Food and Agriculture Organization of the United Nations

E-learning methodologies and good practices

SECOND EDITION

A guide for designing and delivering e-learning solutions from the FAO elearning Academy

FAO elearning ACADEMY

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A guide for designing and delivering e-learning solutions from the FAO elearning Academy

Food and Agriculture Organization of the United Nations
Rome, 2021

About this guide

This guide has been developed to provide guidance, examples and good practices for the design and delivery of e-learning solutions, based on the work undertaken by the FAO elearning Academy over a 15-year period.

The guide has been funded by FAO and the European Union through the Global Network Against Food Crises Partnership Programme.

The document builds on and supersedes the publication *E-learning methodologies – A guide for designing and developing e-learning courses*, which was developed in 2011 as part of the FAO Trust Fund Project: "Improving the abilities of Regional Organizations to develop, implement and monitor food security training programmes", funded by the Government of Germany and implemented by FAO.

Overview

The purpose of this guide is to provide guidance on designing and developing e-learning-based solutions for trainers and instructional designers who are new to e-learning design. The guide also provides basic concepts and information on the processes and resources involved in e-learning development, which may be of interest to human resource (HR) and capacity-development managers.

The content of this guide is based on consolidated instructional design models and learning theories and incorporates more than 15 years of experience of the FAO elearning Academy, including work practices, standards and quality criteria adopted for the delivery of learning programmes and self-paced e-learning courses in development contexts. While there are several definitions of e-learning, which reflect different perspectives, e-learning in this document is defined as follows:

E-learning is the use of electronic devices and Internet technologies to deliver a variety of solutions to enable learning and improve performance.

This guide focuses on courses designed to meet job-related capacity-development goals and targeted professional profiles. Although many of the practices described can be applied to any capacity-development project, this document focuses on the design, development and delivery of activities that are specific to e-learning. Its focus is on e-learning solutions suitable for development contexts characterized by technology constraints, such as limited hardware capabilities and low-bandwidth Internet connections.

Although much of what is covered in this document can be applied to e-learning in primary and secondary school education, these guidelines have been developed mainly for e-learning aimed at adult learners, i.e. learners who have completed their formal education, but who are still motivated to increase their knowledge and competences. Adult learners share some characteristics that are different from those of full-time students, which influence the design of learning programmes. In particular, adult learners:

➜ need to know the benefits of learning (why they should learn something);

➜ like to learn experientially;

➜ approach learning as problem-solving;

➜ learn better when they can see the immediate value and application of content; and

➜ prefer to study at a time, place and pace that is convenient for them.

The guide is divided into four main sections:

Part I
Introduction

**Part I
(chapters 1 and 2)**
provides an introduction to
e-learning characteristics, benefits,
activities and the resources needed to
develop an e-learning project. It mainly targets
training and capacity-development managers and
those who are interested in starting an e-learning
project or integrating e-learning components
into their organization's capacity-development
programmes.

Part II
Designing an
e-learning programme

**Part II
(chapters 3, 4 and 5)**
provides guidance on how to design an
e-learning course (from the needs analysis to the
definition of learning objectives, sequencing, choice
of learning strategies and delivery formats). This mainly
addresses trainers and instructional designers who aim to
create learning projects that match learners' needs by
choosing among different methods and delivery
formats.

Part III
Creating
interactive
content

**Part III
(chapters 6, 7 and 8)**
provides detailed guidance
on creating interactive content
(from the application of learning strategies
and media to courseware development). This
chapter targets instructional designers and subject
matter experts involved in content development,
as well as all those who want to know more
about the methodologies and tools used to
create e-learning content.

Part IV
Managing and
facilitating learning
activities

**Part IV
(chapters 9 and 10)**
provides an overview of online
collaborative learning and learning
platforms used to host online courses. This
is aimed at capacity-development managers,
facilitators and instructional designers who
want to know how to conduct a facilitated
online course and how learning platforms
can support course delivery, knowledge
exchange and communication
among participants.

The guide also includes a **glossary,** a **bibliography,** and a **number of templates, checklists** and **tables.**

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Part I
Introduction

This section reviews the reasons for developing e-learning and provides an overview of those situations in which e-learning can be an appropriate solution. It also discusses the stages of developing an e-learning programme or course, the resources and technology required, the main types of learning solutions and e-learning components and some examples of FAO elearning Academy courses developed with a range of partners worldwide.

1. Getting started

Is e-learning a worthwhile option?

Salim is a manager in a non-governmental organization (NGO). Among its activities, the NGO provides capacity-development on food security to practitioners from several developing countries.

Due to the increasing number of requests for training from different countries, Salim is considering the option of including e-learning in the organization's capacity-development plan. He would now like to know if e-learning is a convenient solution for the organization, and which options exist for combining it with face-to-face training.

This chapter will introduce you to the following topics:

➔ the main reasons for developing e-learning;

➔ e-learning components: e-learning content and social interaction; and

➔ how to combine e-learning with traditional face-to-face training.

1.1 Why develop e-learning?

Many organizations and institutions are increasingly using technology to deliver learning. One advantage for them in using e-learning is its potential for providing a good return on investment. Developing e-learning programmes is actually more expensive than preparing classroom materials or organizing training the trainers' events, especially if multimedia or highly interactive methods are required. However, delivery costs for e-learning (including costs of web servers and technical support) are considerably lower than those for classroom facilities, printing materials, instructor time, participants' travel and job time lost to attend classroom sessions.

Furthermore, while traditional methods can reach a limited number of individuals per year, e-learning can reach thousands of people throughout the world, thereby resulting in a highly cost-effective method in the longer term.

