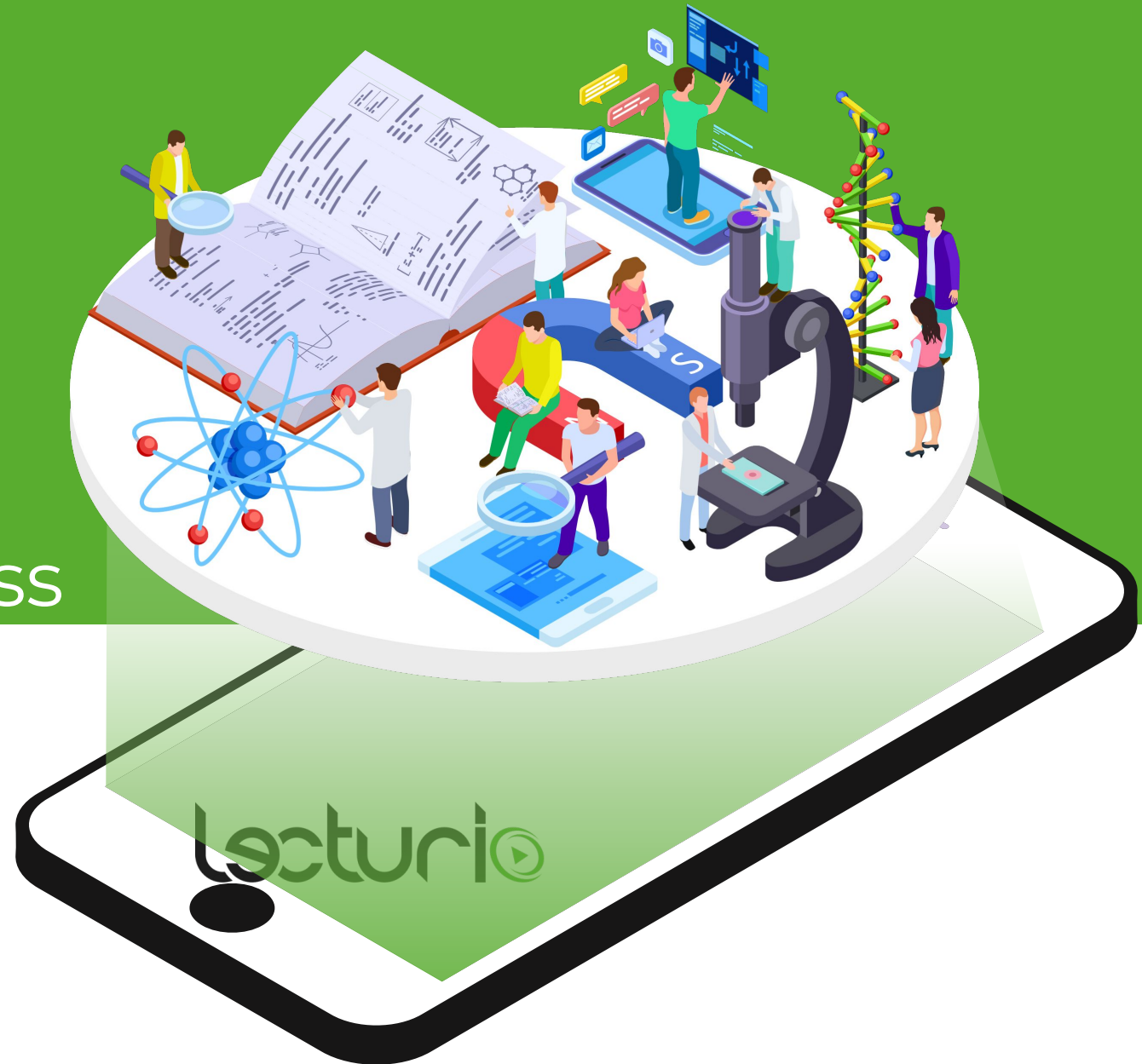


March
23, 2022



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

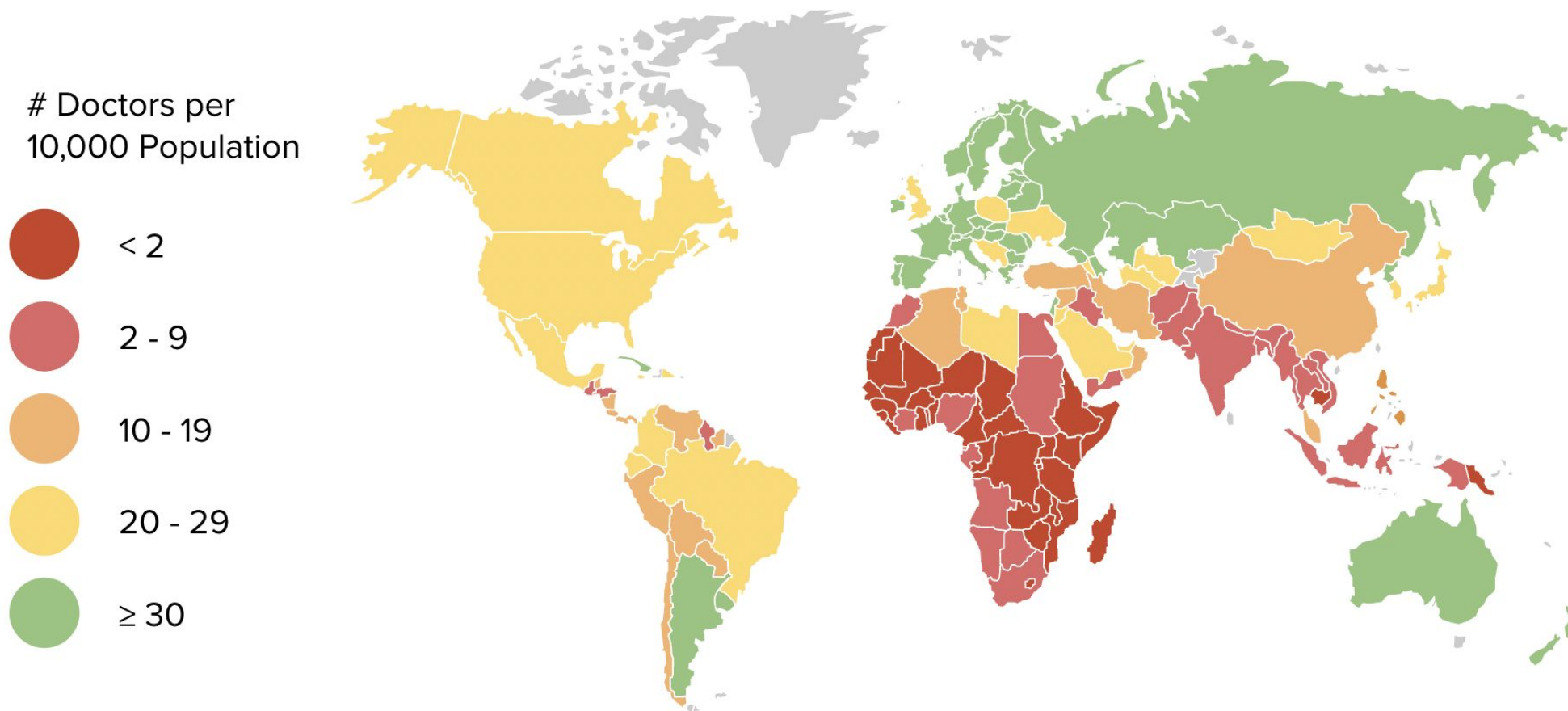
9:40 - 10:00	Setting the scene <ul style="list-style-type: none">• Key challenges faced by LMIC• The need for new methods
10:00 - 10:40	The key elements of medical education capacity-building in LMIC and accompanying challenges <ul style="list-style-type: none">• Technical aspects
10:40 - 11:15	<ul style="list-style-type: none">• Content curation and creation
11:15 - 12:00	Zooming in: Ethiopia, Samoa, and AAIMS
12:00 - 12:30	Open discussion



