

16TH ITU ACADEMIC CONFERENCE

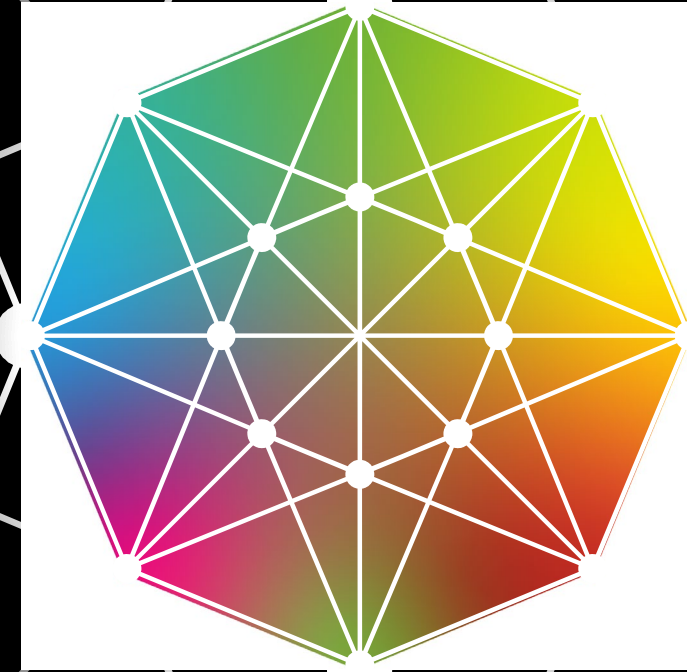
ITUKALEIDOSCOPE

GENEVA2026

*AI and frontier
technologies for good*

7-9 July 2026
Geneva, Switzerland

Hosted by  **AI for Good**
Global Summit



Edge-Native LLMs

8 July 2026





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Session #P3



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INTRODUCTION

- Large Language Models can support individualized tutoring at scale.
- Most AI tutoring systems are cloud-first and require continuous broadband and low latency.
- Rural and remote schools often face weak connectivity, expensive data, high latency, and unstable power



How can AI tutoring remain useful in rural schools when Internet connectivity is intermittent, expensive, or unavailable?

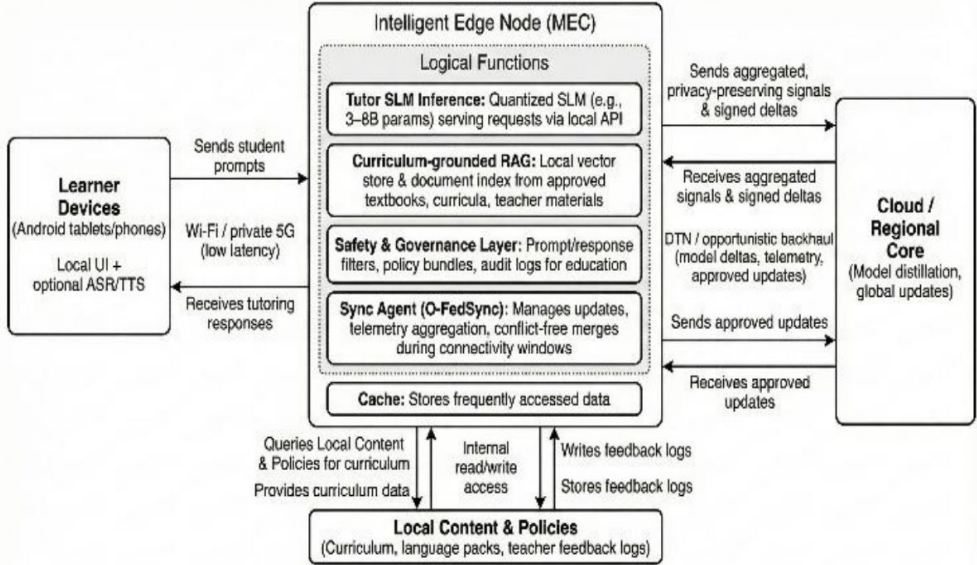
OBJECTIVES

- Develop an edge-native, offline-first AI tutoring architecture.
- Run quantized Small Language Models locally on telecom Multi-access Edge Computing (MEC) nodes
- Introduce O-FedSync, a delay-tolerant synchronization protocol for intermittent backhaul.

RESULTS

Workload model	50 learner tablets; 20 tutoring sessions per learner per day; 25 seconds of voice interaction per session; 32 kbps each direction plus text metadata.
Cloud-centric baseline	Approximately 205 MB/day for interactive traffic.
Edge-native O-FedSync	Approximately 2-20 MB/day for configurable synchronization artifacts
Baseline reduction	Approximately 90.2% to 99.0%.
Sensitivity range	Approximately 76% to 99% across representative school and update scenarios.

METHODOLOGY



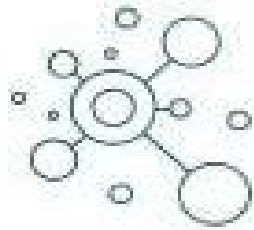
CONCLUSION

- Edge-native tutoring can make AI-assisted education more usable in rural and connectivity-constrained environments.
- The proposed architecture keeps tutoring local and synchronizes only when feasible.
- O-FedSync enables curriculum freshness, teacher feedback, auditability, and privacy-aware synchronization

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Thank you!

