Dimensions of a new Era in Health Education (Part I)

Dr. Lutz Mükke gives an insight into large-scale e-learning projects by Lecturio to support interventions in health systems.

Many Many health and education systems around the world are unable to train the required number of physicians, nurses and community health workers either today or in the near future. A major problem is the shortage of qualified physicians and faculty in teaching hospitals, medical and nursing schools. The brain drain is also affecting the quality of education in many regions, especially in the Global South. The COVID 19 pandemic forced educational institutions into the digital space. The entire world began to recognize and embrace the potential of digitizing education, distance learning, flipped classroom, or blended learning approaches. And most institutions started to invest in digital developments. However, the transition phase we are in brings complex challenges like lack of budgets, equipment, infrastructure and capacity to produce content, among others.

For example, a survey conducted by Lecuturio in Uganda in the summer of 2023 found that none of the nursing schools surveyed had a Learning Management System (LMS), regardless of whether they were in rural areas or large cities, and regardless of the region of the country or internet connectivity status. Poorly equipped traditional libraries do not make the situation any better for students and faculty. Purchases and donations of books and other learning materials, which sometimes quickly become outdated, often fail to keep up with rapid change, scientific knowledge, and the new culture of learning in the digital age. Simply implementing empty LMS platforms has proven difficult and often inadequate in recent years, despite sometimes large investments in instructor training and content production.

The approach proposed in this article involves the development and customization of high-end libraries within a tailored health science education platform based on learning science and supported by Artificial Intelligence (AI). Such a platform can not only solve existing problems but also offer high potential for leapfrogging into the future. Key features include:

- blended learning support
- high-frequency formative assessments
- spaced repetition techniques
- offline learning capabilities, and
- the ability to incentivize mastery
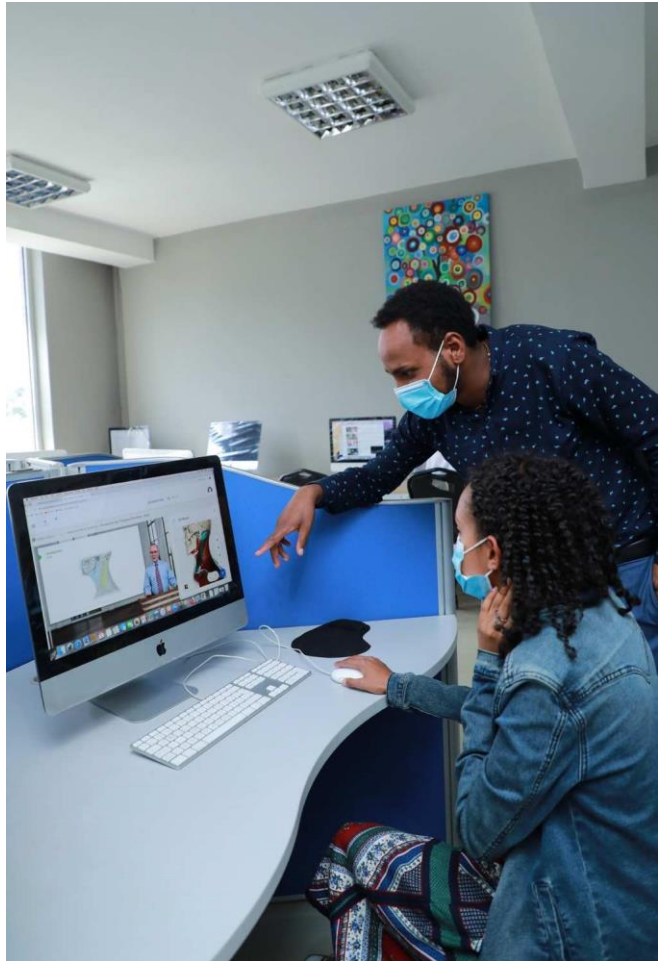
The program runs in the lab at St. Pauls Mellinnium Medical College

By incorporating these elements, the platform can greatly improve the effectiveness of educational delivery and facilitate learning - whether for community health workers, nurses, medical students, or hospital staff.