Key challenges faced by LMIC

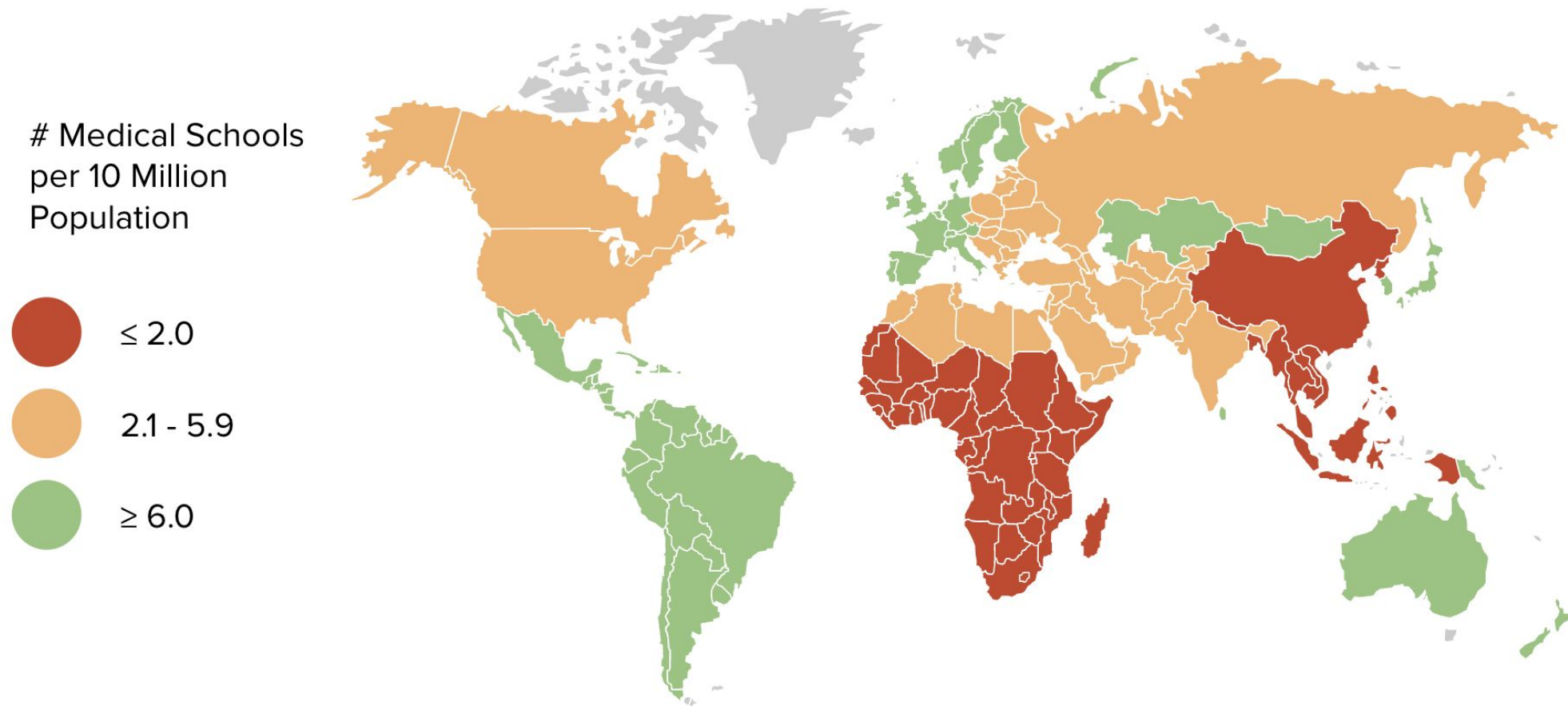


Uneven distribution of healthcare workforce



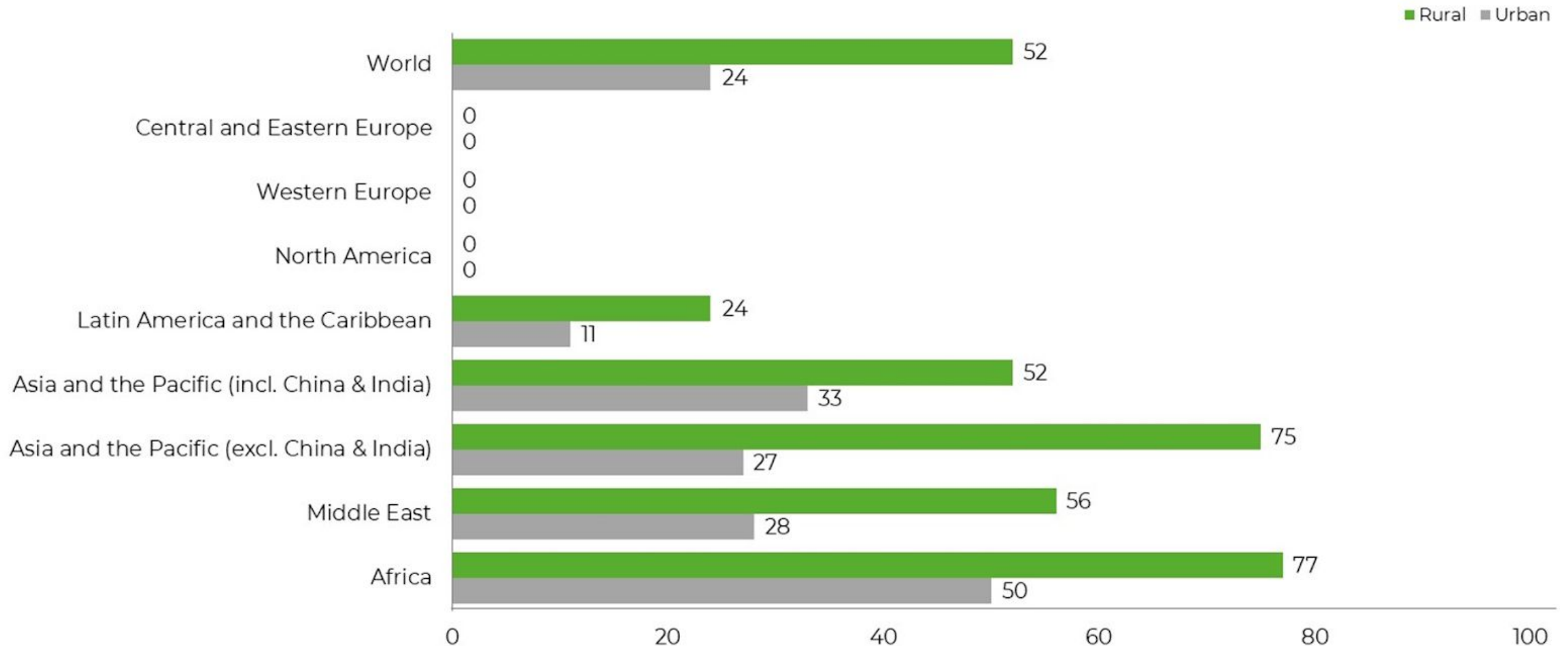
Source: World Health Organization

Limited educational opportunities for the future healthcare professionals



Source: The Lancet Commissions

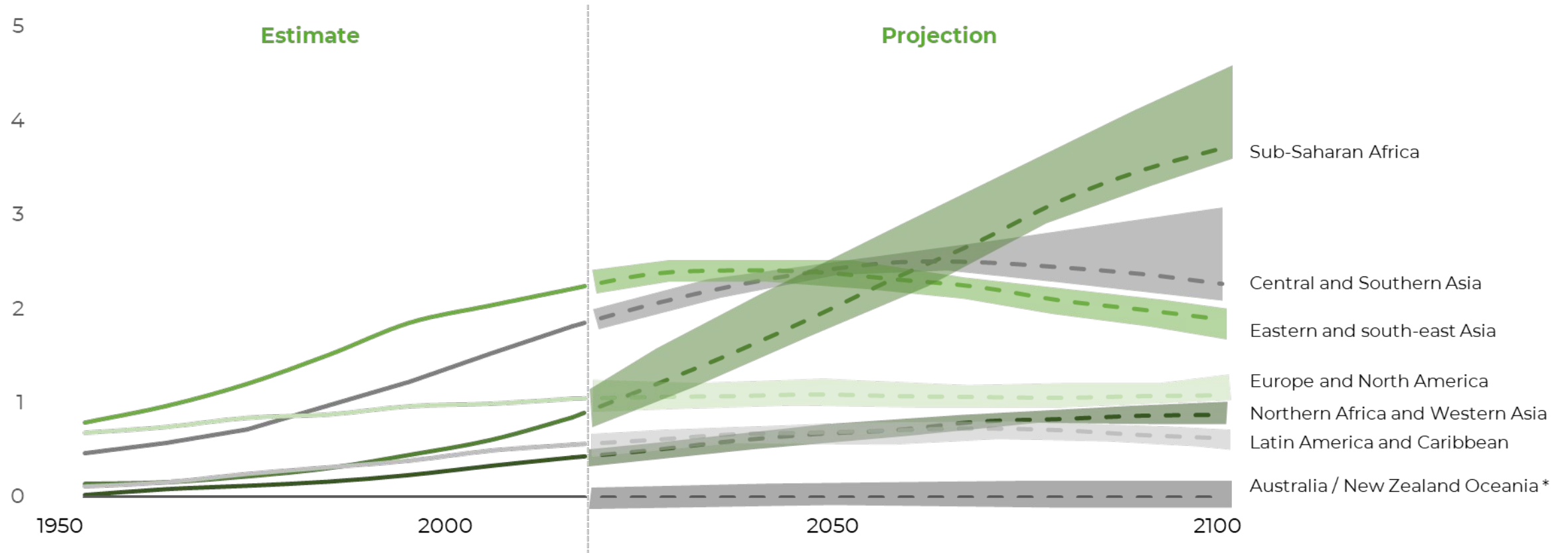
Rural vs urban population without access to health care due to health worker shortages (percentages)



Source: ILO estimates, 2015.

Population growth projections show urgency for action

Total population by sustainable development goal region (bn)



*Excluding Australia and New Zealand

Source: UN Department of Economic and Social Affairs



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**

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



Medicine & Nursing

Systematic support national universities & schools through:

- digital teaching engine and apps
- local content production
- online simulations

In-service personnel training

Community Health Workers

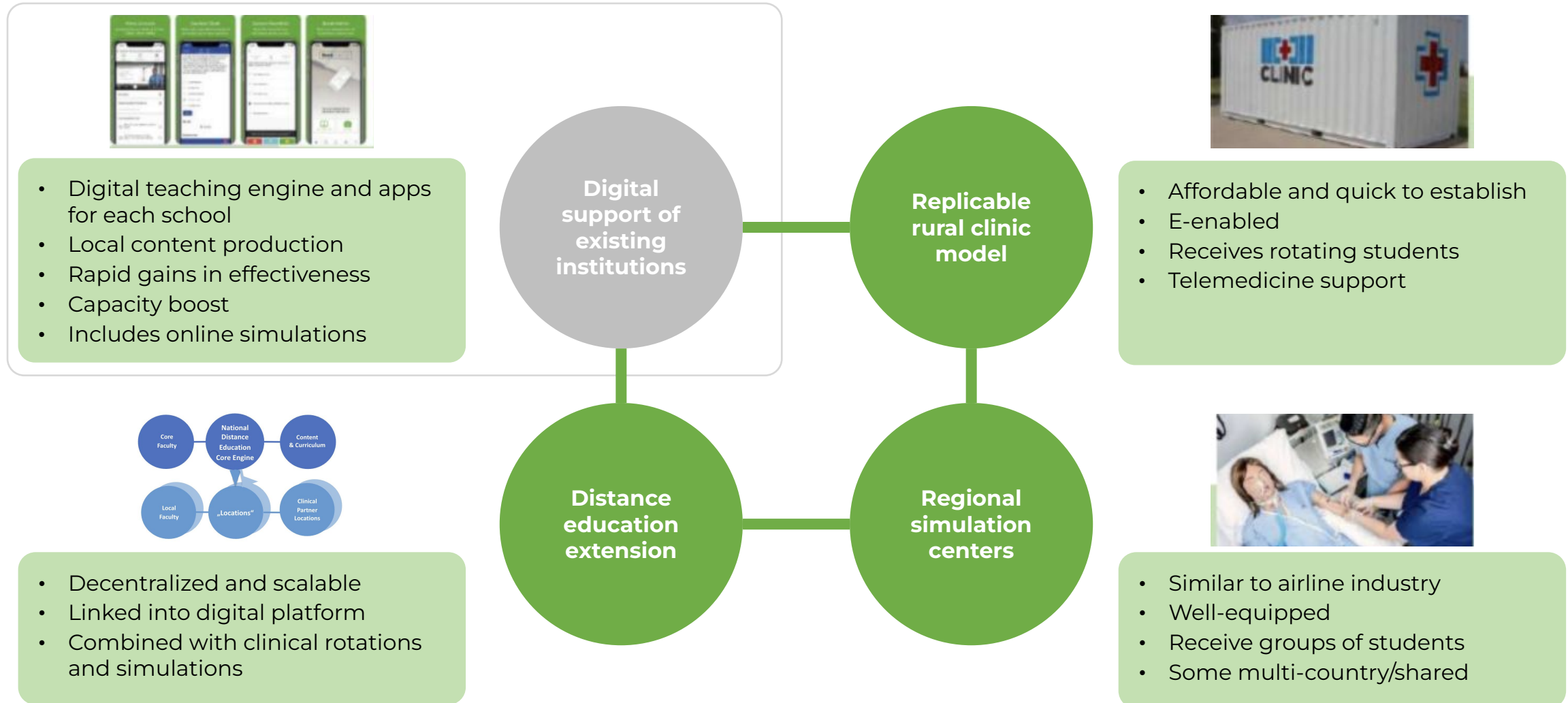
Pre- and in-service training

- digital teaching engine and apps
- local content production
- online simulations

Capacity increase

Capacity increase nationally and internationally (country as an education hub)

