Digitally Supported Capacity Building Across
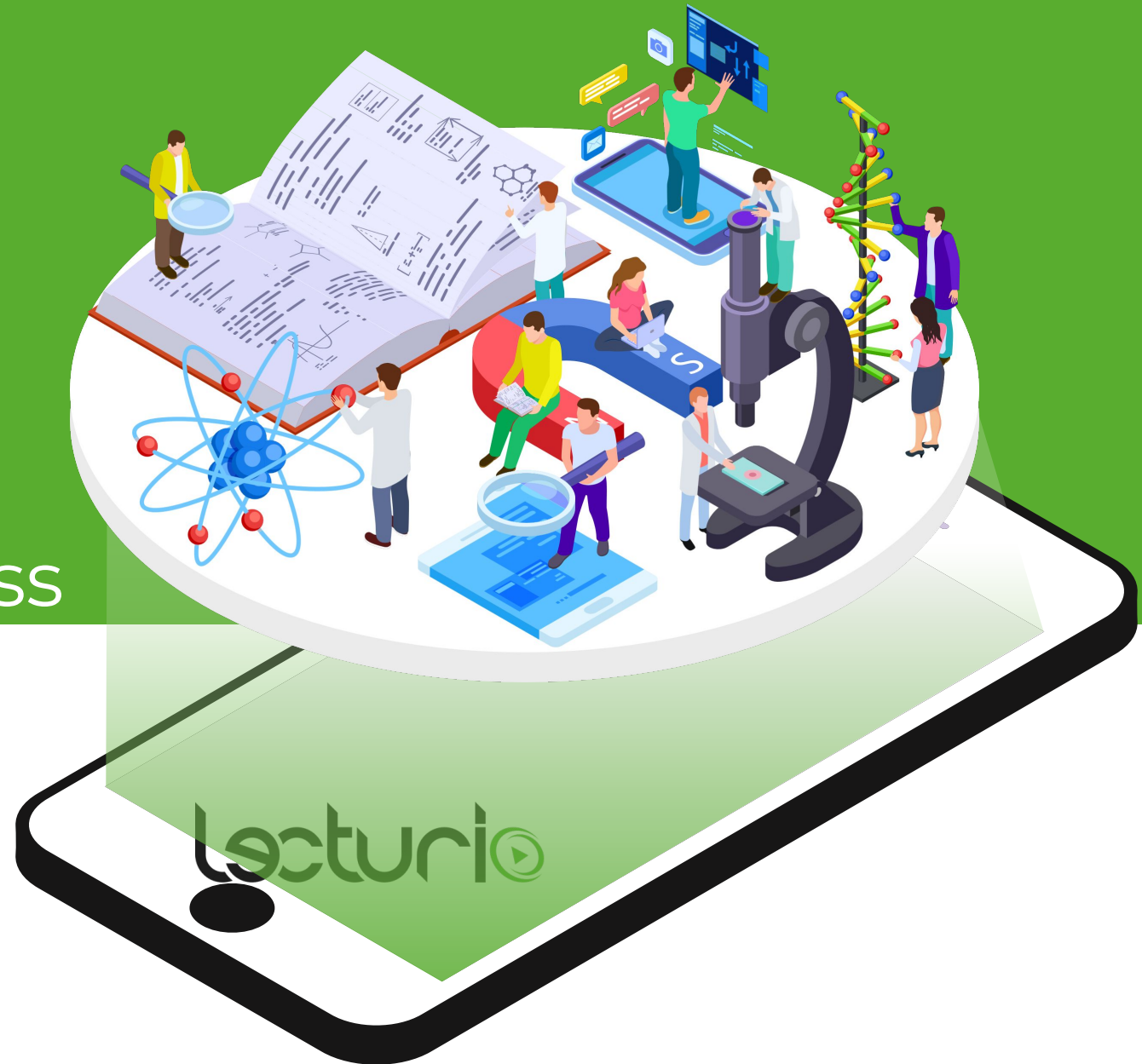## CUGH 2022

March
23, 2022

Presenters

- **Stefan Wisbauer**, Co-CEO of Lecturio
  stefan.wisbauer@lecturio.com

- **Dr. Peter Horneffer**, Director of Medical Education Programs at Lecturio
  peter.horneffer@lecturio.com

- **Sanja Sontor**, Director of Development Partnerships at Lecturio
  sanja.sontor@lecturio.com

Session format

CUGH 2022 Satellite Session
Digitally Supported Capacity Building Across the Health Worker Spectrum
5:30 - 8:30 CET, 9:30 - 12:30 PT

9:40 - 10:00	Setting the scene • Key challenges faced by LMIC • The need for new methods
10:00 - 10:40	The key elements of medical education capacity-building in LMIC and accompanying challenges • Technical aspects
10:40 - 11:15	• Content curation and creation
11:15 - 12:00	Zooming in: Ethiopia, Samoa, and AAIMS
12:00 - 12:30	Open discussion

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Key challenges faced by LMIC

Uneven distribution of healthcare workforce

Doctors per 10,000 Population

- 🔴 < 2
- 🔴 2 - 9
- 🟠 10 - 19
- 🟡 20 - 29
- 🟢 ≥ 30
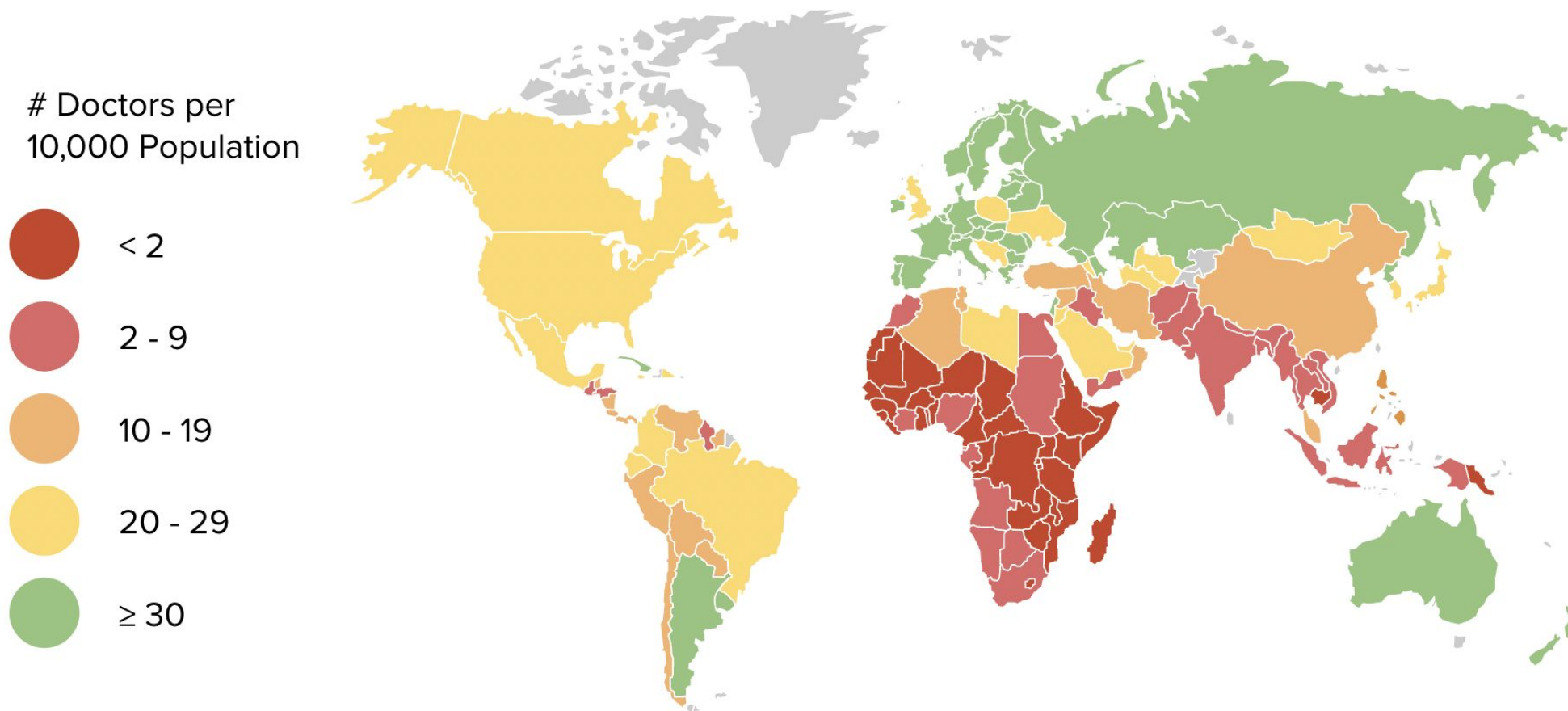
Source: World Health Organization

Limited educational opportunities for the future healthcare professionals

Medical Schools per 10 Million Population

- ≤ 2.0
- 2.1 - 5.9
- ≥ 6.0
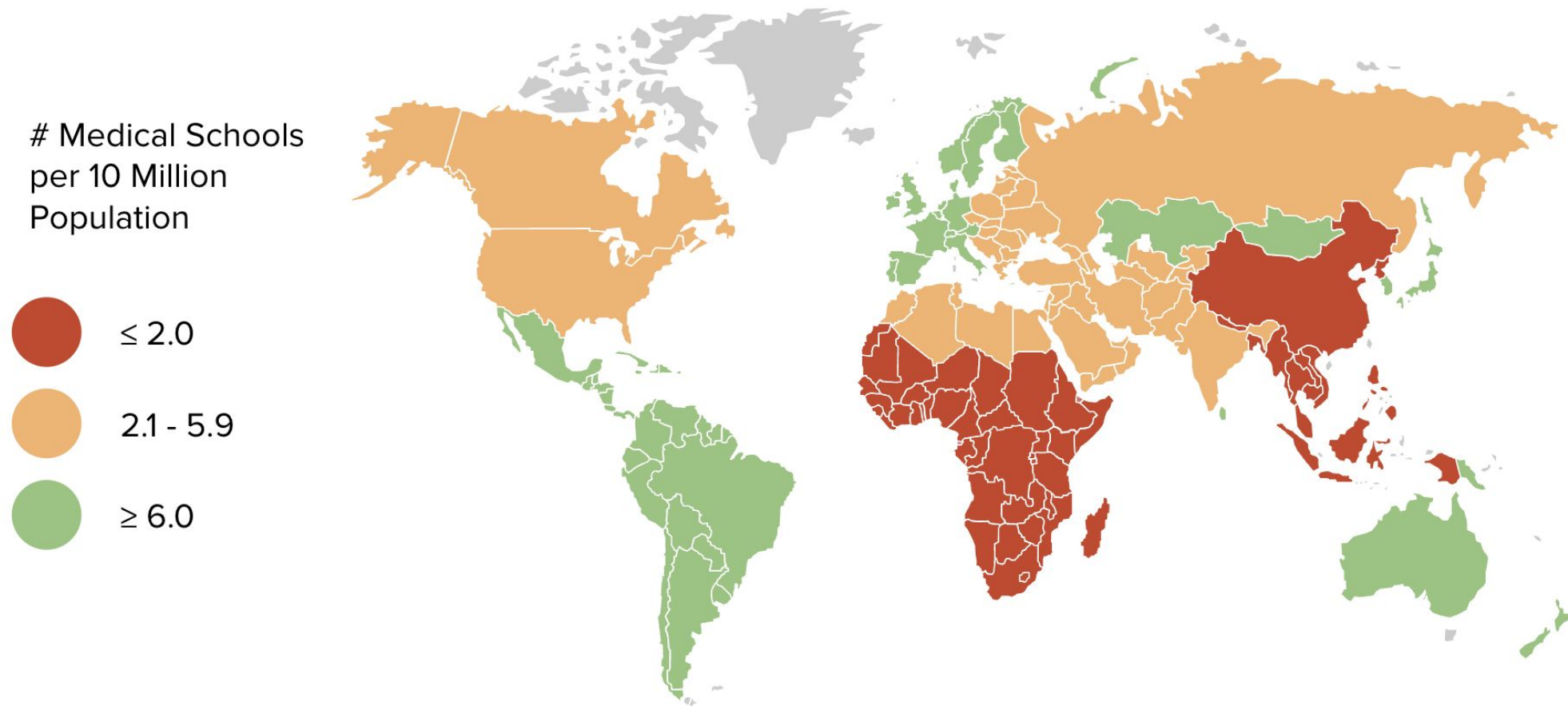
Source: The Lancet Commissions