E-learning can reach a wide target audience, including learners who are:

- geographically dispersed, with limited time and/or resources to travel;

- busy with work or family commitments, which do not allow them to attend courses on specific dates with a fixed schedule;

- contingent workers, such as consultants, professionals working part-time, independent contractors;

- located in conflict and post-conflict areas and/or restricted in their mobility due to security reasons;

- limited from participating in classroom sessions due to cultural or religious beliefs;

- facing difficulties with real-time communication (e.g. foreign language learners).

Moreover, web-based learning makes use of existing infrastructure (computers, servers, intranets, etc.) and learners' activities can be managed, tracked and monitored through learning management systems.

E-learning allows flexibility to learn anytime, anywhere. It enables learning to be easily (and cheaply) spread over time, so that it takes place over a longer period, thereby enhancing its effectiveness. Online learners can take e-learning courses from their office, home or any other place where there is an Internet connection. They can benefit from just-in-time learning, by accessing e-learning content at the moment they need it, rather than over fixed dates and periods.

E-learning also allows the use of a variety of instructional methods, the combination of collaboration activities with individual learning, and the personalization of learning paths based on learners' needs.

Quality of e-learning

The quality of an e-learning course is enhanced by:

LEARNER-CENTRED CONTENT: E-learning courses should be relevant and specific to learners' needs, roles and responsibilities in professional life. Skills, knowledge and information should be provided to this end.

GRANULARITY: E-learning content should be segmented to facilitate the assimilation of new knowledge and allow flexible scheduling of time for learning.

ENGAGING CONTENT: Instructional methods and techniques should be used creatively to develop an engaging and motivating learning experience.

INTERACTIVITY: Frequent learner interaction is needed to sustain attention and promote learning.

PERSONALIZATION: Self-paced courses should be customizable to reflect learners' interests and needs; in instructor-led courses, tutors and facilitators should be able to follow learners' progress and performance individually.

The FAO elearning Academy has adopted a series of quality standards for e-learning courses.

Please see the quality checklists in the Tools section of this document.

Can e-learning be used to develop any type of skill?

Training programmes aim to develop different types of skills:

COGNITIVE SKILLS, which involve increasing knowledge and comprehension (e.g. scientific concepts), following instructions (i.e. procedural skills) and applying methods in new situations to solve problems (i.e. thinking or strategical skills);

INTERPERSONAL SKILLS, such as those involved in active listening, presenting or negotiating; and

PSYCHOMOTOR SKILLS, which involve acquiring physical perceptions and movements (e.g. playing sports or driving a car).

How can e-learning address these diverse domains?

Most e-learning courses are developed to build cognitive skills; the cognitive domain is the most suitable for e-learning. Within the cognitive domain, strategical skills may require more interactivity because those skills are learned better 'by doing'.

Learning in the interpersonal domain can also be addressed in e-learning by using specific methods. For example, online collaboration activities or interactive role playing with appropriate feedback can be used to change attitudes and behaviours.

Some questions to ask when considering integrating e-learning into your capacity development strategy include:

- What is the relative cost of face-to-face training and e-learning?
- Is training best delivered in one unit or spread out over time?
- Do participants have access to required computer and communications equipment?
- Are participants sufficiently self-motivated for e-learning or self-study modes of learning?
- Do target participants' time schedules and geographical locations enable classroom-based training?

E-learning can be a good option when…

→ There is a significant amount of content to be delivered to a large number of learners.

→ Learners come from geographically dispersed locations.

→ Learners have limited mobility.

→ Learners have limited daily time to devote to learning.

→ Learners do not have effective listening and reading skills.

→ Learners have at least basic computer and Internet skills.

→ There is a need for developing homogeneous background knowledge on the topic.

→ Learners are highly motivated to learn and appreciate proceeding at their own pace.

→ Content must be reused for different learners' groups in the future.

→ Training focuses on cognitive and interpersonal skills rather than psychomotor skills.

→ There is a need to collect and track data.

Since e-learning is not ideal for all purposes, it is unlikely that it will replace classroom training completely in an organization. An effective application of e-learning may be to complement conventional training in order to reach as many learners as possible.

1.2 E-learning content

E-learning content can be produced for self-paced e-learning, where learners are free to learn at their own pace and to define personal learning paths based on their individual needs. Alternatively, it can be complemented by facilitation, social interaction and online collaboration activities.

E-learning content is usually hosted on a web server, with learners accessing it from an online learning platform. When offered through an Internet connection, there is the potential to track learners' actions in a central database through online registration.

E-learning content is developed according to a set of learning objectives and is delivered using different media elements, such as text, graphics, audio and video.

Some types of e-learning product are mobile-responsive, meaning that they can also be accessed from and properly displayed on mobile devices (tablets and smartphones).

The FAO elearning Academy

elearning.fao.org

The FAO elearning Academy offers more than 350 multilingual self-paced e-learning courses, as a global public good. These cover a variety of topics in the areas of food and nutrition security, social and economic development and sustainable management of natural resources. The FAO elearning Academy is the result of a collaborative effort involving over 200 partners throughout the world. To date, it has reached a global audience of more than 600 000 users worldwide and the courses, initiatives and activities of the FAO elearning Academy are fully aligned with the Sustainable Development Goals (SDGs), as enshrined in Agenda 2030.

The overall objective of the FAO elearning Academy is to strengthen human capital, through the acquisition of knowledge, skills and competences, in order to generate proficient professionals able to face global challenges.