Digital foundation can enable wider systemic approach





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

Technical aspects

Delivery systems

Hardware

Internet Access

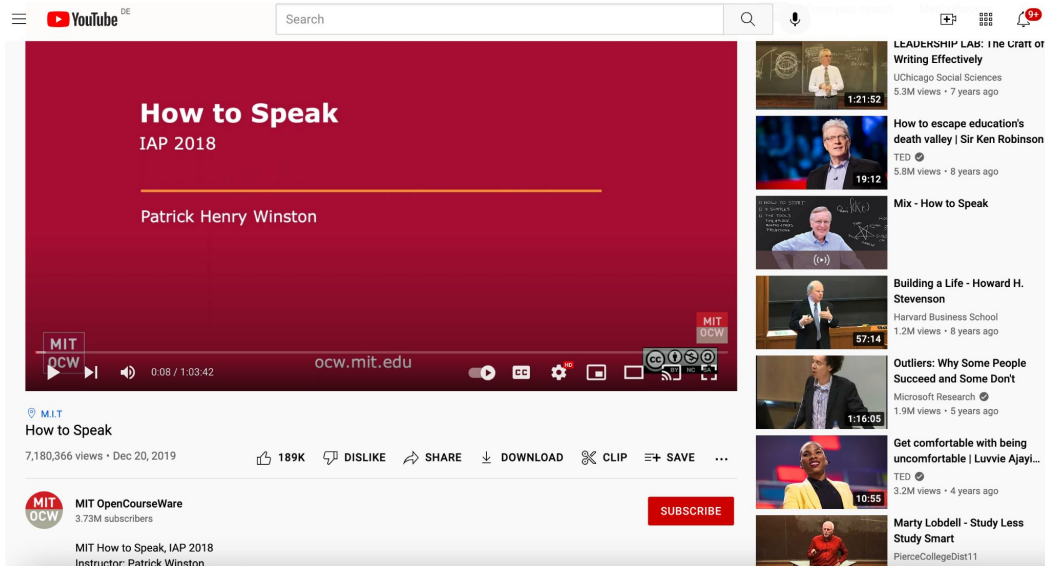
Technical aspects

Delivery systems

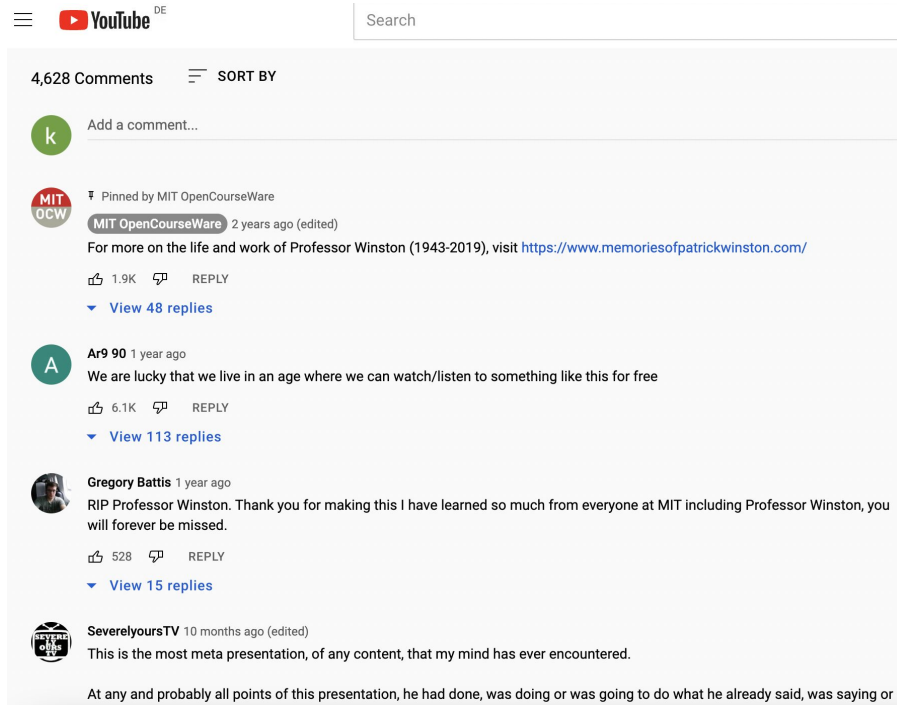
Hardware

Internet Access

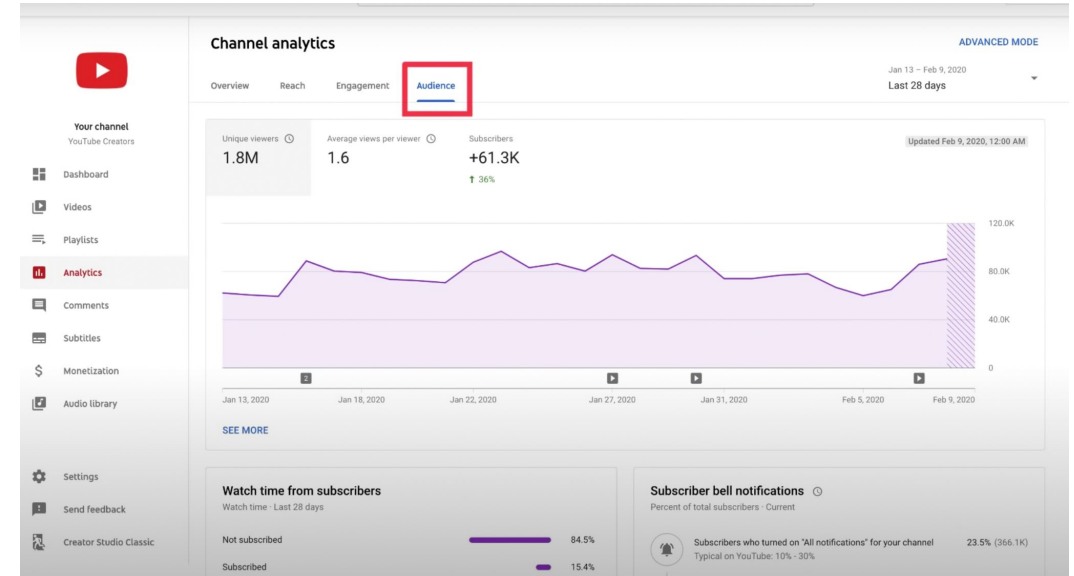
Many delivery systems are simple to use and affordable



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

Do it yourself




- ✓ Open-source and free forever
- ✓ Download, install, host, modify and customise your own site
- ✓ Community support throughout your journey

[Learn how to get started](#)

Free Download

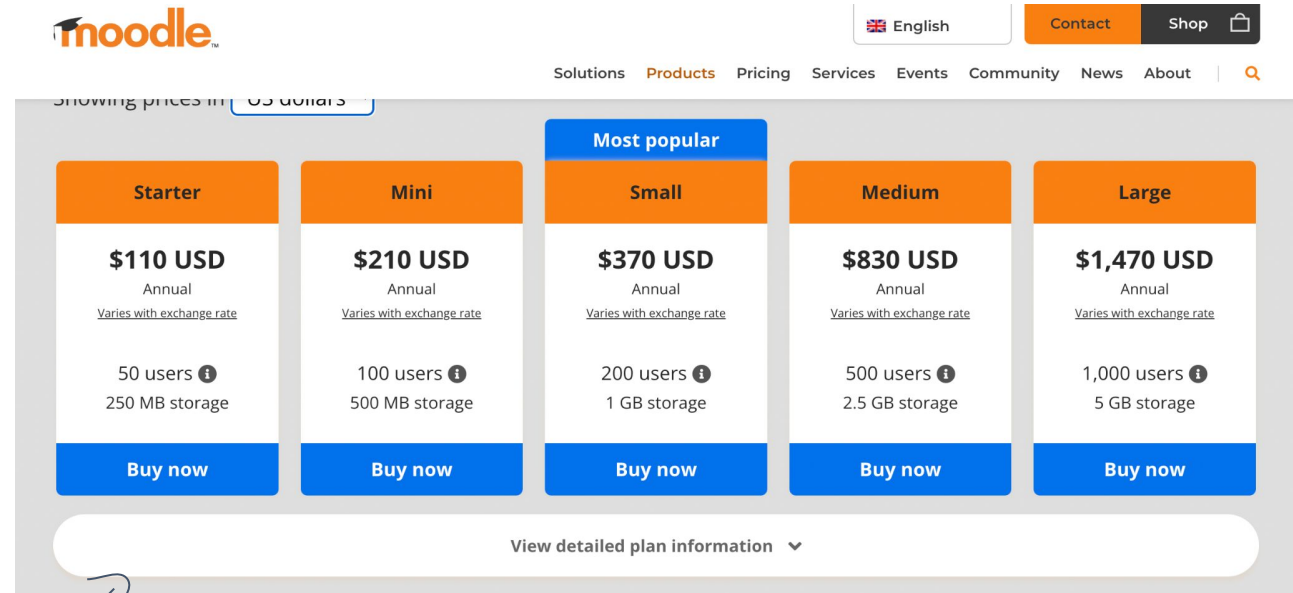
Start with us



- ✓ Free to try for 45 days (no credit card needed)
- ✓ Fastest way to get a Moodle site for trial or off-the-shelf applications
- ✓ Low cost and low maintenance hosting plans including updates and backups

[Learn about MoodleCloud](#)

Get a MoodleCloud plan






The screenshot shows the Moodle website's pricing section. At the top, there's a navigation bar with links for Solutions, Products, Pricing, Services, Events, Community, News, and About. Below this, a dropdown menu shows 'Showing prices in US dollars'. The main content area displays five pricing plans: Starter, Mini, Small, Medium, and Large. Each plan includes an annual price, a note that the price varies with the exchange rate, the number of users, and the amount of storage. A 'Buy now' button is provided for each plan. At the bottom of the pricing section, there is a link to 'View detailed plan information'.

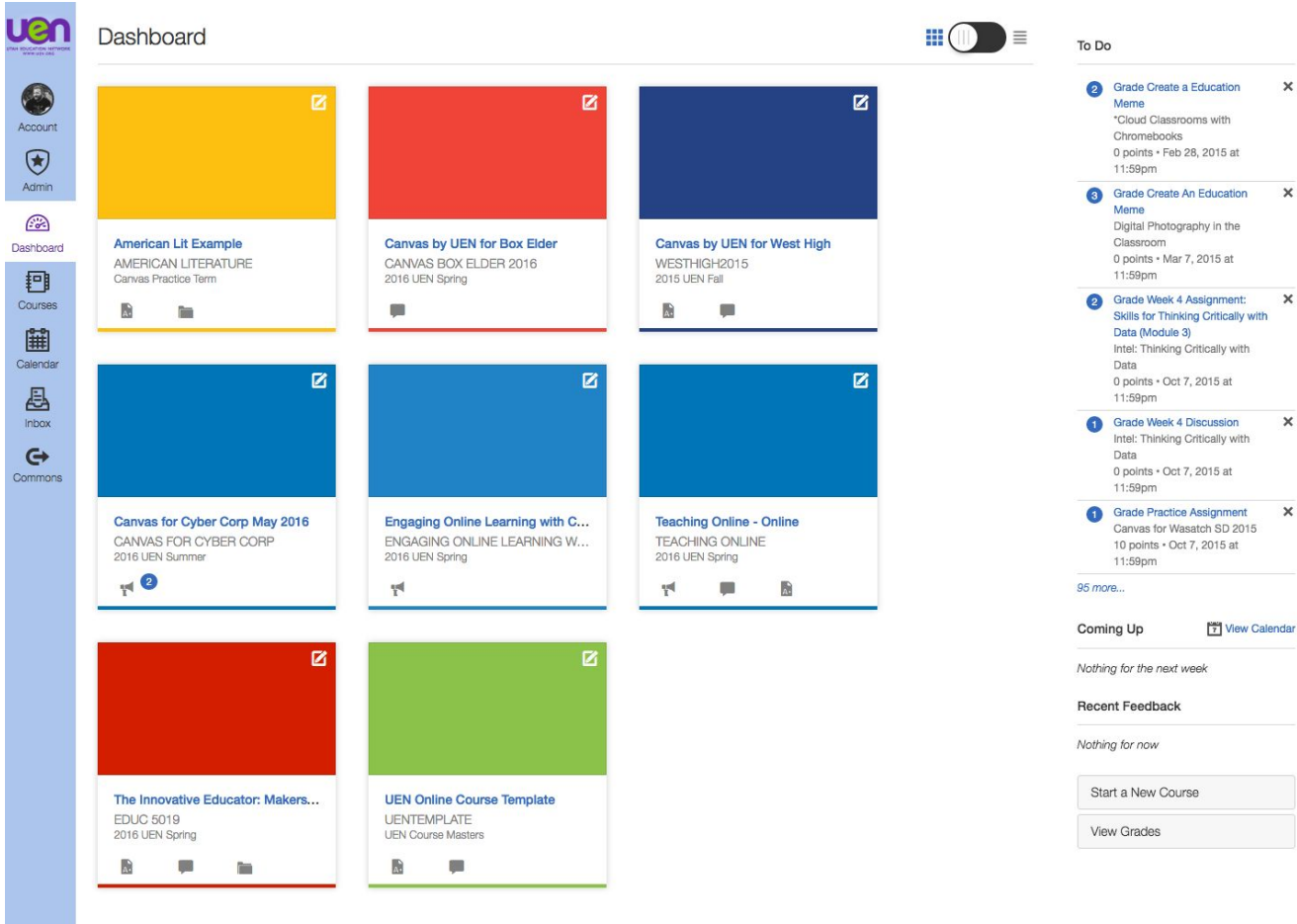
Plan	Price (USD)	Users	Storage
Starter	\$110 USD Annual	50 users	250 MB storage
Mini	\$210 USD Annual	100 users	500 MB storage
Small	\$370 USD Annual	200 users	1 GB storage
Medium	\$830 USD Annual	500 users	2.5 GB storage
Large	\$1,470 USD Annual	1,000 users	5 GB storage

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

Delivery systems should enable, at least


Local control

Local content integration

Tracking and assignments


Adaptability

Local control over the delivery formats and content




ጤና ሚኒስቴር - ኢትዮጵያ
MINISTRY OF HEALTH - ETHIOPIA
የዜጎች ጤና ለሃገር ብልፅግና!
HEALTHIER CITIZENS FOR PROSPEROUS NATION!

