



Digital Education Programme

# Accompanying the transition of African Universities to Digital Education



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Lisa Myers and Virginie Torrens

# Acronyms

<b>AAU</b>	Association of African Universities
<b>ACE Impact</b>	Africa Higher Education Centers of Excellence for Development Impact
<b>ACEPHAP</b>	African Centre of Excellence for Population Health and Policy
<b>ADEN</b>	African Digital Education Network
<b>ADDIE</b>	Analysis Design Development Implementation and Evaluation
<b>AFD</b>	Agence Française de Développement
<b>CAPE</b>	Centre d'appui à l'enseignement
<b>C-CoDE</b>	Centres of Competence in Digital Education
<b>CDA</b>	African Centre of Excellence in Dryland Agriculture
<b>CEA</b>	Centre d'Excellence Africain en Sciences, Mathématiques, Informatiques et Application
<b>CEDE</b>	Centre for Digital Education
<b>EPFL</b>	École polytechnique fédérale de Lausanne
<b>ESMT</b>	École Supérieure Multinationale des Télécommunications
<b>ESP</b>	École Supérieure Polytechnique (Sénégal)
<b>EXAF</b>	Excellence in Africa
<b>ITC</b>	Information, Technology and Communication
<b>LMS</b>	Learning Management System
<b>MDGs</b>	Millennium Development Goals
<b>MOOC</b>	Massive Open Online Course
<b>NM-AIST</b>	Nelson Mandela African Institution of Science and Technology
<b>NOUN</b>	National Open University of Nigeria
<b>NUC</b>	National Universities Commission (Nigeria)
<b>OER</b>	Open Educational Resources
<b>STEM</b>	Science Technology Engineering and Mathematics
<b>UAC</b>	Université Abomey Calavi
<b>UENR</b>	University of Energy and Natural Resources
<b>UM6P</b>	University Mohammed VI Polytechnic
<b>UVS</b>	Université Virtuelle du Sénégal

# Table of contents

<b>Executive summary</b>	<b>5</b>
<b>Introduction</b>	<b>11</b>
<b>Context</b>	<b>13</b>
<b>The project</b>	<b>18</b>
<b>The training process</b>	<b>22</b>
<b>Pedagogical training model</b>	<b>24</b>
<b>Bespoke facilitation</b>	<b>26</b>
<b>Skilling up human capital</b>	<b>28</b>
<b>Promoting the participation of women</b>	<b>31</b>
<b>Faculty members' perspectives on the trainings</b>	<b>33</b>
<b>Regional Digital Education Conferences</b>	<b>38</b>
<b>Best practices and lessons learned</b>	<b>40</b>
<b>Conclusion</b>	<b>45</b>

# Executive Summary

## Context

Digital Education was not just a stopgap during the COVID-19 pandemic; it is a way of dealing with some of the biggest challenges in tertiary education in Africa. Whether it is giving access to the growing youth population, improving the quality of tertiary education or responding to the needs of the job market, the digitalisation process can provide opportunities to African youth and ultimately their countries.

Higher education is a key factor for economic growth in modern economies. In Sub-Saharan Africa, tertiary education not only leads to a 21% increase of earnings of graduates, but it also benefits broader socio-economic development.

Lecture hall in Senegal



By 2035, a quarter of the global population aged 20-24 is expected to live in Sub-Saharan Africa. However, this youth's potential remains largely untapped. In 2019, only 9% of eligible Sub-Saharan Africans participated in higher education against 40% globally. Should the trend persist, only a small fraction of African youth (11.5%) is expected to attend higher education in 2035<sup>1</sup>. To be on a par with the rest of the world, Africa's higher education capacity needs to be multiplied by a factor of 12 from its current level! No country or continent can construct and staff enough universities to fulfil these needs.

In addition to the funding and human capacity challenges, the issues of access, relevance and quality of education need to be addressed as well.

Digitalisation offers unprecedented opportunities to boost higher education in Africa. It can significantly increase the capacity of universities whilst making them more inclusive (e.g. youth living far from universities, women, persons with disabilities). By introducing modern pedagogical approaches, up-to-date educational content and appropriate infrastructures, it has the potential to improve the quality and relevance of instruction.

<sup>1</sup> Own calculations from existing data

**New educational paradigm**

While digital education is on the agenda of numerous policy makers and university Vice-Chancellors working in the African context, its implementation has often been focused on IT and communications infrastructure. However, several non-technical factors such as digital literacy, training of instructors, integration to the curricula and academic regulations are limiting the success of the initiatives launched.

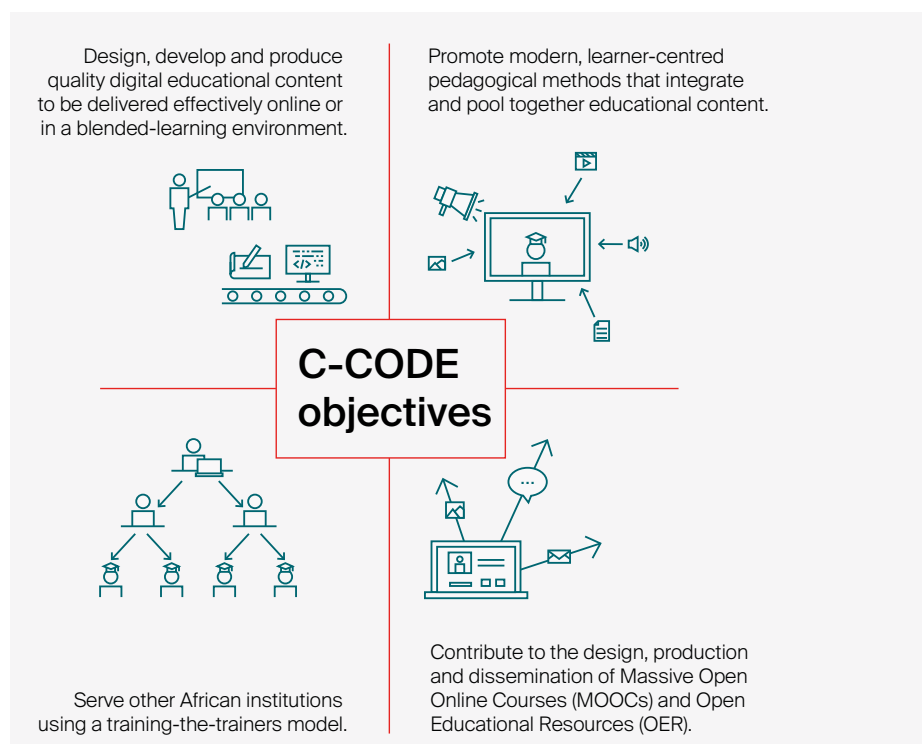
A new educational paradigm not only integrates digital tools and technologies, but it puts the learner at the centre of the knowledge acquisition process. To be successful, it requires instructors to embrace new pedagogical methods to accompany students in the new learning environment.

University Mohammed VI Polytechnic (UM6P) and the EPFL - École polytechnique fédérale de Lausanne's joint initiative 'Excellence in Africa'

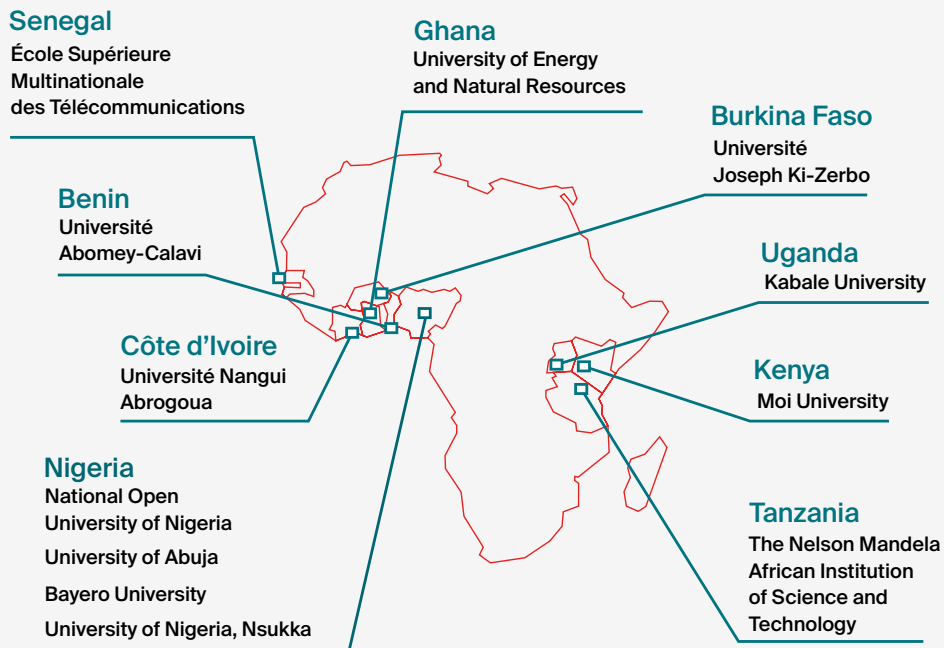
focuses precisely on developing the competencies of individuals. Hence, the emphasis of this programme on training faculty members, experts and technicians, who can then work together to successfully integrate digital education in their respective institutions. Furthermore, it will enable African universities to share their educational expertise worldwide and be more active in the global academic community.

**The initiative**

To accompany the digital transition of African universities, Digital Education was one of the four pillars of UM6P and EPFL's joint initiative Excellence in Africa. It aimed to create Centres of Competence in Digital Education (C-CoDE) in public African universities. Thus, bringing the technical infrastructure and pedagogical expertise together under one roof, to design, produce and deliver online or blended-learning courses effectively.



## Centres of Competence in Digital Education



### The Centres

Following a competitive selection process in 2020, six universities in Sub-Saharan Africa were selected to establish a C-CoDE to support the sustainable integration of digital education in their campuses. Given the acute need for digital education, the Association of African Universities, under the Africa Higher Education Centers of Excellence for Development Impact Project (ACE Impact), and the EPFL initiated a second call in 2021 to establish six additional C-CoDE in ACE Impact host universities.

To provide the necessary techno-pedagogical competencies, infrastructure, equipment and technical expertise to the universities, EPFL and UM6P accompanied them to establish a C-CoDE through:

### 1.

#### Infrastructure and equipment

- Studio to produce videos
- IT and multi-media equipment for the studio and the training facilities

### 2.

#### Training

- Experts in Digital Education
- Faculty members
- Technical specialists

While each university would have 3 Experts and 2 Technical Specialists trained, the number of Faculty members depended on a number of factors such as the number of Faculty members employed, as well as their individual motivation to incorporate digital education in their teaching. However, to induce a systemic change of the educational paradigm, a sizable number of faculty members needed to be trained.