Rural vs urban population without access to health care due to health worker shortages (percentages)

Legend: ■ Rural ■ Urban

Region	Rural	Urban
World	52	24
Central and Eastern Europe	0	0
Western Europe	0	0
North America	0	0
Latin America and the Caribbean	24	11
Asia and the Pacific (incl. China & India)	52	33
Asia and the Pacific (excl. China & India)	75	27
Middle East	56	28
Africa	77	50
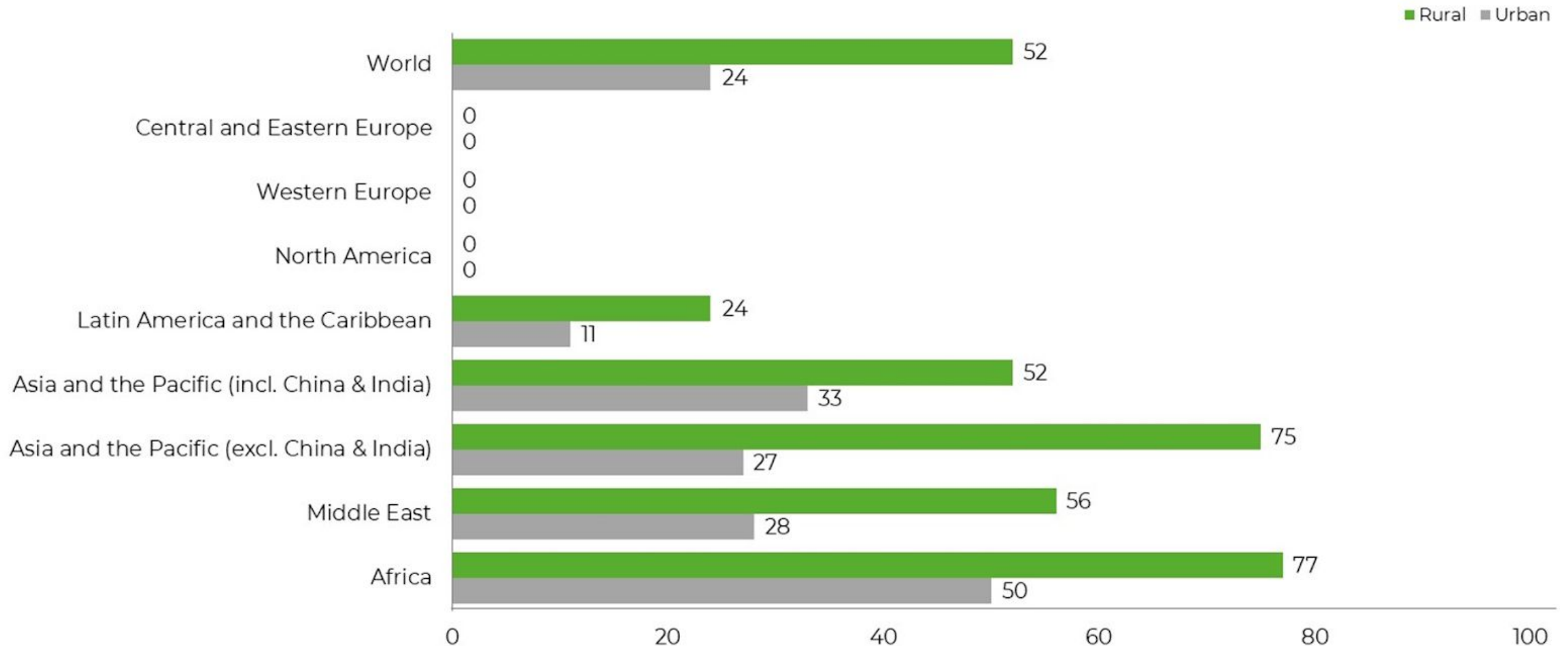
Source: ILO estimates, 2015.

Population growth projections show urgency for action

Total population by sustainable development goal region (bn)

Estimate

Projection

5

4 — Sub-Saharan Africa

3 — Central and Southern Asia

2 — Eastern and south-east Asia

— Europe and North America

1 — Northern Africa and Western Asia

— Latin America and Caribbean

0 — Australia / New Zealand Oceania *

1950   2000   2050   2100
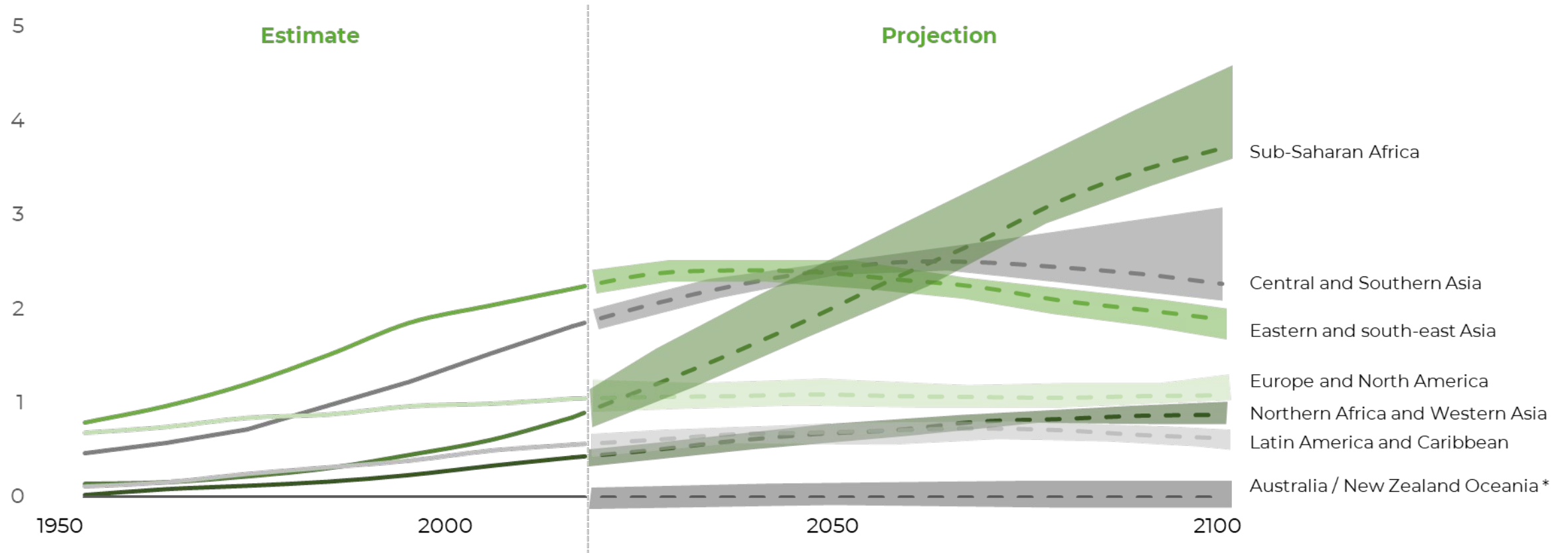
*Excluding Australia and New Zealand
Source: UN Department of Economic and Social Affairs

8

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The need for new methods

Tackling the shortage of healthcare workers with scalable whole-system interventions in Africa

- Infrastructural capacity building, i.e. via new brick-and-mortar medical schools, can only **partially** tackle the issue due to predicted high population growth in many African countries

- The whole-system intervention should lay on **a strong digital foundation across existing institutions**

Source: UN Department of Economic and Social Affairs

Through digital support, multiple areas of healthcare education and provision are enhanced

Medicine & Nursing	Community Health Workers	Capacity increase
Systematic support national universities & schools through: • digital teaching engine and apps • local content production • online simulations In-service personnel training	Pre- and in-service training • digital teaching engine and apps • local content production • online simulations	Capacity increase nationally and internationally (country as an education hub)

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Digital foundation can enable wider systemic approach

- Digital teaching engine and apps for each school
- Local content production
- Rapid gains in effectiveness
- Capacity boost
- Includes online simulations

Digital support of existing institutions

Replicable rural clinic model

- Affordable and quick to establish
- E-enabled
- Receives rotating students
- Telemedicine support

- Decentralized and scalable
- Linked into digital platform
- Combined with clinical rotations and simulations

Distance education extension

Regional simulation centers

- Similar to airline industry
- Well-equipped
- Receive groups of students
- Some multi-country/shared

The key elements of medical education capacity-building in LMIC and accompanying challenges

Technical aspects

Delivery systems

Hardware

Internet Access

Technical aspects

Delivery systems

Hardware

Internet Access

Many delivery systems are simple to use and affordable
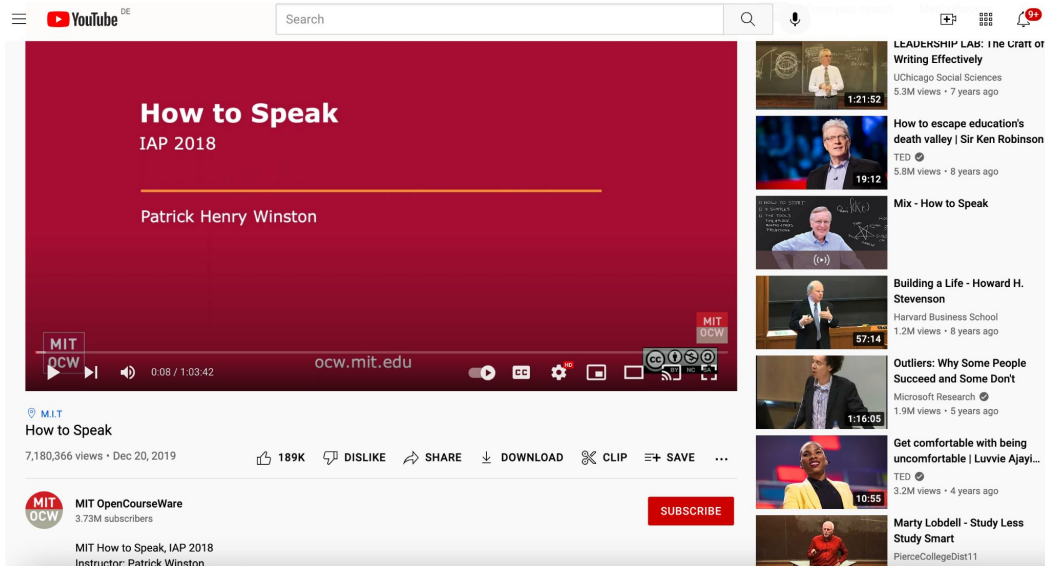
Yet, they do not offer real control
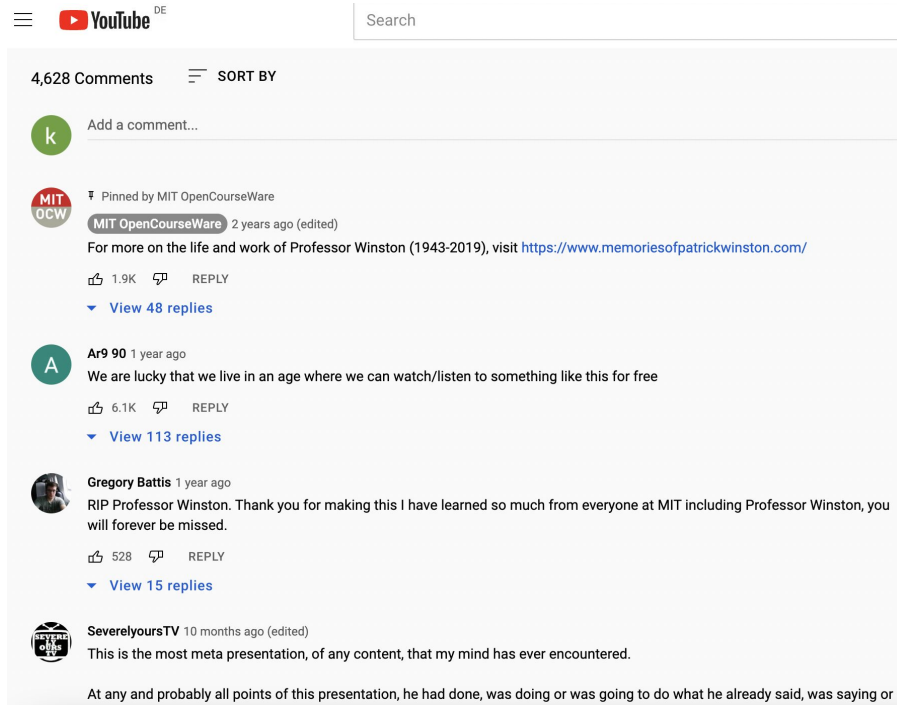
- Feedback loop limited to comments – no real assistance to learning
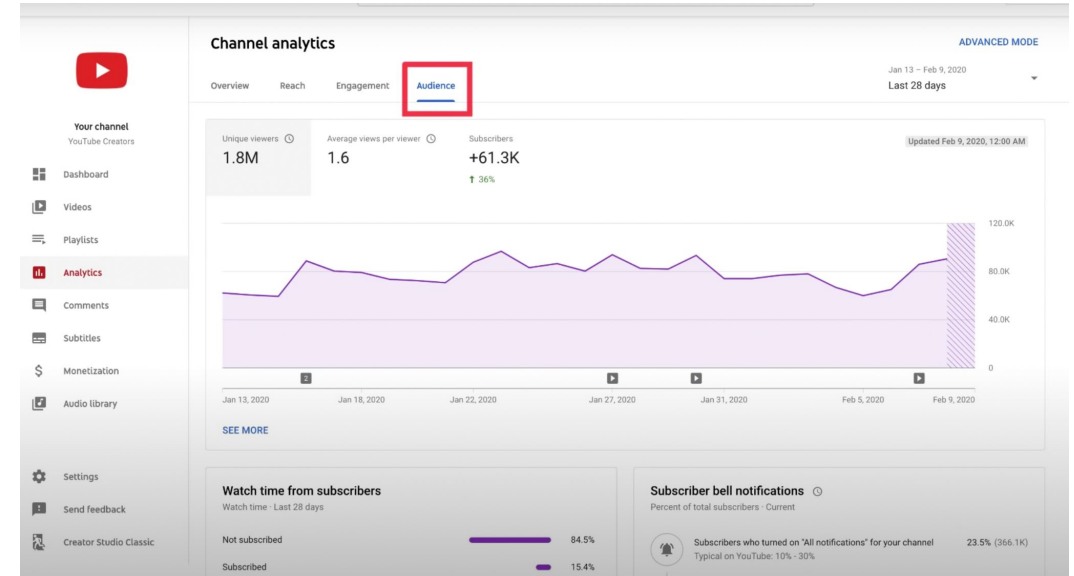
- Data collection in aggregate formats
- No performance tracking
- No assignment options