The article looks at two Public Private Partnership (PPP) projects in Ethiopia that can be considered part of the next-generation eLearning approach and serve as inspiration. These initiatives have been implemented in medical education, nursing education, and training of Health Extension Workers (HEWs). As large-scale capacity-building interventions they have demonstrated positive results and can provide valuable lessons for developing similar interventions in other African countries.
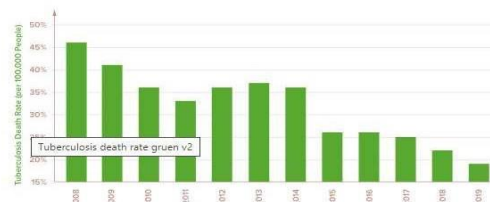

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Trends in under-five mortality rate
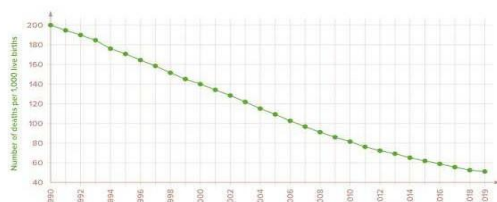
Source: *unicef* | *childmortality.org* as of Apr. 23, 2021

Tuberculosis death rate (per 100,000 people)

Tuberculosis death rate gruen v2

Source: *Worldbank* | *tradingeconomics.com* as of Apr. 23 2021

Ethiopia Statistics

ETHIOPIA: THE CURRENT SITUATION

One figure clearly illustrates the current health care situation in Ethiopia: There is only one doctor for every 10,000 inhabitants in the country. In comparison, Germany has about 40; Iran, 16; and the Philippines, 6 [WHO 2021]. The rural areas of Ethiopia in particular are underserved. Child and maternal mortality rates are significantly affected by this shortage of doctors, as are the rates of malaria and tuberculosis. For this reason, Ethiopia has expanded its health care system more than almost any other African country over the last 15 years. Massive investments were made in new and established medical faculties as well as in the development of rural health care. Ethiopia's system of health extension workers (HEWs), which has its roots in the 1970s and was stimulated by the health systems from the Eastern Bloc countries, is today considered a model for many African countries. Today, there is a health post in the vast majority of Ethiopia's 17,000 village communities. There, about 45,000 community members who have basic health training take on disease-prevention tasks; educate people about contraception, nutrition, circumcision, and hygiene; and vaccinate people, something that is reserved for trained higher cadres of health workers.

Under this approach, Ethiopia's health care system produced impressive results in the last few decades, despite the economic and political difficulties the country has faced: While in 2009, 87 out of every 1,000 children in Ethiopia died before their fifth birthday, today that figure has declined to 50 [Unicef 2021]. Significant successes have been achieved in the fight against HIV, polio, tetanus, measles, and tuberculosis. Access to medicine, drinking water, vaccination programs, and malaria protection has been improved. Today, almost every Ethiopian is within a two-hour walk of a local health clinic. An affordable health insurance system is also under development.

One of the main goals of the Ethiopian Ministry of Health - as in many countries around the globe - is to further reduce the inequalities in health care between different regions in the country but also between urban and rural areas. Planning human resource developments in the health sector for years to come is a herculean task for the federal government of Ethiopia, given the constraints of the health system and budgets. According to the World Health Organization's Global Health Expenditure database, in Ethiopia, only around US$24 per capita was spent on health expenditures in 2018 (in comparison, Mexico spent US$521 that same year). Improving the difficult health situation in a country with 111 million inhabitants with these meager resources seems impossible [WHO 2021].

However, even with these constraints, Ethiopia has managed to establish a health care system based on primary health care (health posts, health centers, and primary hospitals), and all major cities have hospitals with specialized physicians. Although the distribution of hospitals (primary, general, and tertiary) is spread across the country, a high share of Ethiopia's medical doctors live and work in the capital, Addis Ababa. In contrast, access to modern health care is limited in many rural areas, where about 80% of the population lives, and most receive little income from farming. In 2003, Ethiopia started to build its Health Extension Program (HEP).

The government trained tens of thousands of HEWs and assigned them to primary health care units (PHCUs). Today, more than 42,000 government-salaried female HEWs are deployed in the country, particularly in rural areas. They are assigned to health posts, in villages ("kebele") with populations ranging from 3,000 to 5,000 inhabitants. Five health posts and a health centre work in collaboration and form the Primary Health Care Units (PHCU) that serves about 25,000 people.

SIGNIFICANT IMPROVEMENTS

The results have been very positive: A survey undertaken by the University of Queensland, Australia, and the Institute of Tropical Medicine, Belgium, showed "significant improvements in health outcomes during the era of the Millennium Development Goals." In summary, "there was a 67% reduction in under-five mortality; a 71% decline in maternal mortality ratio; a 90% decline in new HIV infections; a decrease in malaria-related deaths by

73%; and a more than 50% decline" in mortality due to tuberculosis between 1990 and 2015. HEP "has enabled Ethiopia to achieve significant improvements in maternal and child health, communicable diseases, hygiene and sanitation, knowledge and health care seeking" (Assefa et al. 2019).