## Training Outputs

### Training of Experts in Digital Education

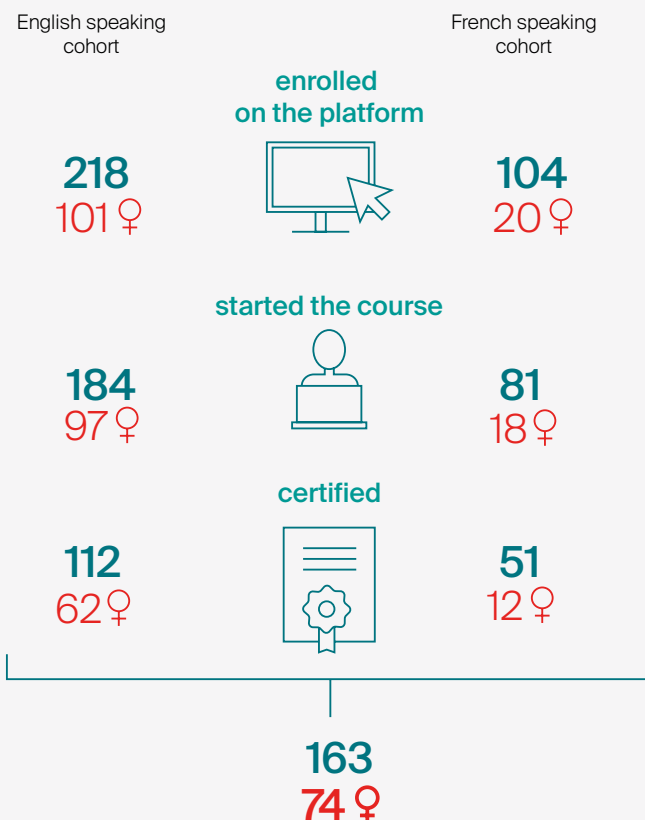


### Training of Technicians



■ total ■ women

### Digital Education Masterclass



\* Université Nangui Abrogoua and Bayero University asked to have an additional Expert and 2 extra Technicians trained respectively.

**I have learnt so much that I feel like a brand-new teacher. Can't wait to apply it and improve my face-to-face lectures by converting it to blended learning.**  
English-speaking Expert

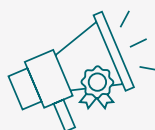
## Key Outcomes



To put theory into practice during the training, faculty members transformed an existing course into an online one as a case study.



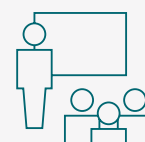
Faculty members experienced best practices in online learning and facilitation, which they can replicate with their students.



Trainees promote digital education in their universities.



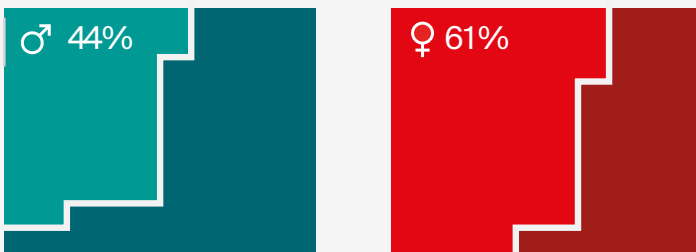
Experts' new digital education competencies were recognised by their peers during regional conferences in Cotonou and Abuja.



Creation of a strong learning community amongst the Experts.



### Percentage of enrolled men and women who successfully completed the Masterclass



### The impact of training women

While fewer women enrolled in the Masterclass, 61% of them obtained their certificate, in comparison with 44% of men.

Promoting the participation of women is, therefore, not only good for women, but also for increasing the impact of the project as a whole.

### Training for Experts in Digital Education came at the right time when the world is experiencing a new way of life.

English-speaking Expert

#### Key messages

- Implementing digital education successfully requires a long-term commitment and strong alignment of the funding, academic regulations, technical infrastructure and training of personnel.
- Identifying faculty members committed and motivated by digital education and giving them the opportunity to get trained in good conditions, is a key factor to success.
- Adopting a new pedagogical paradigm to deliver courses online promotes the quality of teaching and the capacity of universities.
- Creating a critical mass of faculty members who master new competencies to redesign and enrich their courses for the digital environment, is a key driver of institutional transformation.
- Investing in training women in digital education yields a higher return on investment, emphasising the importance of aiming for gender parity from the onset.

**It was a great experience for us, the trained experts in digital education. I believe we will have an impact in our respective institutions.**

Nicholas Nkamwesiga, Kabale University

## Perspectives and possible future action



Expand and refine the concept of C-CoDE to other African universities.



Train a large number of faculty members from African universities in digital education as a means to transform the continent's educational paradigm.



Provide access to online university degrees and certificates to students and professionals who do not have access (e.g. live far from a university, need to work).



Incentivise C-CoDE host universities to produce digital resources (Massive Open Online Courses and Open Educational Resources) to pool and share African expertise.



Address the shortage of university places through fully online or blended-learning courses.



Strengthen the link between the skills acquired with the job market needs.

New Experts from Nigeria and Ghana (cohort 2), AAU representatives and EPFL trainers in Abuja.



## Introduction

Higher education in Africa is facing unprecedented challenges. On the one hand, due to the demographic evolution and the limited investment in tertiary education, universities do not have the capacity to accommodate the growing number of graduates. On the other hand, the curricula often do not meet quality standards nor provide the qualifications required by local economies. Furthermore, studying at the Masters and PhD level is limited by insufficient advanced courses, especially in STEM disciplines.

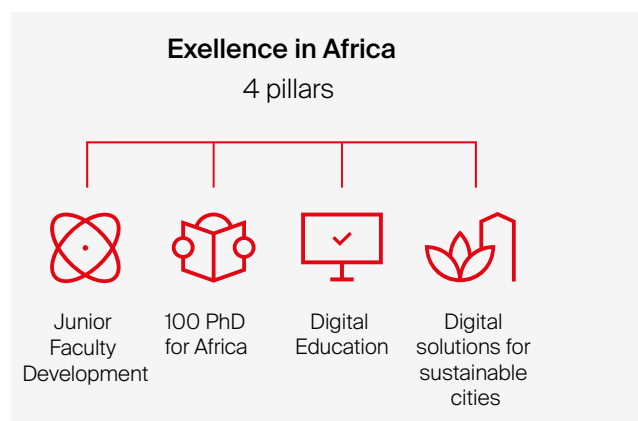
Since 2013, the École polytechnique fédérale de Lausanne (EPFL) in Switzerland has developed considerable expertise in designing and implementing digital education initiatives in Africa. Through its initial commitment entitled MOOCs for Africa (2013-2019), EPFL implemented a capacity building programme in a dozen leading universities and engineering schools in Sub-Saharan Africa.

Over the past five years, the University Mohammed VI Polytechnique (UM6P) in Morocco has built its capacity in MOOCs and OER production. In the process, it has developed substantial knowledge in creating, operating and maintaining large scale cloud platforms. UM6P is also actively working with other African Universities

to promote local course development and help with online course delivery and student management systems.

### The Excellence in Africa Initiative

The Excellence in Africa initiative was launched in early 2020 by UM6P and the EPFL. It aims to promote scientific and technological excellence, particularly through the digital transformation of society. The initiative draws upon a network of scientific institutions and engineering schools in Africa. It is based on the four following pillars:



The Digital Education programme aims to support the transition of universities to digital education, with the sustainable integration of digital tools and technologies, as well as the adoption of new pedagogical approaches.

Digital education tools and technologies (e.g. MOOCs, OER and LMS) provide excellent means for transforming higher education in Africa. They can help universities to address the shortage of qualified instructors, provide access to up-to-date educational content and introduce modern teaching methods. They also have the potential to reinvent continuing and adult education, thus meeting the professional skills needed by local economies, especially those related to the digital economy.

### **Centres of Competence in Digital Education**

As part of the Digital Education pillar, Excellence in Africa initiated the creation of Centres of Competence in Digital Education (C-CoDE) in partner universities. The project aimed to bring together under one roof the technical infrastructure and pedagogical expertise needed to design, produce and deliver effectively online or blended-learning courses.



Following a competitive selection process in 2020, six universities in Sub-Saharan Africa were selected to establish a C-CoDE to integrate digital education in their campuses. In 2021, the Association of African Universities (AAU) under the Africa Higher Education Centers of Excellence for Development Impact Project (ACE Impact), joined the initiative to launch the creation of six additional C-CoDE in ACE Impact host universities.

After an overview of the African Higher Education context, the report presents the C-CoDE and how they contribute to accelerating the incorporation of digital education in public universities. It covers the selection process, the training methodology and its impact on fulfilling the needs of digital education experts, faculty members and technicians. Finally, it analyses the evaluation of the trainings by the trainees, and presents the lessons learned and recommendations for future digital education initiatives.

## Context

With an estimated 60% of its population under 24 - including 41% under 15 (BBC, 2015), and young Africans expected to constitute 42% of global youth by 2030, Africa has the world's youngest population. This youth bulge can be an asset for the continent's future, but for this to happen, these millions of young people need access to quality education, especially tertiary education.

For decades, policy-makers and donors focused on, and invested in, primary and secondary education as the key to poverty reduction and development in Sub-Saharan Africa. Global initiatives, like the Millennium Development Goals (MDGs), had a goal related to education. Its focus was to “achieve universal primary education”. While it is laudable to aim for all children to “complete a full course of primary schooling” (United Nations MDGs), it is not sufficient to be a motor for economic development and prosperity.

The importance of tertiary education has increasingly gained traction as a driver of economic growth and development in Africa. The higher education sector has expanded exponentially since the enrolment of around 200,000 students in the 1970s. There has also been increased (although insufficient) public investment in higher education. Furthermore, it gained importance in international agendas, such as the Sustainable Development Goals, where Target 4.3 focusses on “equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.” (United Nations, SDGs).

Tertiary education not only benefits individuals, but has an impact on society as a whole. Graduates are estimated to have a 17% increase in earnings compared to primary (10% increase) and secondary education (7% increase) (Montenegro & Patrinos, 2014). In Sub-Saharan Africa, these returns are even greater, with an estimated 21% increase in earnings for graduates. In addition to the personal benefits, they contribute to broader socio-economic development. For instance, graduates are more likely to be more environmentally conscious, have smaller families, pay higher taxes and act as drivers for knowledge-based economies.

### **Access to tertiary education**

As the youth population continues to expand - the population of 26 African countries is expected to double in size by 2050 (BBC, 2015), and graduation rates of secondary school increase dramatically, there is an intensifying demand for tertiary education. It includes universities, but also tertiary technical and vocational education and training, which provide knowledge and skills relevant to the labour market.

Yet, the tertiary education enrolment ratio was 9.4% in Sub-Saharan Africa (2018), compared to the global average of 38% (UNESCO, 2018). Enrolment rates vary greatly between countries, with 44% enrolment in Mauritius, while 11 countries have an enrolment rate of 3% or less (World Bank, 2022).