Log in


☐ Remember me 

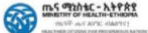
[Forgot your password?](#)

Adaptability and ability to respond to the local needs



BOOKMATCHER




eCHIS TOT | 

eCHIS TOT

1/2 lessons completed 50%

0/1 video watched (0:00/0:01 h)


0 of /2 questions answered




ASSIGN



Description
eCHIS TOT


Educators



 Ministry of Health Ethiopia


Videos / eCHIS TOT

 eCHIS TOT
01:47 min

0% watched  

 eCHIS TOT - PDF File

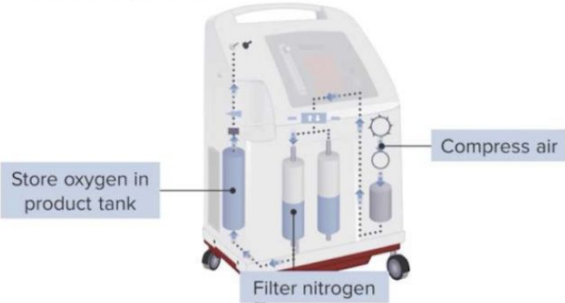
 



Providing Oxygen

Oxygen cylinder Insufficient oxygen On-site production

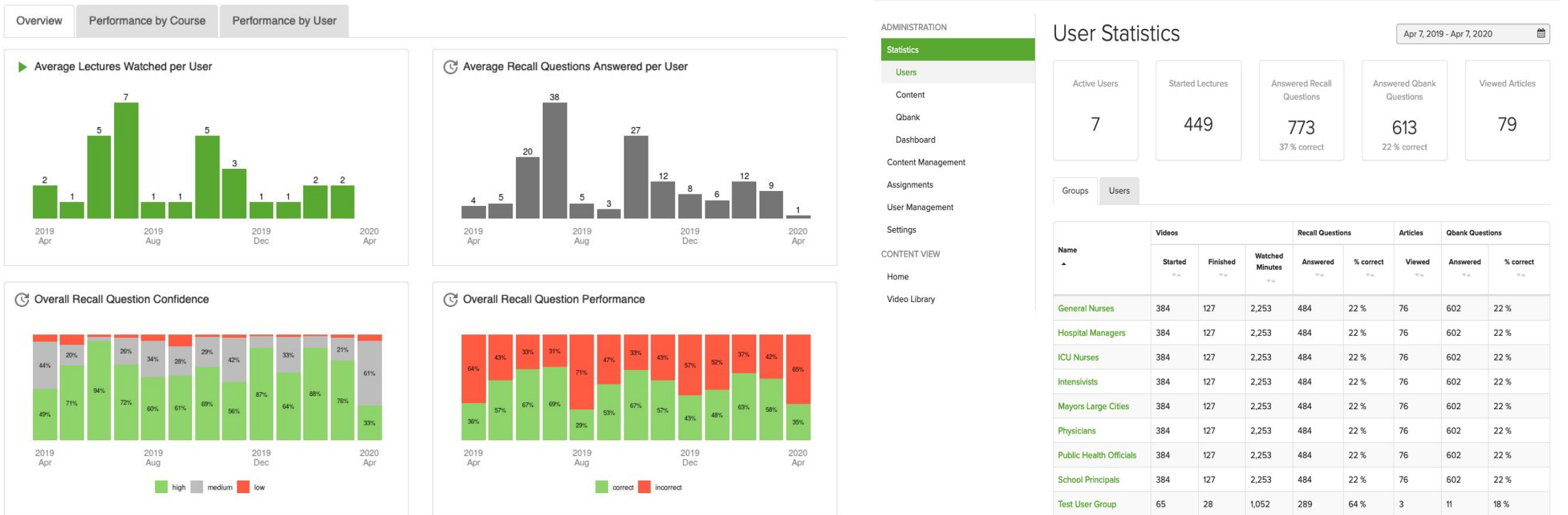
On-Site Production



Store oxygen in product tank Compress air Filter nitrogen

© By Lecturio

Tracking of learners and assignments possibilities



1

Question

- What delivery system have you used?
- What has the experience been?

Technical aspects

Delivery systems

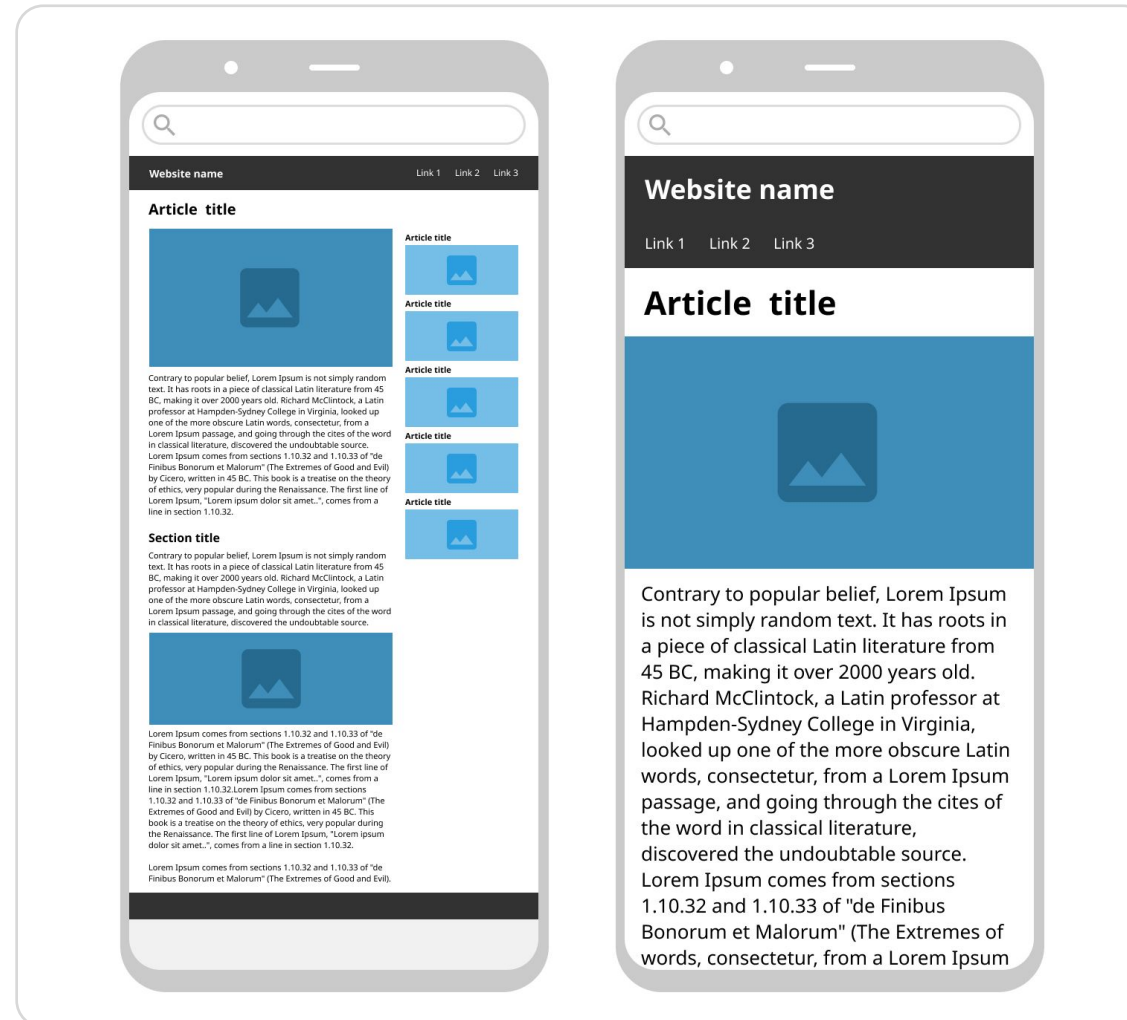
Hardware

Internet Access

Issues with delivery and accessibility of content on old devices



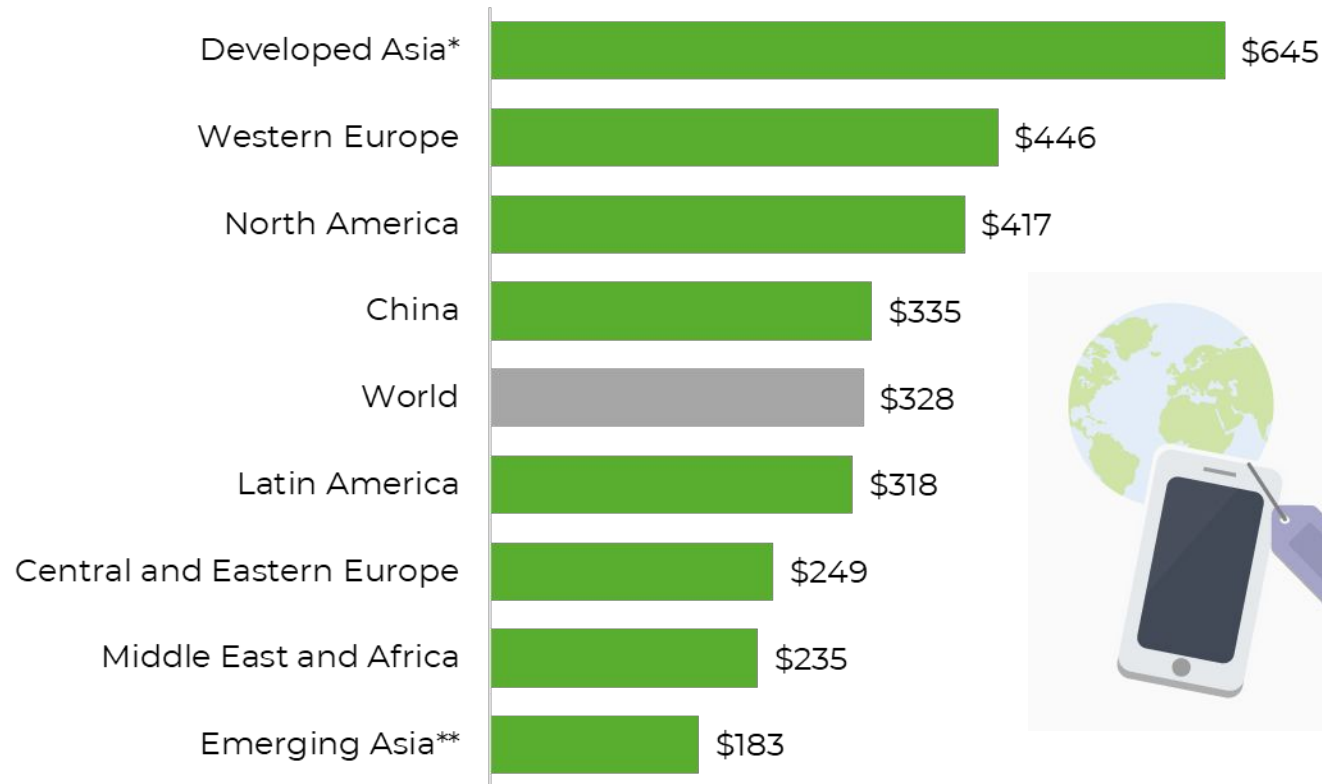
Accessibility of content via apps or (un)responsive web design



Average smartphone prices by world regions

How Smartphone Prices Differ Across the Globe

Average smartphone selling price by world region in 2017



Samsung smartphones are the most sold smartphones in Africa.
Average price for SAMSUNG Galaxy A03s 32 GB: **USD 151**

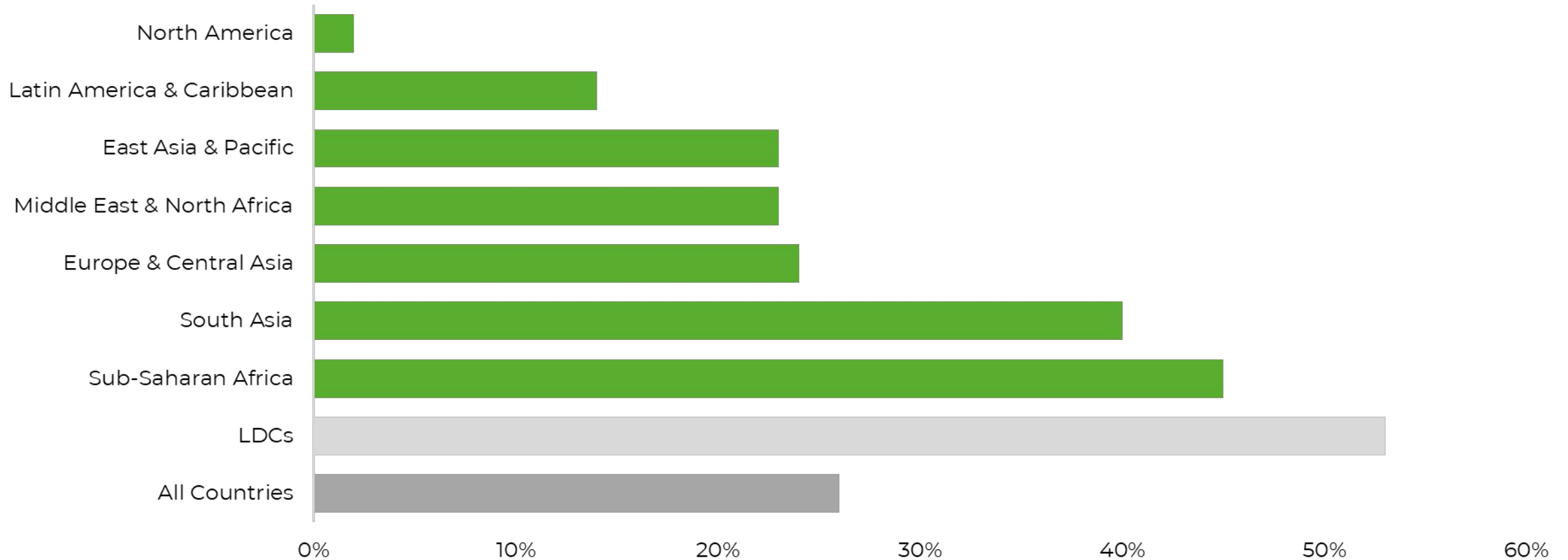
* Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, Taiwan

** 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



Source: Alliance for Affordable Internet

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

Solution operability via multiple devices

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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**

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



giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Device manufacturers offering reduced cost or sponsored provision

EVERTEK

Condor
Prenez votre envol !


