A Technology Game Changer: How GenAI Will Reshape Learning

Speakers:
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No one is left behind

Definition
*The Global Goals are an agreed-upon set of goals, targets, and indicators that all member states of the UN agreed to in 2015 with the goal of ending poverty, fighting inequality, and urgently addressing the climate crisis.

How are designed
*...designed to provide *lifelong education for all.*

This is the story we are going to tell you today.

Ed Tech for Good Curation Framework

• We are seeing today a plethora of educational technology (EdTech) tools emerging:
  • Adaptive learning programs for math, gamified language learning apps, and robotics kits powered by tinyML!

• However, how can governments, organizations, schools, teachers, and parents know which tool better suits their needs?

• Unicef Learning Innovation Hub-Office of Innovation with the Asian Development Bank (ADB) has been developing, along with partners such as Arm, the EdTech for Good Curation Framework.

• In August 2023, we met in Helsinki to shape the framework's pillars together.
A scalable learning experience

How can we help kids learn new technologies or programming languages in a scalable way in the global south?
A scalable learning experience

- Consider the following example:

  Let’s assume we provide a fancy, cool robot in the Global South to teach the foundations of technology.

- Would it be enough to teach technology?

  The answer depends upon whether educators/teachers know the technology and the robot.
  If not, the robot will be just a toy.
A scalable learning experience

- **Educators/teachers are indispensable contributors to children’s education.**

- However, they need continuous professional development to help them broaden their knowledge, which can be very tricky in some countries.
GenAI to scale professional development and learning experience

• GenAI at the Edge is a MUST in some countries (you will know why in a few slides)

• However, is the edge technology ready for genAI?

• The answer is...YES!
GenAl on smartphones and edge single-board computer

• Recently, we demonstrated that large language models (LLMs) can already run on the Arm CPUs of many of today’s smartphones at a speed higher than the average human speed reading.
  • For example, higher than 20 tokens/second thanks to the i8mm extension (matrix-multiplication extension) available on Armv8.6-a onwards

• Software optimizations, like those that enabled LLMs to run on smartphones, also make it possible to run LLMs on single-board computers like Raspberry Pi 5!
## LLM performance on Raspberry Pi 5

<table>
<thead>
<tr>
<th></th>
<th>TinyLLaMA (1.1B)</th>
<th>Phi-2 (2.7)</th>
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<tbody>
<tr>
<td>Text generation speed</td>
<td>10.05</td>
<td>5.90</td>
</tr>
<tr>
<td>(tokens/second)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM use</td>
<td>606 MBytes</td>
<td>1526 MBytes</td>
</tr>
</tbody>
</table>

- 2 threads on Arm Cortex-A76 @ 2.4GHz
  - SDOT instruction available to speed up the matrix multiplication
- Out-of-the-box performance from the llama.cpp framework
- Int4 blockwise weights compression
The technology is here, but why do we need genAI at the Edge?
UNICEF Learning Innovation Hub

The Future of Learning is Now

Session: A technology game changer: How GenAI Will Reshape Learning
tinyAI Forum – 28 March 2024
Opportunities of AI and genAI in education

**Education management and delivery**

**Learning and assessment**
Personalized learning: intelligent tutoring systems, exploratory learning environments, AI-supported reading & language learning, adaptive assessments, smart robots, teachable agents, educational VR/AR, AI-enabled collaborative learning, accessibility & inclusion

**Accelerating growth of AI**

**Empowering teachers and enhancing teaching**
AI-powered teaching assistants (data analysis and insights), AI-human ‘dual teacher’ model

**Lifelong learning**
AI-driven lifelong learning companions, AI-enabled record of lifelong learning achievements
LEARNING CRISIS CATASTROPHE GROWING TREND

share of children unable to read and understand a basic text by the age of 10 in low- & middle-income countries

% 10-year-olds in low & middle-income countries

53% 2015

57% 2019

70% 2022

Source: https://www.unicef.org/reports/state-global-learning-poverty-2022
Snapshot: Rwanda

Connectivity

- 30.5% National internet penetration rate
- Internet costs are high and often unaffordable for families
- 1 smartphone per family (in remote areas “feature phone”)

Infrastructure

- 40% Schools with ICT equipment (usually 1 laptop & 1 projector per school)
- “Smart classrooms”: computer labs – students share devices
- Frequent power cuts
A global home for the architects of the future of learning in Helsinki

UNICEF Learning Innovation Hub

- Young People
- Teachers + Parents
- Entrepreneurs
- Tech Mavericks
- Data Ninjas
- Business Leaders
- Artists
- Designers
- Fiction Writers

UNICEF Country Offices + Programs

Education & Policy Experts

UNICEF

Youth

Teachers + Parents

Entrepreneurs
Tech Mavericks
Data Ninjas
Business Leaders
Artists
Designers
Fiction Writers
Hacking the road to children
by accelerating and scaling access to digital learning

EdTech innovations

ALL Children
A publicly accessible platform that aims to become the go-to place for anyone looking for cutting-edge digital learning solutions, serving as:

1. An easy-to-explore, search and filter **curated collection of ed-tech tools** that can inform governments, organizations working in education and educational institutions on their education digital transformation.

EDTECH 4 GOOD CURATION FRAMEWORK

SAFETY FIRST
Safeguards children’s data ensuring privacy, security, and responsible handling of their personal information, guarantee that the products do not cause harm

IMPACT ON LEARNING
Effective and positive impact on learner outcomes and educational experiences

DESIGNED FOR CHILDREN
Age-appropriate and engaging design elements, interactive features, and intuitive interfaces that cater to the cognitive and developmental needs of children, fostering an enjoyable and effective learning experience

READY TO REACH ALL
Cost-effective solutions that can be easily adopted, implemented, and scaled to reach a wide range of learners in different contexts

LEAVE NO ONE BEHIND
Equitable access and participation for all learners, regardless of their background, abilities, or circumstances
Blue Unicorn “moonshot”

Challenge the search for 1+ Billion dollars ventures and seek to build ventures that impact 100 million children with quality learning experiences that promote gender equality, nondiscrimination and integrates children with disabilities.
“We are called to be the architects of the future, not its victims.”

Buckminster Fuller
Join us

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www.unicef.org/innovation/learninginnovationhub