

Guidebook to a successful implementation of digital education

African Higher Education Centers of Excellence

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NOTE

This guidebook was produced for review by the World Bank (WB). It was prepared by Moussa Traore, an expert in digital education, for the African Higher Education Centers of Excellence project. The views expressed here do not necessarily reflect those of the World Bank. The guidebook is available under a Creative Commons Attribution 4.0 International license.

ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
LMS	Learning Management System
Moodle	Modular Object-Oriented Dynamic Learning Environment.
MOOC	Massive Open Online Course
ML	Machine Learning
TEL	Technology-Enhanced Learning
Video-assisted learning (VAL)	Video-Assisted Learning
STEAM	Science Technology Engineering Arts Math
ICT	Information and Communications Technology
SMS	Short Message Service

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1. Introduction

Over the past several years, digital education has assumed growing importance as a new approach to higher education institutions, and a growing number of institutions of all sizes are now thinking about implementing digital education programs. Such programs must, however, meet quality requirements in terms of both the content that they deliver and the technologies that they use to deliver it. Moreover, e-learning programs must be smoothly integrated into each higher education institution's culture and its processes.

The present guidebook provides decision-makers with an introductory to digital education. This guide attempts to explain e-learning succinctly and effectively and to guide higher education institutions' decision-makers through the major change process that a digital education implementation represents. This guide also attempts to provide institutions with some ideas on how to choose the most effective learning methods based on the competencies to be developed by the student body and the broader institutional context in which the competency development will occur.

the rapid evolution of methods, techniques, and approaches surrounding the development of digital education, requires the establishment of such a guide. Readers will find practical support tools that will help them better understand the concepts presented in this guide and facilitate the implementation of digital education at their respective institutions. The guide also focuses on pedagogical strategies, which are sometimes overlooked but are of course essential to the success of any digital education program.

2. Digital education definition and related terms

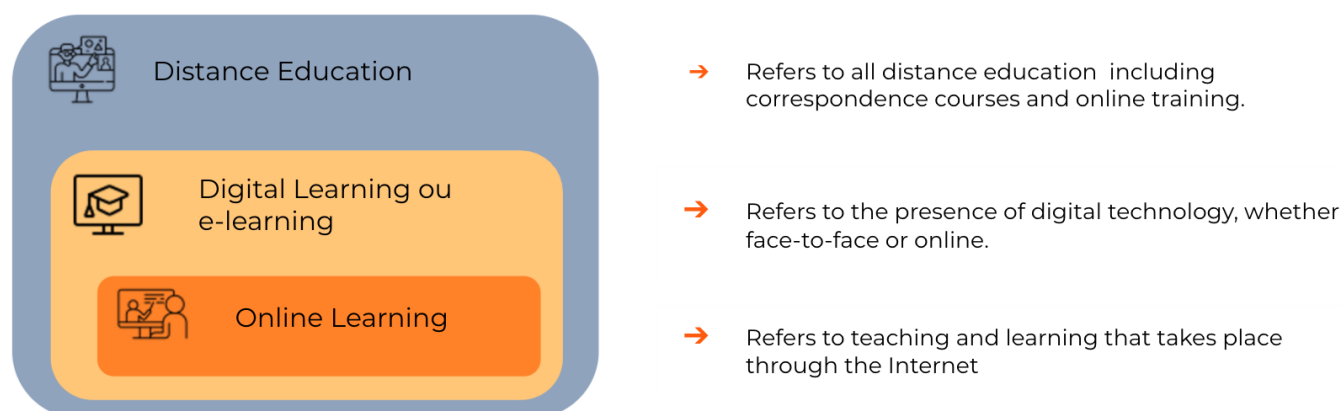
There is some confusion in the literature about the definition of digital education. We, therefore, propose first to clarify some terms to allow the reader to understand the interrelations between the different terms commonly used.

Distance Education (or Distance learning): Distance education is teaching and learning where educators and learners are in different physical spaces. Often used synonymously with distance learning, distance education takes place through one of four modalities: audio/radio, video/television, mobile phone, and/or online learning platforms. Printed and digital texts often accompany these modalities or could be a fifth modality in cases where another technology is not available.

Digital education (or e-learning) is the innovative use of digital tools, technologies, and practices during teaching and learning and is often referred to as Technology Enhanced Learning (TEL) or e-Learning. Exploring the use of digital technologies allows educators to design engaging learning opportunities in the courses they teach, and these can take the form of blended or fully online courses, programs, and applications of technology in classrooms and institution buildings, learning platforms, and many other technology advancements related to teaching and learning.

Online Education (or Online learning): A distance learning modality that refers to teaching and learning that occurs via the Internet. Online learning (or online education) can be used to supplement in-person education (e.g., students follow along on tablets during a guided reading exercise) or be the primary mode of delivery in distance learning settings (e.g., Moodle, Google Classroom, etc.). Online learning can be asynchronous (where learners control time and pace) or synchronous (where teaching and learning happen simultaneously in real-time either in an online space or through a concurrent broadcast) or a combination of the two.

Figure 1 Digital education definition and related terms



This image is made available under the terms



We can see that the term distance education is the broader term and include paper-based media. For this guide, we will use the term digital education or e-learning which refers to tools, technologies, and practices that enhance learning.

3. Digital revolution

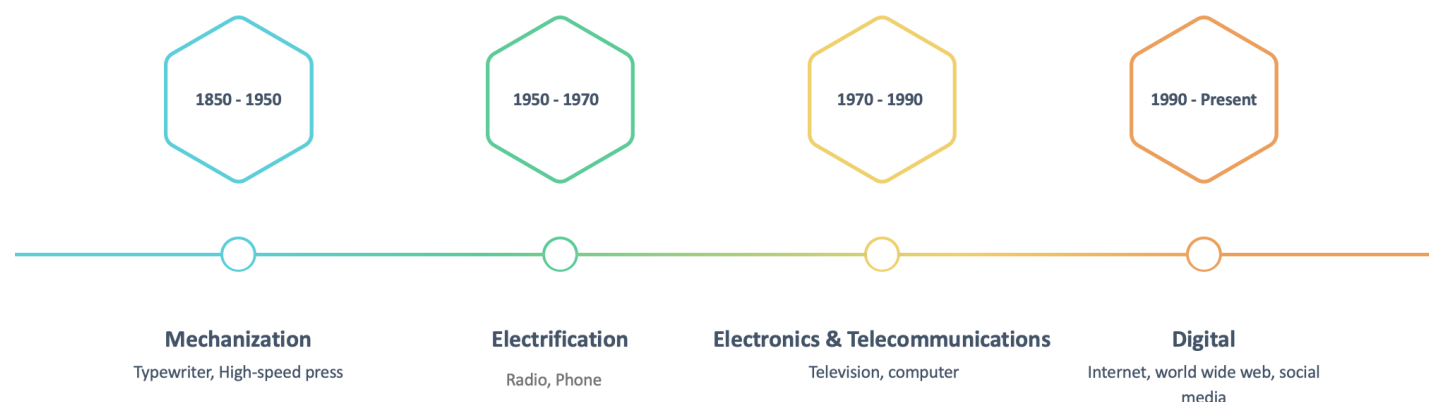
In the past two decades, and at an unprecedented rate, digital technologies have completely changed how people around the world interact, communicate, find information, create, work, consume, and express and entertain themselves. The way we communicate, create, share, and learn has changed as we gain access to a greater variety of information sources and continue to produce and disseminate knowledge at an accelerated rate. This raises serious questions about the quantity, reliability, and processing of information.

Most people born in the 21st century begin to use digital devices before they even learn to read and write, so their interests and aptitudes are a product of their time. Considering this reality, new forms of teaching and new learning tools are being developed and are changing the very foundations of our education system.

Today, the use of digital technologies in daily life is forcing the education system to consider the importance of helping students adopt a creative attitude and develop a critical eye in this regard. If the education system is to achieve its goal of ensuring equal opportunity, it must introduce students to digital technologies.

All of history's industrial revolutions have led to major changes in the world's education systems. The first industrial revolution in the 18th century focused on mechanization, the second at the beginning of the 20th century marked by electrification, and the third at the beginning of the 1970s involving electronics, telecommunications and computerization set the stage for the changes that are drawing us into a fourth industrial revolution, the digital revolution, which is still in the active development stage, is no exception.













Figure 2 Digital transformation: The fourth industrial revolution





4. Innovations & Trends in Higher education

Higher education institutions play a key role in helping societies understand and master the digital technologies essential to their development. Today, they must not only adapt to digital technology; they must be able to harness its full potential and put it to use for students and society as a whole. The table below outlines key innovations and trends of interest to the higher education sector.