Open Source LMSs are an option, but come with a lot of hidden costs

Either option assumes additionally:
- Hosting fees
- Tech support
- Complex systems that require tailored approach
- Setting up offline use and complementary apps complicated

Empty LMS requires development of high-quality content

Delivery systems should enable, at least

Local control

Local content integration

Tracking and assignments

Adaptability

Delivery systems should enable, at least

Local control

Local content integration

Tracking and assignments

Adaptability

Delivery systems should enable, at least

Local control

Local content integration

Tracking and assignments

Adaptability

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Delivery systems should enable, at least

Local control

Local content integration

Tracking and assignments

Adaptability

Local control over the delivery formats and content
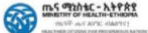
Adaptability and ability to respond to the local needs
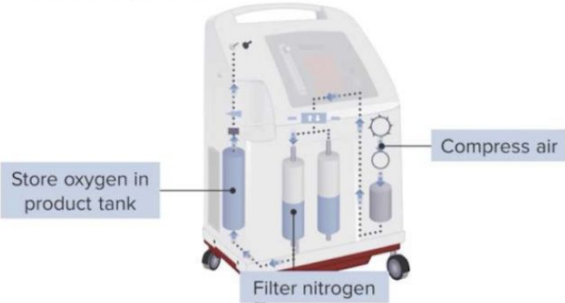
Tracking of learners and assignments possibilities
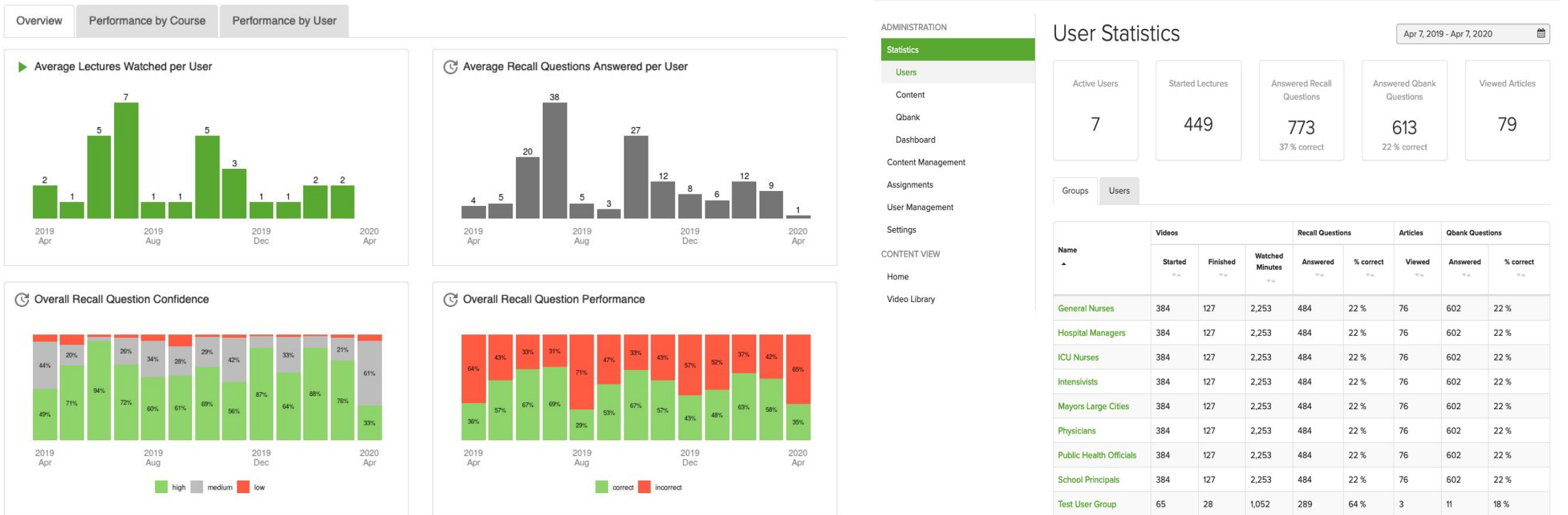
1

Question

- What delivery system have you used?

- What has the experience been?

Technical aspects

Delivery systems

Hardware

Internet Access

Issues with delivery and accessibility of content on old devices

Accessibility of content via apps or (un)responsive web design
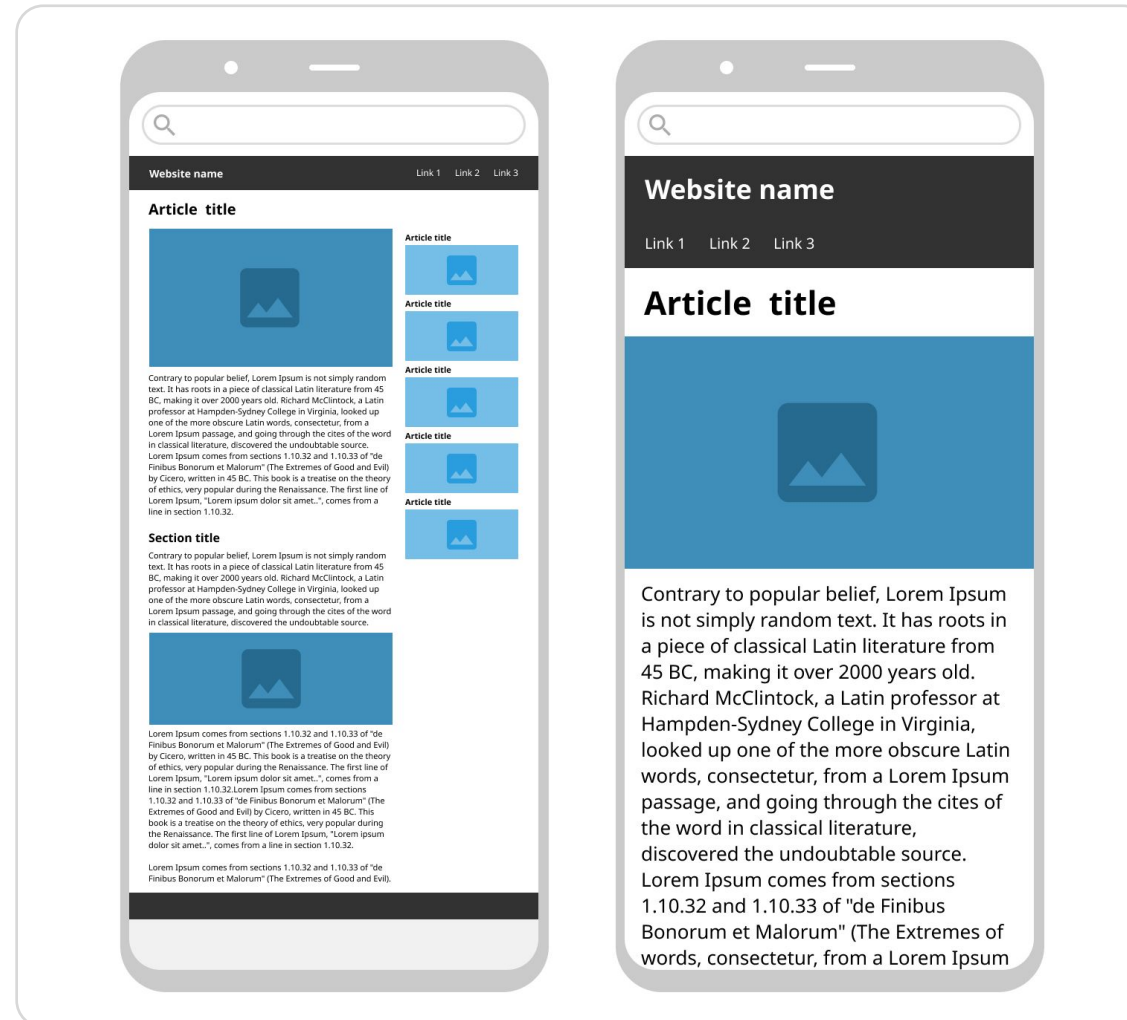
Average smartphone prices by world regions

How Smartphone Prices Differ Across the Globe
Average smartphone selling price by world region in 2017