HUAWEI

SAMSUNG

 **motorola**

CellC
CONNECT YOUR WAY

 **LG**



SONY

 **SICO**
TECHNOLOGY

Telkom

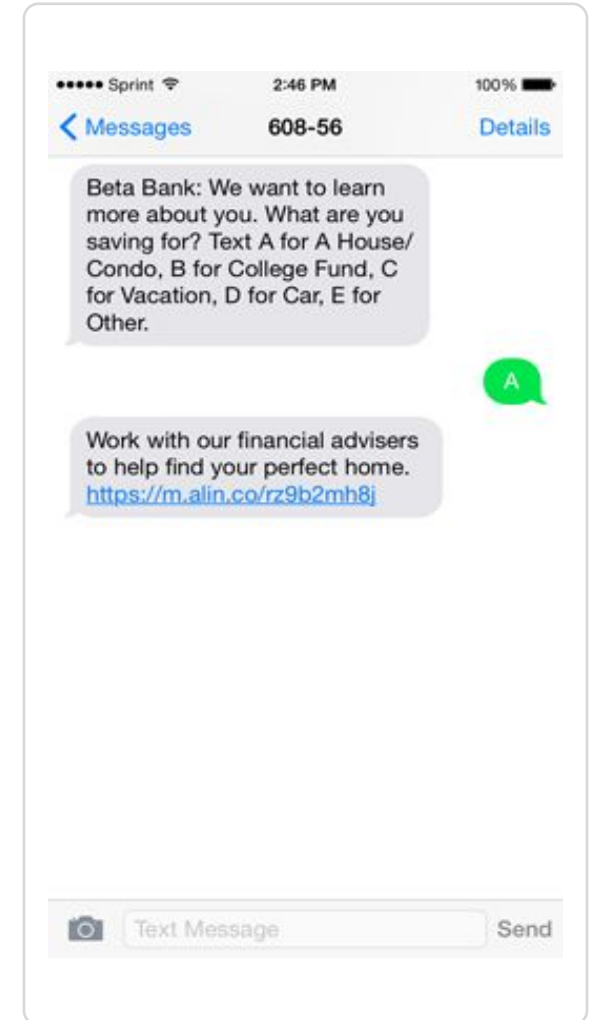
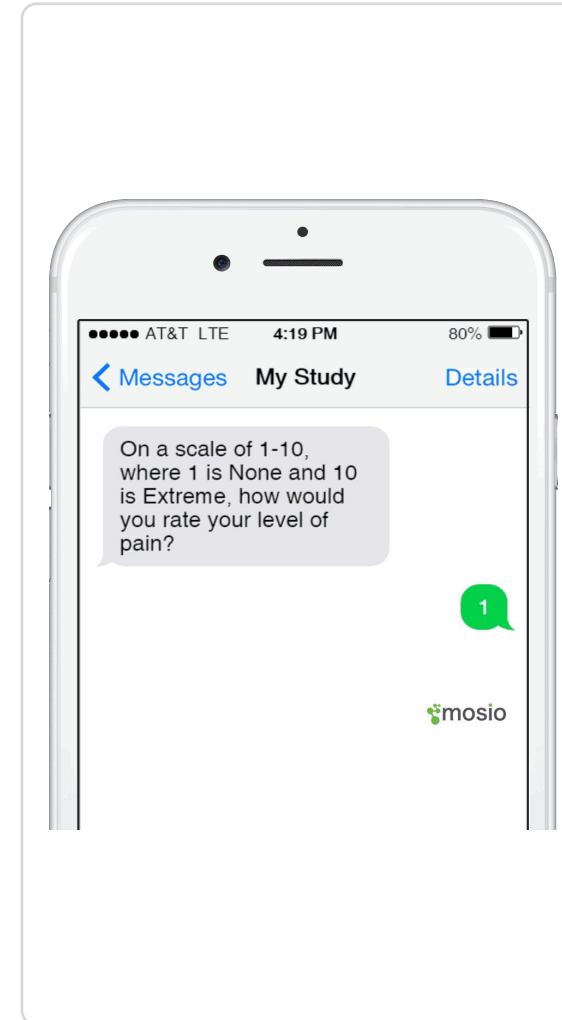
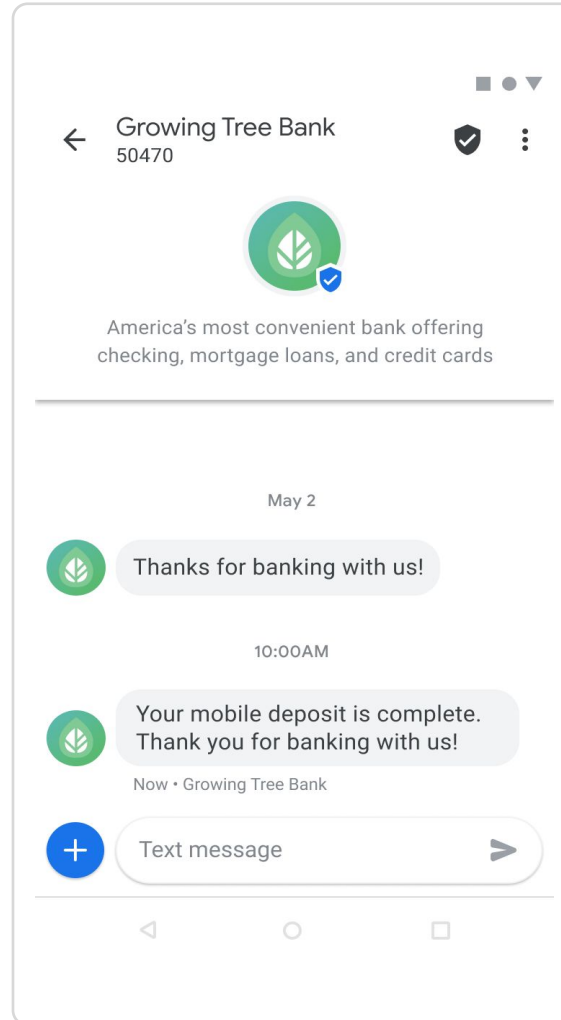
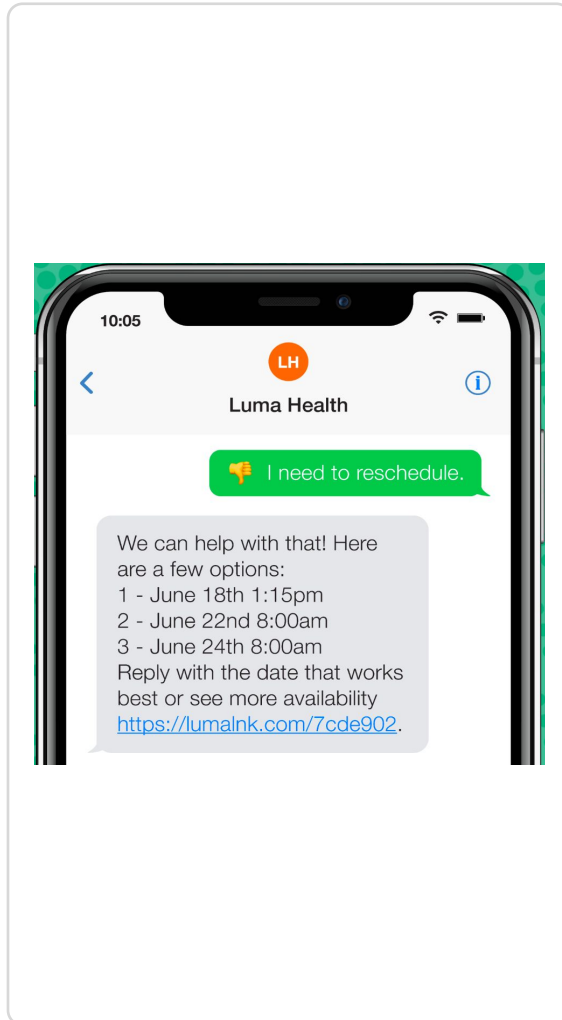
NOKIA

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

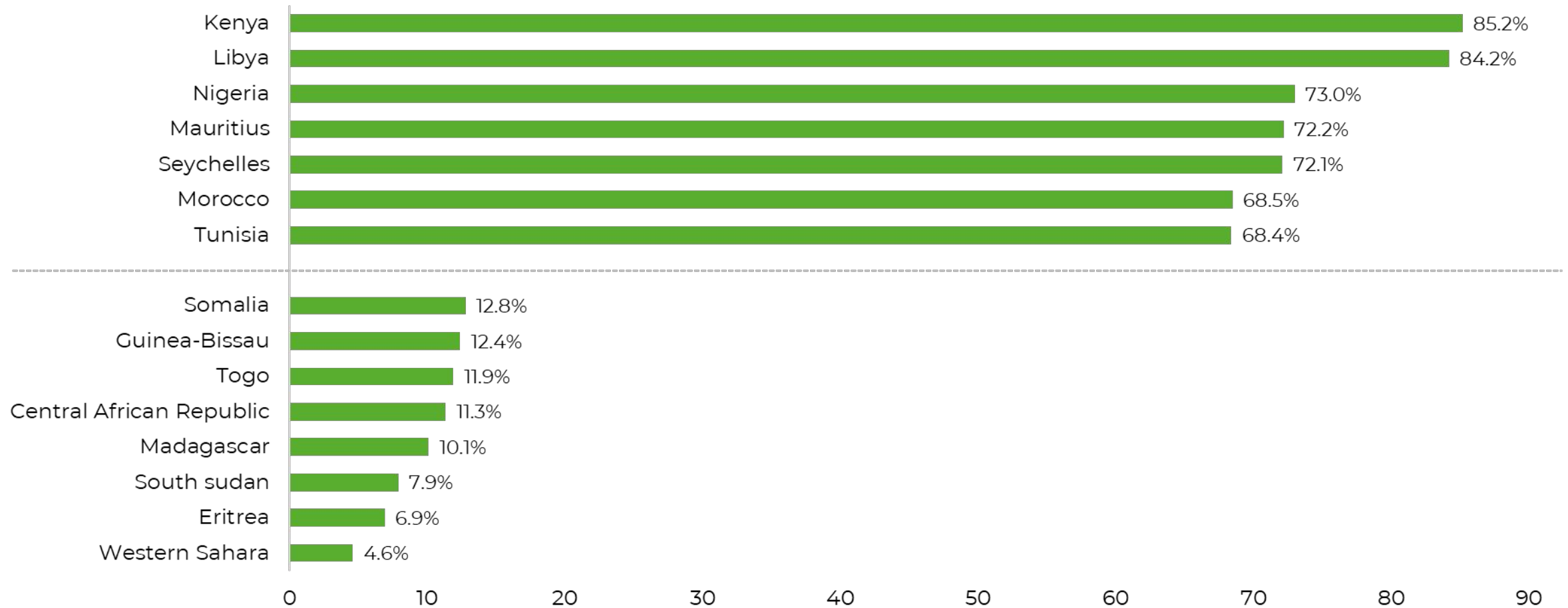
With 170 million users, **Internet penetration** in Africa is at 18% (global average of 30%) and only one in 10 households is connected to the net.



Source: Internet Society, Global Digital Statistics.

