable	102	100.0

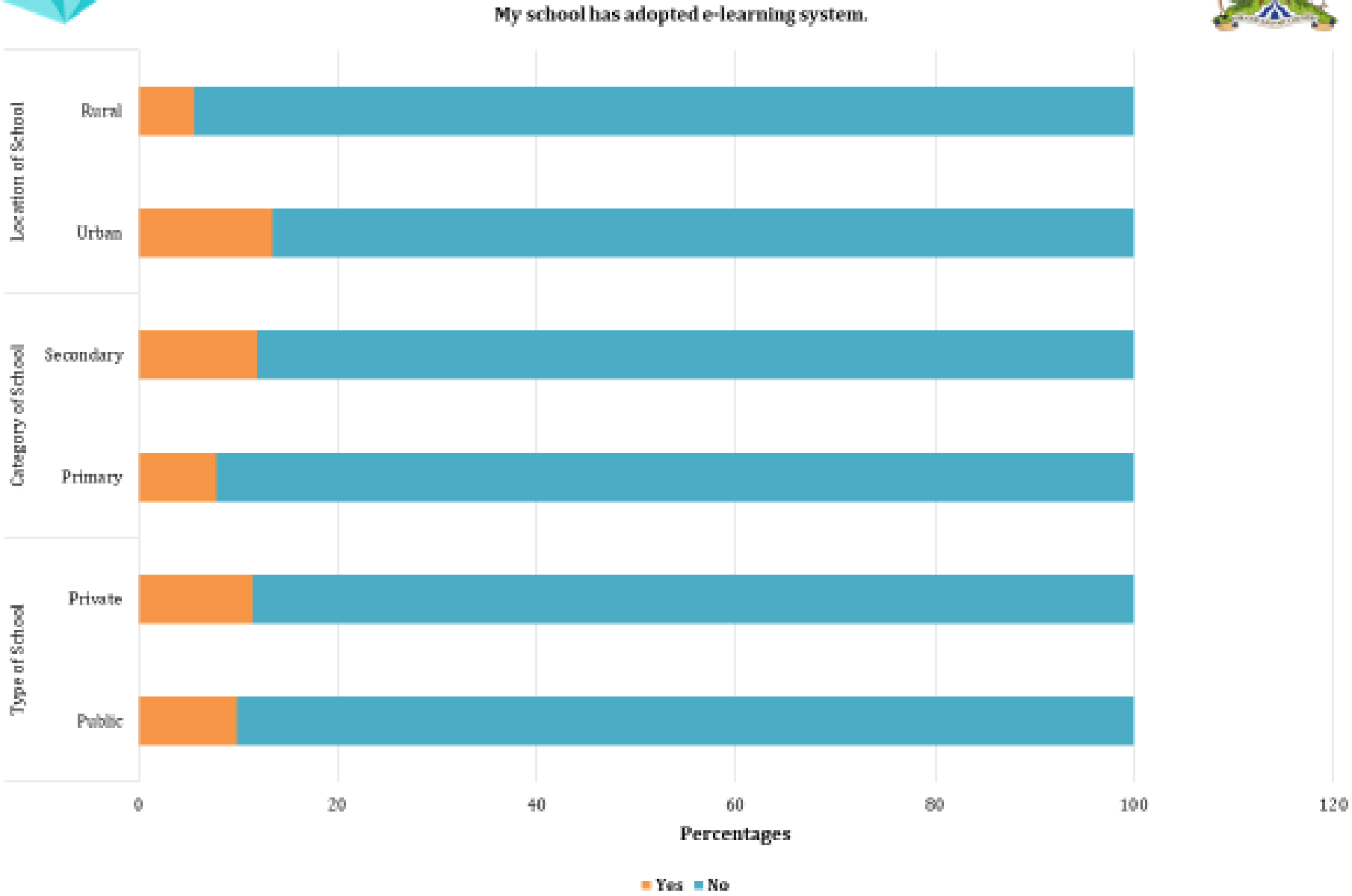
Source: Stakeholder Engagements 2021

AIED-Elearning Platforms

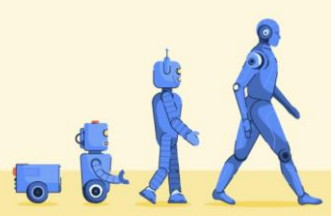


Learning applications: checheza, Muela, Kelms, BSOL, EduTab, Hadithi Hadithi!, Can't Wait to Learn, TutorSasa, VirtualSasa and