All courses are free of charge. Learners can choose whether to take a course online or download it on their computer. Most of the courses can also be accessed through tablets. Some of
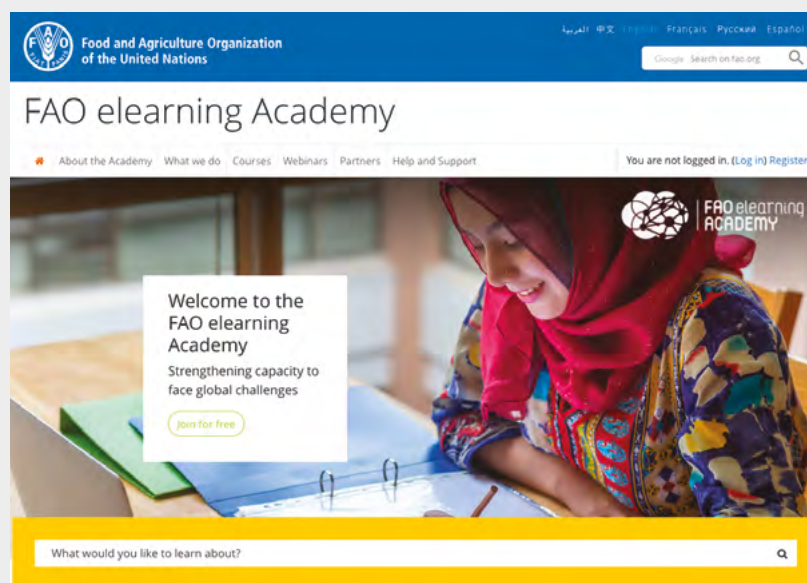
them are mobile-responsive and can be displayed on smartphones.

Courses consist of interactive lessons including text, images, animations, videos and interactions. Different instructional techniques are used, such as storytelling, case studies, examples, questions and practice with reinforcement feedback. Additional resources include links to online resources, recommended reading, job aids and a glossary.

The platform also offers access to technical webinar recordings.

Many courses have a final assessment test which enables certification through digital badging.

Please see more information about digital badges in Chapter 5.4.

1.3 Types of e-learning content

E-learning content includes a range of materials that can be more or less sophisticated in the use of media and level of interactivity. Types of e-learning content can be classified as follows:

Simple learning resources

Simple learning resources are non-interactive resources such as documents, PowerPoint presentations, animated videos, video tutorials and audio files (podcasts). These materials are non-interactive, in the sense that learners can only read or watch content, but cannot perform any other action.

When they match defined learning objectives and are designed in a structured way, these materials can be a valuable learning resource, even though they do not provide any interactivity.

EXAMPLE

Short video

The video *The Principles for Responsible Investment in Agriculture and Food Systems*, targeting private investors in the agriculture sector and the food system value chain, summarizes ten principles for responsible investment.

It also emphasizes the social aspect of the topic, to encourage application of the principles by investors.

You can watch this video at:

🔘 **https://elearning.fao.org/course/view.php?id=626**

E-learning courses

E-learning courses are stand-alone interactive learning materials that correspond to one or more learning objectives by providing explanations, examples, interactivity, questions and feedback, glossaries, etc., in order to make learners self-sufficient in learning new concepts and skills. They can combine several types of media, including text, images, animations, audio and video.

E-learning courses can include one or more e-learning lessons, whose duration should be limited to a maximum of about 30 minutes of learning time.

An e-learning lesson can have a linear sequence, where content is presented in a predefined order; or it can take a branching approach, where learners follow different paths according to their choices.

A range of instructional techniques can be used to create an e-learning lesson.

🖊 **These techniques, as well as guidelines on how to use examples, exercises and media elements, are presented in Chapter 7.**

E-learning course

This e-learning course provides step-by-step guidance on classifying the level of acute malnutrition in a given area, using the Protocols for the Integrated Phase Classification of acute malnutrition.

The course integrates a series of lessons, plus a technical glossary and job aids.

You can see this course at:

🌀 https://elearning.fao.org/course/view.php?id=584

Regardless of the approach selected, there are some typical elements that are generally present in an e-learning lesson. They include:

- introduction: providing the learning objectives for the lesson and an overview of how the knowledge gained from the lesson can be used by the learner (motivational step);

- core content: a set of screens combining text and media elements, examples and practice questions; and

- summary: a short description of the topic covered, or lessons learned, to help the learner memorize the lesson's key points.

E-learning courses often include additional resources, such as downloadable job aids (e.g. checklists, tables), a glossary providing key terms and related explanations, and a bibliography and/or links to web resources, where learners can find out more about the topic.

Simulations and games

Simulations and games are highly interactive forms of e-learning. The term 'simulation' basically means creating a learning environment that simulates the real world, allowing the learner to learn by doing. Simulations are a specific form of web-based training that immerses the learner in a real-world situation and responds in a dynamic way to his/her behaviour. Learning games involve a competitive component, a challenging goal and a set of rules and constraints.

Virtual reality and augmented reality are new and effective ways to realize simulations and games. Virtual reality can be very powerful for simulating human interaction and for practical training in real-world physical scenarios.

Performance support tools

Performance support is informal learning that supports learners in applying existing skills or knowledge. Its use is integrated into the learner's work. It usually provides immediate answers to specific questions, thereby helping users to accomplish job tasks.

Performance support tools can take several forms and be delivered on different platforms (e.g. computer, printed document, mobile phone). Technical glossaries and checklists are a few examples of simple job aids, but sophisticated expert systems can also be developed to assist workers in complex decision-making.

EXAMPLE

Mobile-responsive job aid

This tool is a simple repository of early warning indicators to be consulted when needed, provided in a mobile-responsive format.

It provides bite-sized chunks of information that can be accessed quickly.

It can be linked to a comprehensive course on anticipatory actions for early warning, or used separately.