To accommodate students who reach the age for enrolment in tertiary education between 2015 and 2027, an estimated four universities with a capacity of 30,000 students needed to be built every week (Nhando, 2015). No country, nor continent, can meet that level of demand.

Not surprisingly, students from Sub-Saharan Africa are the most mobile in the world. About 5% of tertiary education students study abroad, compared to an average 2.4% globally (Kigotho, 2020). Nigeria is in the lead, with 85,000 students studying abroad in 2017. While they go to Europe and North America, an increasing number is going to other continents, especially Asia. For instance, as a result of China's recruitment and scholarships, the number of Sub-Saharan African students went from 27,000 in 2012 to 81,562 in

2018 (Kigotho, 2020). Around 75% of Sub-Saharan Africans who earn their degrees abroad, do so outside Africa. With insufficient places at home to meet this youth bulge, the trend is set to rise, especially as the youth population declines in many parts of the world.

### Quality of tertiary education

Yet it is not merely an issue of demographics and saturated universities. "The real or perceived uneven quality of degrees and diplomas is also driving African students to foreign destinations" (Kigotho, 2020). Degrees obtained abroad are perceived to be of higher quality, thus leading affluent families to send their children to study elsewhere.

Certain countries use considerable funds to provide scholarships to study abroad, instead of improving the quality of under-funded local public universities. "For instance, nearly 40% of outbound Nigerian students hold scholarships, most of which are funded by oil revenues" (Kigotho, 2020).

Registration at Limpopo University (South Africa)





Photograph by  
Gallo Images/Phil  
Magakoe (2016)

Decades of limited investment has resulted in higher education institutions being unable to respond to the immediate skills needed nor support sustained productivity-led growth. Amongst the many challenges, there is a shortage of faculty members. Between budget cuts, hiring freezes, low salaries, disruptions due to strikes, limited research funding and laboratories or IT equipment, qualified and ambitious faculty members may be discouraged from staying in African universities. Thus, leading to high rates of migration of talents abroad in search of opportunities.

### **Relevance to the job market**

Higher education in Sub-Saharan Africa has a strong focus on training for public sector needs, not necessarily private sector ones. There is a “current pattern of skills production in Africa that do not match labour market demand or development needs, with choked public sector recruitment and a private sector struggling to find competent candidates” (Khaled, 2021). Thus, even those with degrees are not guaranteed a job. For instance, Kenyan graduates take on average 5 years to find a job (Trudeau & Omu, 2017). In 2015, 74 million youth were looking for work in Sub-Saharan Africa (UN, 2015).

Amongst them, were those with an insufficient level of study due to a lack of access to tertiary education. However, “the main cause of the low level of employability amongst youth is the mismatch between their qualification, even if they have a diploma, and the demands of the labour market” (perspectives économiques en Afrique, 2012). For instance, there are many graduates in areas such as sales and communications and not enough in STEM subjects, agriculture and health. Graduates are also not necessarily operational upon finishing their studies, something which the markets require (Goudiaby, 2014). Employers are increasingly looking for graduates who can think critically, are flexible and innovative.

### **New educational paradigm**

To address certain challenges facing tertiary education in Sub-Saharan Africa, there has been increased focus on digital education. Whether it is providing enough places to study, improving the quality of education, developing the soft skills required by the private sector or the knowledge relevant to the continent’s realities, it has been receiving increasing attention.

It also has the potential to provide broader reach, especially youth who do not live near universities, who work to support their families, who cannot attend easily (e.g. women or persons with disabilities) or who simply do not have the money. Tuition fees, or the costs of living near university, often deter young people from applying.

Yet, while digital education is on the agenda of numerous policy makers and university Vice-Chancellors working in the African context, its implementation has mostly been challenging, with the exception of a few success stories. Implementation has often been led by the ICT community and mostly focused on IT and communications infrastructure.

Despite access to a connected device being a necessity, it is not sufficient for higher education to benefit from the 4<sup>th</sup> industrial revolution. Instead, some of the more influential factors affecting participation and completion rates of online courses, included digital literacy, the alignment of facilitation to the delivery method, time constraints, integration into curricula and institutional support (Nieder et al, 2022).

Based on a decade of experience in EPFL, including the project MOOCs for Africa, several factors at the macro level have been identified to account for the low usage of online courses in the African academic context. These include limited awareness, outdated institutional regulations, lack of training in the integration of digital resources, and the difficulty to communicate and implement a new and sustainable educational paradigm to all stakeholders.

This paradigm not only integrates digital tools and technologies, but it puts the learner at the centre of the knowledge acquisition process. Thus, changing the pedagogical approach. To be successful, it requires instructors to learn how to operate in the online

classroom, benefit fully from the wealth of available educational material online and embrace new pedagogical methods to help students acquire skills for their personal and professional development. Furthermore, it will enable African universities to share their educational expertise worldwide and be more active in the global academic community.

As in most of the world, it has taken COVID-19 to give digital education impetus. The question is no longer whether it should be used to teach, but how to do it effectively.

### **Sub-Saharan Africa's readiness for digital education**

While many institutions want to integrate digital elements into education, there are big disparities in the implementation, access and costs. With increased access to digital devices, especially smartphones, the internet is becoming a notable educational tool. However, the experience of makeshift digital education during COVID-19, has not always helped improve the perception of learning online.

While access to a connected device is a necessity, it is not sufficient for African universities to benefit from the wealth of existing digital educational resources. Ten years after the tsunami of MOOCs hit the academic world, there is strong evidence that the digital divide is not just a matter of connectivity, including amongst Sub-Saharan African students living in urban areas.



In a recent study by Henderikx et al. (2021), the main barriers experienced by learners were predominantly not related to the technical aspects of the courses. Instead, some of the more influential factors affecting participation and completion rates, included digital literacy, the alignment of facilitation to the delivery method, time constraints, integration into curricula and institutional (Nieder et al).

For online learning to be a success, different aspects of readiness need to be taken into account:

- **Technological readiness:** The technology itself (reliable and free/cheap internet, access to devices and software) and the ability to use it by having basic computer and research skills.
- **Psychological readiness:** Students' self-motivation, self-discipline and time-management skills. It also includes preferred ways, habits and tools to learn and attitudes to change, learning and technology.
- **Sociological readiness:** Behaviours expected or encouraged in class, such as disagreeing respectfully or collaborating on a project. Power imbalances, peer-pressure or general conformity have a negative impact on online learning, which requires interactions.

- **Content readiness:** It can sometimes be one of the more complex aspects to address, as lecturers have to go from a teacher-based to a learner-based approach.
- **Context readiness:** COVID-19 has had a big impact on the context, as it led to a shift in the perception of digital education. It has become a reality, rather than a vision, and there is more general acceptance and institutional 'buy-in' to develop digital education.

Given all the issues of access, quality and relevance of existing tertiary education, the transition to more blended-learning or fully online courses provides an opportunity to strengthen the teaching methodology. Thus making curricula more relevant to the local context and more operational by including 'learning by doing', developing IT and soft skills as part of the studies and creating ways to increase student inclusion. Synergies with the private sector, such as providing access to the Internet, can also contribute to accessibility.

# The project

## The Digital Education pillar

UM6P and EPFL's Digital Education pillar could not have been timelier. Launched in early 2020, it went from being a way of addressing future challenges of tertiary education to responding to an urgent need to teach during the COVID-19 pandemic.

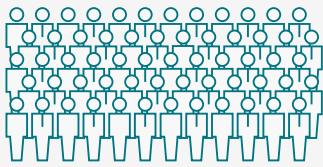
Central to the Digital Education pillar were the **Centres of Competence in Digital Education (C-CoDE)**,

which provide a comprehensive and sustainable way of integrating digital education in African universities.

Given the circumstances, the project was kick-started with an emergency response initiative. To help mitigate the impact of COVID-19 on African universities, and prepare for the 'new normal', EPFL and UM6P provided free digital education resources and a training on online pedagogy. This collaboration provided the following:

### Capacity building response to the Covid-19 pandemic

#### Short trainings in English or French



Enabled over  
**1000**  
faculty members

from  
**34**  
institutions

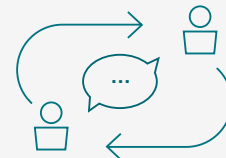


in **12** countries

#### Practical resources for online pedagogy



#### One-to-one coaching



#### EPFL and UM6P courses and digital resources made available for free

EPFL MOOCs on architecture, engineering and science

**20**  
MOOCs  
in English

**23**  
MOOCs  
in French

UM6P's digital 'prépa' courses

**700**  
online  
resources  
in French

The faculty members could integrate these MOOCs and resources in their own classes on the UM6P platform and give access to their students.

This emergency initiative provided a rapid and solid basis for African universities to start integrating digital learning into their teaching, as they prepared for the new reality of tertiary education in COVID-19 and beyond.

This early initiative set the basis for the collaboration between EPFL and UM6P to develop the trainings of faculty members as part of the C-CoDEs.

### Centres of Competence in Digital Education (C-CoDE)

The aim of the C-CoDE was to contribute to accelerating the incorporation of digital education in the public universities. Thus, making it a place to design, develop and produce quality digital educational content for faculty members' online courses.

To provide the necessary techno-pedagogical competencies, infrastructure, equipment and technical expertise to the universities, the establishment of the C-CoDE's consisted of:

#### 1. Creating the premises to produce digital resources and train faculty members:

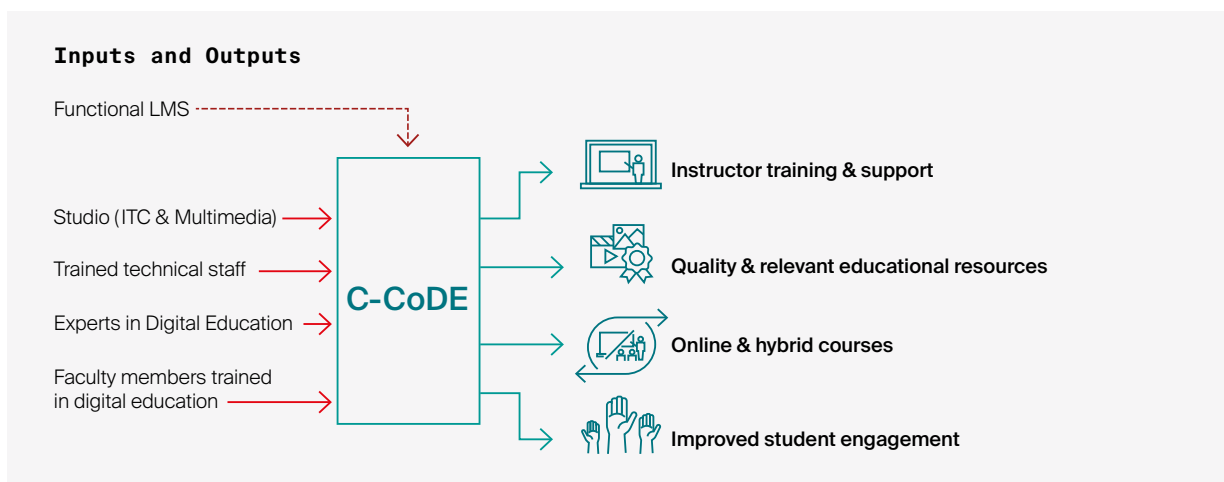
- Studio to produce videos.
- IT and multi-media equipment for the studio and the training facilities.