Adoption of e-Learning in schools



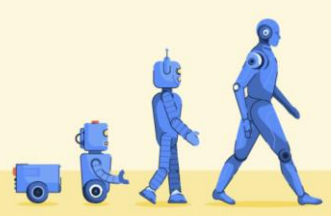
DATC-eReadiness survey: 2021



AIED – How and what is it used for?

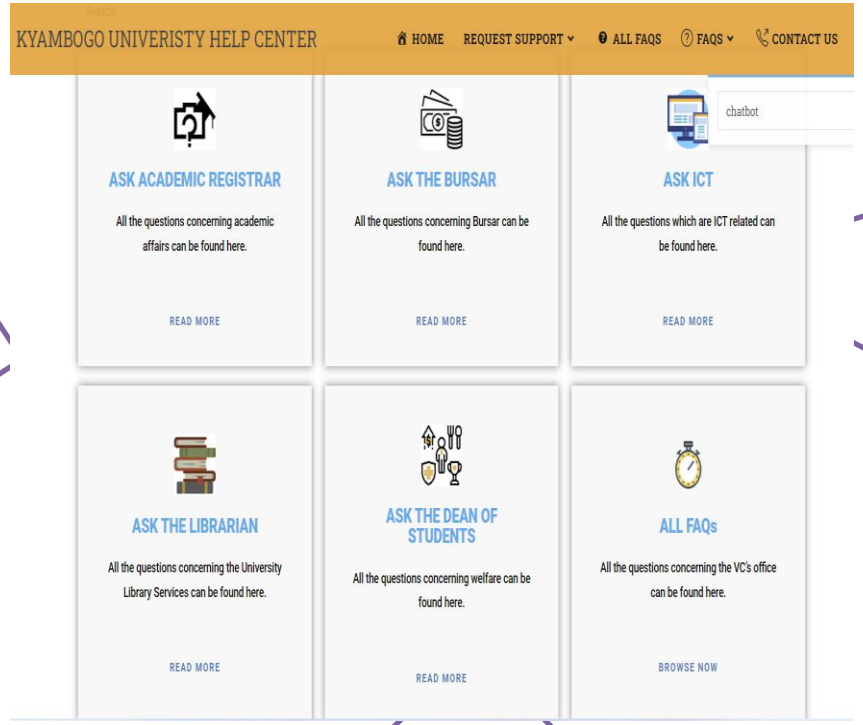
- How are the administrators using it? (Work & Reporting)
- How the teaching staff using it? (Research, Teaching & assessment)
- How are the students using it? (Learning and class activities)
- How is it used for interactions (Communication)



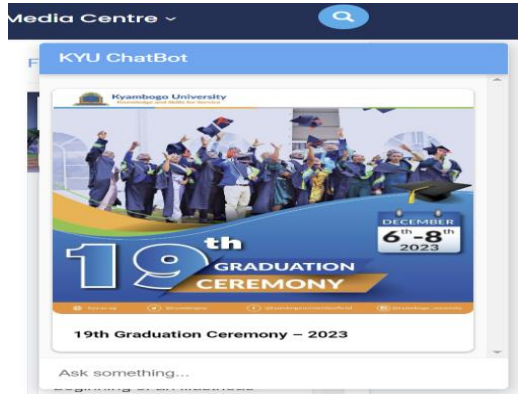


AIED-Use cases

Student's support: enrollment, payments, graduation, virtual campus tours, notifications, news feeds and tracking of progress.