Table 1. Innovations and trends in Higher education

TECHNOLOGY	DESCRIPTION	TECHNOLOGY	DESCRIPTION
	Creation of immersive environments, holographic readouts, and digitally produced overlays on the physical world for mixed-reality experiences.		Development of machines that can substitute for or complement humans, in tasks associated with thinking, multitasking, and fine motor skills
	Learning analytics is the discipline devoted to the measurement, collection, analysis, and reporting of data from learners in a learning context for understanding and optimizing learning and context		Blended or hybrid learning refers to a combination of face-to-face classroom instruction and various media, usually online. Typically, some parts of the course are delivered entirely online while other parts are delivered face-to-face, in problem-solving and seminar-style discussion formats.
	The most promising use case for blockchain in higher education is to transform the “record-keeping” of degrees, certificates, and diplomas – making credentials digital and placing them under the learner's control, without the need for an intermediary to verify their authenticity.		Cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases, networking, and software.
	Tangible platform to work out your creative thinking over a variety of projects		A digital device is an electronic device that can receive, store, process, or send digital information. Today, myriad devices are digital including a smartphone, tablet, and smartwatch
	The digital evaluation system enables evaluators to mark a scanned script or online response on the computer screen itself, rather than on paper. This results in the reduced threat of errors and malpractices, thus, improving the accuracy of the evaluation process.		An eBook (short for electronic book), also known as an e-book or eBook, is a book publication made available in digital form, consisting of text, images, or both, readable on the flat panel display of computers or other electronic devices. Although sometimes defined as "an electronic version of a printed book",
	Gamification is a strategy that uses various activities and rewards to promote student engagement. When used as a		Quality online learning integrates proven and research-based best instructional practices applied in the online environment. Quality online learning takes full advantage of a variety of technology tools

	technique to inculcate a love of learning, it helps students become active and motivated learners.		has a user-friendly interface, and is accessible by learners with special needs.
Machine & Adaptive Learning	Machine learning (ML) is transforming education and fundamentally changing teaching, learning, and research. Educators are using ML to spot struggling students earlier and take action to improve success and retention. Researchers are accelerating research with ML to unlock discoveries and insights. ML is expanding the reach and impact of online learning content through localization, transcription, text-to-speech, and personalization.	MOOCs	A MOOC – massive open online course – is a program of learning offered by a university, open via the internet to users worldwide, free of charge. MOOCs are often based on part of an existing degree course, giving students an opportunity to 'sample' the experience of studying at prestigious institutions
Digital Badges and Microcredentials	Badges represent a way of acknowledging achievements or skill acquisition at a more granular level than an institution degree. Credentials, the use of blockchain, and badges in higher education continue to gain traction to acknowledge achievement and establish qualifications in various professional fields.	Mobile Learning	M-learning or mobile learning is "learning across multiple contexts, through social and content interactions, using personal electronic devices". A form of distance education, m-learners use mobile device educational technology at their convenient time.
Online Collaborative Solutions	These tools (Teams, Google Drive, Zoom, etc.) mix productivity and creativity, getting students to share and collaborate on projects, give, and take feedback, annotate, brainstorm, make media, or just hang out.	Open Educational Resources	The term open educational resources refer to "teaching, learning, or research materials that are in the public domain or published with an intellectual property license that permits their free use, adaptation, and distribution
Student data privacy and cyber security	In the era of online education, student data should be handled safely	Video-assisted learning	Video-assisted learning (VAL) is defined as a strategic teaching approach to using videos – either educational or conceptual – to improve a student's comprehension, cognitive ability, or social-emotional skills. What that means is that videos are more than just a way to pass time or provide additional information on a specific learning objective. Video-assisted learning takes videos and transforms them into an important part of both general education and student wellbeing.
STEAM	STEAM education is an approach to teaching and learning that integrates science, technology,	Social media in learning	The use of social media in education provides students with the ability to get more useful information, to connect with learning groups and other educational systems that make education

	engineering, the arts, and math as pathways to guide student inquiry, discussions, and critical thinking. Education experts say STEAM education helps students develop the capacity to: Take thoughtful risks		convenient. Social network tools afford students and institutions multiple opportunities to improve learning methods.
	Wearable Technologies have a tremendous potential to improve education, empowering students as well as instructors in their teaching and learning experiences. Beyond the affordances of head-mounted displays to present information and of smartwatches to passively monitor students, the variety of form factors and sensors available enable many applications to be developed. Their features range from data collection and monitoring of students' behaviors and affective states to timely delivery of personalized notifications, alerts, and reminders.		3D printing technologies enable educators to provide students with accurate physical prototypes, which provides practical, hands-on knowledge useful for understanding scientific concepts. Educators can also use 3D-printed visualizations to improve spatial education.

5. The growing importance of education digitalization in higher education institutions

Digital transformation has become more important to the success of higher education in the past two years and is expected to become even more so in the next two years. In a study conducted by Educause (2021), respondents were asked to rate the retrospective and prospective importance of digital transformation to the success of higher education. Two-thirds (67%) of respondents said that, compared to two years ago, digital transformation has become more important; nearly another third (31%) said it was just as important as two years ago. Looking ahead, three-quarters (75%) of those surveyed believe the digitalization of higher education institutions will become more important in the next two years. Sixty-one percent of respondents said both: the digitalization of higher education has become more important and will continue to do so.

African Higher education institutions must take action to ensure a successful economic and social future, and they can do so by having their education system play an active role in the digital revolution. Equipping African students with the appropriate digital skills will ensure a positive outcome to the revolution.

Every education system is affected by these changes. The world's education systems have had to adapt and innovate and are now a part of the dynamic of change, as can be seen in the explosion of educational technology in recent years. In 2015, global investment in this area stood at \$4.5 billion, an annual average increase of over 30% since 2011.

Digital technologies are changing every component of the educational mission, which is to provide instruction, socialize and provide qualifications. They are broadening the range of pedagogical practices, opening new avenues for innovation, and offering user-friendly and interactive learning opportunities for students.

Education is the primary means by which African countries will be able to develop as an inclusive, fair, and innovative digital society and to be among the world leaders in the digital field.

Our education systems must ensure that today's students, as well as future generations, acquire the knowledge and skills they will need to become free, creative, responsible, and autonomous critical thinkers who can communicate and collaborate in a constantly changing world.

6. Challenges and issues

The literature shows that digital transformation is usually faced with several challenges and issues. Often, those challenges are not listed in any specific order based on criticality. Challenges reported include the changing staff experience/expectations, resistance to change, resistance to technology, lack of leadership support, lack of competency and digital transformation skills, failing or poor analytics, lagging and legacy business models and systems, poor planning, misalignment with business strategy, technology and data challenges, lack of clear vision, and digital literacy of stakeholders. (Maltese 2018), (NV 2017), (Chaurasiya 2019).

To be meaningful and efficient, i.e., to improve student learning, the massive implementation of digital technology must be able to overcome certain challenges and issues. The table below summarizes the main challenges and issues specific to higher education, which we have classified into four broad categories.

Table 2. Challenges and issues

INFRASTRUCTURE, CONNECTIVITY EQUIPMENT	DIGITALLY SKILLS AND COMPETENCIES (STUDENTS, TEACHERS, AND STAFF)	GOVERNANCE AND INSTITUTIONAL CAPACITY	HIGH-QUALITY LEARNING CONTENT
<ul style="list-style-type: none"> › Recurring investment costs as digital technologies advance › Disparities in access to the internet and digital technology › Deliver the benefits of ICT to rural and geographically remote institutions › Development of the infrastructures needed to support all these changes › Reliance on networks and professionals to initiate change › System-based compatibility/ capacity of existing systems › Technological determinism: disconnected designs, applications, hardware-centered policies › Accelerated adoption of digital tools › Privacy and security issues 	<ul style="list-style-type: none"> › Qualify and engaged teacher/facilitators › Student digital skills and motivation › Teacher training to foster and accelerate the enhancement of digital pedagogical practices › Improvement of the digital skills of teachers, learners, and the general staff 	<ul style="list-style-type: none"> › Lack of instructions or strategy (organization, vision, and planning) › Reticence to change/ insufficient cross-institution planning or coordination/ buy-in understanding the potential benefits of digital transformation › Development of a culture of innovation and the conditions necessary to achieve it › Data silos › Unclear data pictures for the institution › Absences of educational policy or regulatory framework › Policies for intellectual property and fair use 	<ul style="list-style-type: none"> › Compensation to teachers for extra time for course design › Instructional design and technical support Resources › Creation of more digital pedagogical activities and resources › Absence of proper content

7. Benefits

The benefits of the digitalization of education are multiple. The table below shows some of them.