#### 2. Training faculty members and technicians

- **Experts in Digital Education:** to take a leading role in their institutions to implement digital education and accompany their colleagues in the process.
- **Faculty members:** to integrate digital education into their courses.
- **Technical Specialists:** to operate the multimedia production studio and produce videos.

In addition to these inputs, the universities were expected to have a functional LMS, where online or blended-learning courses could take place.

Between the newly skilled staff and the studio, universities would have the capacity and resources to produce quality and relevant educational courses. All this would contribute to addressing some of the main challenges faced by students in African universities.



## Selecting the universities Call for proposals

To make the C-CoDE sustainable, the project required institutional buy-in from the universities. This included creating the space to house or build the studio, contributing funds to equip it as well as having a critical mass of staff to train.

There were two calls for proposals for the C-CoDE. A first joint one with UM6P (June 2020), which resulted in applications from 44 universities from 19 countries across Africa. The second joint call with the Association of African Universities (AAU) in June 2021, to all Africa Centers of Excellence for Development Impact (ACE Impact), which resulted in 12 applications from six countries.

## Selection process

Each application went through an evaluation process which consisted of two steps:

1. a compliance check,
2. a desk evaluation.

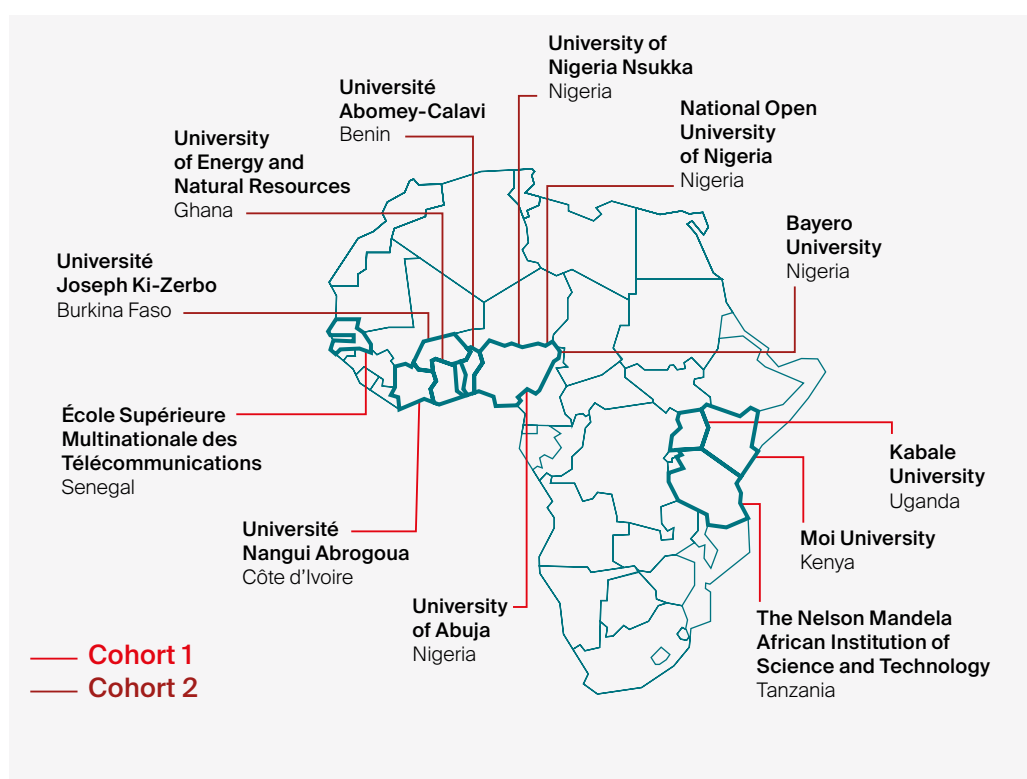
Applications were evaluated based on three main categories:

- A. The current technical and pedagogical environment (**starting point**)
- B. The commitment and perceived capacity of the university to implement the project (**feasibility**)
- C. The integration of the project in the wider vision and plans of the university (**sustainability**)

In addition to the strength of the candidacies, a few smaller or regional universities were included, giving them a chance to take part in such an initiative, even if they had fewer Faculty members. Altogether, eight English-Speaking and four French-Speaking universities were selected.

## Selected universities

The twelve universities that took part in this initiative were:



### Learning from digital education specialists

The trainings were designed based on EPFL and UM6P's expertise in instructional design and experience in developing online courses, as well as the best practices from the MOOCs 4 Africa programme. Furthermore, to calibrate the training's content to the faculty members' needs, the future experts filled out a questionnaire prior to starting the training to gauge their experience in digital education, existing technical skills and what they wanted to learn.

### Main instructors

The Training for Experts and the Digital Education Masterclass were developed by:

#### EPFL

Lisa Myers  
Dimitris Noukakis  
Virginie Torrens  
Andrés Gomez  
Toni Aigroz

#### UM6P

Amira Lyazrhi  
Malak Cherkaoui  
Ayoub Bensalah

Expertise on specific topics was also provided by:

- EPFL's Centre for Digital Education (CEDE) and Teaching Support Centre (CAPE),
- UM6P's Digital Learning Lab,
- Abdourahmane Mbengue - Université Virtuelle du Sénégal,
- Javier Tejera - University of Edinburgh,
- Dennis Kriel, University of Pretoria.

A number of instructors also took part in facilitating the trainings. Thus, providing considerable added value for the learners, as they mastered the content.

# The training process

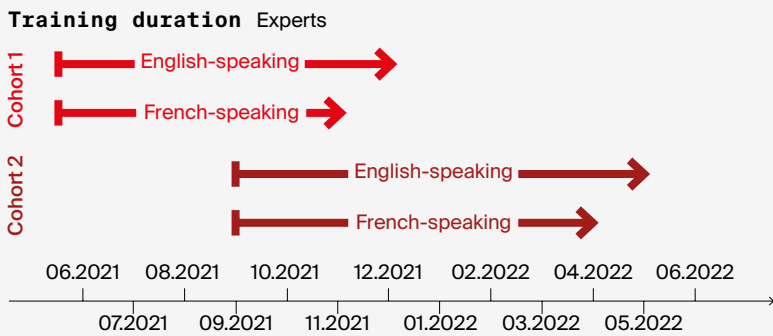
To cover the pedagogical and technical elements necessary to create quality online courses, bespoke trainings were developed for the future experts, faculty members and technicians. The experts were trained ahead of the faculty members, enabling them to motivate, support and mentor the latter. Meanwhile, the technicians were trained in time to coincide with constructing the premises and buying the equipment for the studios.

## Training of Experts in Digital Education

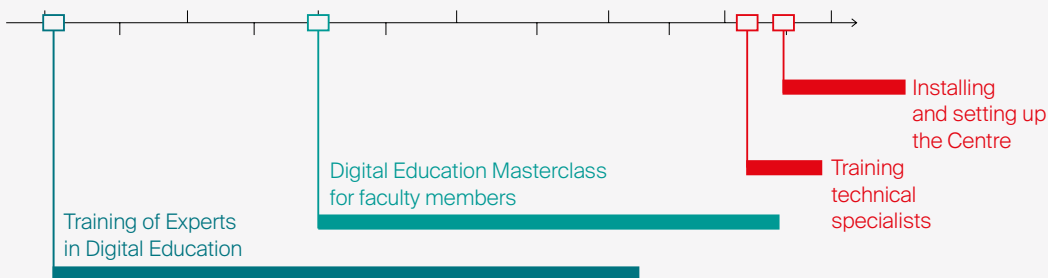
Given their central role in successfully implementing the C-CoDE, each university nominated three faculty members who fulfilled the criteria for long-standing resident Experts in Digital Education.

To experience the full range of online courses, the future experts followed a blended-learning training. It followed a flipped classroom approach, with three online workshops (i.e. webinars and activities on a platform) and the last workshop face-to-face. The latter enabled the 'teams of experts' to strengthen their collaboration within and between universities. They were hosted by four universities taking part in creating a C-CoDE.

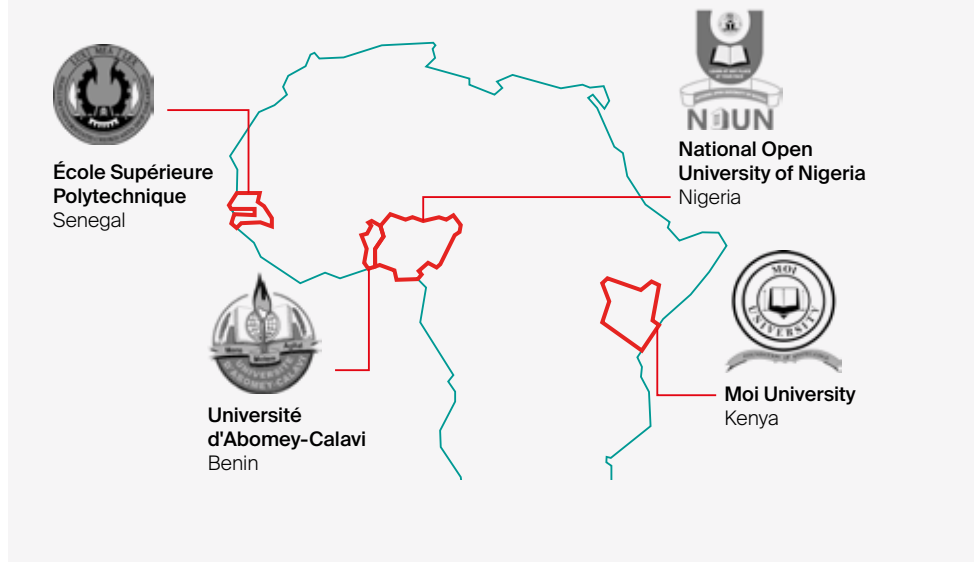
The training of the second cohort lasted longer to coincide with regional conferences on digital education. During the conferences, the experts showcased their new expertise and advocated for other institutions and government representatives to integrate and invest in digital education.