🌀 **https://rise.articulate.com/share/JPnHDl_tqX_ICwuFoP-8QbUbeil7vA_k#/**
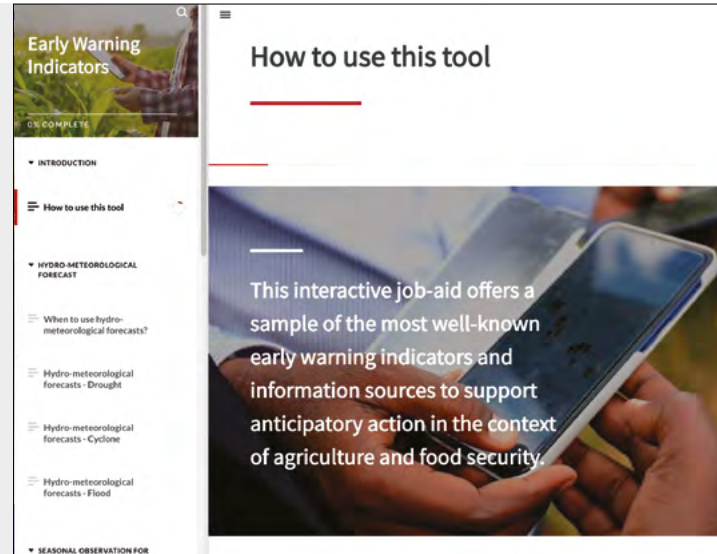
Tests

Tests (also called quizzes, assessments, or knowledge checks) are an essential component of e-learning. They can be integrated into an e-learning course or be provided as stand-alone learning components.

Tests help to assess learners' progress, as well as the effectiveness of learning. They also have the potential to increase learners' engagement and to support the learning process through the provision of personalized feedback.

✈ **Chapter 7.3 provides guidance for developing practice and assessment tests.**

1.4 Online facilitation and social interaction

Social interaction components can be used to complement e-learning content with human and social dimensions. They include:

➜ **E-tutoring, e-coaching, e-mentoring:** these services provide individual support and feedback to learners through online tools and facilitation techniques.

> **Tutoring, coaching and mentoring**
>
> Tutoring is provided by a tutor or facilitator to support learners in completing activities throughout the course.
>
> Coaching is a task-oriented service to support the development of specific skills; it is normally provided by a subject matter expert over a short-term period.
>
> Mentoring is a longer-time service to support future learners' development. For example, it can support the transfer of acquired knowledge and skills to the job context.

➜ **Collaborative learning:** these activities range from discussions and knowledge sharing to working together on a common project or for a common objective. Social software, such as chats, discussion forums and blogs, are used for online collaboration among learners.

- Online discussions are designed to facilitate communication and knowledge sharing among learners. Learners can comment and exchange ideas about course activities or contribute to group learning by sharing their knowledge.
- Collaborative project work involves collaboration among learners to jointly perform a task or an assignment and reach a common objective. Collaborative activities can include project work and scenario-based assignments.

➜ **Webinars and virtual classrooms:** these instructional methods are the most similar to traditional classroom training, as they are live events led by an instructor or a subject matter expert. An instructor teaches a group of learners remotely, and in real time, using a combination of materials (e.g. PowerPoint slides, audio or video materials). A virtual classroom usually includes interactive activities such as question-and-answer (Q&A) sessions, polls, quizzes and group work. Appropriate technology and good connectivity must be in place for both learners and providers.

EXAMPLE

International technical webinars organized by the FAO elearning Academy, Agreenium and UN-ESCAP

A series of international technical webinars is organized by the FAO elearning Academy, Agreenium (l'Institut agronomique, vétérinaire et forestier de France) and UN-ESCAP (United Nations Economic and Social Commission for Asia and the Pacific). These webinars offer an opportunity to share experiences and lessons learned, discuss challenges, and propose innovative solutions and models. They aim to provide a holistic and comprehensive view of current trends in thematic areas related to global challenges, by combining development research and innovation perspectives.

The main objective of these technical webinars is to give practitioners the opportunity to interact with international experts, United Nations officers, university professors, researchers and fellow participants, throughout the world. Webinars can be attended as interactive online sessions on Zoom, where sharing perspectives and asking questions of experts is encouraged.

In the 1.5-hour event, the speakers from different organizations intervene for about 20 minutes, bringing a unique perspective to their presentations. The remaining time is dedicated to an audience survey to gather statistics related to gender, the type of affiliated institution, the country, and a moderated question and answer session.

Prior to the live event, a large-scale promotion is conducted involving the communication officers of partner institutions, to advertise the time and date of the event, explain the scope of the webinar and the issue to be addressed, introduce the speakers, and relay relevant links for further information.

Following the live event, the *Webinars* section of the FAO elearning Academy serves as an archive, where a recording of the webinar, together with the PowerPoint presentations and a Q&A summary, are shared. This enables the audience and those who could not attend the live session to access the webinar package at their convenience.

See the webpage at:
https://elearning.fao.org/course/view.php?id=598

You can find a checklist for organizing a webinar In the Tools section of this document.

Synchronous and asynchronous e-learning

The flexibility of Internet technology creates grey areas around the concepts of synchronous and asynchronous events (Morrison, 2003). For example, video and audio sessions can be recorded and made available for learners who cannot attend a live event.

Synchronous events

take place in real time. Synchronous communication between two people requires them both to be present at a given time. Examples of synchronous activities are chat conversations and audio/video conferencing.

Asynchronous events

are time-independent. A self-paced course is an example of asynchronous e-learning, because it can be studied at any time. E-mail or discussion forums are examples of asynchronous communication tools.

EXAMPLE

Knowledge Sharing Platform on Resilience (KORE)

The webinar *The role of conflict-sensitive natural resources management approaches* was the first of a series on *Sustaining peace* that looked at natural resource management through a conflict-sensitive lens. In the 1.5-hour event, three speakers from different organizations each spoke for about 10–15 minutes, bringing a unique perspective to their presentations. The remaining time was dedicated to a moderated question-and-answer session and an audience survey at the end for feedback.

Here you can see the dedicated webpage that incorporates relevant tags to help retrieve the content. Prior to the live event, this serves the purpose of advertising the time and date, explaining the scope of the webinar and the issues addressed, introducing the speakers, as well as relaying relevant links for further information.

Following the live event, this webpage serves an archival purpose, where the recording of the webinar, the PowerPoint presentations and a Q&A summary are shared. This enables the audience and those who could not attend the live session to access the webinar package at their convenience.