Table 3. Benefits and advantages

ADVANTAGE	DESCRIPTION
Start of training "at any time"	Digital education allows students to learn about a wide range of topics at any time, without having to wait for a particular course to be delivered at a specific time.
The flexibility of the training location	The different delivery modes of digital education offer more options for taking a course (traditional classroom, home, or even workplace.)
Standardization and personalization of learning	Digital teaching allow both to ensure a certain coherence of the training and to provide students with training or parts of training according to the needs expressed.
Provision of simultaneous education to a large student audience	To train many students simultaneously, at any given time, online and distance learning is a perfect strategy. It is possible to reach everyone who has access to a computer, tablet, or even a smartphone. This ensures that everyone receives the same training at the same time.
Analysis of student learning	Digital technology offers a more realistic way to track student progress and learning by allowing the information contained in student work to be recorded. Indeed, digital technology allows teachers to track the progress of their student's learning. For example, several learning activities can be compared at regular intervals to others, already digitally pre-recorded, which allows to visualize and understand which students are improving and which ones need more attention.
Improved student outcomes through data analysis	Educational institutions can use data analytics to track and improve student outcomes. This makes it easier to understand the needs of individual students and institutions by examining the information gained from using digital learning. The more clearly, we can understand how a student missed a term, the more the course can be improved. So digital helps diagnose gaps much more easily and reliably than teachers would in classrooms with often 50+ students.
Collaborative learning	Collaboration is forced by digital learning. Indeed, teachers can create and manage groups through learning platforms. Student work and presentations are facilitated by collaborative authoring environments such as Google Drive, OneDrive, etc. Such interactive tools are already used in the corporate job market.
Development of digital skills	Digital integration in education supports the development of digital skills required for the 21st century.
Reaching out to students in remote areas	La numérisation de l'éducation permet une économie de temps et d'argent pour les étudiants des zones reculées du pays. Pour rejoindre leurs institutions d'enseignement, certains étudiants doivent parcourir de longues distances et souvent coûteuses. Dans ce cas de figure, la formation numérique est d'un grand secours pour ces étudiants.

8. Digital education readiness assessment

Institutions need to assess their status to decide what form their success will take to develop a strategic plan for digital education deployment and adoption. To do so, we propose support tool 1 - "Digital education readiness assessment", which is intended as a framework to assess the readiness of a higher education institution to digitize its teaching and learning. The proposed framework is structured around 5 main pillars:

1. student information management
2. teaching, and learning
3. technology infrastructure and equipment
4. academic research
5. governance.

The tool draws on several references (UNESCO, World Bank, Microsoft, etc.) and is based on research, evidence, and field experience. It provides an understanding of how to achieve ambitious change without making the most common mistakes and therefore offers a holistic view of your institution, allowing you to develop your digital strategy in distinct phases, answering a key question: "Where do we start?" Or "Where are we?" depending on where your institution stands for the digitization of education.

We, therefore, suggest that you first conduct a situational analysis to assess your level of readiness for digital teaching and learning at your institution. The digital education readiness assessment tool 1 examines your institution's current culture, technologies, processes, and infrastructure to prioritize investments and initiatives for digital education at your institution. See **Support tool 1 – Institutional Digital education readiness assessment** (page 28) to help you prepare for this diagnostic.

9. Approach to a successful implementation

Step 1: Analyze your institutional environment

- **Analyze characteristics of the targeted students**

Are all the students at your institution, or just some who are able and ready to adopt e-learning? Conduct a small survey of a sample of students and measure their level of digital competency. Are these people comfortable using a computer? Do they have the basic skills to take training with minimal supervision? What are the objections? See **Support tool 2 - Student characteristics assessment** (page 28) to help you prepare for this step.

- **Analyze teachers support and needs**

The purpose of this exercise is to assess the skills your teachers need to succeed in online and distance education; to evaluate their ability to effectively supervise and evaluate students at a distance; to establish a training plan based on the needs expressed; to identify the training modes and modalities most appropriate to the context and reality of the teachers. See **Support tool 3 – Teacher's needs and support** (page 28) to help you prepare for this step.

- **Analyze technical infrastructure**

You will then need to determine whether your institution has the necessary resources. A technical and organizational audit will allow you to estimate the costs and evaluate the timetable for the implementation of this digital teaching and learning initiative.

Take an inventory of the hardware and software that may be useful to you during the digital teaching and learning implementation initiative. See **Support tool 4 - Technical Infrastructure assessment** (page 28) to help you prepare for this step.

- **Elaborate a list of keys potential courses and/ or programs for digital education**

Identify face-to-face courses that you would like to digitize or currently offered online courses that need to be enhanced. Make sure that the courses you choose will be favored by decision-makers. This initial list of strategic courses can be very useful to illustrate the feasibility of implementing digital education within the institution or improving your current approach.

Box 1. Guidelines for your courses list selection

- › Short (no more than three hours of training).
- › Multiple types of students or multiple faculties within the institution.
- › Stable content (that you will not have to update every month) to ensure the sustainability of the initiative.
- › Content that is easier to popularize in virtual mode. For example, anything that is procedural or cognitive type

Following this first exercise, you will, at a later stage of the process, select a pilot project from which to work to implement e-learning within your institution. See **Support tool 5 – Content Readiness assessment** (page 28) to help you prepare for this step.

- **Meet with key stakeholders in the institution and set the stage**

Meetings with the various stakeholders within the institution who have a say in the implementation of digital education will be necessary. Set up a working committee, plan meetings with faculty, teachers, unions, ICT services, financial management, and, if necessary, students targeted by the initiative.

Share perceptions and concerns about this new initiative. Listen to the fears and concerns expressed to provide appropriate responses.

Your meetings should allow you to establish an initial exchange, take the pulse of your allies, and evaluate the resistance to the implementation of e-learning within your institution.

▪ **Manage resistance efficiently**

As with most major changes, you may encounter several forms of resistance. These are likely to come from three main fronts.

Within the teaching staff

They might feel threatened by this new medium. To reassure them, insist that e-learning is just another tool in your institutional training strategy. Why not suggest that e-learning can work well with the traditional way of learning or that it can be used to support current methods (blended learning)?

Identify the teachers who are best able to integrate these new training strategies and rely on them as agents of change. In any case, you will not transform all your training into digital mode. Allow your teachers to make the shift gradually and get the most out of each experiment.

Among the ICT department staff

They may raise objections related to the technology infrastructure or the workload associated with increased user support. Often, ICT managers are opposed to this kind of addition to their infrastructure. Let them know well in advance of your intentions and of course, make sure they are actively involved in the whole implementation process.

There may be objections to the bandwidth and the number of computers available in the institution that should be considered. There are several effective strategies to circumvent these potential problems (slowing down operations, increasing costs by adding bandwidth, insufficient capacity of available computers, lack of a campus-wide Wi-Fi network, etc.).

Among students themselves

There is always a portion of the population that objects to change or fears technology like the plague. Use user-friendly demonstrations and emphasize the personal benefits of e-learning. The personal benefits they will derive from e-learning. Never forget that all of this may require additional staffing resources before, during, and after the implementation of e-learning. You will need to budget accordingly.

▪ **Mobilization of supports**

For this e-learning implementation initiative to succeed, you will need the support of the institution's senior management among your allies. Talk to them often and engage them. Your colleagues in the ICT department are already stretched with many projects (such as the implementation of enterprise resource planning - ERP - programs). In many cases, a clear directive from senior management will convince them to make this project a priority.

Also, identify, among all the groups in the institution: teachers, ICT people, students, who are excited about the project and involve them early on so that they can convince others and use their influence within the institution to break down resistance as it arises. Finally, communicate effectively. To help you plan your communications strategically, read Step 5 - Develop an Engagement Strategy (page 22).

Step 2: Choose the appropriate teaching models and delivery modes

■ Teaching models

Asynchronous model

Asynchronous teaching and learning is a model that adapts to the students' availability. In short, students have access to one or more training tools such as a video, an audio recording, a text, a learning management system that they can use as they wish. Follow-up with the teacher or between members of a group of students will be done indirectly by email or discussion forum.

Box 2. Main advantages of the asynchronous method from the student point of view

- › They can move at their own pace
- › They can adapt the order in which they understand the elements of the course
- › They can revise and deepen certain aspects of the course at their leisure
- › They avoid wasting time on the more familiar aspects of the material

Synchronous model

Synchronous teaching and learning, as opposed to the asynchronous method, is characterized by direct, real-time interaction between students and the teacher. In this method, the students in a group are simultaneously online with their teacher and they exchange with each other through videoconferencing and chat. Note that this method requires a consistent and stable internet connection.