Region	Price
Developed Asia*	$645
Western Europe	$446
North America	$417
China	$335
World	$328
Latin America	$318
Central and Eastern Europe	$249
Middle East and Africa	$235
Emerging Asia**	$183
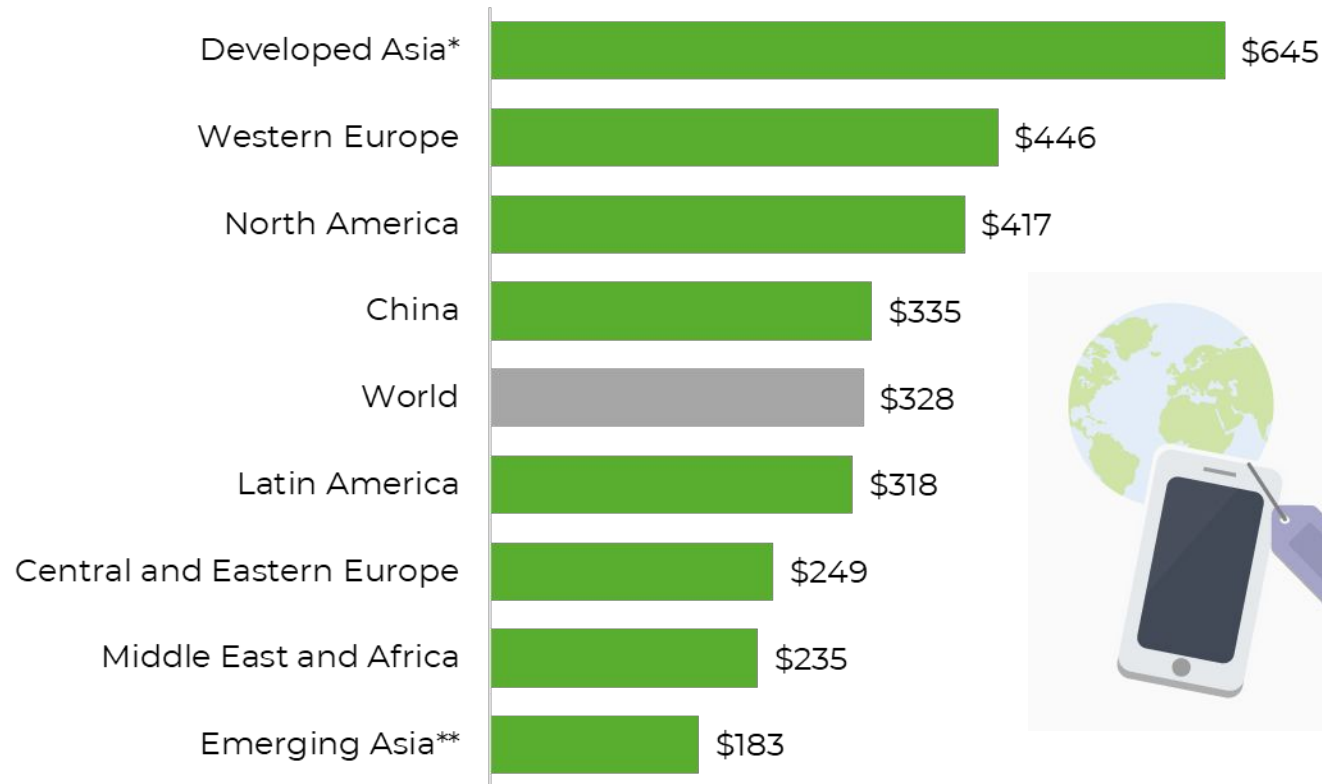
Samsung smartphones are the most sold smartphones in Africa. Average price for SAMSUNG Galaxy A03s 32 GB: **USD 151**

* Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, Taiwan
** Bangladesh, India, Cambodia, Malaysia, Myanmar, Philippines, Thailand, Vietnam
Source: Statista, 2017, GfK

Steep prices for a smartphone in African countries and LDCs when put against the average monthly income

Average Cost of a Smartphone. as % of Average Monthly Income

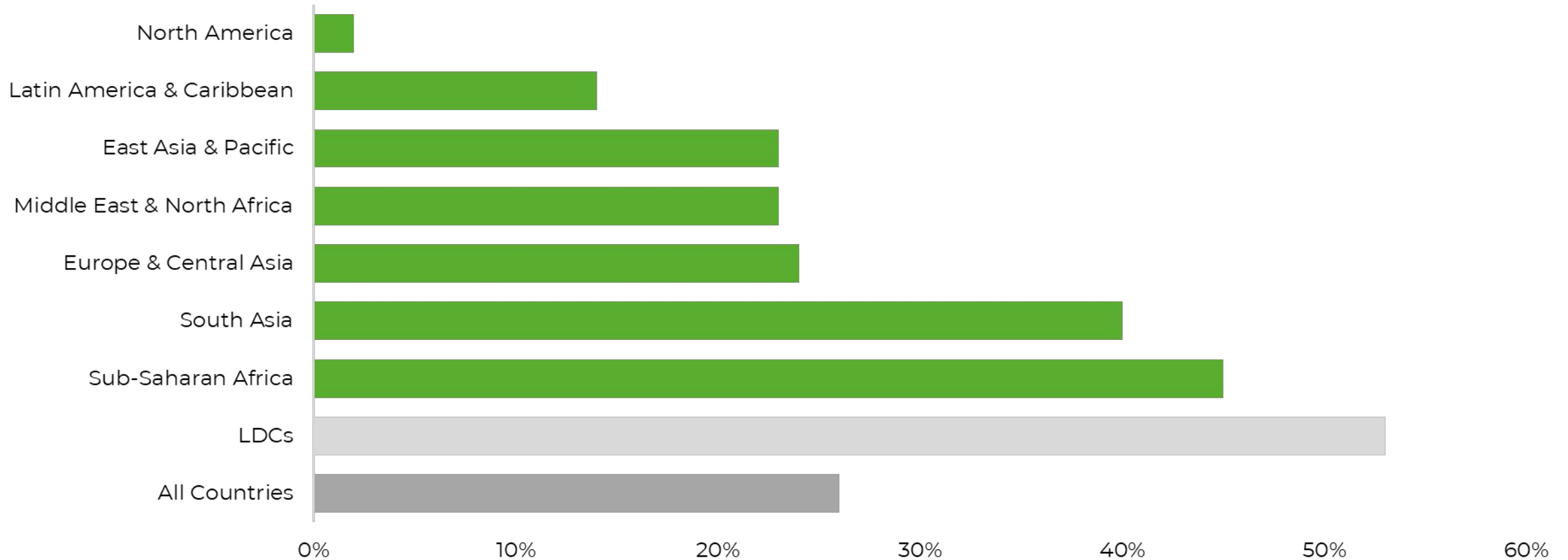| Region	
North America	~2%
Latin America & Caribbean	~14%
East Asia & Pacific	~23%
Middle East & North Africa	~23%
Europe & Central Asia	~24%
South Asia	~40%
Sub-Saharan Africa	~45%
LDCs	~53%
All Countries	~26%

Source: Alliance for Affordable Internet

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Hardware challenges can be offset through

Solution operability via multiple devices

External financing programs

Reduced costs offered by device manufacturers

SMS messaging for data collection and communication

Hardware challenges can be offset through

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External financing programs

Reduced costs offered by
device manufacturers

SMS messaging for data collection and communication

Financing programs to offset the costs

Focus areas:

- Internet access
- Digitization
- Education, etc.

Sources:

- Ministries
- Development agencies
- Multilateral organizations
- International development funders and donors
- Corporates, etc.

Possible funders

BILL & MELINDA GATES foundation

USAID — FROM THE AMERICAN PEOPLE

Sida

Google for INDIA Digitization Fund

giz — Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

# Device manufacturers offering reduced cost or sponsored provision

Solution that works through multiple –
and simple - devices

Country	Tablet - price range	
	Local currency	USD
South Africa	R 2.990 - 9.000	USD 195 - 600
Ethiopia	ETB 21.501 - 25.450	USD 430 - 550
Ghana	GHS 787 - 1.329	USD 115 - 200
Tunisia	TND 558 - 1.600	USD 180 - 850

SMS messaging as an option for communication or data collection
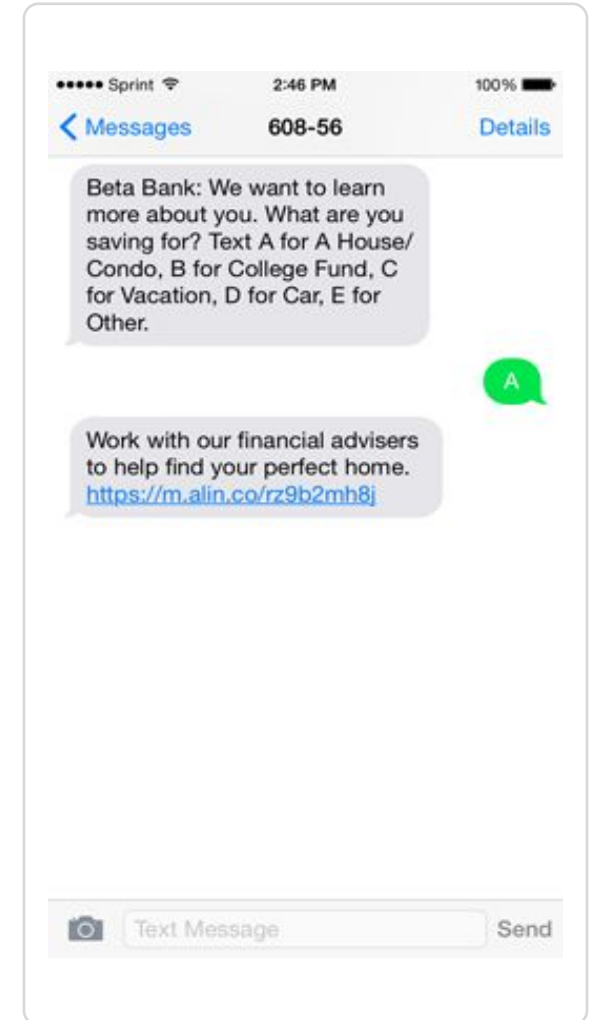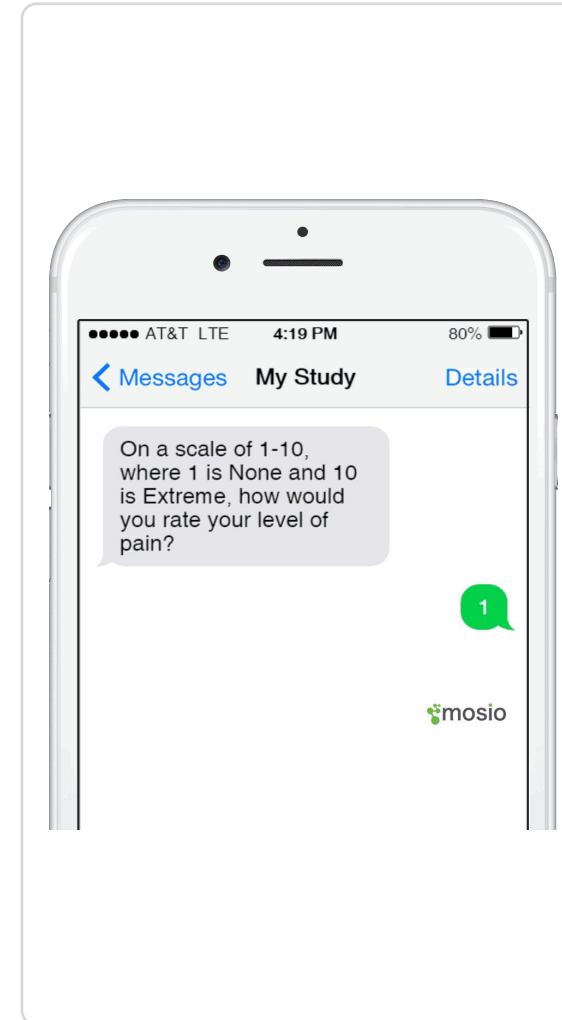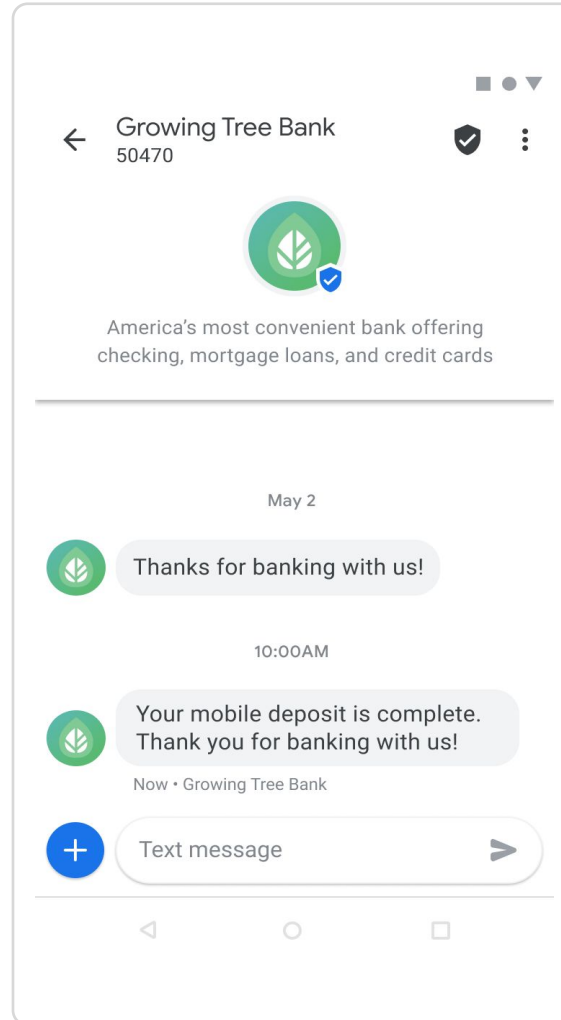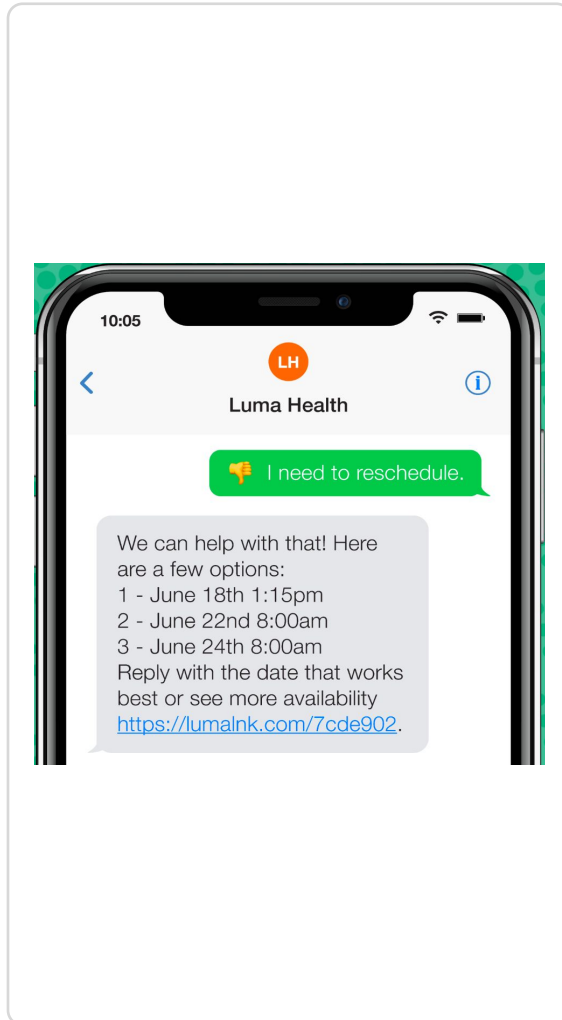
2