See the webpage at

www.fao.org/in-action/kore/webinar-archive/webinar-details/en/c/1027774/

Facilitated online courses

A facilitated/instructor-led e-learning course is scheduled and led by an instructor and/or facilitator through an online learning platform. It can integrate e-learning content for individual study with an instructor's lectures, as well as providing individual assignments and collaborative activities for learners.

Learners, facilitators and instructors can use a variety of communication tools to work together. These can be both synchronous – if live sessions are planned – such as audio and video conferencing, and asynchronous, such as e-mails, discussion forums and wikis.

The FAO elearning Academy organizes online facilitated courses targeting specific audiences. The following is an example of an online facilitated course using asynchronous communication.
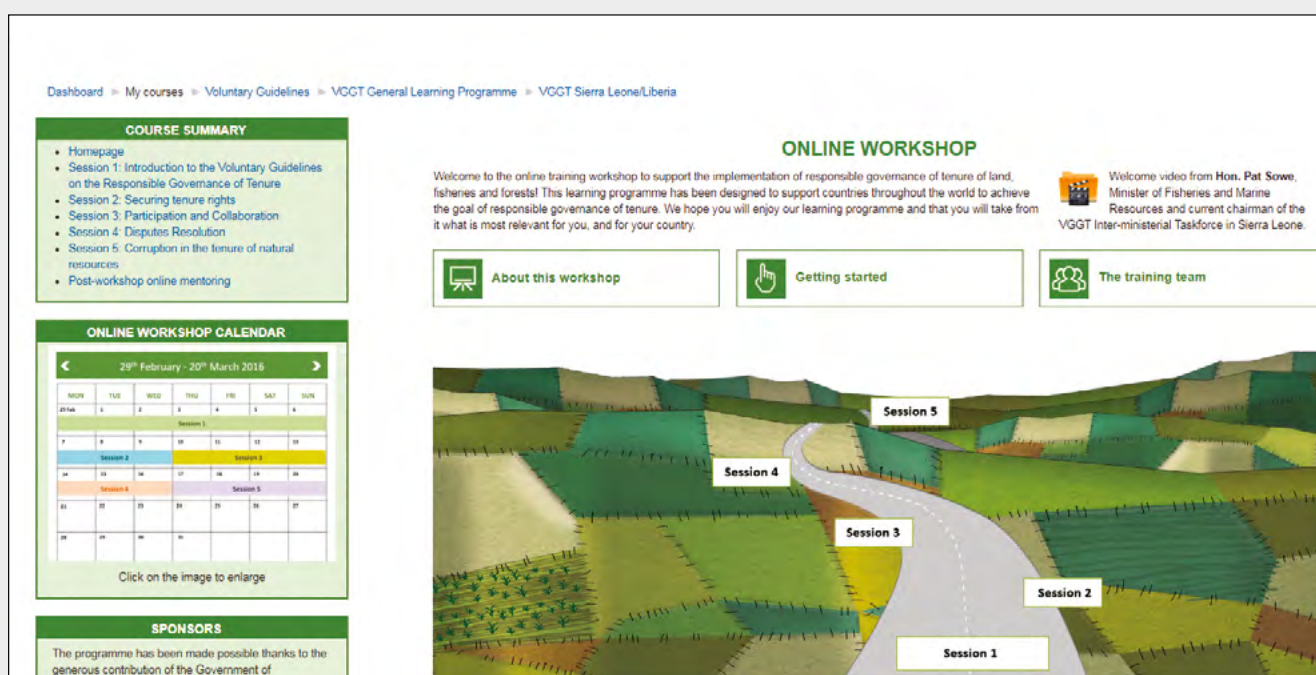
EXAMPLE

FAO online course to support the implementation of responsible governance of tenure of land, fisheries and forests

This online course provides participants with key concepts related to the responsible governance of natural resource tenure and supports them in applying these to their country context. The course adopts a facilitated and collaborative approach, using a combination of learning materials and asynchronous collaboration tools. Activities include self-paced study of e-learning courses, online discussions and collaborative analysis.

Learners have weekly deadlines for activities and assignments, but they are free to schedule study sessions anytime during that week. The course is delivered through the Modular Object-Oriented Dynamic Learning Environment (Moodle), an open-source web-based learning platform.

✈ **Chapter 9 of this document provides guidance on delivering online facilitated courses.**

Massive Open Online Course (MOOC)

A MOOC is a facilitated online course that can involve a large number of participants and is open to everyone.

FAO elearning Academy MOOC

The FAO elearning Academy organizes, supports and delivers free Massive Open Online Courses (MOOCs), working together with a number of partners on various thematic areas, aligned with the United Nations Sustainable Development Goals Framework.

For example, the two-week online course *Forests and transparency under the Paris Agreement* was jointly developed in 2020 by FAO and the United Nations Framework Convention on Climate Change, and funded by the Capacity-Building Initiative for Transparency Trust Fund of the Global Environment Facility.

The course, which is available online in three languages, consists of three core modules addressing three different topics, supplemented by a welcome and a closing module. Within each core module, participants are able to consult online lessons and resources, engage in online discussions with experts and other participants, and prepare for the final test.

The closing module includes two webinars with simultaneous interpretation and a final test, which enables participants to earn a digital badge.

1.5   Blended (face-to-face and online) learning

An effective way of delivering e-learning can be to complement it with face-to-face (F2F) training within the same learning programme. This approach is generally called 'blended learning'.

Blended courses can be defined as a combination of face-to-face with online experiences, to produce effective, efficient and flexible learning (Stein and Graham, 2014).

Below are some examples of blended learning approaches:

Using e-learning before a face-to-face event

An online pre-class event can be used to level the knowledge and skills of learners before the F2F class begins.