Box 3. Main advantages of the synchronous method from the student's point of view

- › Students interact intensively online with the teacher. Oral and visual language is used.
- › the model is familiar to students and teachers as it is like the traditional classroom.
- › Group dynamics are established more quickly.
- › Training is faster to implement.
- › Real-time virtual classes allow learners to attend classes from multiple training sites
- › When the learner can record the course and save the exchanges between students, they can review the aspects they wish to revise at their leisure, which is a real gain.

Blended learning

As you may have guessed, borrows from different learning methods. This training method combines elements of e-learning and traditional classroom learning. In a blended learning model, between 20% and 80% of the activities are now offered at a distance, which requires an in-depth pedagogical reengineering of the training.

Figure 3: Blended Learning Model



Source: Laval University

Box 4. Examples of blended learning scenarios

- › Before receiving traditional classroom instruction, students are provided with digital materials. Meeting time is reduced by this preparation and classroom instruction is focused on in-depth discussions
- › Between classroom sessions, students continue their education through structured virtual exchanges and collaborative tools
- › A class meets in real-time (synchronous mode: video conference, chat) and continues offline (discussion forum, email exchange, tutorial)
- › Coaching is provided to students, either virtually or in the classroom, to facilitate the integration of the knowledge acquired through e-learning.

Box 5. Key Benefits of Blended Learning

- › Academic studies have shown that learning is higher with blended learning, which is more responsive to the different learning styles of learners
- › By combining the use of standardized training software with in-class and assignment-based formats, training preparation can be significantly reduced and still provide valuable training activities.

▪ Instructional design strategies

The emergence of a multitude of new opportunities for developing students' skills presents a significant challenge: making the best choice in terms of training methods according to specific student needs or content requirements. Knowledge of the training needs, the characteristics of the target students, and the benefits of each of these new opportunities becomes an asset in making the best choices. There are no hard and fast rules. Several structured research studies and experiments are currently underway to better identify the advantages and disadvantages of various methods in specific contexts.

It is already known that the asynchronous method lends itself particularly well to learning software or any function requiring the knowledge of clear and well-structured rules. It can also be combined in a very effective way with instructions given in a traditional classroom, thus becoming mixed. It is also valid as a support to more traditional courses for the learning of tasks requiring the exercise of analytical

judgment, for example for decision making. On the other hand, the learning of physical tasks or tasks requiring reflexes or sensory perceptions lends itself better to real practice with a teacher, except in the presence of an asynchronous simulation method.

Box 6. Examples of instructional design strategies

- › Microlearning
- › Collaborative learning
- › Video-Based learning
- › Social and emotional learning
- › Simulation

Box 7. Distance education delivery modes

- › Online and offline
- › Mobile learning
- › Radio based learning
- › TV Based learning
- › SMS based learning
- › Printed

Step 3: Choose your main systems and applications

▪ Digital learning offers management (LMS, MOOC, etc.)

The training will be managed by a Learning Management System (LMS). A learning management system is a software designed to automate the various functions related to the organization of courses, including student registration, tracking of student progress, access to content, and links with instructors.

Learning management systems usually represent a significant initial investment. There are many products on the market, so before you begin your search, you should first list your current expectations and the foreseeable needs you want the system to meet. Opt for open-source systems (Moodle¹, OpenEdx², Coursera³, etc.).

▪ Virtual classroom

There are many different methods of collaboration, all of which are based on a form of learning based on an exchange between students and between students and the teacher. Virtual classroom systems (MS Teams⁴, Zoom⁵, Google Meet⁶, etc.) are particularly good at fostering this need for collaboration and communication. These collaborative tools are particularly appropriate for conducting creative efforts (brainstorming), finding

¹ <https://moodle.org/?lang=fr>

² <https://open.edx.org/>

³ <https://www.coursera.org/>

⁴ <https://www.microsoft.com/fr-ca/microsoft-teams/group-chat-software>

⁵ <https://zoom.us/>

⁶ <https://meet.google.com/>

solutions to specific problems, and creating virtual work teams. Collaborative tools are well suited to blended learning.

- **Chose tool for content authoring and multimedia production**

At this stage, it would be advantageous to put in place procedures and processes for selecting and comparing the various technological tools. To this end, UNESCO has produced a non-exhaustive list of technology solutions⁷ that could serve as a starting point for the selection and comparison of software and technology platforms.

Step 4: Develop an implementation plan

- **Develop the strategic vision of digital education for your institution**

Align yourself first with the overall vision statement of the country or lead ministry for digital education. Then in the second step, on the main requirements for distance teaching and learning (infrastructure improvement, connectivity, equipment, digital skills, institutional capacity, and content quality from a pedagogical point of view. It is very important to consider equity of access so as not to further widen existing inequalities. Finally, establish a list of measurable objectives in the short, medium, and long term.

- **Create an implementation committee**

A winning practice is to structure a dedicated e-learning implementation team early in the process and assign centralized responsibilities. This team must implement not only e-learning but also the winning practices of leading institutions in this field. This committee is usually composed of individuals from various functions of the institution such as ICT, faculty, administration, and a few target students (if possible). Specialized external consultants may also be called in on an ad hoc basis for certain meetings. This consultation strategy will allow you to maximize your chances of success.

- **Elaborate and present your Digital Education Implementation Plan**

When your implementation plan is ready, reconvene meetings with the key stakeholders mentioned in step 1 (administrative and financial management, teachers, ICT services, rector, or senior management) to present and discuss your implementation plan. If you email your implementation plan to them for review on their own time, it will not have the same impact as presenting it yourself. In addition, use this opportunity to clarify certain aspects of the plan if necessary and to obtain support for certain strategic decisions.

Don't forget to present your implementation plan to your newly formed committee so that they too can be included in your important e-learning project. To prepare for this step, see **Support tool 6 - Digital Education implementation plan template** (page 28).

⁷ <https://en.unesco.org/covid19/educationresponse/solutions>

Step 5: Develop an engagement strategy

■ Prepare an omnichannel communication plan

There's no point in developing the best e-learning plan if you can't get your institution's management and staff on board. The support of your institution's management and staff. Senior management, middle managers, or end-users will need to understand and agree with the change you want to make in your institution's current learning methods. A communication plan could be very helpful in informing and creating buy-in for this new teaching and learning approach.

Strategically time the announcement of the project. As seen in the previous step, you can first present your implementation plan to the stakeholders who will be your allies in the project, but also plan other communication strategies aimed at reaching the entire staff of the institution who are often your target audience for e-learning activities. The **Support tool 7 – Engagement strategies** (page 28) gives you some ideas of possible strategies to use.

Once the project is up and running, you should be able to share successes, developments, or any information that you feel is useful. You may need to invent new ways to engage your institution's staff: for example, nothing will motivate managers more than to see senior managers using e-learning themselves. For example, nothing will motivate executives more than to see the company's top executives using e-learning themselves.

Also, adopt a theme, a slogan that will be associated with your communication campaign to identify your project among all the others in the institution. In your key messages, insist on the benefits that all your target students will enjoy flexibility, accessibility, flexibility, and so on.

The communication plan should allow users to provide feedback on this new training technology. For example, students could be invited to express themselves in an online discussion forum. Or you might as well conduct a survey and disclose their opinions via selected media. Being able to measure student feedback and the effectiveness of your e-learning program is a very important aspect that could earn your project points!

Be creative and ingenious in the way you communicate your e-learning project to your target student, and they will gradually integrate this new feature into the institution's current practices.

Step 6: Run a pilot project

■ Select volunteers for testing

First, select a group of students representative of the target audience to which you plan to deploy the training. Establish selection criteria such as disciplines, study cycles, faculties, etc. Generally, with a group of 8 to 12 volunteers, you will get credible results. Depending on the size of the project and for non-homogeneous target students, the instructional designer may choose to hold multiple pilots.

■ Reproduce teaching and learning context

Consider offering the training in the same context as the planned activity: synchronous, asynchronous, or blended, in groups or individually, in a classroom set up for this purpose or at home.

▪ Invite volunteers

Formally invite volunteers by SMS or email far enough in advance so that they can attend. Ask them to confirm their attendance. You may also want to invite a few content experts and teachers who are interested in the project and who could benefit from getting an up-close look at how the project is going. Don't forget to include a computer technician on your guest list who can assist you if needed.

▪ Gather information

Prepare your questions and the aspects you want to evaluate through this pilot and be methodical in the way you collect the results. Usually, at the end of the training activity, a plenary session allows participants to share their experiences. You may want to arrive with your discussion points annotated on a sheet of paper in advance.

▪ Conduct and evaluation

During a pilot, two types of evaluation can be conducted and allow for the collection of information at two levels. These are the formative and summative evaluations.