Although the health-related problems in Ethiopia are still substantial compared with those in the Global North, the country has become a benchmark for many African countries over the last decade. Many delegations from Sub-Saharan countries travel to Ethiopia to learn more about its health care policy and HEP.

Like many other African governments, the Ethiopian government is aware of the significant potential that comes with digital education. Experts in the directorate of Human Resources for Health in the federal Ministry of Health understand that digitalization offers enormous opportunities. For example, digital innovations can enable tens of thousands of students, medical personnel, and community workers to participate in training programs. Costs for instructors, travel, accommodation, and food can be reduced enormously. Although parts of the education and training would continue to take place in small seminar groups on-site, digital solutions are expected to bring about a major leap in quality, quantity, and efficiency. eLearning programs can reach even the most remote parts of the country, and staff no longer have to travel for days to attend workshops. Depending on the time of year and the road conditions, just getting to Addis Ababa can take days, as Ethiopia is four and a half times the size of Great Britain. Doctors and health workers are overloaded at work, every day. In-service eLearning can be part of the solution.

FRUITFUL MEETINGS

Understanding this potential, it took the Ministry of Health and Stefan Wisbauer, co-CEO of the German online learning platform Lecturio, only a few hours to agree on a joint plan for a large-scale capacity-building intervention described here. The department of Human Resources for Health is responsible for the education and training of all state health personnel in Ethiopia, for the employees of health posts in 17,000 villages as well as for training doctors at the university level. Lecturio outlined a solution in a form of a complete tailored, online medical and nursing curricula.

Since 2015, world-class lecturers have flown to Leipzig, Germany, every year to produce comprehensive learning videos at Lecturio's production studios. The result is more than 14,000 videos covering the full medical curriculum, from anatomy to pharmacology to surgery, taught by educators from renowned schools and universities, including Harvard, Johns Hopkins, Imperial College, University College London, and Yale University. The interactive learning platform itself was developed by IT experts in Germany, the United States, and Bulgaria. Contents and functionalities are based on learning science and comprise artificial intelligence, 3D models, thousands of clinical case questions, and deep analytics for both sides ,learners and educators/administrators. Educators get to know their students' learning progress, their weak points, can assign contents and tasks (and track

them) and can also use a secure online exam system.

One aspect was particularly important for Ethiopia, the platform's learning apps also work offline. Users can download contents beforehand and access them wherever they are, even in rural areas without internet connection, an important tool in Ethiopia, where infrastructure is an issue, especially in remote areas.

The goal that the Ministry of Health and Lecturio agreed on in 2019 was to support thousands of Ethiopian medical students online, including a train-the-trainer program, as well as the local production of video tutorials for medical equipment use and maintenance for technical assistants and nurses. To help jumpstart this innovative approach, the German Federal Ministry for Economic Cooperation and Development (BMZ) and the German Society for International Cooperation (GIZ) got on board. Working systematically with universities across a large country such as Ethiopia on an eLearning project was a new undertaking, and interest was high. A public–private partnership was forged to make the project financially feasible; it began its work in mid-2020. The BMZ highlighted the project under its Strategic Partnership Technology for Africa as a "project with developmental added value," like Volkswagen's engagement in Rwanda and that of the German software giant SAP in 10 African countries (BMZ 2021).

THE NEW NORMAL - DESPITE LOCKDOWN AND INTERRUPTIONS

One and a half year later, 31 state medical faculties in Ethiopia were equipped with dedicated tailored digital medical teaching platforms. Despite its launch in the middle of a COVID-19 pandemic lockdown, as well as several other disruptions, such as the country's 2020 elections and the ongoing civil war, the project has been moving along well. Today, more than 9,800 students and faculty are using the eLearning platform, the video tutorials were produced with local partners in Addis Ababa, and thousands of students and educators have attended webinars, where they learn how to use the platform and integrate it into their daily routines, along with flipped classroom and blended-learning strategies. The digitalization of education and learning processes has been acknowledged as a challenge and a significant culture change in many Ethiopian universities. Like St. Paul's Hospital Millennium Medical College in Addis Ababa, other universities have a change management center for digital health education in place, as they understand that continuous project work is necessary for success. It is not only older professors who have difficulty making the switch to digital. Doctors and lecturers are usually extremely busy, and it's not always easy to find the time or inclination to integrate innovations into daily routines. However, at St. Paul's, for example, that was never left to the whims of faculty members. To integrate Lecturio into their operations, St. Paul's offered orientation and training seminars for the directors of each department, and then their staff, and the university kept track of who attended.