For example, the online event can be an assignment. The trainer may review the results of the online session and adjust the programme for the face-to-face class by focusing on knowledge and skills gaps.

Alternatively, the online event can include readings and online discussions. It is important that everyone does the preparatory reading in order to make a meaningful contribution to the online discussion. From the discussion, the trainer can recognize the critical areas for the face-to-face session. The F2F event is much more effective than it might have been, because the participants have come to class with ideas and opinions about the topic (Stein and Graham, 2014).

As these examples highlight, this approach has several advantages over a traditional face-to-face approach: it forces learners to come prepared to the classroom; it enables the design of more efficient classroom activities that are tailored to the specific needs or interests of the participants; and it reduces the total time spent in the classroom, which in turn reduces costs.

To optimize efforts to design and produce e-learning courses, the materials designed for e-learning – including media elements such as videos and infographics, together with textual content – can be reused to create training materials for face-to face sessions.

Using e-learning as follow-up to a face-to-face event

Another approach consists of starting with a core classroom event, followed by online independent experiences that can include, for example, interaction with online resources or e-mentoring services for continuous reinforcement. This approach could be used to develop communities of learners or to engage in further discussions on advanced topics of individual interest.

Using e-learning before and after a face-to-face event

The two approaches previously described can be combined, for example using online events to both introduce and conclude a blended learning programme.

The FAO elearning Academy approach to blended learning

Since 2011, the FAO elearning Academy has delivered a series of blended learning programmes, which are generally aligned with regional or national policy and/or legal frameworks that need to be implemented, or higher-level conventions or treaties to which countries or regions need to adhere.

The overall aim is to strengthen the capacities of targeted professionals and allow them to acquire specific competences, to facilitate the implementation of policy and legal frameworks and decision-making processes, while addressing local and regional-level challenges.

These blended learning interventions are the result of a thorough preliminary multistakeholder and multidisciplinary collaborative learning needs assessment, involving local government and institutions, field practitioners and target audience representatives.

The detailed assessment paves the way for the design of a comprehensive curriculum, targeting specific audiences.

The blended learning programmes provide a continuous learning opportunity over a period of three to six months, through a blended approach, including:

| PRE-WORKSHOP PREPARATION 1 week | ONLINE WORKSHOP 2/3 weeks | BRIDGE PERIOD 3 weeks | FACE-TO-FACE WORKSHOP 2 weeks | E-MENTORING 3 months |

➜ **PRE-WORKSHOP PREPARATION:** Participants are asked to describe their professional role and areas of expertise. This helps facilitators to tailor the activities to participants' profiles and allows participants to understand each other's roles and responsibilities.

➜ **ONLINE WORKSHOP (CORE COMPONENT)**: Participants interact, via a collaborative learning platform, to learn the basic concepts and fundamentals, and initiate a participatory analysis of the country or regional context. In the online component, there is support from a tutor to guide participants' learning experience. Participants are encouraged to use social learning, through blogs and discussion forums, to interact and complete assignments. Performance measurement criteria and assignments are included to assess participants' performance and ensure that they meet the prerequisites for attending the face-to-face workshop.

➜ **BRIDGE PERIOD:** This is a period between the two core components of the course. Online support is provided to participants to help complete their preparation prior to the F2F workshop.

➜ **FACE-TO-FACE WORKSHOP (CORE COMPONENT)**: Based on the performance evaluation, following the online workshop, only successful participants attend a face-to-face workshop. This workshop is designed based on the results of the online activities, with the overall objective of enabling participants to apply the competences acquired in the online workshop, and to jointly develop realistic action plans at national or regional level.

➜ A final online **MENTORING PHASE** completes the blended learning programme. In the mentoring period, learners are encouraged to apply learned skills and share the challenges, doubts and issues that they are facing at country level, with the other geographically dispersed participants. This is known as peer-to-peer support, and the tutor provides mentoring, guidance and advice. In this phase, therefore, participants receive support for implementation of the action plans designed in the face-to- face workshop, and maintain collaboration and dialogue with other participants.

1.6 Case study: FAO blended learning programme

The learning programme below applies the FAO blended learning model previously described.

The context

Between 2012 and 2016, FAO designed and delivered a series of blended learning programmes as a direct contribution to the Global Programme for *Supporting Implementation of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (VGGT).* The overall objective of the project was to support human and institutional capacity development in the field of governance of tenure of land, fisheries and forests, and in particular the implementation of the VGGT at national level.

Within this framework, the blended learning programme **Safeguarding Land Tenure Rights in the Context of Agricultural Investment** was designed in 2016 to support the application of the VGGT by providing technical guidance on how to safeguard tenure rights in the context of agricultural land-related investments.

Overall goal, target audience and structure

The programme aimed to enhance the capacities of government authorities involved in the promotion, approval and monitoring of agricultural investments, and between 2016 and 2020 it was implemented in seven countries in Asia and Africa. In Sierra Leone, the learning programme was delivered between September and December 2016, with 35 participants from Sierra Leone and Liberia.

The learning programme was based on a blended approach, consisting of three interlinked phases, each building on the previous one:

➜ an online workshop comprising 5 sessions over 3 weeks;

➜ an intensive 4-day face-to-face workshop; and

➜ a one-month follow-up online mentoring phase

Critical elements for the programme's success

The learning programme was designed based on the results of a **learning needs assessment undertaken at country level** and conducted at the beginning of the project. This step turned out to be a key element for the success of the programme, because it provided meaningful insights, during the design phase, for localizing and adapting the general design of the programme, and subsequently of the learning materials, to the Sierra Leone and Liberia legal and policy context. This made the learning experience more relevant for participants, who acknowledged in the final evaluation that their knowledge and understanding of the VGGT principles, and in particular their practical implementation, had improved as a result of participating in the learning programme, with its case studies and examples linked to their context.