Share of Internet users in Africa

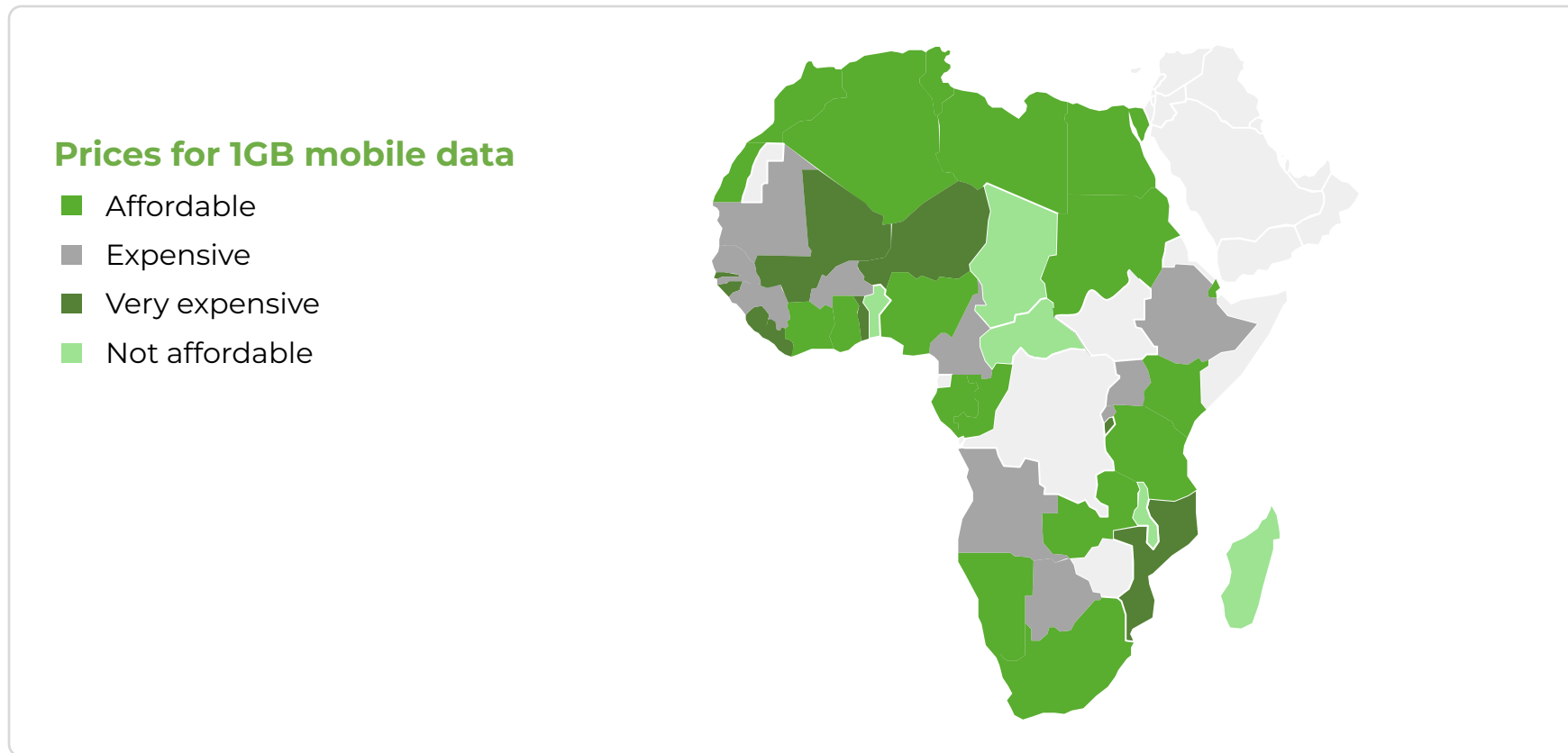
Share of internet users



Source: Statista, 2020

Internet charges is Africa

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



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%

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

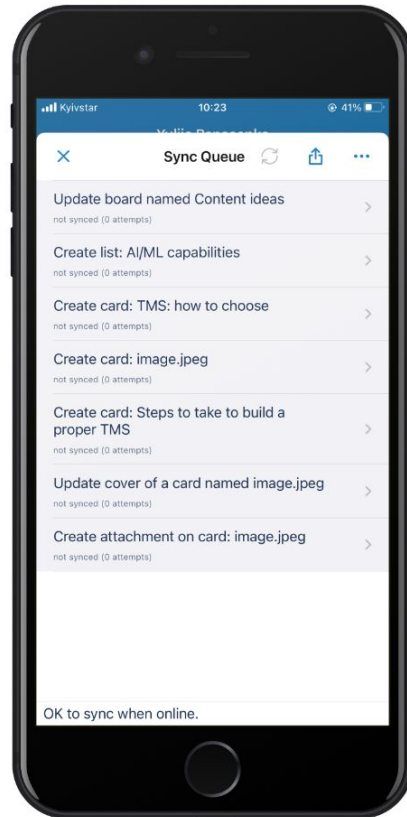
Partnering with mobile providers

Local WiFi without Internet solutions

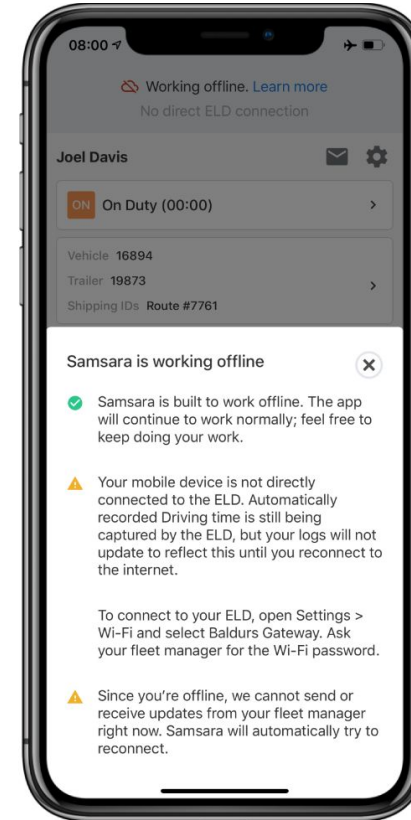
Mobile provider partnership for free access for relevant apps or discounted data bundles



Mobile app with offline support

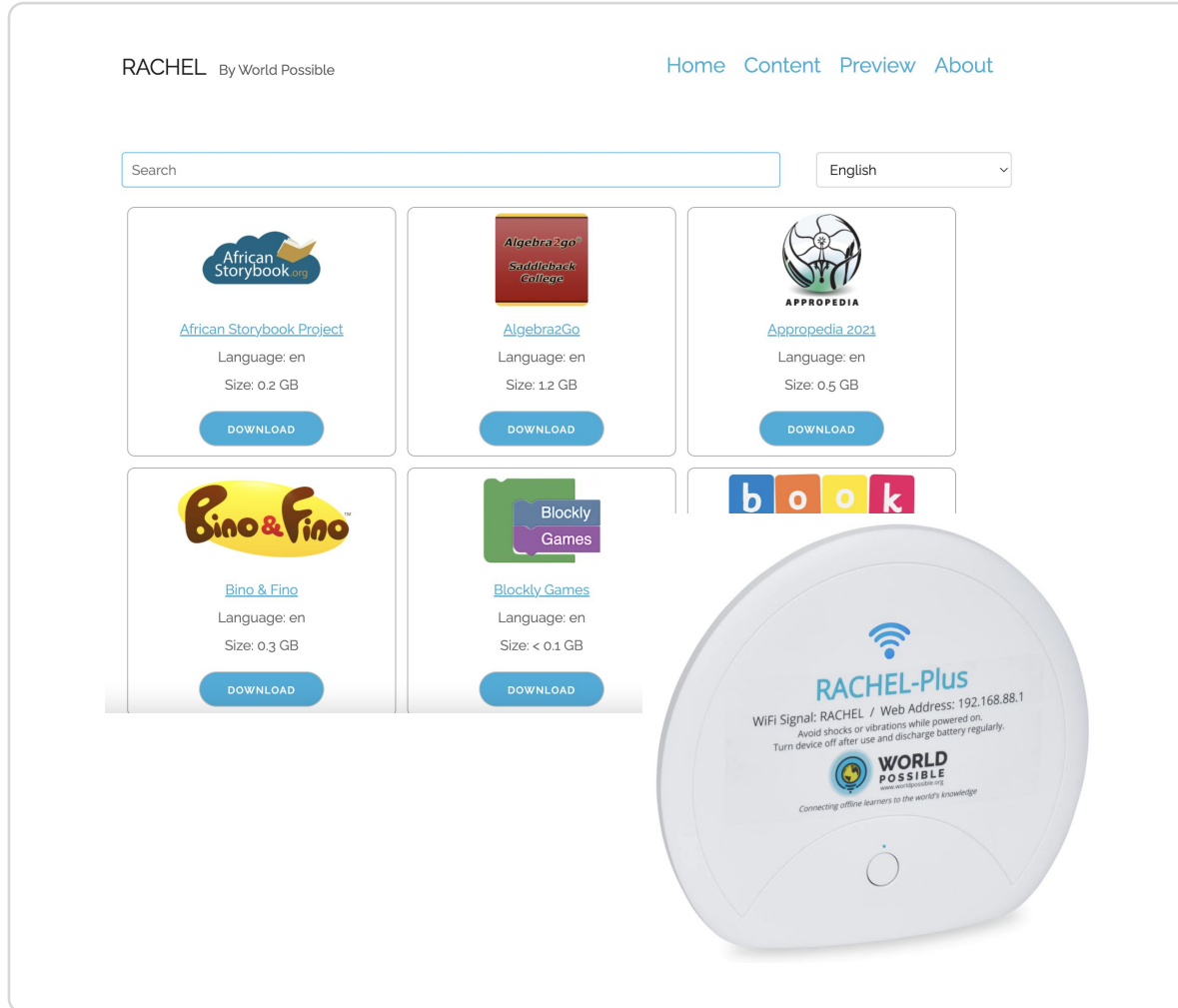


Trello app working offline



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

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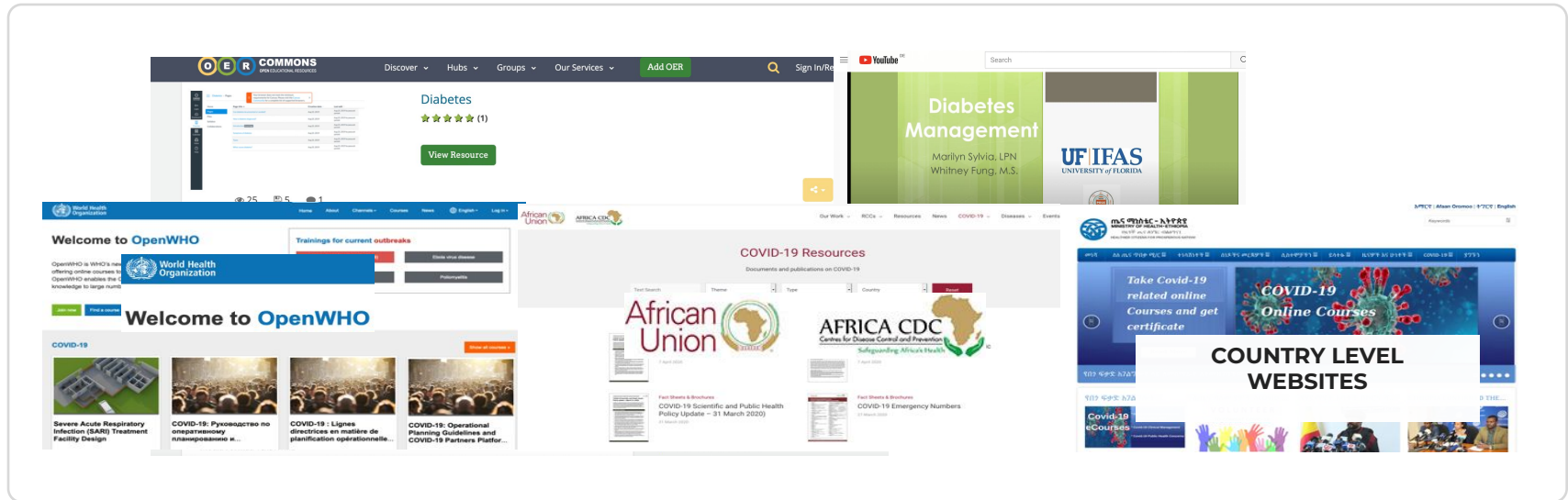
Effective delivery formats

E.g. Text
Videos
Graphics

**Effective Assessment and quality feedback loop
formats**

Content sources

Open Knowledge
Pools



PULL

Country-
Level Learners

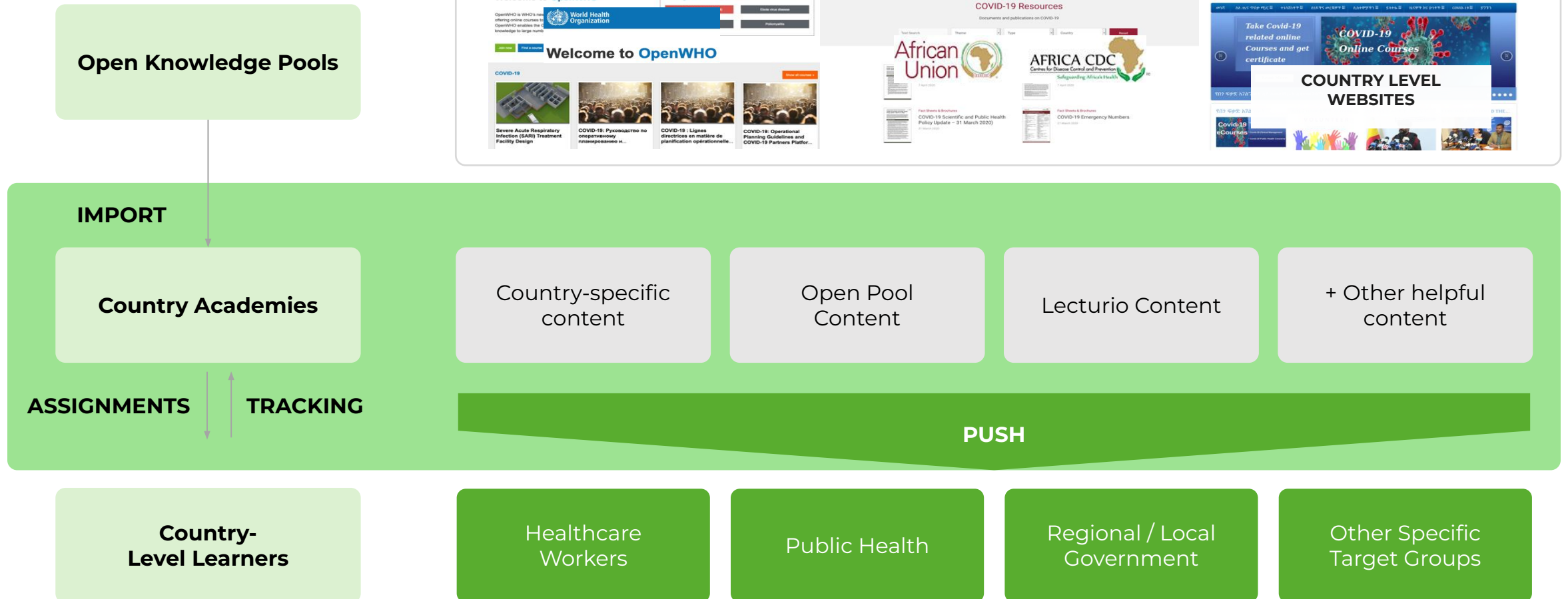
Healthcare
Workers

Public Health

Regional / Local
Government

Other Specific
Target Groups

Content sources



Lecturio's library - Videos

Videos / ... / Biochemistry: Basics / Overview – Introduction to Biochemistry

helping us to better understand the molecular basis of life. In this lecture I will go through