Question

How did you offset the issue of hardware in implementation of your solution?

- Through financing programs via 3rd parties

- Discounted prices for smartphones/tablets/computers

- Ensuring operability of the system on multiple devices

Technical aspects

Delivery systems

Hardware

Internet Access
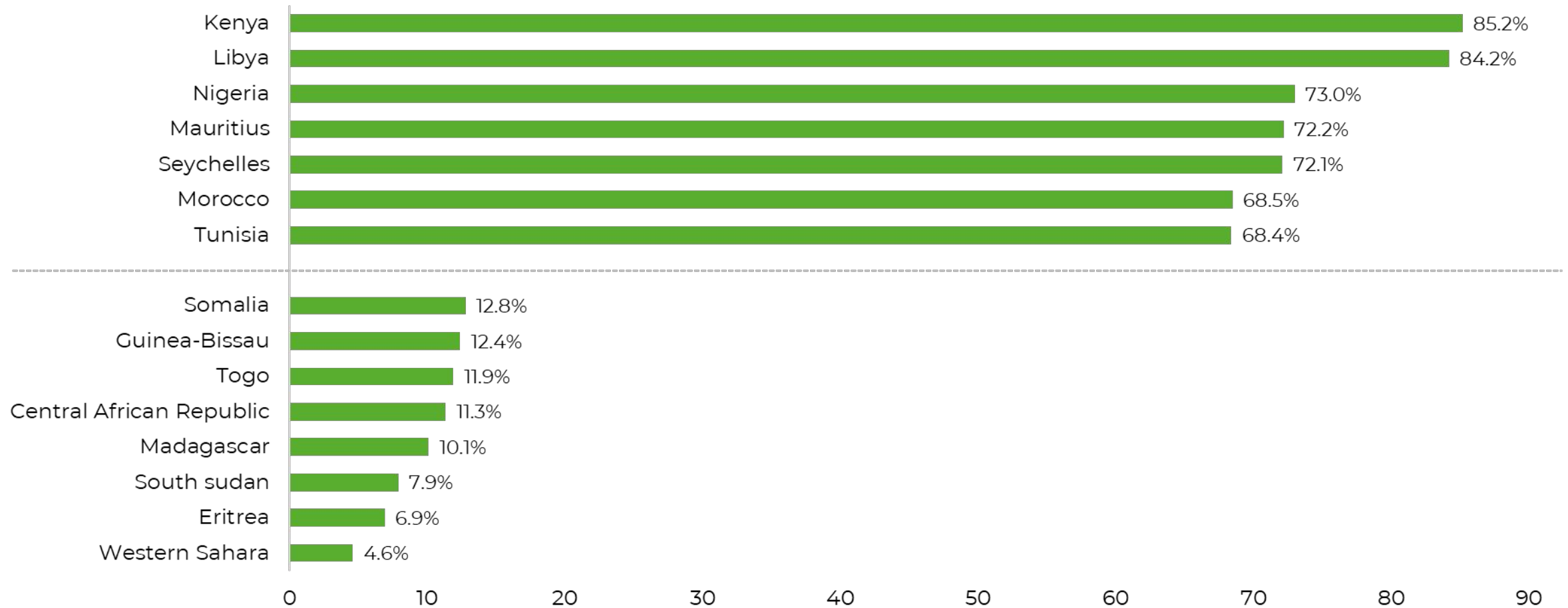
Global Internet penetration

With 170 million users, **Internet penetration** in Africa is at 18% (global average of 30%) and only one in 10 households is connected to the net.

North America 81%

Western Europe 78%

East Asia 48%

Southeast Asia 25%

Africa 18%

Oceania 63%

South America 47%

Source: Internet Society, Global Digital Statistics.

Share of Internet users in Africa

Share of internet users

Country	Share
Kenya	85.2%
Libya	84.2%
Nigeria	73.0%
Mauritius	72.2%
Seychelles	72.1%
Morocco	68.5%
Tunisia	68.4%
Somalia	12.8%
Guinea-Bissau	12.4%
Togo	11.9%
Central African Republic	11.3%
Madagascar	10.1%
South sudan	7.9%
Eritrea	6.9%
Western Sahara	4.6%

Source: Statista, 2020

Internet charges is Africa

African mobile users pay nearly **three times** the global average for voice calls and internet.

Prices for 1GB mobile data

- ■ Affordable
- ■ Expensive
- ■ Very expensive
- ■ Not affordable
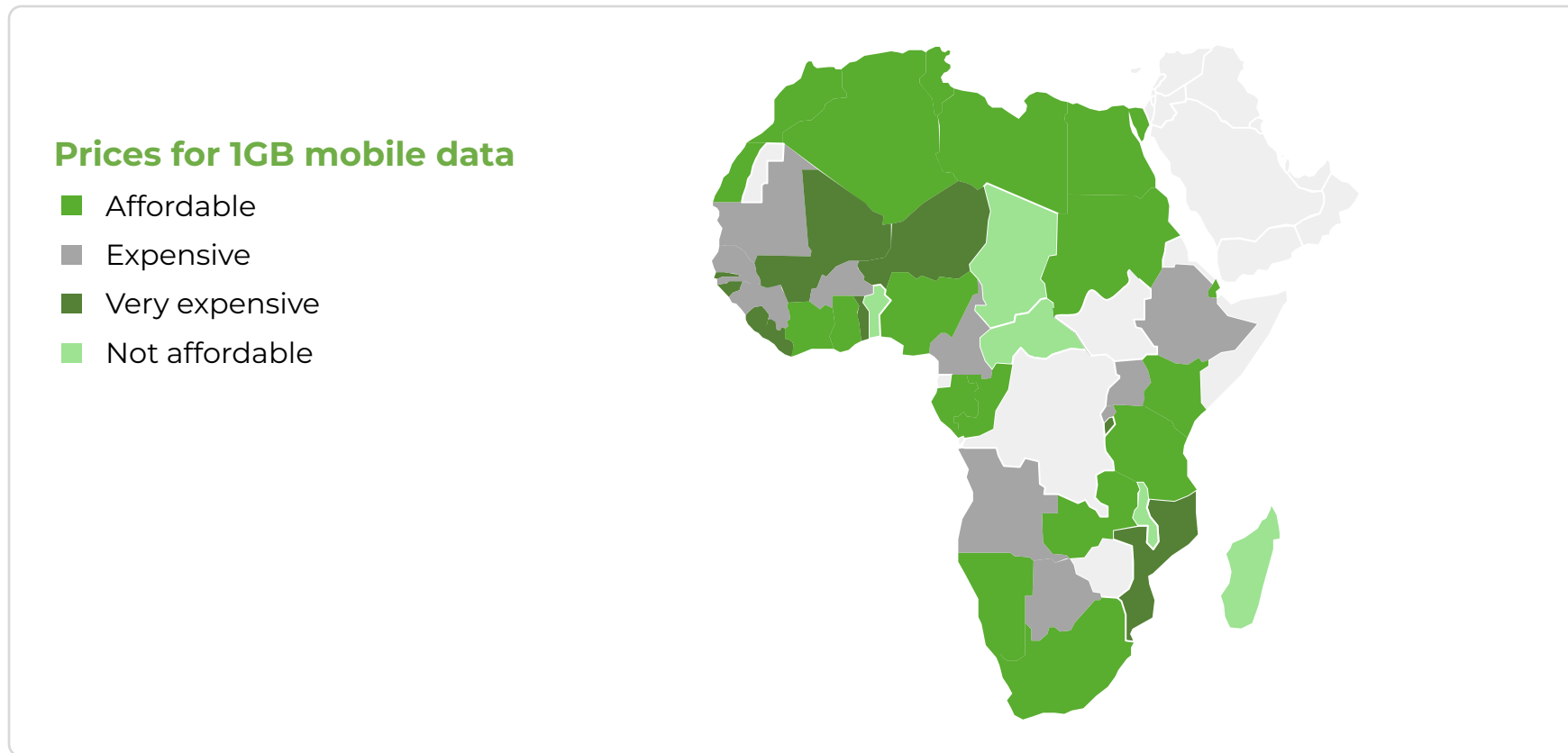
Source: CableUK Research Unit (2020), github.com/dw-data/mobile-internet affordable: 1GB costs less than 2% of the monthly income, expensive: 2 - 3.99%, very expensive: 4- 15.99%, not affordable: more than 16%

45

Rural vs urban Internet access

Huge discrepancies in access to the Internet in rural vs urban settings. In urban areas, on average 28% of households have access to the Internet versus only 6% of households in rural areas.