The formative evaluation collects data on the pedagogical design of the course: appropriateness of the content and objectives to the needs, the effectiveness of the exercises, level of information presented, clarity of instructions, the usefulness of task aids, etc. The formative evaluation will also focus on analyzing not only the content but also the entire e-learning context such as navigation, interactivity, and the learning environment.

The summative evaluation focuses more specifically on how well volunteers/students pass the training activity and whether they learn from it. Evaluation tools need to be developed and scored. If you use a pre-test and a post-test, you will need to have the same evaluation tools completed twice: the pre-test at the beginning of the course and the post-test at the end of the course. Following this evaluation, you can decide to keep the training activity in the inventory or to withdraw it if its content does not correspond to the reality of the target students.

The reality of the target students. This type of evaluation is usually done after the formative evaluation has been completed and after the necessary corrections have been made to the activity. However, some institutions may decide to do both evaluations in the same pilot session but will analyze the results of the summative evaluation carefully.

Discuss with the content experts any changes to the training materials following the pilot session. Validate the changes, if necessary, with a second test run. Pay attention to the participants during the pilot. The information gained will allow you to adjust both the product and its strategic implementation before implementing e-learning on a larger scale in your institution. See **Support tool 8 – Formative and summative evaluation elements in a Pilot Project** (page 28) for a list of items to consider.

- **Train your teachers for their new role with digital education**

First, you will have to familiarize your teaching staff with the different models of e-learning delivery (synchronous, asynchronous, and blended). You will have to give them some time to master the course content, the teaching syllabus, and the technology to be used. You may have to guide your teachers through the course many times to make sure that they are comfortable with teaching it in this new environment. If possible, involve your teachers in the process of designing the e-learning course.

Your teachers must prepare just as well as if they were going to be teaching a traditional classroom course. They must thoroughly master the course content and the teaching syllabus and make sure that the technology is working properly. All of this will contribute greatly to the success of the training activity.

It is also important to check certain things before the course begins, such as access to a technician in case the system malfunctions, the number of learners who will be connecting to the teacher, the composition of this student group, where its members come from, the relationship between this group and the content to be taught, and so on.

Take a creative approach to training your teachers to be versatile coaches who can help students succeed with a variety of training methods

Step 7: Measure costs and benefits

- **Types of benefits to consider**

The main problem you will face in calculating the return on investment (ROI) of e-learning is that some benefits are tangible, i.e., directly quantifiable, while others are more intangible, i.e., difficult to quantify. The profitability of the latter will be difficult to evaluate, and you will have to find a solution to translate them into concrete data.

- **Quantifiable benefits**

Quantifiable benefits fall into the category of reductions in expenses such as transportation, accommodations, meals, teacher's fees, etc.

- **Non-Quantifiable benefits**

As mentioned above, the return on e-learning is not only quantitative but also qualitative. You will notice that it is not easy to quantify the benefits generated in this case. These benefits fall into the category of benefits attributable to, for example, improved overall communication in the improvement of support to the academic community, increased productivity of faculty, etc. You will find that it is not easy to assign a dollar value to such qualitative benefits.

- **Calculation**

There are as many formulas for calculating the return on investment (ROI) of e-learning as firms are specializing in the implementation and development of this new learning method. Some experts suggest that a cost/benefit inventory be drawn up for each stage of the implementation process. This method has the

advantage of allowing you to visualize the phases of the process that generate the best results in terms of Return on Investment for your institution.

To monitor your activities and justify your investments in e-learning, a good Excel spreadsheet can do wonders.

Step 8: Roll out your implementation to the entire institution

■ Deployment Strategies

Below are 3 strategies for deploying e-learning at your institution. If this is your first e-learning project, you can certainly link it to one of the 3 deployment approaches presented. However, if you have several projects already implemented, it would be a good idea to develop a deployment strategy if you do not have one to be able to track all the projects. This will allow you to make the necessary adjustments to the activities to maintain the good reputation that e-learning has acquired as a training method within your institution.

Generic approach

For your very first steps, familiarize yourself with the digital education environment using simple generic modules/programs. This approach will allow you to grasp the basic functioning of the concept and observe the degree of adoption by your students.

Vertical approach

The vertical approach is also ideal for your introduction to the world of e-learning. This approach allows you to do your learning without too much risk. The vertical approach consists of replacing a specific training module/program with an e-learning program. It can also be summarized as presenting a new e-learning program that meets a specific need. This is the small steps approach, targeting one group of students at a time.

Horizontal task approach

This approach consists of addressing a specific task that is specific to several groups/departments/faculties within your institution. For example, it could be a new method of pedagogical engineering of courses and/or programs that systematically includes a technological dimension and that needs to be implemented within certain units. In this way, the e-learning solution can be standardized and widely disseminated.

Once you have successfully taken your first steps in e-learning using one or more of the above approaches, you can consider a more comprehensive implementation.

■ Elements favoring the success of the implementation

Implementing e-learning is not only about introducing it, but also about ensuring that it can be established sustainably. For this training to develop, a considerable number of factors must be considered, such as resistance to change, the effectiveness of the teachers, or the appropriateness of the content throughout its use by the target students. An implementation process can sometimes take place over a relatively long

period. There is no magic formula, but we must pay particular attention to certain elements that will influence the success of this stage.

Box 8. Implementation success factors

- › Provide training sites, schedules, teachers, support equipment, and other required resources
- › Train enough teachers at each training site
- › Appoint an implementation coordinator whose role will be to ensure that the students are properly registered for the e-learning courses, that the teachers are available to run them, and that the equipment needed for them is working properly
- › Take equipment availability and maintenance into account.
- › Provide a knowledge-transfer system

■ Learning update strategies

Finally, revising the training to ensure that it continues to meet the needs of the target students is an important part of the implementation plan. Effective e-learning cannot be said to exist without a willingness and concern to make in-use improvements to the training. The content must be periodically reviewed, updated, pedagogical strategies added or removed, in short, the training must adapt to the changing context of the institution and the needs of the target students.

10. Conclusion

The steps presented in this guide have provided you with the means to promote the smooth deployment of deployment of e-learning within your institution and obtain positive results.

This guidebook is based on specialized literature and is inspired by the winning practices of institutions that are leaders in this field.

It should also be noted that not only is the way people learn changing with e-learning, but also the way training content is designed and delivered. Other stakeholders such as graphic designers, multimedia integrators, and computer scientists are now present in the training design process. The instructional designer must now interact with a greater number of stakeholders than before and must also broaden his or her field of expertise. As for teachers, they must adapt to less traditional roles than before.

Significant challenges lie at the heart of the training function within higher education institutions. Most teaching resources do not have the expertise to initiate e-learning projects in their respective institutions. However, some options can be considered. They can, at first, call upon external consultants to develop the projects and take advantage of the opportunity to acquire some training or experience. They can also gradually retrain and take courses in the field. Several educational institutions now offer short programs in instructional design and multimedia production.

Finally, everyone in the institution is seeing their way of doing things changed by the advent of new information and communication technologies. Decision-makers in the training units must be on the lookout

for new training trends and be proactive in offering training to their students. Teachers will have to adapt their advisory and support role to the technologies used, designers will have to master new processes for designing learning activities, and students will also have to learn how to train themselves using these new technologies. In short, everyone will have to make the necessary efforts to contribute to the successful implementation of an e-learning initiative within the institution.