Another critical element for the programme's success was the **careful participant selection process** that was carried out prior to the training, and

which aimed to ensure the participation of learners who, as part of their job responsibilities, would have the power to introduce changes in administrative rules and procedures, institutional structures, and planning and monitoring tools and mechanisms. In the case of Sierra Leone and Liberia, 35 'change agents', from 10 different government institutions all involved in the promotion, approval and monitoring of the investment process, were selected after a careful screening process.

Follow-up online mentoring phase
Design action pland and implementation of new projects.

Create

Evaluate

FACE-TO-FACE WORKSHOP
Group work exercises aiming to:
- apply the VGGT principles to the country context;
- analyse and identify gaps; and
- critically examine and evaluate the potential actions to be put in place for improvement.

Analyse

Apply

ON-LINE WORKSHOP
E-learning lessons, quizzes, online discussions, context mapping exercises.

Understand

Remember

The design: three interconnected phases

The design of the programme defined three interconnected phases, along the lines of the revised Bloom's taxonomy[1], which includes five levels of learning objectives, each building on the previous one: remembering, understanding, applying, analysing, evaluating and creating.

The learning strategy envisaged learning objectives that initially aimed at the acquisition of knowledge and the comprehension of basic concepts and principles linked to the VGGT. These then moved on to an analysis and evaluation of how such concepts applied to the countries' context, before seeking to identify gaps and solutions to those gaps, and addressing the design of action plans and implementation of what had been learned during the learning process.

In the **online workshop,** participants learned the basic concepts and fundamentals through e-learning lessons and assessed their knowledge through online quizzes. They then started to apply this knowledge to their country context, through context mapping exercises and facilitated online discussions. After the online workshop, only successful participants could advance to the **face-to-face workshop**, in which all group work activities were designed based upon the results of the online activities – in particular the online discussions and context mapping exercises – and where participants applied the knowledge gained in the previous phase to identify potential activities that could improve responsible governance of tenure, and start reflecting on realistic action plans. During the **follow-up online mentoring phase**, participants, under the guidance of the subject matter expert and the facilitator, developed concrete action plans to generate new projects aimed at advancing implementation of the VGGT at country level.

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1   **Bloom's taxonomy** is a classification system used to define and distinguish different levels of performance within the cognitive, affective and psychomotor domains. The one reported here is a revised version of the Bloom taxonomy of the cognitive domain.

How face-to-face activities built on online activities

ONLINE WORKSHOP

In Session 3, participants were asked to carry out a collaborative analysis to identify the roles and responsibilities of their ministry/organization in the agricultural investment process of their country. Participants worked through an online brainstorming tool (GroupMap) and individually contributed to creating a concerted mapping of the ministries/organizations involved throughout the agricultural investment process, and their various responsibilities.

Collaborative work on GroupMap (groupmap.com)

FACE-TO-FACE WORKSHOP

In the face-to-face workshop, the consolidated results of the online context mapping exercise were analysed in greater depth and were discussed in person. From the online mapping exercise, it emerged that not all the areas included in the investment process were covered by a ministry and that in many areas, the responsibilities of different ministries overlapped. The participants took advantage of the face-to-face discussion to identify duplication of efforts and design a process where roles and responsibilities were well and efficiently distributed. This activity also informed the individual action plans that participants drafted on the last day of the face-to-face workshop.

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Action plans and sustainability of results: the new Sierra Leone Investment Approval Process

The combination of all these factors described so far, which underpinned the design of the learning programme, were important in driving impacts and progress on the long-term pathway of VGGT implementation at country level, as a result of the participants' action plans.

In Sierra Leone, for example, the participants saw the need to improve their countries' Investment Approval Process (IAP) and to bring it more closely into line with the VGGT. They therefore committed, in their action plans, to carrying out a participatory review of the current IAPs, both in Sierra Leone and Liberia.

After several months, this process led to the development and national approval of a new IAP in Sierra Leone. This is now being used, and represents an excellent example for neighbouring countries and a best practice in VGGT implementation.

1.7 Mobile learning and microlearning solutions

In certain learning contexts and settings, e-learning resources can be made available on mobile devices (e.g. smartphones, tablets). Mobile learning delivers content in small modular chunks and can be particularly effective and appropriate when learners are in remote areas with poor Internet connectivity, or in cases where they need quick, just-in-time support.

Mobile learning (m-learning) is gaining in popularity in developing countries. As a result of offline apps, mobile learning works in low-connectivity conditions, so it can be considered as a powerful means of opening up learning to all those who might otherwise remain on the sidelines of education (Kukulska-Hulme 2010).

See Chapter 10.4 on mobile learning technologies.

However, it should be noted that although e-learning and m-learning complement each other, they generally require different instructional approaches.

Indeed, the type of learning that is appropriate on a mobile device is different from anything that learners will do at their desk. While e-learning is aimed at developing knowledge and skills, m-learning is primarily intended to be used immediately at the point of need, and often serves as a performance support resource or job aid.

Thus, while e-learning is more suitable for in-depth learning and wider-ranging courses, and allows for more creativity and flexibility in navigation design, m-learning resources are generally tailored to a specific context; they are designed to be delivered in small chunks, and focus on simple and intuitive navigation. Furthermore, while e-learning evaluation is based on traditional measurement standards,[2] m-learning can be measured through its use and correlation to performance, although a comprehensive framework for evaluating mobile learning practices and outcomes is still to be developed.

Examples of m-learning resources include videos, mobile-friendly digital publications, interactive checklists, microlessons, reminders, easy-to-use games and quizzes. Mobile learning can also be used for content creation by learners and to exchange tips and best-practice solutions within communities of practitioners.[3]

Similarly, microlearning is focused on a single topic or learning objective.[4]

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[2] See Chapter 5.3 on evaluation standards.

[3] See Chapter 8.3 about mobile-responsive authoring tools.