Internet cafe: Kigali, Rwanda

Possible Internet access solutions

Mobile app with offline support

Partnering with mobile providers

Local WiFi without Internet solutions

Possible Internet access solutions

Mobile app with offline support

Partnering with mobile providers

Local WiFi without Internet solutions

Possible Internet access solutions

Mobile app with offline support

Partnering with mobile providers

Local WiFi without Internet solutions

Mobile provider partnership for free access for relevant apps or discounted data bundles

Mobile app with offline support
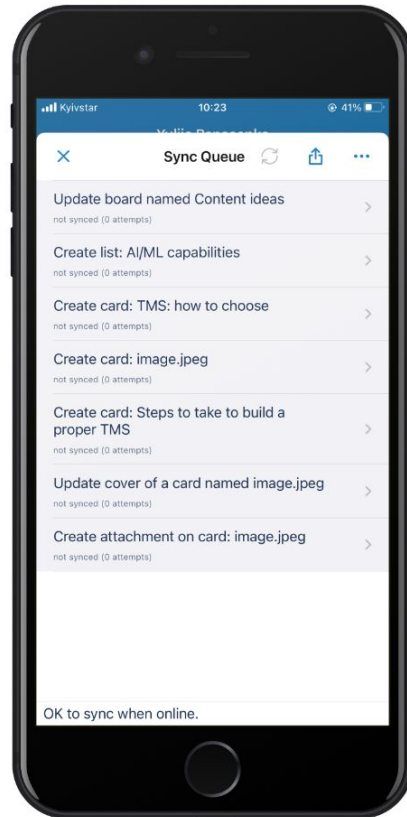
Trello app working
offline
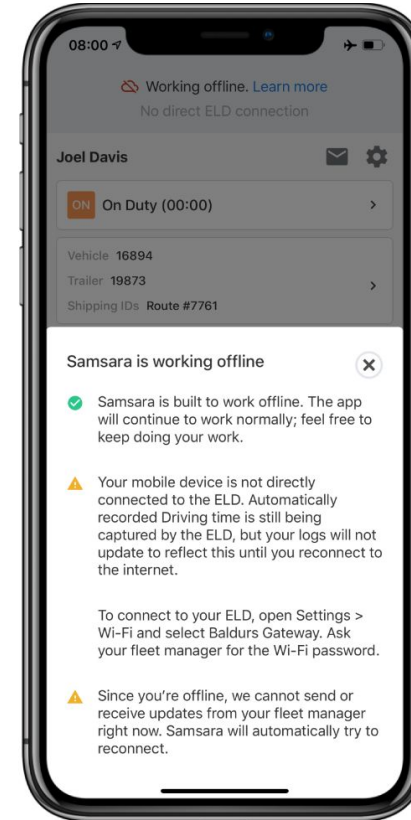
Samsara driving app in
offline mode

Copies of educational websites in offline format
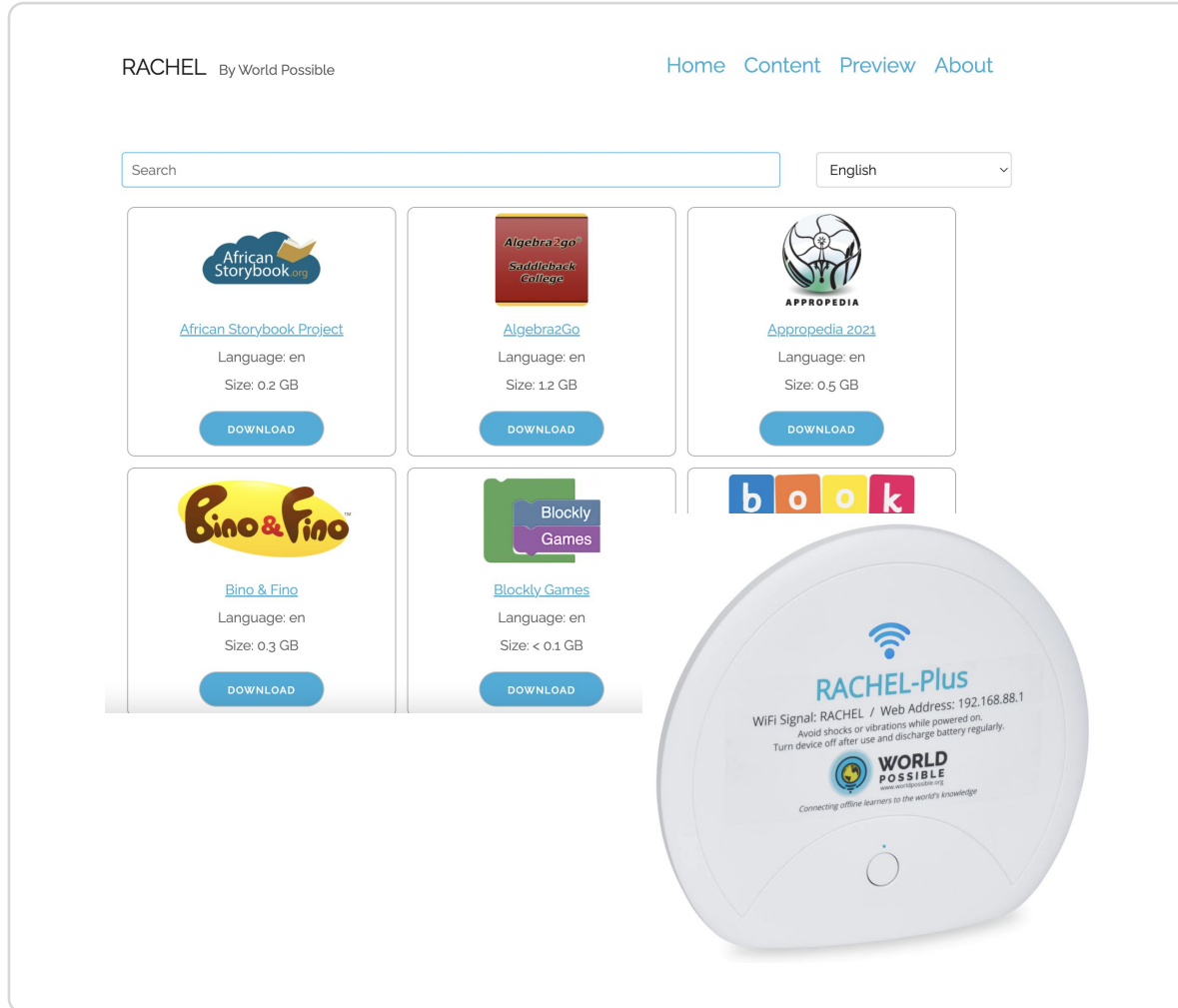
- Battery-powered device

- Contains copies of educational websites in offline format

- Rachel can wirelessly deliver free education content on any device without Internet or data plans required

- Up to 20-50 simultaneous users

- Remote access and updates if/when plugged into the internet

- 5+ hours battery life

3

Question

Which technologies have you applied to offset the Internet connectivity issue?

4

Question

Which of the three technical aspects presented the biggest challenge in implementation of your solution?

- Delivery systems

- Hardware

- Internet access

Content

Creation

Curation

Content

Creation

Curation

Content curation and creation aspects

Digital literacy

Other literacy challenges

OERs and copyright issues

Effective delivery formats

E.g. Text
Videos
Graphics

Effective Assessment and quality feedback loop formats

Content curation and creation aspects

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Effective Assessment and quality feedback loop formats

Content sources

Open Knowledge Pools
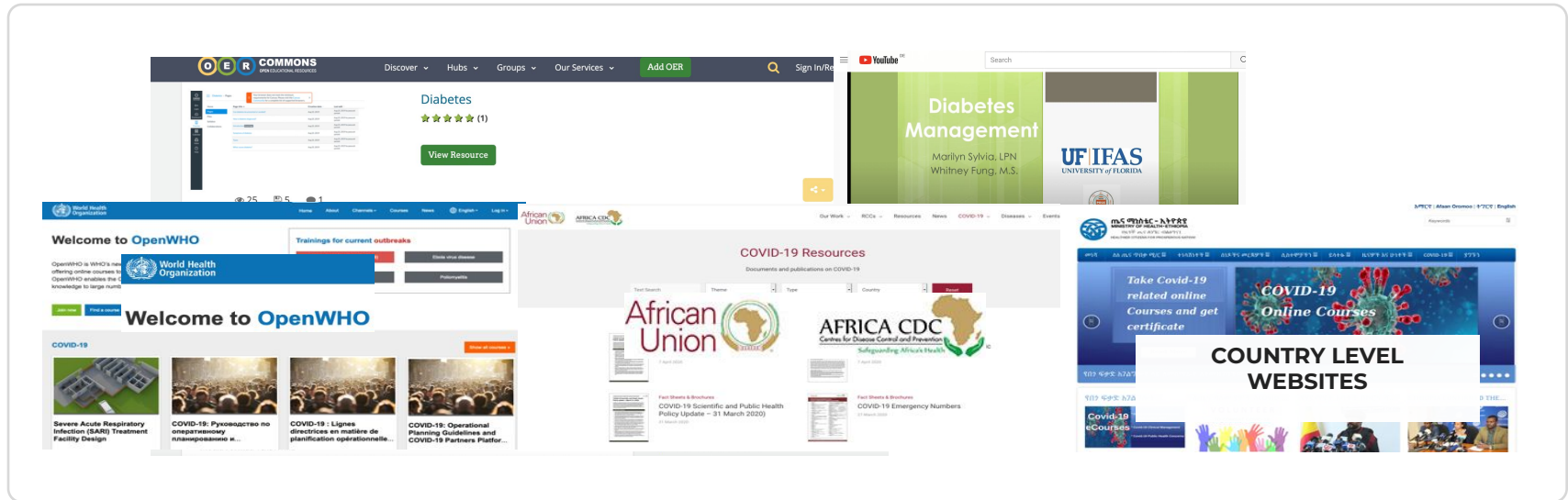
PULL

Country-Level Learners

| Healthcare Workers | Public Health | Regional / Local Government | Other Specific Target Groups |

Content sources

Open Knowledge Pools

COUNTRY LEVEL WEBSITES

IMPORT

Country Academies

| Country-specific content | Open Pool Content | Lecturio Content | + Other helpful content |

ASSIGNMENTS **TRACKING**

PUSH

Country-Level Learners

| Healthcare Workers | Public Health | Regional / Local Government | Other Specific Target Groups |
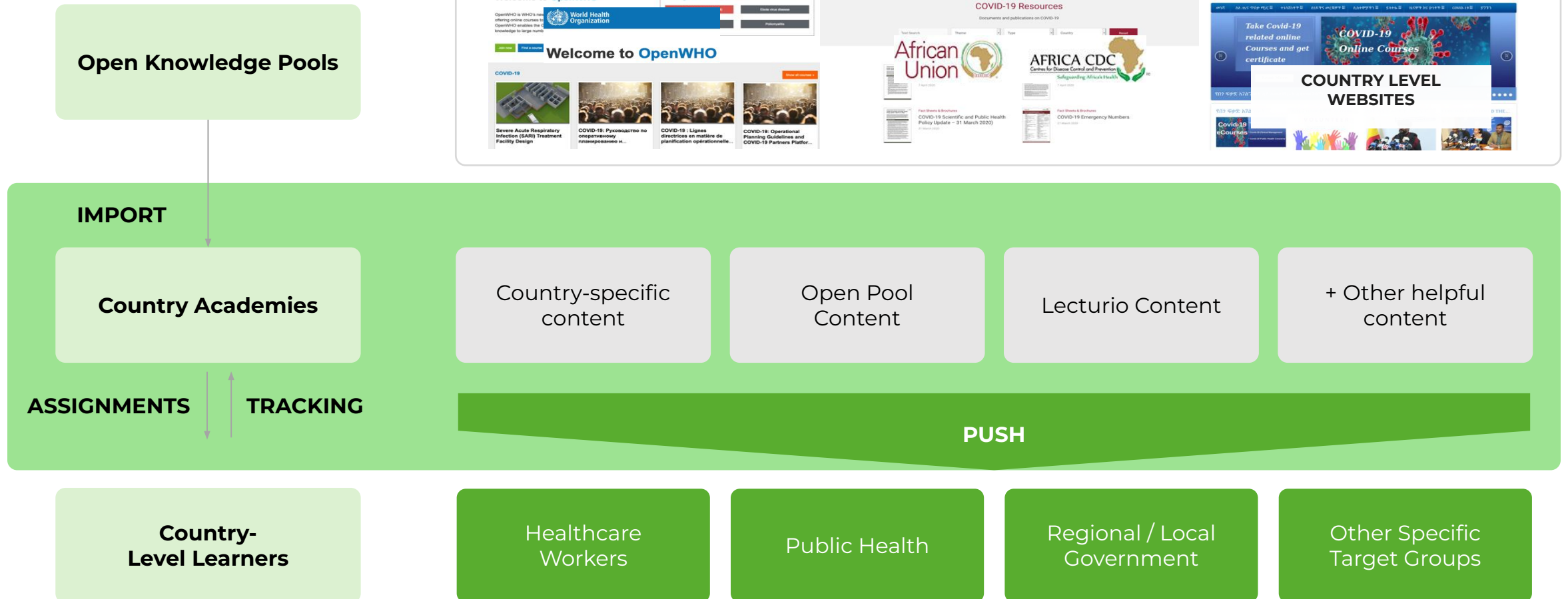
Lecturio's library - Videos

Lecturio's library - Concept pages

Co-creation of local content

Course: Technical Maintenance, MOH Ethiopia

Application of learning science principles

5

Question

What content sources have you used in low income settings?