Appendices

Support tool 1 - Digital education readiness assessment

Pilars	Entry	Emerging	Advanced	Transformative
STUDENT INFORMATION MANAGEMENT				
Digital Skills for Higher education	Students can browse, search, and filter information and data, as well as evaluate, analyze, and manage digital content by organizing and storing it. They can interact, communicate, and collaborate through digital technologies	Students can develop, edit, modify and improve digital content in different formats, as well as understand and respect copyright and licenses.	Students know how to protect devices, digital content, personal data, and privacy in digital environments, and know how to give understandable instructions to a computer system (ex: programming)	Students can identify and solve technical problems with operating devices, they can assess needs, and use digital tools to solve them and resolve conceptual problems and difficult situations in a digital environment
Student Management Information System	Offline management of student information throughout the lifecycle. Ad hoc manual reports from multiple locations to measure student performance	Student information systems provide administrators access to basic information about students	The central student information system provides a comprehensive view of every student's profile, academic performance, attendance, and well-being.	360-degree view of a student from enrollment to graduation. Identify and predict student performance leveraging machine learning and AI capabilities
Alumni data management	Alumni data is not well or consistently kept and gathered information is unstructured.	Alumni data is organized using a data collection tool, but there is no real understanding of the information.	Alumni data is highly organized using a central data collection and visualization solution. Insights on the alumni base can be derived and understood.	Institutions can effectively target the appropriate alumni contacts for events and marketing campaigns using robust insights and intelligence from dynamic data dashboards.
Student Relationship Management	Student recruitment and enrollment efforts are unstructured using little to no marketing tools or channels, and there is no real understanding as to the success of activities.	Student recruitment and enrollment efforts are organized using appropriate marketing tools or channels, but there is no real understanding as to the success of activities.	Student recruitment and enrollment efforts are highly coordinated utilizing a central marketing solution that targets all appropriate channels. Recruitment success is measured and understood.	Institutions can effectively attract and engage students, robust insights and intelligence can be derived from recruitment campaigns and marketing efforts.
TEACHING AND LEARNING				
Learning content	Teaching and learning strategies use basic technology and static content for learning.	Learning content is up to date but delivered on outdated technology and content is slow to be updated.	The academic staff has access to relevant content. Opportunities are available to supplement education with a variety of learning on technology and even industry certification	The academic staff has access to relevant content. Opportunities are available to supplement education with a variety of learning on technology and even industry certification. Content is based on analytics.
Online learning technologies	No online learning technologies are used to engage students in the delivery and assessment tasks.	Online learning technologies are used to engage students in the delivery and assessment tasks;	Online learning technologies are used to engage in the delivery and assessment tasks, and there is an alignment between the learning and	Online learning technologies are used to engage in the delivery and assessment tasks, and there is an alignment between the learning and teaching

		however, there is a lack of alignment between the learning and teaching activities and the assessment tasks.	teaching activities and the assessment.	activities and the assessment. The assessment tasks are designed to take up the affordances of online learning technologies.
Collaboration in Learning content development	Course content and planning are handled by specific academic staff and distributed by hard copy. Most learning content is distributed on paper or in textbooks.	Academic staff can discover and share course content and lesson plans online, however, learning content is stored in multiple online locations.	Academic staff can communicate and collaborate on course content and lesson plans and learning content can be accessed in a central online location on campus or remotely.	Learning content can be accessed in a central online location distributed by professors. Content is contextualized based on analytics about the individual students.
Student centric approach	No immersive experiences, little focus on personalized experiences for learning. Administrators rely on paper records or electronic documents for managing student information throughout the student lifecycle.	No immersive experiences. Administrators have access to a student information management solution which is used to provide the basic functions of managing students throughout the student lifecycle.	Ambition to move to student-centered personalized approaches. Staff can access a central student information management solution, which provides a comprehensive view of every student's profile, academic performance, attendance, and well-being.	Student-centric approach, with effective technology-enabled approaches to support well-being and inclusion (e.g., connecting with student health providers). This capability integrates with appropriate channels, so that information is consistent for all users. Content is contextualized based on analytics about the student.
Professional development	Absence of conducive conditions for professional development on digital education	Learning content is up to date but delivered on outdated technology and content is slow to be updated.	The academic staff has access to industry-relevant content. Opportunities are available to supplement education with a variety of certifications and learning on technology and pedagogy.	The academic staff has access to industry-relevant content. Opportunities are available to supplement education with a variety of certifications and learning on technology. Content is based on analytics.
Mentoring and peer coaching	Absence of mentoring and peer-coaching programs for professional development on digital education	Some mentoring and peer-coaching of digital education can be found. They are ad-hoc or unplanned.	The institution has mentoring and peer-coaching programs for professional development on digital education	The institution has mentoring and peer-coaching programs for professional development on digital education. The teaching staff is also encouraged to be involved in Communities of Practice within the institution and across Higher Education Institution
ACADEMIC RESEARCH				
High-Performance Computing	A small number of IT systems and services are available on-premises, hosted on local servers, and lack	Hybrid architecture for IT systems with limited services automation. Many IT systems are hosted on-premises	Cloud-based architecture with scalable and secure High-Performance Computing (HPC), leveraging the latest	A fully cloud-based environment with scalable and secure High-Performance Computing using the latest

	the necessary computing power for research workloads.	that are unable to scale to meet fluctuating compute demand.	technology and services available on demand. Cloud-based services are billed by consumption, offering efficiencies in procurement, operation, and deployment available through a local reseller	in machine learning and artificial intelligence (AI) technology.
Data Automation, Analysis, and Visualization	On-premises siloed data sets stored on local workstations and servers using flat-file data syncing.	Beginning to aggregate data, pulling from multiple on-premises data sources with simple report authoring.	All institutional data is aggregated in the cloud with the ability to generate modern data visualizations with mobile and automated workflows.	Fully connected systems across the institution collecting data in the cloud using data lake aggregation and IoT data collection. Leveraging the latest in machine learning, artificial intelligence (AI) technology, and predictive analytics.
Digital Sharing of research	No digital sharing of research findings between researchers at the institution or in the research community. Ad-hoc, distributed manually over email or hard copy.	Some digital sharing of research findings within the institution delivered ad-hoc over email or other internal business applications.	Fast and seamless sharing of research data and findings for collaboration between researchers at the institution and across the research community.	Visibility to the latest data trends and continuous access to experts in the field to accelerate research breakthroughs.

INFRASTRUCTURE, CONNECTIVITY AND EQUIPMENT

Integrated and Seamless Security	No identity security, on-premises only, siloed data sets, no DRP, DLP, and no information protection or compliance.	Basic security with identity and access management, device security, hybrid cloud environment (or IaaS), and minimal DRP, DLP.	Advanced identity and access management, device security, information protection, cloud PaaS, advanced security, and compliance, full DRP/ DLP, and first and third-party app access protection.	Advanced identity and access management, device security, information protection, cloud SaaS, advanced security, and compliance, full DRP/ DLP, and first and third-party app access protection.
Mobile & Automated Workflows	On-premises siloed business applications and flat file data syncing.	Connected business apps with limited integration.	Cloud business apps with mobile and automated workflows.	A fully cloud-based environment with automation of data and AI and machine learning capabilities.
Connected Asset Management	No collection of managed cloud services that connect, monitor, and control campus assets.	One or more devices or backend services running in the cloud that communicate with each other.	Device connectivity and management with telemetry ingestion, command, control, and security of all devices.	High-volume device connectivity and management. High-volume telemetry ingestion. Command, control, and security of all devices.

GOVERNANCE (VISION, POLICIES AND PRACTICES)

Vision	Absence of institutional vision that considers Digital education.	Institutional vision focuses ONLY on how digital education support existing	Institutional vision focuses on the need for changes in culture, policies, and practices in	Institutional vision is being studied and emulated by other institutions.
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		learning and teaching practices.	Digital Education-rich environments.	
Philosophy, value & principles	Absence of underlying philosophy for a digital education approach towards learning and teaching.	The underlying philosophy for the digital education approach towards learning and teaching is mainly to involve technologies to enhance learning.	The underlying philosophy for the digital education approach towards learning and teaching is addressing the learning needs of students. Learning outcomes are what decide which, how and to what extent technology could be used.	The underlying philosophy for digital education approach towards learning and teaching is mainly situated in encouraging meaningful learning experiences and offering students a conducive environment allowing for reflection
Reconsidering the role of digital education	Absence of reconsideration of the role of digital education in the institution.	The need for reconsideration of the role of digital education in the institution is acknowledged.	The reconsideration of the role of digital education in the institution is reactive. In other words, it reacts to changing needs of its students and society.	The reconsideration of the role of digital education in the institution is proactive and visionary (anticipating/ pre-emptive) in essence.
Policies and financial planning	Absence of policies and financial planning that support digital education in the institution	Some policies and financial planning that support digital education in the institution are implemented.	Policies and financial planning that support digital education are developed and implemented at all levels in the institution.	There is an alignment of digital education master plan, corresponding policies, financial planning, specific guidelines, and mechanisms that encourage teaching staff to engage in digital education.
Institutional capacities	Absence of institutional structure that leads and supports digital education in the Institution.	A specialized center that leads and supports digital education in the institution is established	A senior leader in the institution structure leads the digital education initiative with the support of the specialized center in the institution.	Strong leadership teams or task force is in place at the institution level to push and oversee digital education implementation with the support of the specialized center in the institution

Support tool 2 - Student characteristics assessment

(Fill in with your institution information)