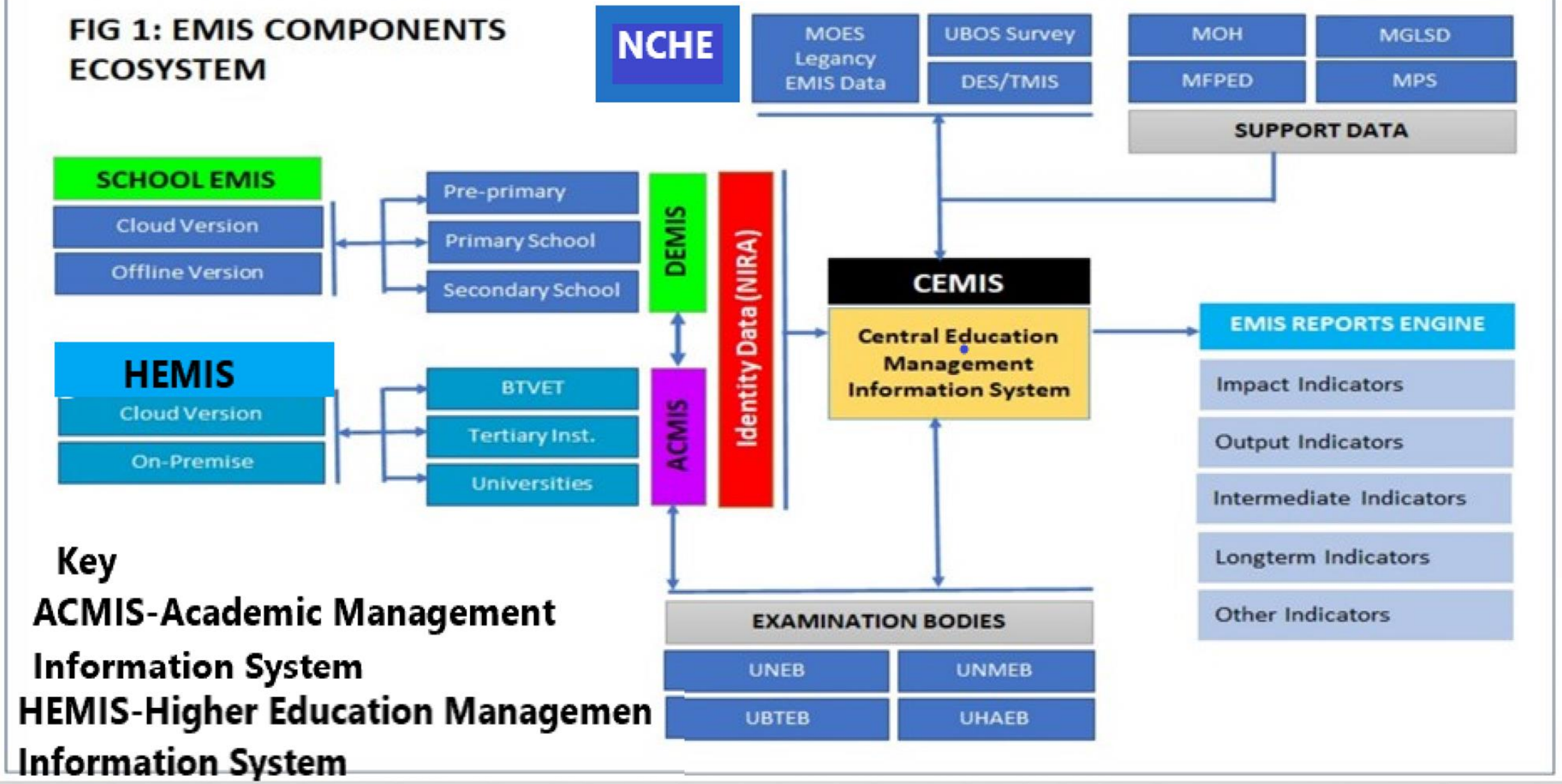


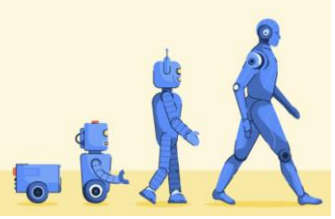
Direct access to the most relevant information



Search engines: Google Bard, Microsoft Bing and Yahoo, Duckduckgo, Startpage, Qwant, Brave Search etc.