Lecturio

6

Question

What do you perceive as substantial barriers for digital capacity building support in LMICs?

- Technical issues

- Quality content

- Financing

Zooming in:
Lecturio's experience
in working and
building medical
education capacity
efforts in LMIC

Ethiopia

Support quality and more scalable medical education and capacity building to help address the shortfall of healthcare workers.
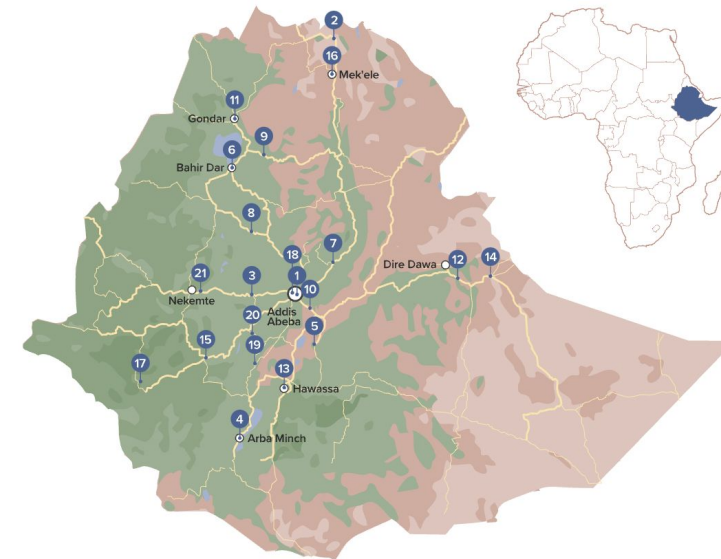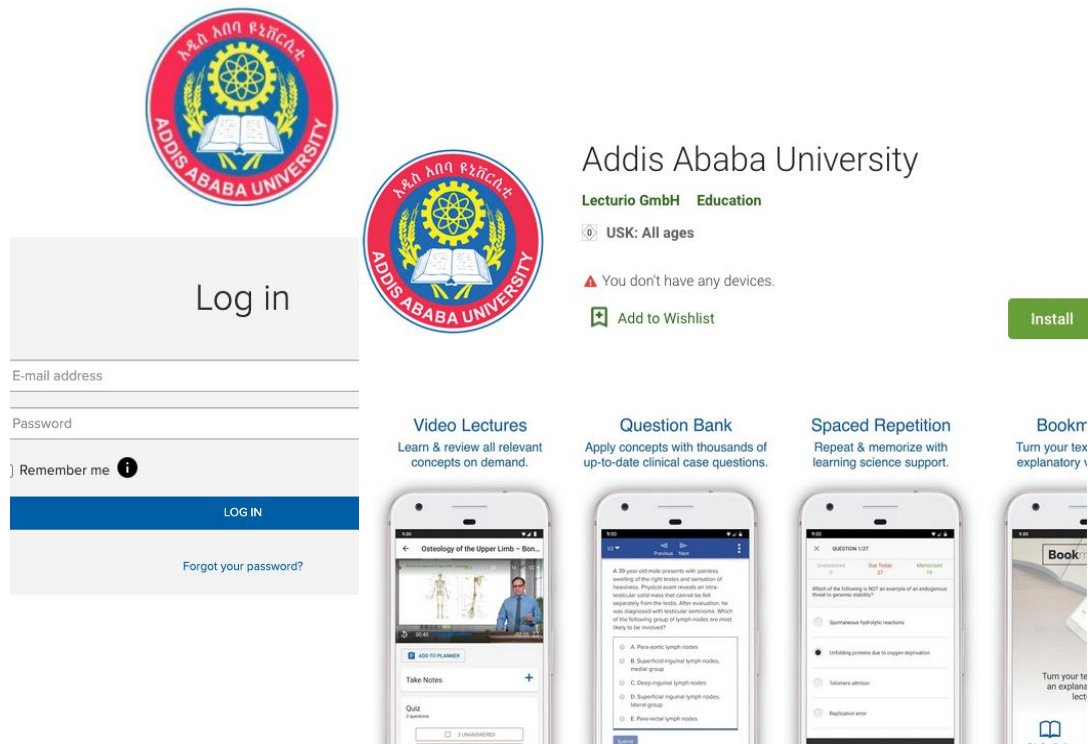
Digital Medical Capacity Building in Ethiopia

A private-public partnership (PPP) between Ministry of Health in Ethiopia, German Corporation for International Cooperation, and Lecturio

- **Digital support platform** for 25 direct enrolment medical schools; including **apps**

- National curriculum integrated into digital platform

- Custom production of learning content for technician training as well as medical education & nursing

- Foundation for work innovative distance education efforts

- **9,000+ students** learn utilizing Lecturio platform

Digital Medical Capacity Building in Ethiopia

National Digital Teaching Support
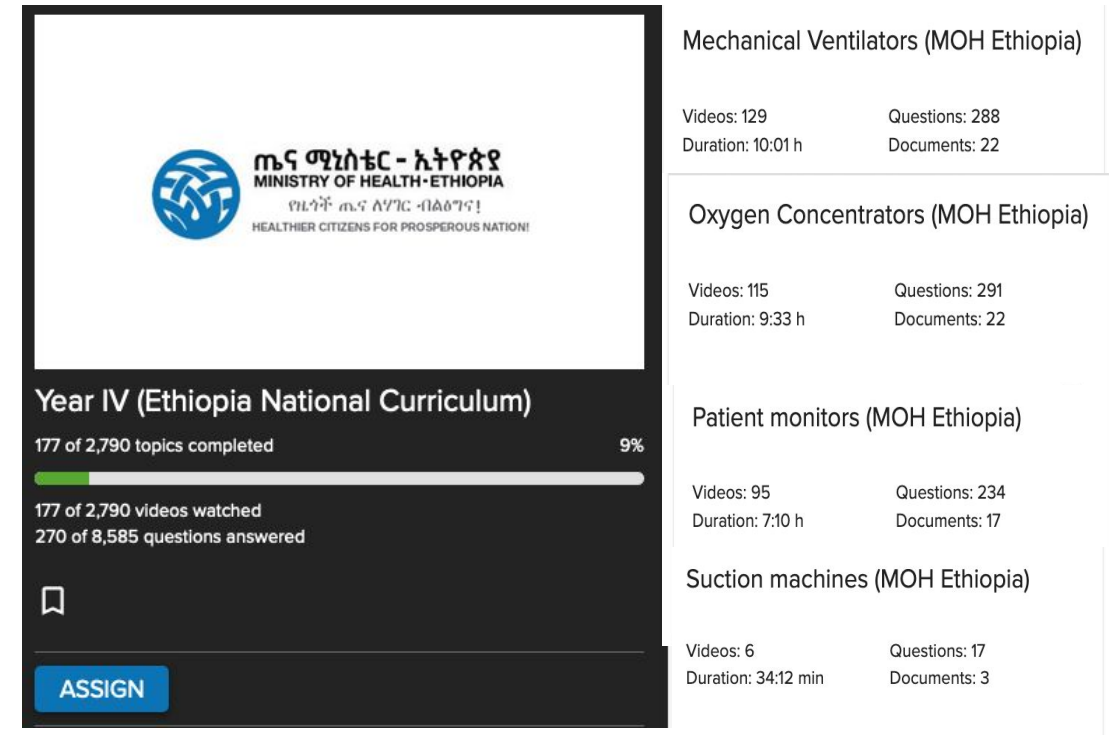
Co-Production of Tailored Content

Local content co-production
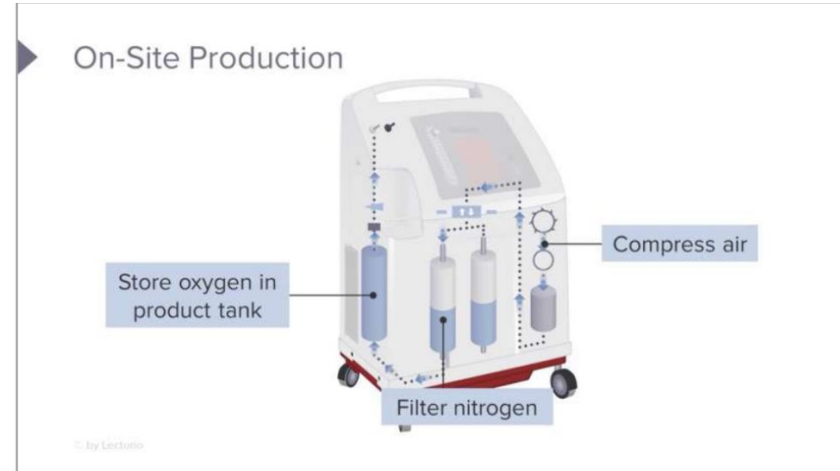
Samoa

Delivery of medical computer-based curriculum in a cost-effective way.

The number of physicians well below the world average

Introduction of standard teaching platform to deliver didactics

Improved quality by turning local doctors into teachers

AAIMS

A platform-based approach to provide state-of-the art medical education

Faculty of AAIMS

Pedagogical design of AAIMS curricula

- Content experts - teaching online

- On campus student coaches to provide oversight and guidance to students

- Education specialists (Instructional designers) to provide oversight and guidance to faculty and mentors

- Evidenced-based teaching and learning utilizing proven strategies from learning science

Mastery-based modular curriculum

Year One (MS-1)			
11 Weeks per Quarter			
Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
Anatomy (incl. Developmental) - Thorax and Abdomen	Anatomy (incl. Developmental) - Upper Limb/Lower Limb	Anatomy (incl. Developmental) - Head/Back/Neuro	Intro to Pathology
Cells and Tissues - Micro Anatomy	Epidemiology - Biostats	Immunology - Hematology	Intro to Physiology
Applied Biochemistry	Molecular Medicine/Genetics	Microbiology	Intro to Pharmacology
POM - Medical Ethics/Physician as Leader	POM - Research Study Design- Research Project	Nutrition I&II	Health Systems Science

Final Grade of 80 or greater: Honors
Final Grade between 60-79: Credit/Pass
Final Grade between 0-59: No Credit (Course must be repeated)
There will be no Re-Sits
Standard academic progression is for students to take and pass 4 blocks/quarter (but can elect to take a heavier courseload if approved by their advisor)
The first 16 blocks are all mandatory prerequisites for the second 16 blocks

Mastery-based modular curriculum

Year Two (MS-2)			
11 Weeks per Quarter			
Quarter 5	**Quarter 6**	**Quarter 7**	**Quarter 8**
HBD - Integrated CVS	HBD - Integrated Endocrine	HBD - Integrated Reproductive - Male and Female	HBD - Integrated Hematology-Oncology-Immunology
HBD - Integrated Respiratory	HBD - Integrated GI	HBD - Renal	HBD - Integrated Neurosciences
Complementary Medicine	Patient Communication Skills - H&P	HBD - Integrated Musculoskeletal/Skin	Behavioral Medicine
POM - Clinical Correlates to Ongoing Courses - PBL	POM - Clinical Correlates to Ongoing Courses - PBL	POM - Clinical Correlates to Ongoing Courses - PBL	POM - Clinical Correlates to Ongoing Courses - PBL