Questions	Options	Response
What age groups will the digital education target?	18 – 34 years	%
	26 – 35 years	%
	36 – 45 years	%
	46 – 56 years	%
	More than 56 years	%
What are the levels of study targeted by digital education?	Courses	%
	Bachelor	%
	Master	%
	Doctorate	%
What is the gender balance?	Men	%
	Woman	%
What are the varied socio-economic backgrounds of the target students?	Low-income	%
	Low- to middle-income	%
	Middle-income	%
	high-income	%
Why do they take your distance or online courses?	Find a job	<input type="checkbox"/>
	Continuing Education	<input type="checkbox"/>
	Have a degree	<input type="checkbox"/>
	do research	<input type="checkbox"/>
How do they finance their training?	Scholarships and Bursaries	%
	Own funds	%
	Other	%
When will they take the online courses or programs?	Day	%
	Night	%
	Anytime	%
Where will they take the online courses or programs from?	Campus labs	%
	Home	%
	Other	%
What special needs do students have?	Students who are hard of hearing or deaf	%
	Students who are visually impaired or blind	%
	Students with special developmental needs, e.g., Down syndrome, autism, dyslexia, and processing disorders	%
	Students with physical disabilities, e.g., muscular dystrophy, multiple sclerosis, chronic asthma, and epilepsy	%

	Students with special behavioral/emotional needs, e.g., ADHD or bipolar disorder	%
What level of support do students need from your institution, if using the digital education material out-of-institution?	Constant technical and educational support	<input type="checkbox"/>
	Support setting up and connecting	<input type="checkbox"/>
	Support understanding content	<input type="checkbox"/>
	Standby support	<input type="checkbox"/>
What percentage of students have access to the listed devices?	No devices	<input type="checkbox"/>
	Regular phone	
	Smartphone	<input type="checkbox"/>
	Tablet	<input type="checkbox"/>
	Laptop / Computer	<input type="checkbox"/>
What percentage of students have digital competency through the following statements?	Check the source and content of an email before opening an attachment or clicking on a link to avoid phishing and to protect personal data.	%
	Use digital tools to enhance writing, using online collaborative publishing.	%
	Strategically selects note-taking and organizational tools to retain information and learn more effectively.	%
	Plan and implement a research strategy to find out more about a topic for an oral presentation.	%
	in a virtual classroom actively participates in a collaborative project by exchanging ideas with classmates.	%
	Selects an appropriate discussion tool based on the nature of communication (Private or public) to protect the privacy of personal data.	%
	Creates a blog to present a project carried out in class.	%
	Knows how to select, from a range of alternatives, the tool that most closely meets the requirements of a given learning situation, while considering peer needs and preferences.	%
	Discovers professional opportunities by using digital technology to stay informed and interact with others in the field.	%
	Uses a discussion forum to ask a digital community about a problem encountered with a classroom project and builds on the discussion to co-create an innovative proposal.	%
	Assesses the reliability of a statement on a website using rigorous criteria and a	%

	variety of sources.	
	Shares new web-inspired creations online.	%
	Strategically selects note-taking and organizational tools to retain information and learn more effectively	%
	Plan and implement a research strategy to find out more about a topic for an oral presentation.	%
	In a virtual classroom actively participates in a collaborative project by exchanging ideas with classmates.	%
	Selects an appropriate discussion tool based on the nature of communication (private or public) to protect the privacy of personal data	%
	Creates a blog to present a project carried out in class.	%
	Knows how to select, from a range of alternatives, the tool that most closely meets the requirements of a given learning situation, while considering peer needs and preferences.	%
	Discovers professional opportunities by using digital technology to stay informed and interact with others in the field.	%
	Uses a discussion forum to ask a digital community about a problem encountered with a classroom project and builds on the discussion to co-create an innovative proposal.	%
	Assesses the reliability of a statement on a website using rigorous criteria and a variety of sources.	%
	Shares new web-inspired creations online.	%

Support tool 3 – Teachers needs and support

(Fill in with your institution information)

Questions	Options	Response
What skills do teachers need to be successful in distance learning (online)?	written communication skills	<input type="checkbox"/>
	Technological literacy skills	<input type="checkbox"/>
	Time management skills	<input type="checkbox"/>
	Digital assessment and evaluation skills	<input type="checkbox"/>
	Student motivation skills	<input type="checkbox"/>
	Other	<input type="checkbox"/>
What are the main issues about teachers' ability to support learners?	Underpaid teachers	<input type="checkbox"/>
	Underqualified teachers	<input type="checkbox"/>
	Lack of continuous teacher professional development for teachers	<input type="checkbox"/>
	Overworked teachers	<input type="checkbox"/>
	Infrastructure, connectivity, and facilities, especially in rural and remote areas.	<input type="checkbox"/>
	Other	<input type="checkbox"/>
Of all the tasks involved in delivering a distance education course or program, which ones are you most comfortable with?	Analysis of training needs	<input type="checkbox"/>
	Organization and structuring of training content	<input type="checkbox"/>
	Definition of delivery and evaluation methods	<input type="checkbox"/>
	Content development process	<input type="checkbox"/>
	Use of pedagogical strategies in content development	<input type="checkbox"/>
	Courseware development	<input type="checkbox"/>
	Delivery and animation of an online course	<input type="checkbox"/>
	Use of e-learning platforms	<input type="checkbox"/>
What are the tasks for which you feel you are not performing well enough? Why?	Integration of ICT in education	<input type="checkbox"/>
	Curriculum Delivery and Evaluation	<input type="checkbox"/>
	Pedagogical skills	<input type="checkbox"/>
	Application of digital skills	<input type="checkbox"/>
	Organization and administration of a training course	<input type="checkbox"/>
	Continuous professional learning on a personal basis	<input type="checkbox"/>
Describe occasions when your teacher's performance was affected by a lack of training?		
What would you consider to be the most important training needs for your teachers?	Learn to use technology to acquire relevant educational resources.	<input type="checkbox"/>
	Learn to modify collected media resources and design content that meets course standards.	<input type="checkbox"/>

	Learn to use technological means to assess students online and at a distance (e.g., using online quiz tools).	<input type="checkbox"/>
	Learn to use multimedia equipment (such as projectors, electronic whiteboards) to teach.	<input type="checkbox"/>
	Learn to use digital devices (such as cell phones and computers).	<input type="checkbox"/>
	Learn to skillfully use teaching-related presentation applications (e.g., PowerPoint or others) in the classroom.	<input type="checkbox"/>
	Learn how to use the Internet and exploit it skillfully.	<input type="checkbox"/>
	Learn to enrich my teaching methods and strategies through online learning (such as MOOCs).	<input type="checkbox"/>
	Learn to pay close attention to network security, protect my educational and curricular resources from network viruses.	<input type="checkbox"/>
	Learn how to prevent cyberbullying in an online teaching environment.	<input type="checkbox"/>
Ideally, what format should the training take to fit you and your work context?	Audio (Podcast, radio)	<input type="checkbox"/>
	Television	<input type="checkbox"/>
	Internet (Smartphone, tablet, computer)	<input type="checkbox"/>
	Printed	<input type="checkbox"/>
Over the next three years, what will be the major challenges for your institution in terms of distance learning?	Infrastructure, connectivity, and digital equipment	<input type="checkbox"/>
	Effective digital capacity planning and development, including up-to-date organizational capabilities	<input type="checkbox"/>
	Digitally competent and confident teachers and education and training staff	<input type="checkbox"/>
	high-quality learning content, user-friendly tools, and secure platforms which respect e-privacy rules and ethical standards	<input type="checkbox"/>
Does your institution have facilitators or coaches to support teachers?	yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
	We will procure them	<input type="checkbox"/>
What percentage of teachers have access to the digital devices listed below?	No devices	%
	Smartphone	%
	Tablet	%
	Laptop	%
	Desktop computer	%

Support tool 4 - Technical Infrastructure assessment

(Fill in with your institution information)