## Timeline for the implementation of a C-CoDE



**Partner universities which hosted the face-to-face workshops**



**Digital Education Masterclass**

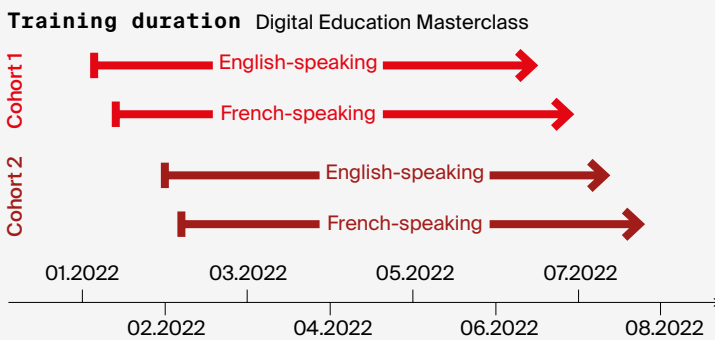
While mirroring the topics of the workshops, the Digital Education Masterclass was fully online and asynchronous, providing faculty members with the flexibility to organise their study time, while sticking to deadlines. The Masterclass took place at a slower pace, as it lasted 17 weeks over 6 months.

**Training of Technicians**

The technicians followed a two-week intensive training in recording studios. The practical and hands-on activities led them to master how to set up and operate a multimedia production studio, as well as how to edit educational videos.

Central to the C-CoDEs, and previous EPFL initiatives (e.g. MOOCs 4 Africa), is the capacity of African universities to train each other. Thus, most of these trainings took place in African universities.

The training staff of UM6P participated in the first training of technicians at EPFL (June 2022) to ensure the same training methodology would be used. Meanwhile, ESP staff, who trained technicians in Senegal, were trained by EPFL specialists in 2017, thus ensuring the consistency of methodologies.



To create a **learning community** during the Masterclass, participants were divided into groups of 15 to 20 persons. The groups were facilitated by a pool of digital education specialists from EPFL, UM6P and external contractors.

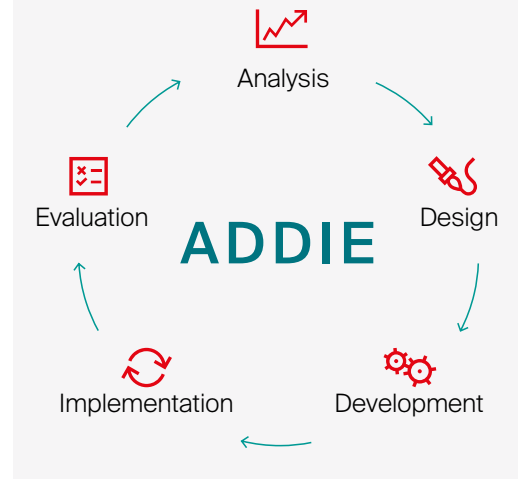
# Pedagogical training model

The overall objective for the faculty members of these trainings was that:

**By the end the training, they have the skills, practical experience and knowledge to create engaging online courses and teach effectively online.**

For those being trained as experts, they also had to be able to “mentor their peers” to teach online.

To achieve this objective, the trainings were based on the pedagogical model called ADDIE, which is commonly used in digital education.



To put theory into practice, the future experts and faculty members used an existing face-to-face course as a **case study** course. It enabled each learner to apply the new teaching approach directly to his or her content. The resulting documents and/or resources could be used to design, develop and implement a future online course relevant to their subject matter and context.

By learning fully or partly online, the future experts and faculty members experienced digital education from a student’s perspective, as well as best practices in online teaching.

## A. Specific learning objectives

### Analysis and design

- Develop an overview of the training, the participants and key elements of digital education.
- Assess the readiness and key stakeholders involved in transforming a face-to-face course into an online one.
- Adapt the design of an existing course into an online format using an instructional design approach.

### Educational resources

- Integrate existing digital content into an online course. Organise part of a face-to-face course as a flipped classroom.

- Develop different types of assessments.
- Apply the best practices of creating educational videos.

### Development and implementation

- Develop activities to be delivered through a Learning Management System.
- Prepare the steps and stakeholders for implementing the course.

### Delivery and evaluation

- Apply interactive teaching strategies to enable active learning.
- Conduct an evaluation to improve an online course.



## B. Outputs

The practical nature of the Training for Experts and Masterclass enabled the participants to finish with a number of documents or resources resulting from the assignments, which they could use in their future online course.

**The most important outputs were:**

**Map of key stakeholders:** a map covering who can influence or assist in developing/running their online course.

**Instructional Design Document:** a roadmap, which included the design time and milestones to develop it, key stakeholders, the delivery method, learning objectives and evaluations.

**Lesson Plan:** a detailed plan taking into account the pedagogical approach and learning activities adapted to an online learning environment.

**Flipped classroom design:** a detailed plan integrating third-party educational materials (e.g. OERs) into the course.

**Online assessment:** a type of assessment (e.g. multiple choice), which could be used during their course and fulfils the criteria for online assessments.

**Educational video:** a self-recorded educational video taking into account best practices of video production.

**Sample course online:** a part of their course created directly on the Learning Management System.

**Beta test:** constructive feedback to and from a peer on their online course, with advice on how it could be improved.

**Implementation plan:** a plan to provide all stakeholders with detailed information on the practical aspects of the course (e.g. registration, location and contact persons).

**Gamification activity:** a way to incorporate gamification elements in their course using gamification software.

**Student preparation plan:** a plan with the steps to prepare students to follow a course online successfully, including IT, Learning Management System and communication skills.

**Facilitator's profile:** a profile of a facilitator who would assist them in running their course, with the key competencies, experience, skills and duties.

**Evaluation questionnaire:** a questionnaire for students to provide feedback on their learner-experience.

# Bespoke facilitation

At the heart of the trainings was bespoke and personalised facilitation. Bespoke, because it was tailored to the type of training, whether it was fully online, blended-learning or fully face-to-face. And personalised, because the facilitators adapted their facilitation to individual learners' needs.

A team of digital education specialists from EPFL, UM6P and external contractors from universities based in Senegal, Cameroon, South Africa and Scotland facilitated the training for Experts and the Masterclass. Meanwhile, technical experts of EPFL, UM6P and ESP, who run their studios in their respective institutions, were responsible for training the technicians.

**The mix/blend of the training methodologies & styles used by the facilitators (local & online) were impactful in our learning. We interacted and learnt from both the trainers & our fellow trainees.**

English-speaking Expert



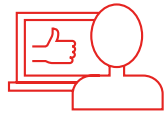
## Creating a team of Experts

To develop teams of experts in each university, and rapidly develop their competencies, a facilitator oversaw three experts from the same institution. The facilitators coached them, provided feedback on assignments and answered questions. Thus, ensuring they gained the necessary practical skills to lead their own digital education projects.

The final face-to-face workshops, which were run by instructors, enabled the experts to consolidate their new knowledge and skills, as well as strengthen the network of Experts within and between universities.

New experts from Kenya, Nigeria, Tanzania and Uganda, Moi University representatives and EPFL trainers in Eldoret.





### Motivating from a distance

To address the challenges of a self-paced training, like the Masterclass, there were strong motivational and informational elements to facilitating the groups of faculty members. Over the 6-month training, facilitators encouraged, supported and provided personalised feedback based on their individual needs. Not only did it help them stay on track, but it emphasised the importance of facilitation and how to carry it out in their future courses.

**The facilitators were very active in responding to my needs and that enhanced my progress.**

English-speaking Faculty members, Masterclass

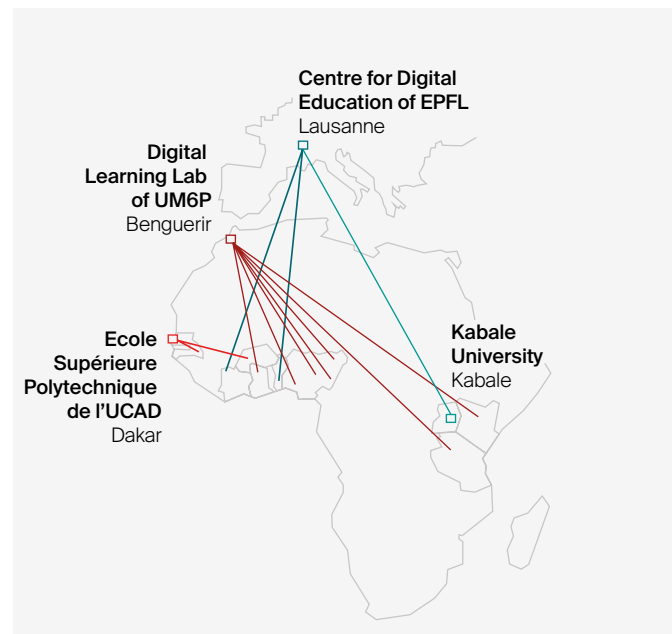
Setting up the camera during the training.



### Learning in a studio

Learning-by-doing was at the centre of the trainings of technicians, taking them through all the steps of producing a video and setting up a studio.

They were trained in multimedia studios in the following universities:



Working under the supervision of local seasoned technicians, they went through the different phases of filming, editing and producing an educational video. They also got familiar with the IT and multimedia equipment and learnt how to set up, adjust and operate a multimedia production studio.

# Skilling up human capital

## Leading Experts

Given the personal commitment required to their new role and the personalised facilitation, there was a 100% success rate. At the end of the training, each university had three experts<sup>3</sup> ready to motivate, train and mentor their colleagues, as well as act as leaders of digital education in their institutions.

Amongst the 37 experts, 9 were women. There were twice as many women experts in the 2<sup>nd</sup> cohort than in the first one.

## Critical mass of faculty members

To accelerate the incorporation of digital education in the universities, a critical mass of trained faculty members was needed. Not only would they be able to create their own online courses, but they could motivate or inspire others to do so.

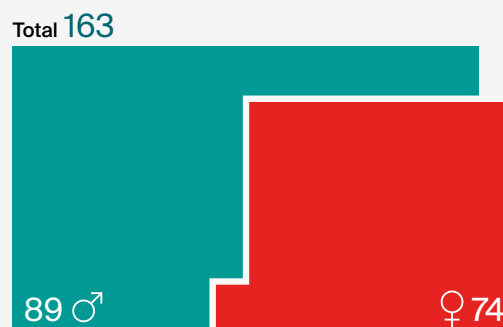
<sup>3</sup> Université Nangui Abrogoua had 4 experts, as they had requested that an additional person takes part.

<sup>4</sup> This means they achieved over 70% across all the assignments and activities in the Masterclass.