AIED-EMIS


FIG 1: EMIS COMPONENTS ECOSYSTEM
NCHE
MOES Legancy EMIS Data
UBOS Survey
DES/TMIS
MOH
MGLSD
MFPED
MPS
SUPPORT DATA
SCHOOL EMIS
Cloud Version
Offline Version
Pre-primary
Primary School
Secondary School
DEMIS
Identity Data (NIRA)
CEMIS
Central Education Management Information System
EMIS REPORTS ENGINE
Impact Indicators
Output Indicators
Intermediate Indicators
Longterm Indicators
Other Indicators
HEMIS
Cloud Version
On-Premise
BTVET
Tertiary Inst.
Universities
ACMIS
EXAMINATION BODIES
UNEB
UNMEB
UBTEB
UHAEB
Key
ACMIS-Academic Management Information System
HEMIS-Higher Education Managemen Information System



AI-Enabled Administration

Timetabling, scheduling and policy enforcement.

Business intelligence and analytics tools for decision making

Tracking teaching and Research outputs of staff

AI-Powered ERP Software

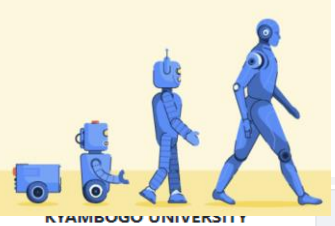
Streamlining Administrative Tasks



Finance records management: Real time reports

Human resources management: Workload balancing, real time updates, compliance monitoring

Data Privacy and Security: A.I. powered collection and analysis of large amounts of data, including sensitive information.



ACMIS- AI powered ERP



KYAMBOGO UNIVERSITY

SYSTEM ADMINISTRATOR ROLE

DR.JOHN AD

MY APPS

MY APPLICATIONS

MY APPLICATIONS

Manage Institution Policies.

Manage Key Events, Academic Calendar, Teaching and Examination Timetables.

Open running schemes, Manage Applicants and View Reports.

Manage Students' Records and Bio data.

PHOTO & BIOMETRICS CAPTURE

Upload Students photos and Biometric Data.

ENROLLMENT & REGISTRATION

Manage Enrollments and Registration Records.

STAFF AND STUDENT IDENTIFICATION

Manage Staff and Student Identification.

STUDENTS' BILLING & PAYMENTS TRACKER

Manage Students' Invoices and Payments.

UNIVERSAL PAYMENTS

Manage Universal Receivables and Payments.

COURSE ASSIGNMENT & TIMETABLE

Assign Courses/Modules to Lecturers/Tutors.

BUSINESS INTELLIGENCE

View Business Intelligence Reports.

RESULTS MANAGEMENT

Manage Results and View Reports.

DEANS & STUDENTS' WELFARE

Manage Students' Welfare.

HUMAN RESOURCE MANAGEMENT

Manage Human Resource.

ACADEMIC DOCUMENTS PRODUCTION

Produce Academic Documents.

ESTATES MANAGEMENT

Manage Estates.

E-VOTING

Manage e-Voting.

MEDICAL SERVICES

Manage Medical Services.

OUTREACH MANAGEMENT

Manage OutReach.

POINT OF SERVICE

Manage Point Of Service.

STUDENT'S CLEARANCE TRACKER

Manage Student's Clearances.

USER SUPPORT

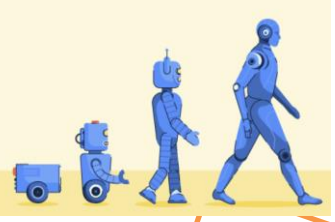
Manage Staff and Student Quick Support Queries.