Questions	Responses					
What percentage of your student sub-groups have access to the internet?	Percentage	High income	Low income	Men	Women	Average
	0 – 20 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	20 – 40 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	40 – 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	60 – 80 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	80 – 100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What is the percentage of internet coverage in various parts of your country?	Percentage	Urban	Peri-urban	Rural		Average
	0 – 20 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	20 – 40 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	40 – 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	60 – 80 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	80 – 100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
What are the bandwidth limitations in different areas of your country?	Bandwidth	Urban	Peri-urban	Rural		Average
	< 1 Mbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	5 Mbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	25 Mbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	50 Mbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	100 Mbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	> 100 Mbps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
What is the mobile cost of data per Giga Bytes from different Internet Service Providers (ISPs)?	Cost per GigaBytes	ISP 1	ISP 2	ISP 3	ISP 4	Average
	\$1–\$2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$2–\$5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$5–\$10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$10–\$20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	>\$20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are various parties planning to invest in further network infrastructure in your country?	ISP 1		ISP 2	ISP 3	Government	Average
	Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What percentage of your campus(es) have adequate infrastructure (e.g., desks, chairs, textbooks, water, toilets)?	Percentage	Campus 1	Campus 2	Campus 3	Campus 4	Average
	0 – 20 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	20 – 40 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	40 – 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	60 – 80 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	80 – 100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What is the percentage of adoption of your learning management system (LMS) by region (if any) (eg., Moodle)	Percentage	Urban	Peri-urban	Rural	Average	
	0 – 20 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	20 – 40 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	40 – 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	60 – 80 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	80 – 100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Percentage	Urban	Peri-urban	Rural	Average	
What is the level of adoption of the official communication and collaboration tool (if any) within your institution (e.g., Teams, Zoom, Webex, Skype, etc.)?	0 – 20 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	20 – 40 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	40 – 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	60 – 80 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	80 – 100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Percentage	Campus 1	Campus 2	Campus 3	Campus 4	Average
	0 – 20 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What percentage of your campus(es) have electricity?	20 – 40 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	40 – 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	60 – 80 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	80 – 100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Percentage	Campus 1	Campus 2	Campus 3	Campus 4	Average
What percentage of your campus(es) have access to the internet? (WIFI)	0 – 20 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	20 – 40 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	40 – 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	60 – 80 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	80 – 100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What kind of network infrastructure equipment need to be replaced or upgraded in the next 3 – 5 years in your campus(es)?	Servers	Database Server	Switches	Routers	firewalls	Wireless access point
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What level of technology access is in all your campus(es) classrooms?	Percentage	1 Teaching computer	1 projector	1 digital camera	1 intercom speaker	Network connectivity
	0 – 20 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	20 – 40 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	40 – 60 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	60 – 80 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	80 – 100 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Support tool 5 – Content readiness assessment

(Fill in with your institution information)

Questions	Options	Response
Which grades do you plan to put on digital education?	1st cycle	<input type="checkbox"/>
	2nd cycle	<input type="checkbox"/>
	3rd cycle	<input type="checkbox"/>
	All	<input type="checkbox"/>
What subjects do you plan to put on digital education?		
In which languages do you plan to offer your courses and distance learning programs?	English	<input type="checkbox"/>
	French	<input type="checkbox"/>
	Local languages	<input type="checkbox"/>
How much of your curriculum is already in a digitized version?	0 – 20 %	<input type="checkbox"/>
	20 – 40 %	<input type="checkbox"/>
	40 – 60 %	<input type="checkbox"/>
	60 – 80 %	<input type="checkbox"/>
	80 – 100 %	<input type="checkbox"/>
What types of digitized content is already available?	Learning material	<input type="checkbox"/>
	Exercises	<input type="checkbox"/>
	Quizzes and assessments	<input type="checkbox"/>
	Other	<input type="checkbox"/>
What formats is the currently available, digitized content in?	Text	<input type="checkbox"/>
	Images, figures, or charts	<input type="checkbox"/>
	Interactive HTML applications	<input type="checkbox"/>
	Videos	<input type="checkbox"/>
	Other	<input type="checkbox"/>
Do you have content that can be used on multiple modalities (e.g., print, radio, television, and online)?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
How similar is your curriculum to that of other institutions?	Very similar	<input type="checkbox"/>
	Somewhat similar	<input type="checkbox"/>

	Not similar at all	<input type="checkbox"/>
What open education resources exist that are aligned with, or can be aligned with your curriculum?		
What new digitized, curriculum-aligned content do you require for each subject and grade?		
Do you have a team of education specialists and content designers to curate and align content?	Yes	<input type="checkbox"/>
	We are in the process of building a team	<input type="checkbox"/>
	No	<input type="checkbox"/>
How much time would it take to prepare all the types of digital content needed, in the various formats needed, for all the subjects and grades, such that they are ready for uploading to digital education?	0—3 months	<input type="checkbox"/>
	3—6 months	<input type="checkbox"/>
	6—12 months	<input type="checkbox"/>
	12—18 months	<input type="checkbox"/>

Support tool 6 - Digital education implementation plan template

(Fill in with your institution information)

BACKGROUND

Digital Education: Definition

Government Policies and Plans

The institutional vision

The purpose and the pedagogical objectives

RELEVANCE OF DIGITAL EDUCATION FOR YOUR INSTITUTION

The Digital Revolution

Innovations and trends in higher education

The growing importance of digital education in higher education institutions

The benefits and advantages of digital education

STATUS OF DIGITAL EDUCATION AT YOUR INSTITUTION

Strengths and opportunities

Challenges and issues

Priorities

STRATEGIES

Roles and responsibilities of key players

Instructional strategies

Delivery modes and modalities

Computer systems and applications

The steering committee

Organization of technical and pedagogical support

IMPLEMENTATION APPROACH

Project Structure

Project Implementation Committee

Milestones and timeline

Implementation of a pilot project

Global deployment

Monitoring and control mechanisms

RESULTS ACHIEVEMENT MEASURES

Evaluation of learning

Return on investment

APPENDICES

Support tool 7 - Engagement Strategies

(Fill in with your institution name)

Institution-wide support can happen in some of the following ways:

- Instructional coaches
- Institution site mentors
- Student-led support
- Workshops for staff development
- Digital resources for self-guided professional development
- Communities of practice

1. Which of the following could be a possibility at your institution?

Use the bulleted list to focus on your institution. You can add ideas from the list above.

-
-
-
-

2. Select ideas from above and share why they would work for your institution's site.

Methods for encouraging buy-in and leadership support can happen in some of the following ways:

- Presentation on the relevance of digital education for your institution
- Educational technology newsletters on the institution's website with links to blogs, websites, and resources.
- Articles on innovations in digital education implementation
- Institutional slogan for online and distance education
- Tech and instructional meetings, open to all who wish to participate within your institution
- Testimonials from students who have taken online courses or programs
- Testimonials from teachers who have built online courses or programs
- Roundtable discussions with an external consultant to help develop the plan and objectives of a digital learning support service within your institution.
- Surveys identifying wants and needs for technical support for students.
- Surveys identify the wants and needs for professional development for teachers.
- Events organized for students and teacher's faculty to demonstrate the valuable teaching methods that take place in a student's program.
- Video of the institution's senior leadership and /or director of teaching and learning endorsing digital education
- Video of teacher union president endorsing digital education.
- Faculty and department tours to demonstrate the benefits of digital education

1. Select from the list above ideas you would like to see at your institution site. Be sure to share additional ideas not listed above.

-
-
-
-

2. Use the space below to plan ways to make your list above a possibility!

Next Steps

1. Brainstorm a list of all who could be involved in helping this plan become a reality.

-
-
-
-

2. Create a “To do” list for what needs to happen next:

-
-
-

Support tool 8 – Formative and summative evaluation elements

(Fill in with your institution name)

Elements		Questions	
		Formative Evaluation	
Technology		<ul style="list-style-type: none"> Did the students experience any technical difficulties that made learning complicated, unpleasant, or impossible? Slow computer performance Slow network response 	
Navigation		<ul style="list-style-type: none"> Did the students have any trouble in finding their way through the various steps or learning paths that they were supposed to follow? 	
Interactivity		<ul style="list-style-type: none"> Was the degree of interactivity satisfying enough to make learning pleasant? 	
Learning environment		<ul style="list-style-type: none"> Did the students have a favorable environment for learning? Times set aside for training Isolated setting, or other usual disruptions. 	
Content quality		<ul style="list-style-type: none"> Was the content suited to their needs? Was the content organized so that it could be fully understood and easily absorbed? (Sequence of activities, appropriate objectives, evaluation tools, etc.) Were the exercises and the task aids clear and did they adhere to the reality of the setting? 	
Support		<ul style="list-style-type: none"> Did the students have access to technicians, content experts, and coaches while they were taking their training? What were their expectations and needs in this regard? 	
Timing		<ul style="list-style-type: none"> Was the content organized so that students could absorb it in small doses, that is, go through a short learning session, then leave off and come back and continue later? 	
Incentives		<ul style="list-style-type: none"> Were the training objectives well understood? What were the incentives or obligations to take this training? 	
Statistics		<ul style="list-style-type: none"> How many people registered for the training? How much time do they spend on it? What percentage dropped out, and so on? 	
		Summative evaluation	
		<ul style="list-style-type: none"> Did the students pass the course? What percentage of the participants passed the course? Could the students' marks have been better? Are the evaluations realistic? Were the volunteers selected properly? Were there any factors that interfered with learning (support, interactivity, lack of feedback, etc.)? Will this e-learning activity be retained or removed? Does the activity need to be reworked for the desired learning to take place? What rework needs to be done to make this activity more effective? (Add theoretical content, spend more time on applied practice, adjust the duration of the activity?) 	

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