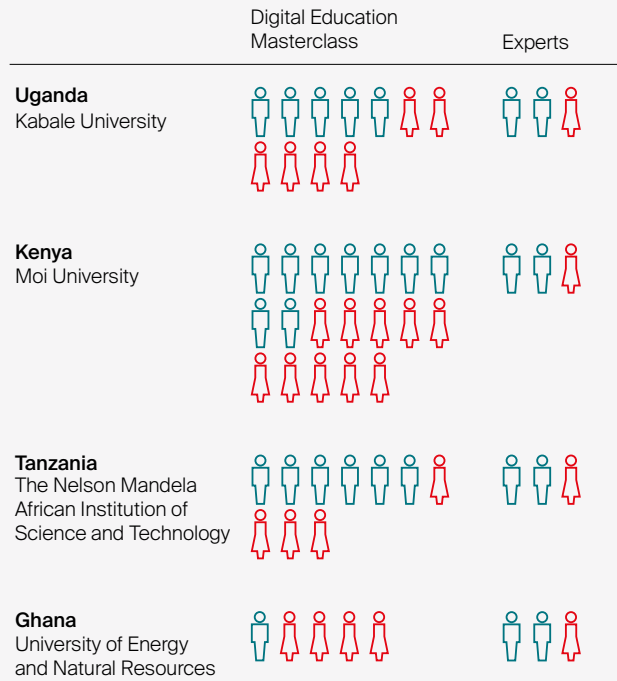
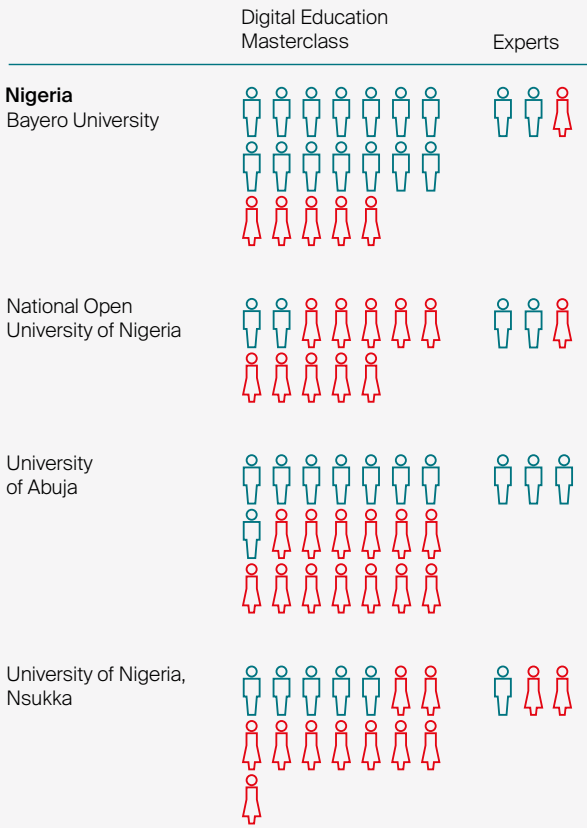
As part of the C-CoDE, each university could propose up to 30 Faculty members to take part in the Masterclass, bearing in mind that for smaller universities, they might not have enough faculty members to choose from. As for the Training of Experts, the AAU and World Bank encouraged the participation of women.

Certain universities let more than 30 faculty members enrol, which often led to a higher number of them finishing the Masterclass (e.g. the University of Abuja), while others had around 20 enrollees. Of the participants who went on the platform to start the Masterclass, 60% successfully completed it.<sup>4</sup> Thus, across the 12 universities which took part, 163 faculty members obtained a Certificate of Achievement. Given the comprehensive nature of the course, the ones who were certified are highly motivated to take digital education forwards in their respective institutions.

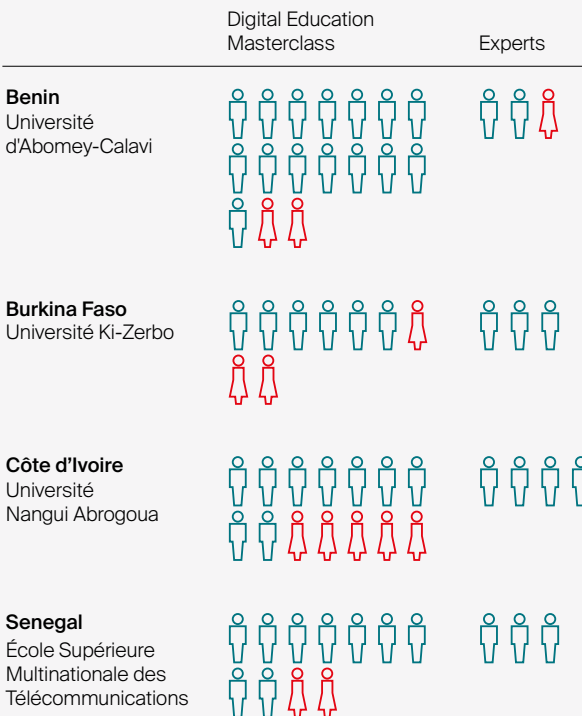
In certain smaller universities, such as NM-AIST (Tanzania), the support and mentoring provided by one of the Experts led to a higher completion rate. Thus, confirming the importance of training in-house Experts to drive digital education in their institutions.



### Critical mass of faculty members English-speaking



### French-speaking



Meanwhile, in others, external circumstances such as strikes or uncertain political situations had an impact on the number of Faculty members finishing the Masterclass, despite an initial strong start.

While trying to achieve gender parity was a formal requirement for the second cohort, women made up 45% of those who finished the Masterclass across both cohorts.

### Technicians ready to run the studios

To coincide with the end of the Masterclass, as well as setting up and equipping the studios, the technicians were trained between May and August 2022. Bayero University sent 4 technicians to be trained, as they wanted to set up two studios.<sup>5</sup>

The timing meant they would be ready to hit the ground running, as faculty members embarked on the process to develop their own videos. It would also be fresh in their minds

as they replicated what they saw in the studios where they were trained. With the trainings mostly taking place in Africa, namely in Morocco, Senegal and Uganda,<sup>6</sup> the technicians were able to see how to set up studios in conditions that were more similar to their own and learn from technicians who might face similar challenges. For instance, how they deal with keeping the material and studios cool in hotter climates. Of the 26 technicians trained, only 2 were women.

<sup>5</sup> As there are two campuses at Bayero University that are quite distant from each other, ACEPHAP and CDA have suggested that a fully-fledged studio is built at the new campus and a "light" (or mobile) version at the old campus.

<sup>6</sup> The other one was in EPFL in Switzerland.

**I am so happy I had the opportunity to be a student here for a couple of weeks. It takes pride in Africa and I am just grateful to be here. I think it's a great example to follow.**

Participant at a training at UM6P



Training of technicians in Dakar, July 2022

# Promoting the participation of women

The proportion of women participating in, and finishing the trainings, differed considerably depending on the types of trainings, universities and languages spoken.

Out of the 37 Experts, nine of them were women. While there were eight English-speaking women participating, there was only one from the four French-speaking universities.

### Women's engagement

While women made up 38% of those enrolled in the Masterclass, 45% of those certified were women. Thus, the dropout rate was lower amongst women than men.

This contrast in dropout rate between women and men is significant, as 61% of women and 44% of men who enrolled in the course went on to receive a certificate.

Promoting the participation of

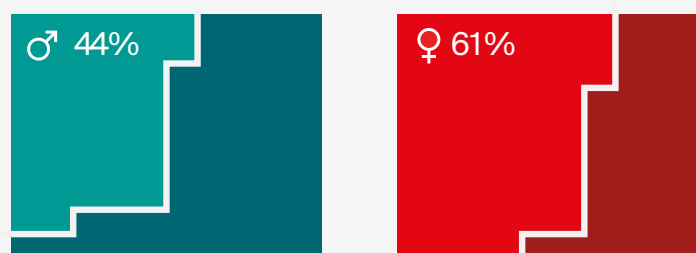
women is, therefore, not only good for women, but also to increase the impact of the project as a whole.

Furthermore, in six universities, more than 50% of those who achieved the certificate were women, including all four English-speaking universities of cohort 2.

### Contrast between English and French-speaking women

Only 17% of the women who enrolled in the Masterclass were French-speaking. While it was more than the participation of women (11%) in the Training of Experts, it remains low. However, 60% of French-speaking women who enrolled received a certificate, which is in line with the English-speaking ones.

Percentage of enrolled men and women who successfully completed the Masterclass





Developing questions for an evaluation questionnaire for future experts in the Eldoret workshop.

### **Few female technicians**

Of the 26 technicians trained, only 2 were women, reflecting a domain which remains male-dominated.

Promoting the participation of women, therefore, not only has an impact on their participation, but also on increasing the number of certified participants

overall. The reasons for the limited participation of women in French-speaking countries should be explored. While there might be fewer female faculty members, efforts should be made to encourage them to take part.



## Faculty members' perspectives on the trainings

In line with good practices of digital education, the participants were asked to fill out an anonymous evaluation form. This was carried out after each workshop or section, to calibrate or adapt upcoming ones (e.g. give more time or adapt certain activities), as well as at the end of the entire trainings, to get an overview of the overall learning experience.

Based on the feedback, the second cohort of the Training of Experts was spread over a longer period to account for the fact that they were not dispensed from their teaching duties during the workshops, as originally anticipated.

Overall, the different types of trainings were evaluated positively. Thus, illustrating that they were well calibrated to the learning needs of faculty members in African universities.

**The training has completely changed my approach to pedagogy equipping me with the necessary tools for better delivery.**

English-speaking Faculty Member Masterclass



Experts preparing for the regional conference in Abuja

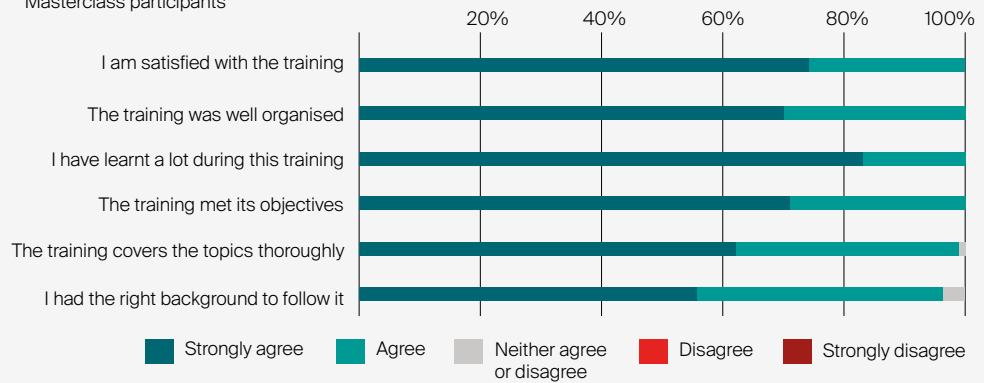
### A. Training of Experts and Faculty members Overall evaluation

The overall satisfaction was high amongst the experts and faculty members. Amongst the positive ratings, they felt they had learnt a lot, with 74% of experts and 83% of faculty members giving the highest rating respectively. Their newly acquired knowledge and skills to create online courses was also emphasised in their comments, with a number of them noting that it would not only help them teach online, but also in the classroom.