NTC RESULTS MANAGEMENT

Manage NTC Students' Results.

RESULTS UPLOAD & SUBMISSION

Upload and Process Students' Results and View Timetables

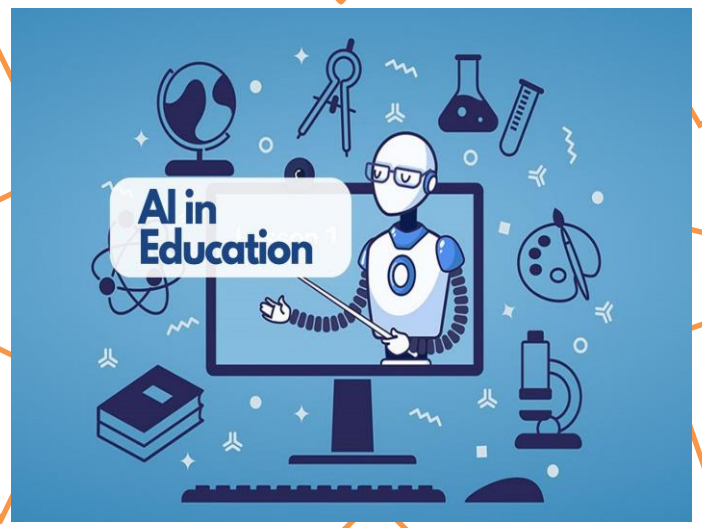


AI-Real & Possible Learning Experiences

Adaptive learning: basic and advanced skills with guided instructional guides for proficiency

Scheduling and tracking teaching and learning events. Analysis of students' success metrics,

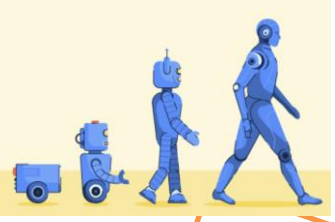
Enhanced assessment integrity: Automated scoring and grading, documents verification plagiarism checks of AI generated content



Personalizing materials to suit each student style, pace, NLP and preferences

Classroom behavior management: real time management, personalized feedback.

Assistive technologies: students with special needs, visual or hearing impairment helped with audio or text or video assistance.