Overview – Introduction to Biochemistry by Kevin Ahern, PhD

★★★★★ (0)

Learning Objectives

Describe biochemistry at a cellular level with regard to the history of the evolutionary process

Playlist

72 videos

Overview – Introduction to Biochemistry

History – Introduction to Biochemistry

SHOW PLAYLIST

Quiz

2 quiz questions

1 Unanswered

1 Due Today

Lecturio's library - Concept pages

Anatomy of the Eye

The human eye is a sensory organ whose primary function is vision. The eye has a spheroidal shape and is structured in 3 layers: a supporting outer fibrous layer, a middle vascular layer, and an inner neural layer. The eye can also be subdivided into 3 compartments: the anterior, posterior, and vitreous chambers. Surrounding the eyeball itself are the extraocular muscles, the lacrimal apparatus, various nerves and vessels, and the bony structure of the orbit. Light travels through the compartments of the eye to focus on the retina, which is the location where photoreceptors convert the stimulus into a neural impulse that is carried by the optic nerve to the brain.

Last update: December 3, 2021 9:11 am

Table of Contents

- Development
- Gross Anatomy
- Neurovasculature
- Function
- Clinical Relevance
- References

Share this concept:

Development

General

- Develops from the forebrain
- Regulated by the *PAX6* gene
- Lens placode gives rise to the lens.
- Optic cup gives rise to the retina.

Timeline

- Begins at week 3, with formation of optic grooves from forebrain
- Optic grooves fuse to become the optic vesicles
- At week 4, the optic vesicles form the optic cup,
- Continues through week 10 of embryologic development

forebrain

The anterior of the three primitive cerebral vesicles of the embryonic brain arising from the neural tube. It subdivides to form diencephalon and telencephalon.

[Development of the Brain, Spinal Cord, and Face >](#)

Embryologic development of the eye

Image by Lecturio.

Related videos


Development of Eye

Co-creation of local content

Course: Technical Maintenance, MOH Ethiopia





Application of learning science principles





ጤና ሚኒስቴር - ኢትዮጵያ
MINISTRY OF HEALTH-ETHIOPIA
የሕዝብ ጤና ለማረጋገጥ
HEALTHIER CITIZENS FOR PROSPEROUS NATION


BOOKMATCHER





 Home


 Study Planner


 Library


 Videos


 Question Bank


 Learning Paths


 Spaced Repetition

 Bookmarks

 Notes

 Performance

 Patient Notes

 COVID-19 Resources

Spaced Repetition

Selected Deck
All Questions ▼

Total Due ⓘ
Number of total due questions

Questions for today
55

2

Due

1

Overdue

52

Long overdue

ANSWER DUE QUESTIONS

SETTINGS

Mastery Level

Questions by times answered correctly in a row

Total Deck Size
55

16

28

11

0

0

0

Times Correct

012345+

5

Question

What content sources have you used in low income settings?

6

Question

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

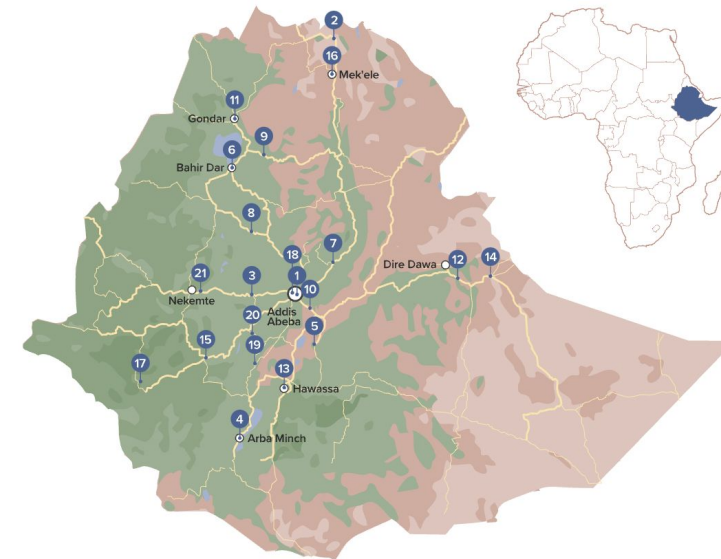
- Technical issues
- Quality content
- Financing



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.



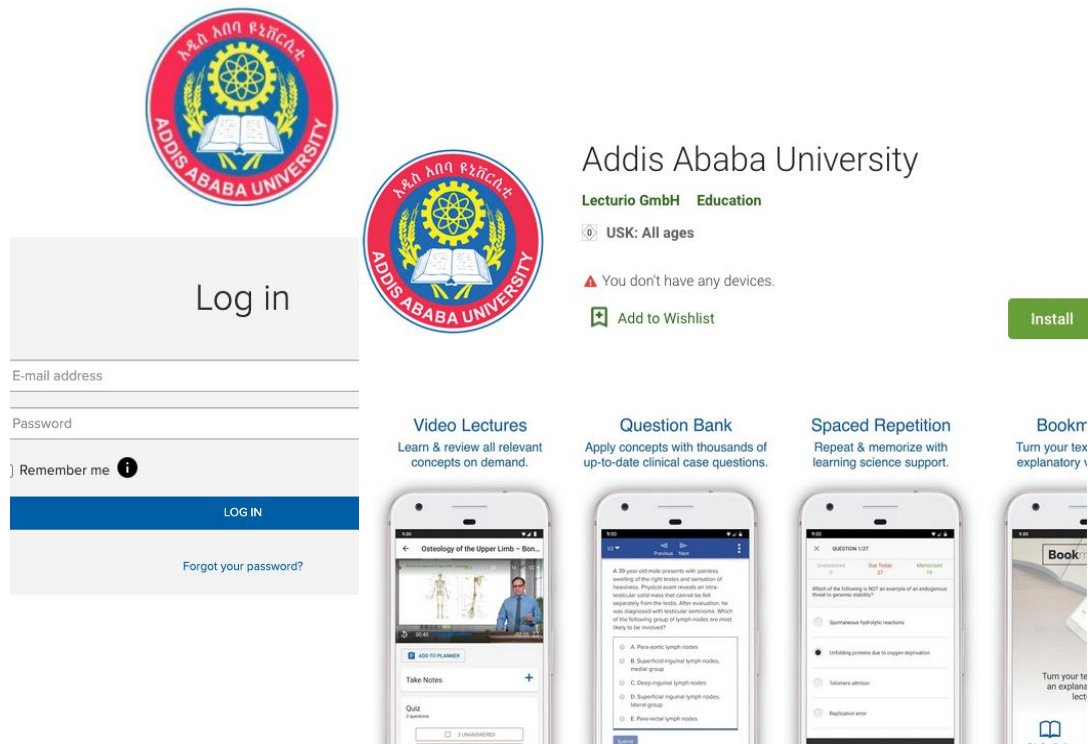
Digital Medical Capacity Building in Ethiopia

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



Addis Ababa University
Lecturio GmbH Education
USK: All ages

You don't have any devices.
Add to Wishlist Install

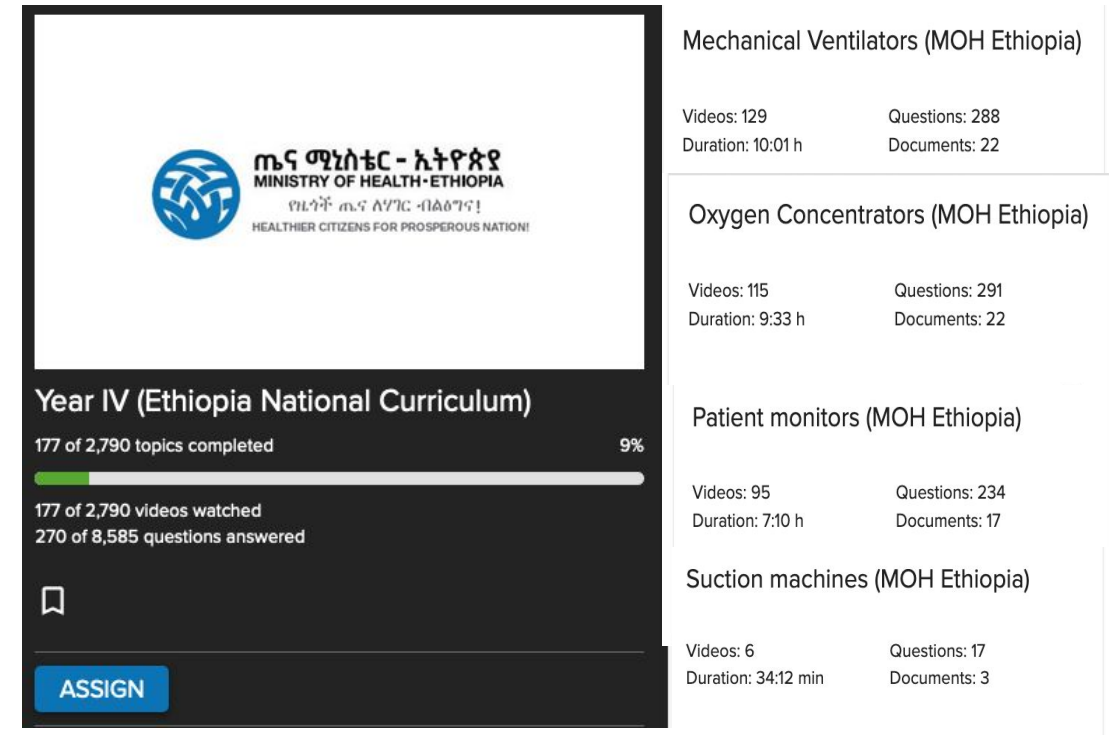
Video Lectures
Learn & review all relevant concepts on demand.

Question Bank
Apply concepts with thousands of up-to-date clinical case questions.

Spaced Repetition
Repeat & memorize with learning science support.

Bookmarks
Turn your text into explanatory videos.