Response rate	Number of respondents	
	Number of respondents	Percentage
Experts	37	100%
Faculty members	139	85%
Technicians	26	100%

### How would you evaluate the training?

Masterclass participants



**Right now, my confidence is built especially when people who are skeptical about teaching Chemistry online confront me, I can tell them to try Flipped Classroom. I will suggest that Digital Education should also extend to High Schools as well.**

English-speaking Expert

#### Content and format

While the Experts went into more depth, they covered the same topics as the faculty members in their training. The main difference between the two trainings was the format. The Experts' blended-learning workshops enabled them to experience different ways of incorporating digital elements in their teaching both online and face-to-face. Meanwhile, the Digital Education Masterclass was fully online, asynchronous and spread over 17 weeks.

<sup>7</sup> Although it does not include those who dropped out.

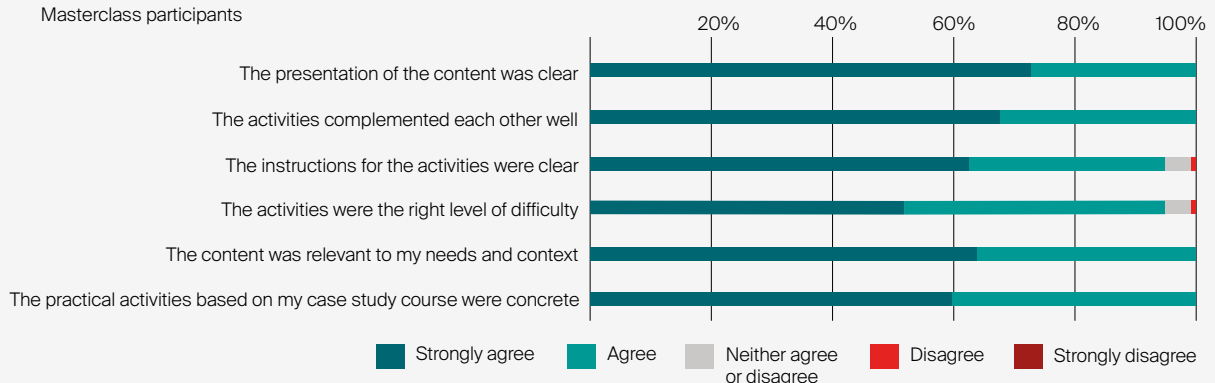
<sup>8</sup> While they had deadlines for assignments, they could organise their study time during the week.

The content and format were highly rated by the experts and faculty members. Over 95% of them either 'strongly agreed' or 'agreed' that the content was clear, relevant and the activities were complementary. However, a few of them (11% of experts) found that the level of difficulty was a bit hard.

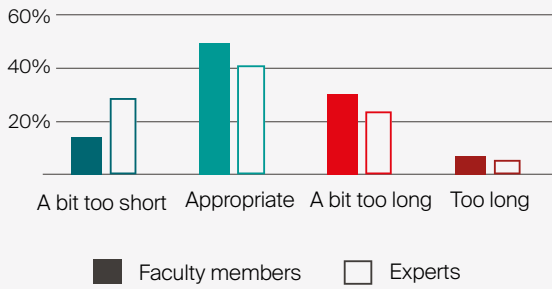
Overall, faculty members<sup>7</sup> often rated the different elements higher than the experts. Given that the Masterclass was self-paced,<sup>8</sup> longer and with less interaction, the overall satisfaction was significant, especially since it required more self-discipline and self-motivation to finish the training.

### What did you think of the content and format?

Masterclass participants



**The length of the training was**



**If the workload could be spread further so it would not be so demanding, it would be nice.**

English-speaking Faculty members, Masterclass

**Length and workload**

Nearly half the faculty members (49%) found the length appropriate, while 41% of experts did. In addition to the faculty members (30%) and experts (24%) who found it a bit too long, there were quite a few experts (29%) who found it a bit too short. However, for the face-to-face workshop, 86% of the experts found the length to be appropriate.

The workload of the online trainings was considered to be a bit too heavy by over half the experts (53%) and faculty members (55%). These results are not surprising, as the experts were supposed to be relieved of their teaching duties during the workshops, but unfortunately this was not the case for most of them. However, the workload was deemed appropriate by 76% of experts for the face-to-face workshop.

While the faculty members were not expected to have time off, they faced external challenges, such as university strikes and week-long power cuts, which led to considerable delays.

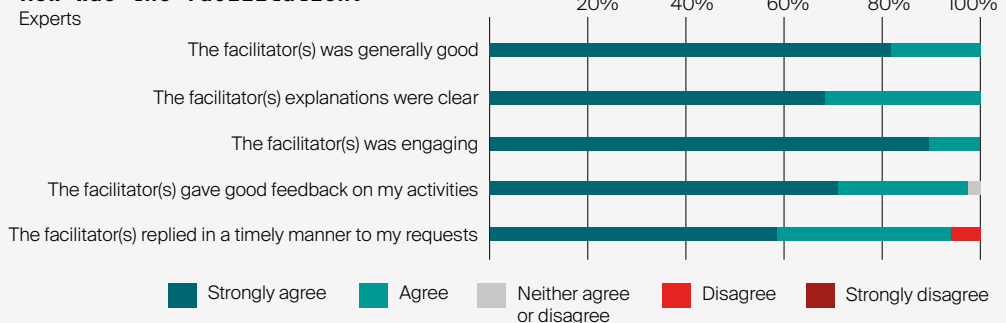
Future editions should include ways to reduce certain activities (e.g. the number of peer reviews), having a modular programme or using an LMS which is accessible offline. Meanwhile, the experts' training could be spread over a longer period. These could attenuate the main challenges which impede their ability to follow the training according to schedule.

**Facilitation**

The facilitation, which was central to the pedagogical approach, was highly appreciated by the experts and faculty members. The experts mostly rated the facilitation positively across the board, whether it was the clarity of explanations, engagement and quality of feedback. Two of them, however, felt that the replies were not always timely.

Meanwhile, the face-to-face facilitation was rated very highly, reflecting the interactive and participative nature of the final workshops. This was palpable at the end of these workshops, where the experts were clearly highly motivated, committed and driven by the desire to take digital education forward in their respective universities.

**How was the facilitation?**





Faculty members' perspectives on the trainings

**The facilitators considered individual differences as they carried each person along. No one was left behind.**

English-speaking Expert

These results confirm the added-value of personalised facilitation to ensure the experts develop their knowledge and skills rapidly and to a high level to fulfil their new role.

Given the asynchronous nature of the Masterclass, facilitation was essential to keep faculty members on track and motivated. The added-value of facilitation was clear, with 90% of them rating it highly across all categories.

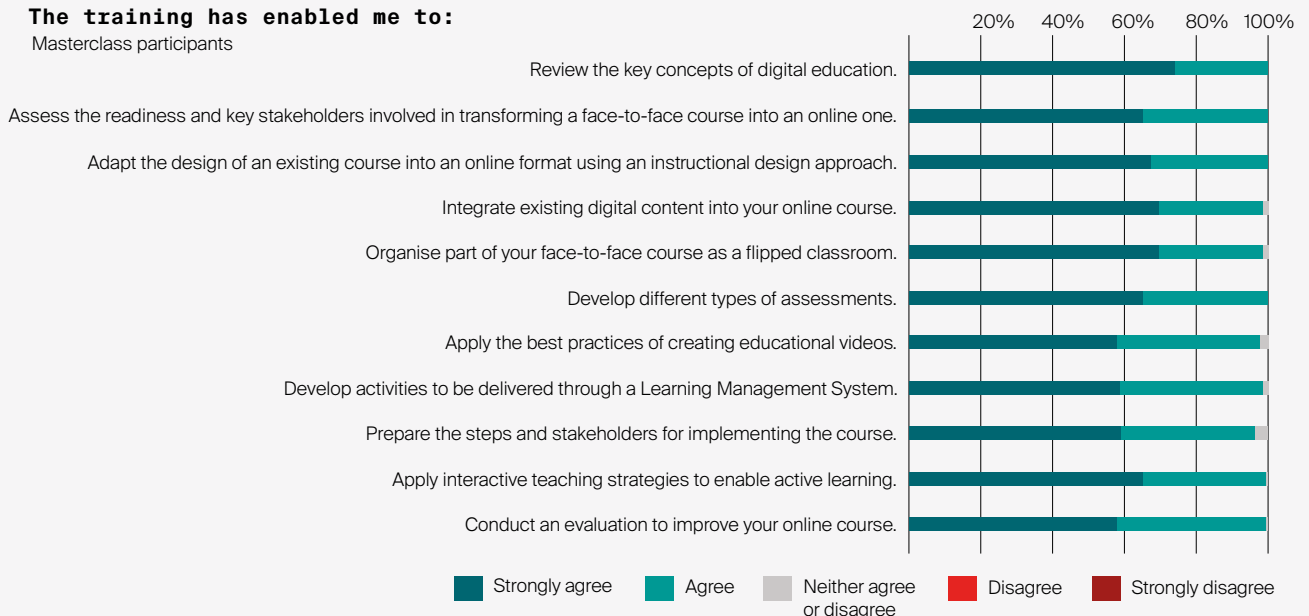
In relation to the challenges faced by certain faculty members, facilitators provided considerable flexibility for handing in assignments. This led to situations where several learners submitted assignments with considerable delay, sometimes leading to delayed feedback.

**Acquired competences**

Overall, experts and faculty members felt that they acquired a full range of new competences to design, develop and implement an online course. With this strong basis, they can easily integrate digital education into their teaching, whether in a blended-learning or fully online format. Furthermore, they can apply quite a few of the pedagogical best practices to their face-to-face courses.

**The training has enabled me to:**

Masterclass participants



Setting up the equipment to film a video during a training in UM6P. (July 2022)



### Training of Technicians

The pedagogical approach of learning by doing was popular amongst the technicians. Being trained in a studio provided hands-on and practical learning.

**This is what I think trainings should be like, no distractions just two weeks of intense work. The topics were practical, we learned so much just by simply doing and practicing, it was a good way to introduce us to how we can create and run a center.**

Participant at a training at UM6P

As for the Training of Experts and Masterclass, they had practical assignments, such as filming and editing videos. The technicians also assisted and assessed each other's work. The practical and collaborative approach was reflected positively in their evaluation of the training, where they rated all the pedagogical aspects highly.

The only aspect that they rated 'negatively' was the length of the training, as they would have liked it to last longer. Some of them had a steeper learning curve, as they did not have all the fundamental skills required for the training.

Training in the UM6P studio.



## Regional Digital Education Conferences

For digital education to be effective and sustainable, change is needed at national and institutional level. Whether it is the infrastructure to provide reliable access to the internet, devices for lecturers and students, a regulatory framework that attributes credits to online courses or paying lecturers for teaching online (not just their physical presence in class), all these dimensions need addressing.

To promote the sustainable integration of digital education in the teaching processes of ACE universities and universities in Sub-Saharan Africa, two regional digital education conferences were held in Cotonou, Benin (April 2022) and Abuja, Nigeria (May 2022). Participants included government officials, policy makers, ACE for development impact centers of excellence and non-ACE educational institutions.