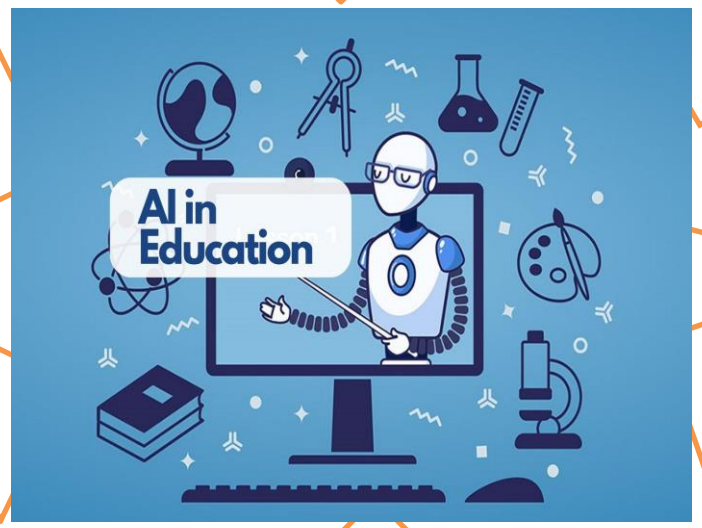


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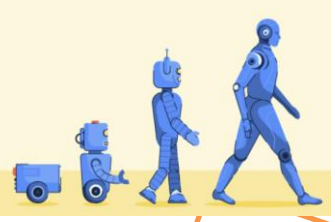
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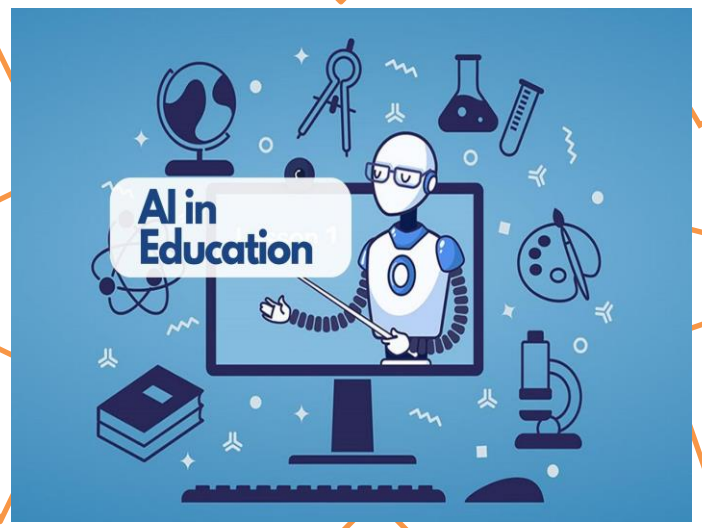


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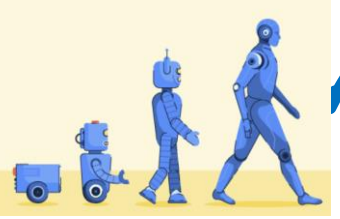
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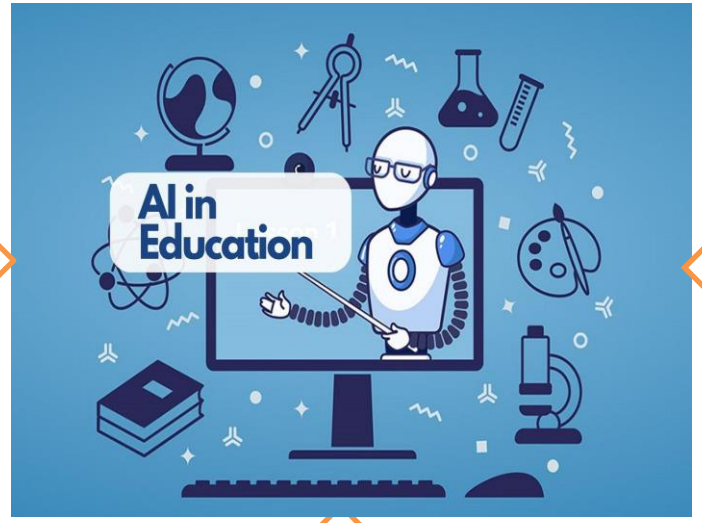
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AI-Real & Possible Learning Experiences…

AI assisted writing (e.g. ChatGPT) can enhance creativity if the learners are empowered to

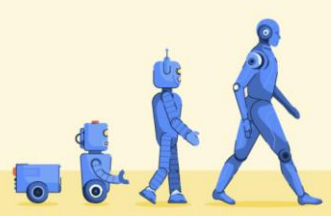
Gamified and Virtual reality learning experiences



Voice-video based interactions and with simulations

Technology-assisted drafting/prototyping and preparation of lessons/material from the curriculum.

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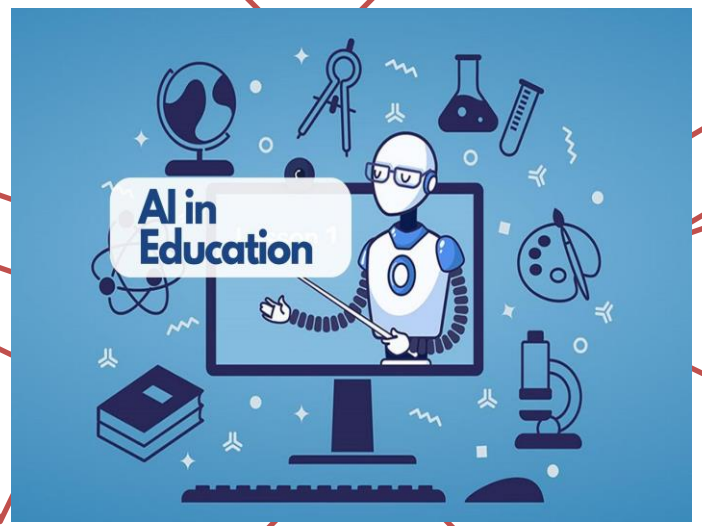