Co-Production of Tailored Content



Year IV (Ethiopia National Curriculum)
177 of 2,790 topics completed 9%
177 of 2,790 videos watched
270 of 8,585 questions answered

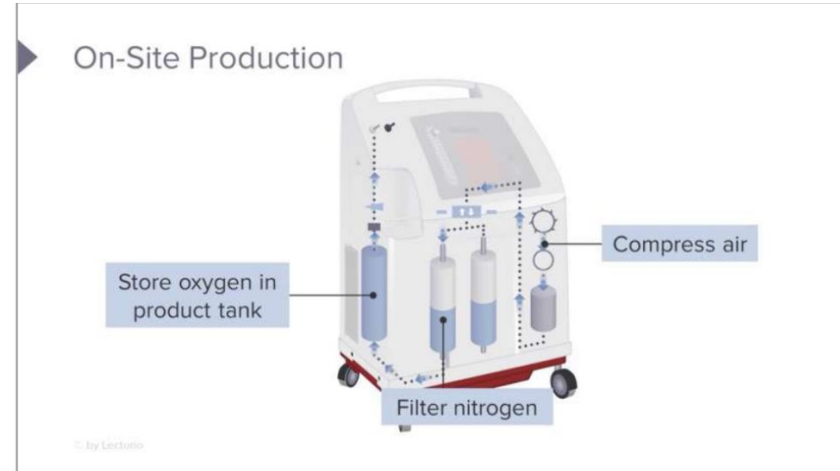
Mechanical Ventilators (MOH Ethiopia)
Videos: 129 Questions: 288
Duration: 10:01 h Documents: 22

Oxygen Concentrators (MOH Ethiopia)
Videos: 115 Questions: 291
Duration: 9:33 h Documents: 22

Patient monitors (MOH Ethiopia)
Videos: 95 Questions: 234
Duration: 7:10 h Documents: 17

Suction machines (MOH Ethiopia)
Videos: 6 Questions: 17
Duration: 34:12 min Documents: 3

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

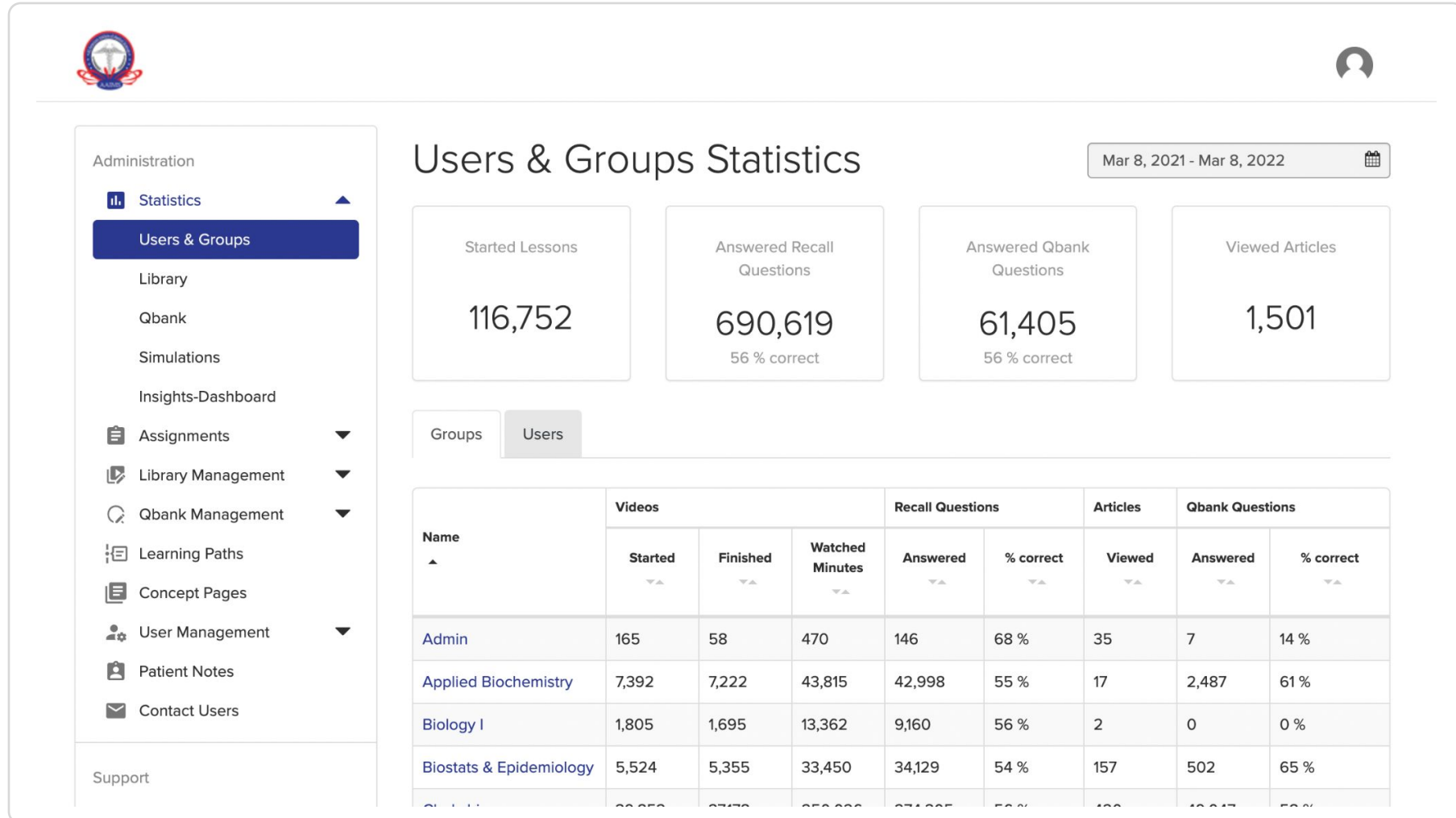
Year Two (MS-2)			
11 Weeks per Quarter			
Quarter 5	Quarter 6	Quarter 7	Quarter 8
HBD - Integrated CVS	HBD - Integrated Endocrine	HBD - Integrated Reproductive - Male and Female	HBD - Integrated Hematology-Oncology-Immunology
HBD - Integrated Respiratory	HBD - Integrated GI	HBD - Renal	HBD - Integrated 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

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 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

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



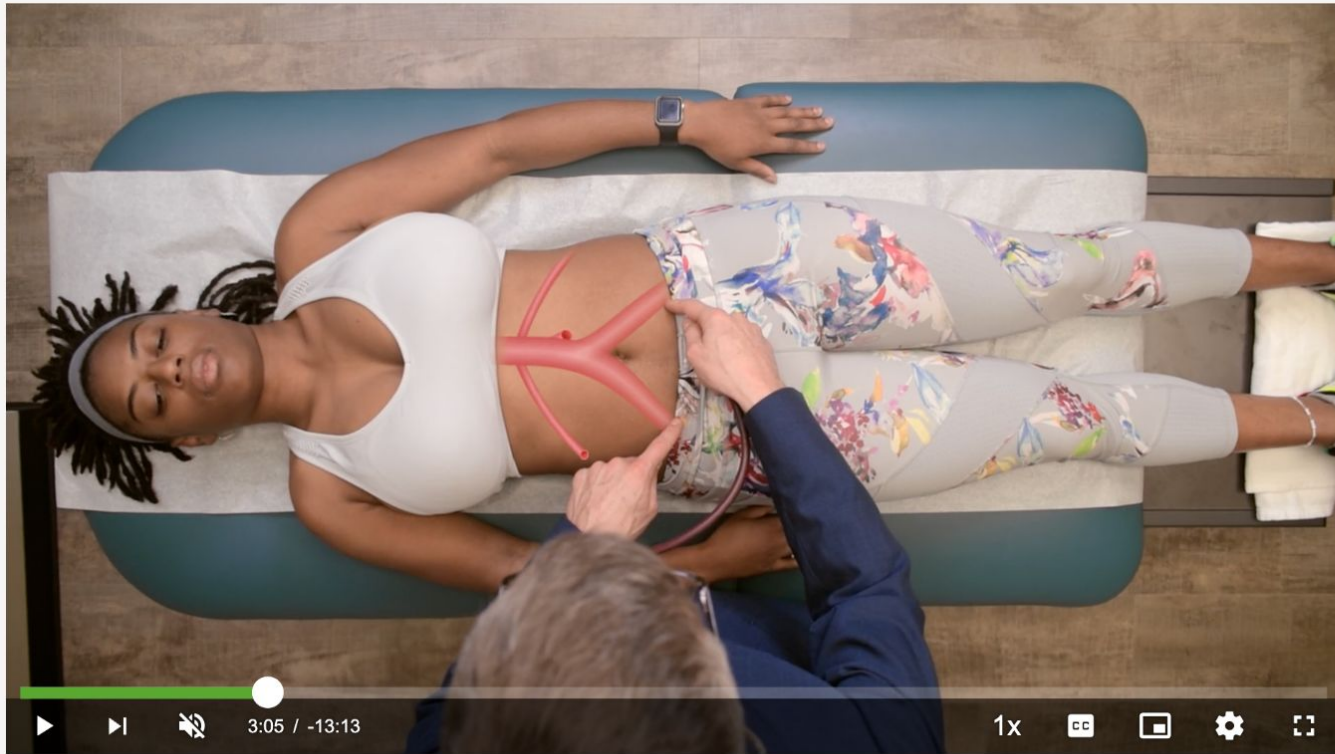
Shared recorded content and the facilitation of active learning especially important for less advanced learners



BOOKMATCHER



Videos / Examination of the Abdominal Region / Examination of the Abdomen



▶ ⏮ 🔊 3:05 / -13:13

1x CC 📺 ⚙️ 🔍

Examination of the Abdomen by Stephen Holt, MD, MS

☆☆☆☆☆ (0)

Learning Objectives

×

List several possible findings on inspection of the abdomen

List several possible findings on auscultation of the abdomen

List several possible findings on percussion of the abdomen

List several possible findings on palpation of the abdomen

Playlist

6 videos

▶ Examination of the Abdomen

▶ Physical Exam Findings in Cirrhosis

✓ SHOW PLAYLIST

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



Videos / ... / Thoracic Viscera / Thoracic Cavity – Lungs, mediastinum and cardiac valves

Thoracic cavity
Radiograph

- Pleural cavities
- Mediastinum

3:17 / 5:45

Thoracic Cavity – Lungs, mediastinum and cardiac valves by Craig Canby, PhD

☆☆☆☆☆ (0)

Learning Objectives

- Describe the 3 potential spaces that exist within the thoracic cavity
- Describe the structures of the thoracic cavity in the axial section
- Identify the structures of the thoracic cavity on a radiograph
- Identify the structures of the thoracic cavity in the axial section in a CT scan

Playlist
25 videos

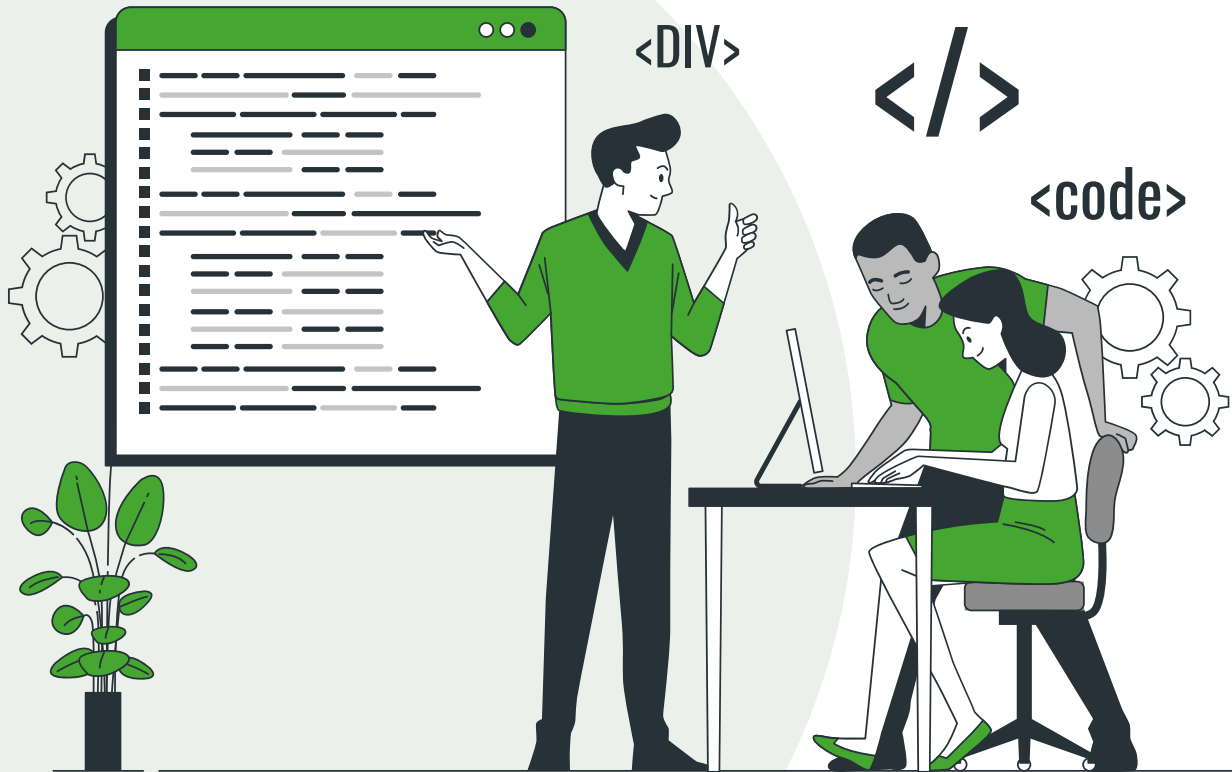
- Thoracic Cavity – Lungs, mediastinum and cardiac valves
- Topography of the Lungs – Lungs, mediastinum and cardiac valves

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