Over 70 participants (face-to-face and online) from Burkina Faso, Togo, Côte d'Ivoire, Senegal, Niger, and Guinea Conakry attended the conference in Cotonou, while 150 participants attended the one in Abuja. Amongst the participants, there were high level representatives from Nigeria, including the Ministers of Communication and Digital Economy as well as the

Minister of Education. In addition, high level representatives of regional or international bodies, such as the World Bank, the Agence Française de Développement (AFD), Association of African Universities (AAU), National Universities Commission (NUC) and the African Digital Education Network (ADEN) were also present.

The new Experts in Digital Education were key advocates for digital education during the conferences. They explained how digital education could concretely be used in their settings, including some of the best practices they learnt during their trainings.

Regional conference in Abuja.



Three new experts presenting best practices in digital education.

The key messages from the conferences were that:

- Implementation of digital education was necessary,
- digital education must be sustainably implemented to achieve the intended educational outcomes,
- key players have to coordinate their efforts for digital education to be a success,
- the C-CODE initiative was a proven methodology to implement digital education,
- ongoing capacity building for academic staff, technical staff and students is essential, and
- partnerships, including public-private ones, are key to developing digital education.



The importance of national and institutional policies was emphasised, including their implementation and monitoring the progress made.



Regional Digital Education Conference in Benin.

# Best practices and lessons learned

To offer trainings tailored to the needs and working conditions of faculty members in African universities, close collaboration with university management is essential.

They are key drivers of the digital transition in their universities, in addition to having the power to provide the conditions for their Faculty members to follow the trainings. This may include the provision of computer equipment, data to connect to the Internet, or occasionally a partial discharge of duties to focus on the assignments to be handed in.

The depth and breadth of the trainings not only provided the theoretical foundations, but also the practical, hands-on experience and skills to effectively design and deliver courses online.

The personalised facilitation was highly praised by the learners, as they received constructive feedback on how to transform one of their face-to-face courses into an online one.

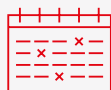
## A. Trainings

The training of experts and the Masterclass fulfilled the needs of faculty members. Some noted that their “perception of digital education had totally changed” and that it had come at the “right time as the world is experiencing a new way of life.” Others stressed that it not only helped them with online courses, “but also getting the knowledge of pedagogy skills” which they could use in their face-to-face courses.

## Lesson learned



Strengthen the selection process in universities to attract the most motivated faculty members to the Masterclass.



Make the Masterclass schedule lighter to enable more faculty members to take part.



Create a strong community of Experts by starting and finishing with face-to-face workshops.



Finish the training of Experts before starting the Masterclass, to strengthen their legitimacy to mentor their peers.



Verify that each university has a functional Learning Management System and team to run it.





Group work during the Eldoret workshop for Experts

**The practical activities based on my case study course were concrete and interesting.**

English-speaking Faculty members, Masterclass

**Putting learning into practice**

Using an existing course as a case study for the assignments was a good practice with valuable outcomes. By the end of their trainings, they had a range of documents, such as a Lesson Plan, which they could use for their future online course.

They had also practiced creating course materials, such as videos. Finally, the opportunity to create a small course on Open edX gave many of them their first experience in developing a course directly on a Learning Management System.

**Nomination of faculty members**

For the Training of Experts, the universities were asked to put forward candidates with the right profiles, interest and time for this important role. While the universities received a

syllabus on the content and format of the training, this information did not seem to have always been transmitted to the faculty members in question. It resulted in some of them being asked to ‘just follow this training’, without anticipating the length and workload and their future role as Digital Education Experts in their respective universities.

For the Masterclass, faculty members were sometimes nominated without being formally briefed or informed, which was counterproductive. It would be preferable to broaden the internal selection process within the universities, so that more faculty members are informed about the training and the motivated ones have the opportunity to register for the Masterclass.

**Role of the Expert**

Some of the experts took on their roles as mentors quite quickly. They accompanied faculty members taking part in the Masterclass when requested. They also motivated “late comers” to complete the training. These exchanges helped to strengthen the community of practice in digital education.

To ensure that those with the best profile and motivation become the experts in residence, EPFL should communicate directly with a bigger pool of candidates to explain what will be expected of them before they register to follow the training. This would enable some of the leading participants in the Masterclass to become experts.

**Dedicated time and data for the training**

To provide the best learning conditions for the experts, they should be relieved of their teaching duties to follow the synchronous webinars, to complete the requested assignments and to familiarise themselves with the pedagogical resources on the platform.

Based on experience with this Masterclass, we also recommend that universities release faculty members for one (or two) days during the week following the end of each section of the training to allow them to complete the

required assignments. This would help them to avoid cumulating a backlog of assignments, thus being able to start the next section with confidence.

The participants should have reliable and free access to the internet, either in a place where they can access it on campus and/or the university should pay for their data to follow the courses. This would remove the financial obstacles, especially for those who were not getting paid due to the university strikes in Nigeria.

**Creating a learning community**

During the training of experts, the exchanges via zoom, and especially the face-to-face workshop, led to the creation of a strong learning community. To get this training off to a good start, it would be preferable to start the cycle of workshops face-to-face to create the kind of atmosphere we developed in workshop 4.<sup>9</sup> This would lay the foundations for the rest

<sup>9</sup> This was not possible during these trainings due to COVID-19 related travel restrictions.

**Perhaps the future training should be organized in such a way that the selected participants could be relieved from their daily official routines to enable them to concentrate.**

English-speaking Faculty members, Masterclass



Synchronous facilitation of Experts.



New experts from Côte d'Ivoire and Senegal, trainers from UVS and EPFL in Dakar

of the workshops and their respective roles in their institutions. Workshops 2 and 3 could be entirely online and then the last one could be face-to-face, to lead to the next steps.

Furthermore, by training Experts, Faculty members and Technicians from different faculties, who might not necessarily interact otherwise, the C-CoDE contributes to creating a rich network of individuals with expertise in digital education. This interaction can be beneficial to learn from each other as they increasingly digitalise their courses.

#### **Schedule of trainings**

As the experts were tasked with accompanying the Masterclass learners from their university, the schedule should be adapted to enable them to finish their training before the Masterclass starts. This would increase the feeling of confidence and legitimacy within their institution. It would also allow them to be immediately involved in a facilitation process as recognised experts.

#### **Availability of an LMS**

While having a functional Learning Management System was a criterion of the selection process of the universities, it became apparent that in some of the universities it was not used in practice. The status of the institutional Learning Management System should be verified at the beginning of the C-CoDE. It may also be worth including the training of technicians to run this system and ensure the infrastructure is in place, as part of the creation of a C-CoDE.

#### **B. Technical infrastructure**

Although the construction works to build or rehabilitate existing rooms for the Centre looked rather straightforward, internal decisions (i.e. choose the right location for the studio) and procurement processes were rather slow. However, the delays incurred were not critical as the equipment of the studios took time to be procured.

The procurement of specialised multimedia equipment for the studio is problematic in certain countries and the post , supply difficulties of electronic components made it even harder. Though some of the equipment was available, there was no local supplier able to provide all the equipment with the exact specifications to ensure the compatibility of the different components.

### **C. Operation and sustainability of the C-CoDE**

The effective implementation of the C-CoDE requires dedicated staff at each institution to operate it. Some of the persons trained, either as experts in digital education or as technicians of the multimedia production studio, could be engaged for this purpose.

However, it will be important to assign the leadership of the C-CoDE to an academic with a strong interest in digital education, and the necessary academic authority to promote the technical and pedagogical benefits of the Centre to the rest of the university.

For the C-CoDE to be operational and sustainable, a sustainability plan should be created in partnership with the management of each host university, as a way to put forward the expertise of the C-CoDE and spread its activities to the local and regional level.

**The training covered pedagogical aspects that go above and beyond putting courses online.**

French-speaking Faculty Member, Masterclass

## Conclusion

The COVID-19 pandemic revealed the resilience of universities which had already integrated digital education approaches and the fragility of those which were still relying on traditional teaching approaches.

A collective awareness has emerged among the academic community about the urgency of adopting a new educational paradigm that integrates digital tools and technologies alongside evidence-based pedagogical methods. Having highly motivated individuals taking digital education forwards in each university is key to their success.

Digitalisation should be considered an opportunity which benefits faculty members, students and ultimately employers and society as a whole. Through existing digital tools, technologies and content, there can be notable improvements in the quality of teaching and capacity of universities.

Our interactions with the various stakeholders of the 12 universities with which we collaborated over two years were very insightful and led us to make the following recommendations.

### **Recommendations**

#### **Optimise conditions for training in digital education**

- University leadership needs to be readily involved in such projects to successfully steer the digital transition and create the conditions for implementation. Adopting new

methods and tools to teach students requires lecturers to invest a considerable amount of time initially. Hence the need to provide the necessary infrastructure, connectivity and support to facilitate the trainings.

- Those trained as experts, to drive the digital transition within their university, should be offered incentives, be recognised amongst their peers and be given the opportunity to showcase best practices.
- For the sustainable integration of digital education, it is important to have a critical mass of faculty members who master the competencies to teach online effectively. Hence, the need for training relatively large cohorts of lecturers simultaneously.
- While small universities might not have as many Faculty members trained, they might constitute a higher proportion of the overall number of Faculty members, which is also important to lead to institutional change.
- Trainings offered to faculty members should include hands-on experience and the acquisition of practical skills to design and deliver courses online effectively.

### **Implement digital education**

- The creation of a Centre dedicated to digital education should be part of the implementation strategy. It needs to be given visibility and be managed by an academic with strong interest in digital education and the institutional authority to promote the technical and pedagogical benefits of the Centre to the rest of the university.
- A sustainability plan should be developed in partnership with the university management to promote the expertise of the Centre and spread its activities at the local and regional level.
- A fully functional LMS, implemented across the university with in-house support for the lecturers and the students, is essential.
- The creation of digital educational resources and their integration in an LMS can initially be tedious and time consuming. For faculty members to engage in developing blended-learning or fully online courses, they need incentives, as well as the necessary human resources and expert support in instructional design.
- The importance of national and institutional policies to ensure that digital education is recognised cannot be over emphasised.

The agreed policies must be properly implemented, and the progress of implementation should be regularly evaluated.

### **Perspectives and possible future actions**

- Expand and refine the concept of C-CoDE to other African universities.
- Incentivise C-CoDE host universities to produce digital resources (Massive Open Online Courses and Open Educational Resources) to pool and share African expertise.
- Train a large number of faculty members from African universities in digital education as a means to transform the continent's educational paradigm.
- Address the shortage of university places through fully online or blended-learning courses.
- Provide access to online university degrees and certificates to students and professionals who do not have access (e.g. live far from a university, need to work).
- Strengthen the link between the skills acquired with the job market needs.

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