AIED-Fears in the classroom

Lack of Human Interaction: Over-reliance on A.I. may result in students feeling isolated or disconnected from their peers and teachers

A.I. may lead to content fatigue and demotivation

A.I. in education may pose a risk to students' privacy and personal information



Creativity in some skills such as writing are affected with reliance on AI

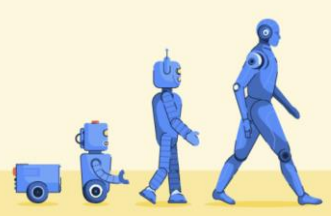
Bias & Misinformation in Algorithms
A.I. algorithms can be biased if they are trained on data that is not representative of the student population.

A.I. in education raises ethical and legal questions around issues such as algorithmic bias, data privacy, content ownership, and transparency..

AIED-What is the Solution?



- AI Challenges can be overcome by Integration of AI into Human Intelligence (HI)

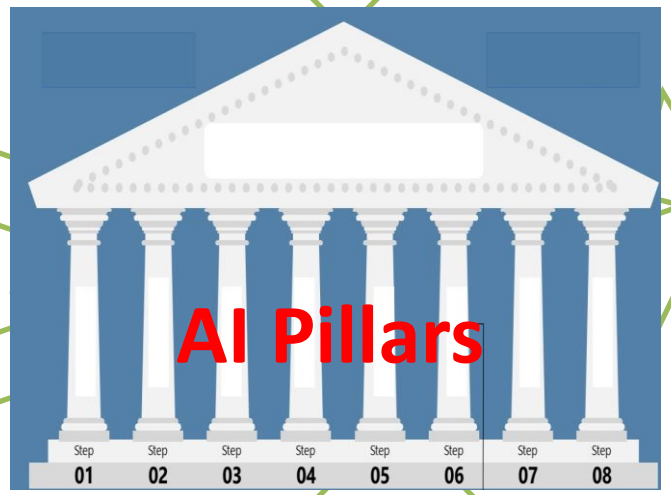


AIED-Overcoming Challenges/Policy Brief

2. Installation of the required technological infrastructure

1. Good and progressive leaders and a conducive political climate

3. Training Teachers on how to use AI & Training of specialists to create local content

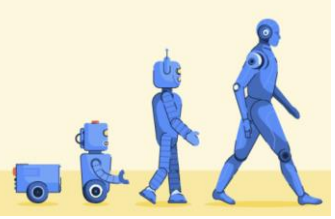


8. Bringing Public-Private-Partnerships on Board

4. Putting the necessary Laws and Regulations in place
.



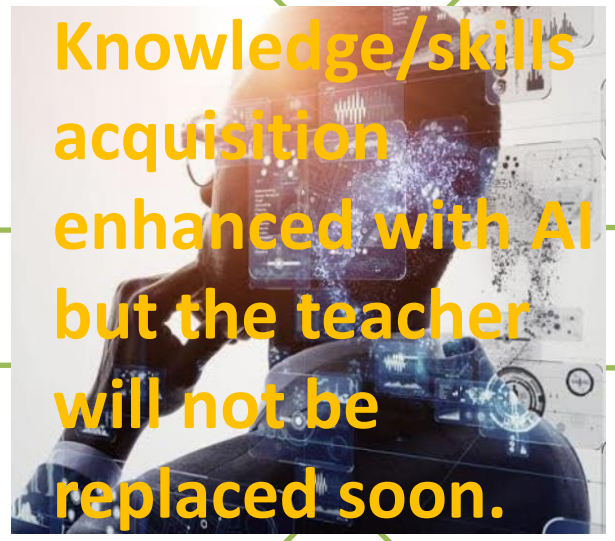
5. Creating a Framework for the use of AI
6. Provision of Internet Subsidies
7. Provision of complementary infrastructure- e.g labs, power, water etc