Final Grade of 80 or greater: Honors
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Mastery-based modular curriculum

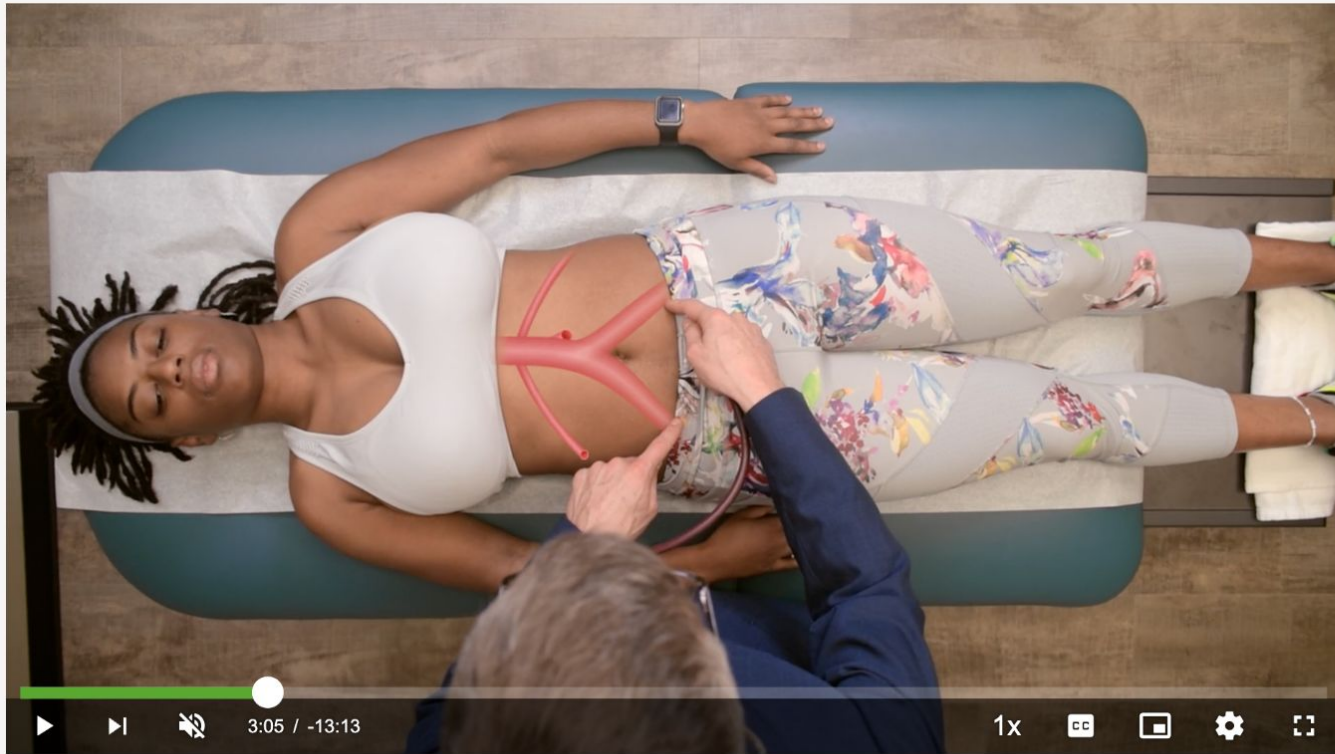| Board Review and Pre-Clinical Preparation		Year Three (MS-3)	Year Four (MS-4)	
4-6 Weeks	2 Weeks	48 Weeks	24 Weeks	8 Weeks
Basic Science Board Review	Transition to Clerkships	Core Clerkships	Elective Clerkships	Comprehensive Exams

Embracing a new way of learning
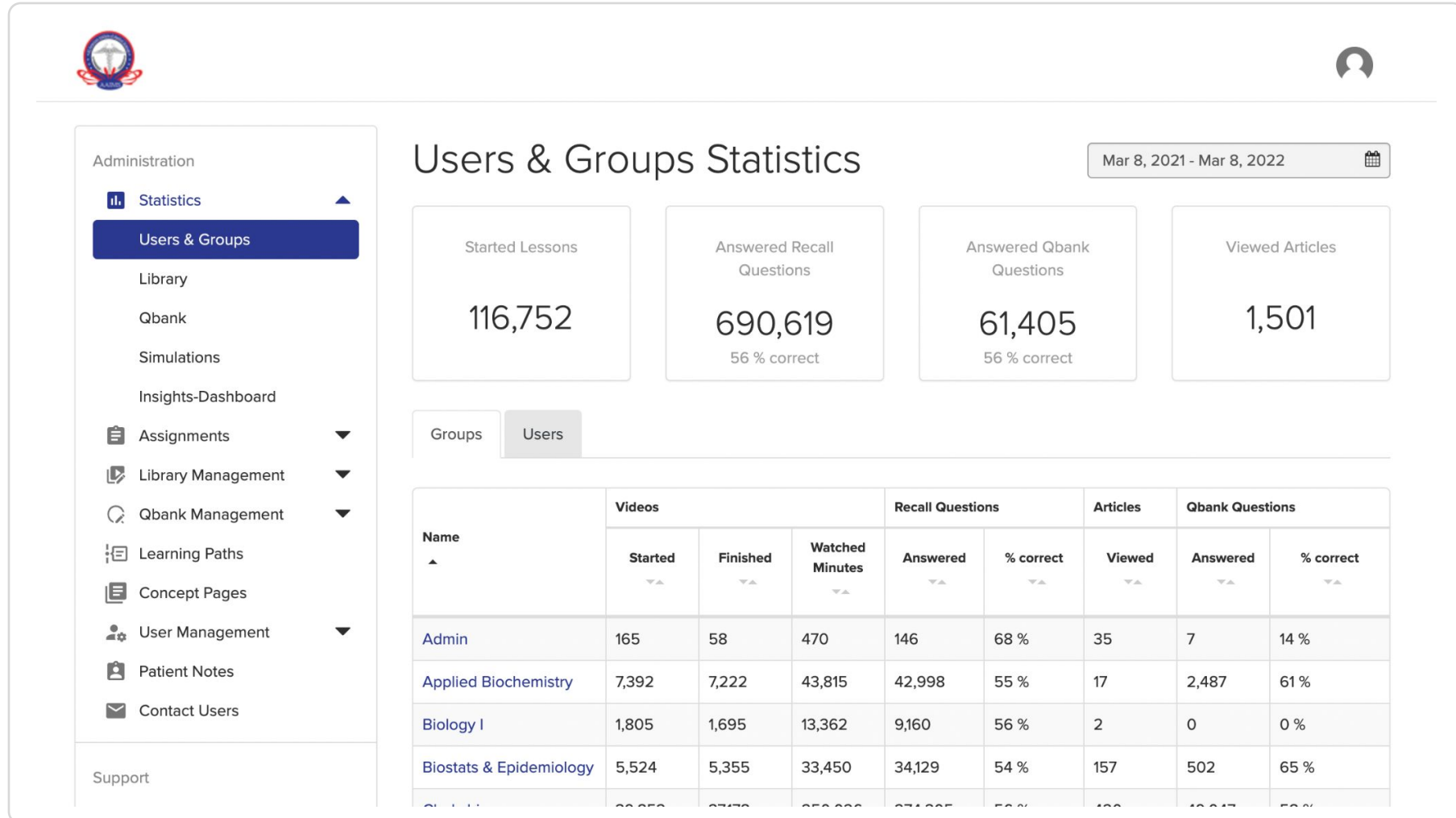
Shared recorded content and the facilitation of active learning especially important for less advanced learners

Global events and geo-political instability causing a paradigm shift in the way education is delivered

The dawn of transformation in the education process

- Platform-based learning – the new gold standard

- Flipped classroom - application of evidence-based learning strategies

- Move from passive to interactive learning - game learning

- Teachers as coaches, mentors and motivators

- Person-to-person interaction augmented, not diminished

- Increased effectiveness, availability, and affordability in Medical Education

The dawn of transformation in the education process
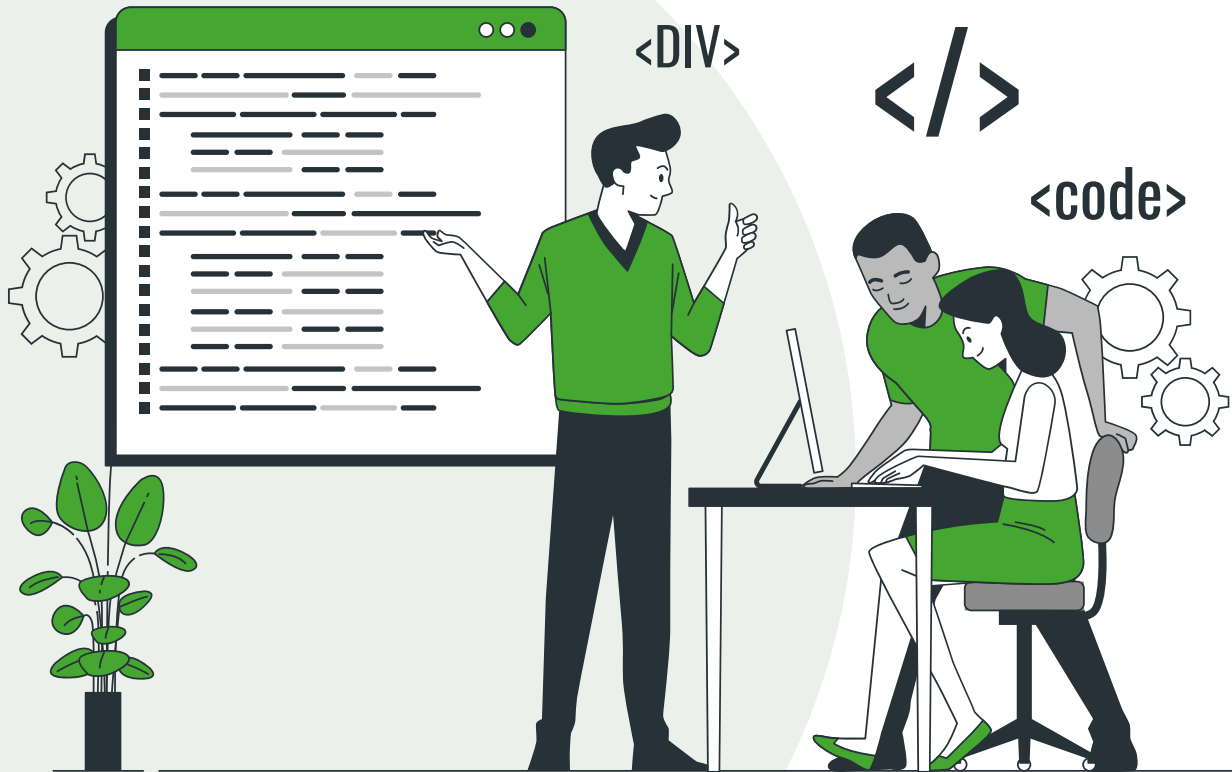
Lock step progression	Mastery-directed learning
Historical precedent	Data-driven teaching and learning
Testing to assign rank	Testing as a diagnostic and learning tool

New predictors of performance - **grit, perseverance, creativity**

Unprecedented advantages – What does the future hold?

- Master-directed learning

- Teaching and learning beyond University walls

- Continuing education - involved alumni-perpetual community

- Wiki authoring-teachers as editors

- Tuition reduction

- Vastly improved access

Educators should control the process

- Software platforms are best developed and managed by businesses who partner with faculty developers

- Find one you like and work with them

- Give your students the tools they need to learn effectively

- Use technology to improve effectiveness and availability of medical education

- Help shape how technology is used

7

Question

Which countries are you interested in supporting or working with?

8

Question

What is the target audience in your own education/cap building efforts?

- Ministries
- Universities
- Doctors
- Nurses
- CHW
- General population
- Specific target groups

9

Question

Do you work on:

- Multinational
- National
- Regional
- Institutional level?

Q&A
Discussion