AIED-Future

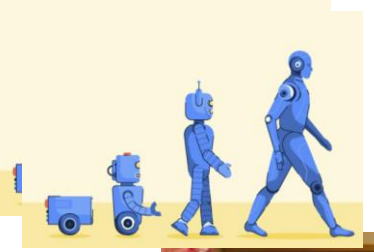
1. Intelligent tutoring systems: AI-powered tutors to provide personalized and adaptive learning experiences, analyzing student data to identify areas for improvement and tailor instructional content accordingly

3. Intelligent learning platforms: AI can analyze vast educational content and recommend personalized learning resources to students, catering to their individual needs and interests

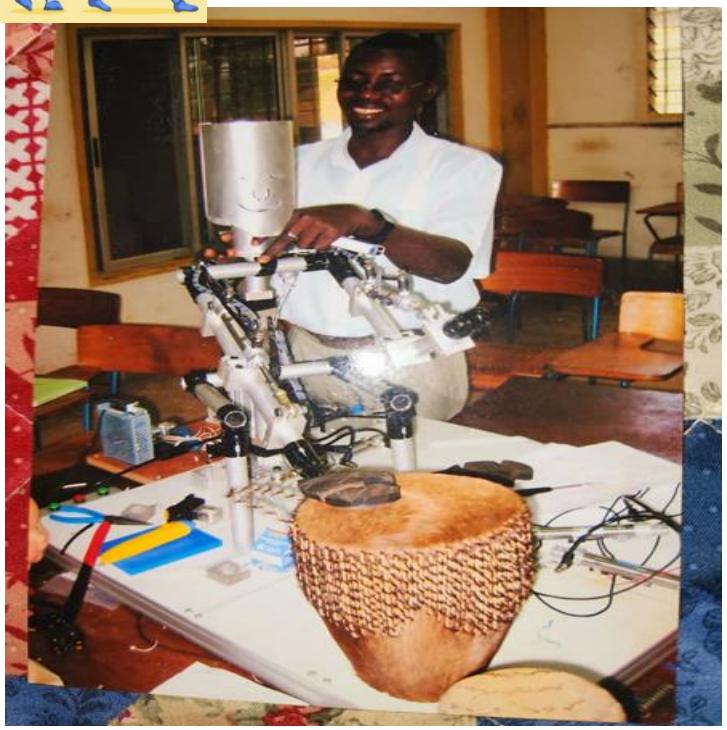


4. Virtual reality and augmented reality: AI could enable immersive learning experiences through virtual and augmented reality. Students can explore simulations and visualizations, making complex concepts more tangible and engaging. Voice-based learning.

2. Data analytics for decision-making: AI algorithms can process large amounts of data to provide meaningful insights on student performance, teacher effectiveness, and curriculum development. This data-driven decision-making can enhance educational planning and policy-making at various levels

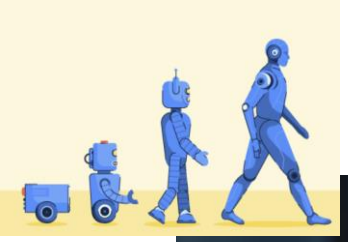


AIED-Conclusion



It is essential to ensure that AI in education is implemented ethically, taking into consideration issues of bias, privacy, and inclusivity. Additionally, ensuring equitable access to AI technology and building the necessary human capacity for its integration will be crucial for its successful implementation in Uganda's education system.

AI should be a strong hinge for Human Intelligence (HI) leveraging existing culture and traditional practices for education




The End