[4] See Chapter 7.11 about microlearning.

EXAMPLE

A mobile responsive learning resource for private investors

The mobile-responsive tool *Responsible investment in agriculture and food systems - targeted to the private sector* was designed to address the need of private sector investors to be compliant with the principles of responsible investment.

It includes short, independent components such as an introductory video, a self-assessment tool, a series of short lessons, and a final scenario-based assessment.

You can find this resource at the FAO elearning Academy:

https://elearning.fao.org/course/view.php?id=626
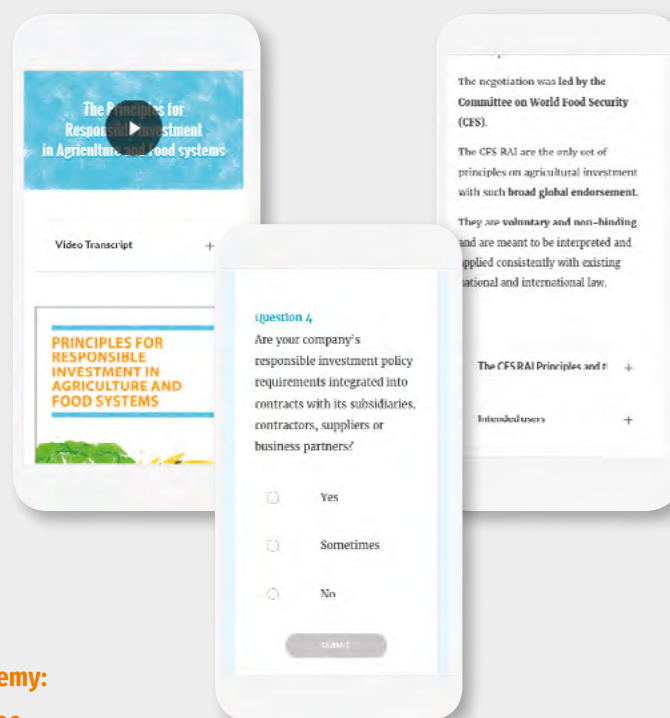
1.8 In summary

Key points for this chapter

→ Many organizations and institutions are using e-learning, since it can be as effective as face-to-face training, and reduces costs.

→ E-learning content can support self-paced learning, where learners are free to learn at their own pace and to define personal learning pathways based on their individual needs and interests.

→ E-learning content can be complemented by social interaction. A facilitated/instructor-led e-learning course, scheduled and led by an instructor and/or facilitator through an online learning platform, can integrate e-learning content with facilitation and collaboration activities.

→ An effective way of delivering e-learning can be to complement it with face-to-face training within the same capacity-development programme (blended learning). In a blended approach, e-learning sessions can be integrated with face-to-face activities, using a variety of solutions.

→ In certain learning contexts and settings, e-learning resources can be made available for learning on mobile devices, such as smartphones and tablets.

2. What is needed to develop e-learning?

What do we need?

Salim, the senior manager, has decided that e-learning is a good option for covering some training needs.

Clara, the training manager, is in charge of initiating and coordinating an e-learning project that will reach hundreds of food security professionals living in different countries around the world.

Clara needs to know the process to follow and the resources required to develop e-learning courses and make them accessible to learners.

This chapter will introduce you to the following topics:

➔ the activities required to design and develop e-learning;

➔ professional roles in an e-learning project; and

➔ the technology needed to produce and deliver e-learning.

2.1 **The activities**

Good design and planning, while crucial for every type of training programme, are even more important for e-learning projects.

E-learning content and activities must be carefully designed before implementation, as less space is given for last-minute adjustments compared with face-to face training. Producing e-learning content may require more resources, so it is important to make sure that the final product meets some quality criteria. In addition, e-learning content can be delivered many times to different learners, and reused in different contexts.

Also, social interaction through online tools must be carefully planned to keep engagement and participation by learners who are not physically present in the same room. Instructions for activities must be very clear and technology must work properly.

Several models have been developed to guide project managers and instructional designers through the process of realizing an e-learning project. In this document we refer to the ADDIE model, which is the best known one and includes five stages: Analysis, Design, Development, Implementation and Evaluation.[5]
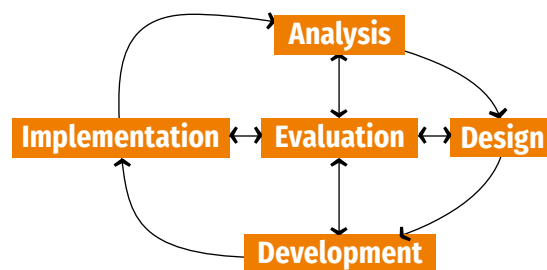
In general, using a model is wiser than proceeding without any plan, but flexibility is needed to select and adapt a model to a given situation. The ADDIE model is not intended to be applied as a rigid procedure, but as a flexible process that instructional designers can adapt to a specific project, using their creativity and competences.

Other models have been developed starting from ADDIE phases. For example, the Agile Project Management (APM) approach emphasizes iteration and openness to change throughout the project, by requesting training to be tested, evaluated and revised during design and development (Torrance, 2019).

Phases of an e-learning project

E-learning projects vary considerably in size and complexity. The process described below is comprehensive – it covers all the options that can be included in a complex learning project and can be applied to both self-paced and facilitated e-learning courses. However, some of the steps can be skipped or simplified according to the project's objectives and requirements, including budgetary, expertise and organizational constraints.

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[5] In its first representations, ADDIE stages were represented in a linear and sequential way. However, since practice has shown the need to go back to previous stages, in a cycle of continuous improvement, the model has also been represented using arrows that indicate feedback between different stages, or putting evaluation as a central stage of the process.

1. Analysis

A needs analysis should be conducted at the start of any development effort to determine whether:

- training is required to fill a gap in professional knowledge and skills; and

- e-learning is the best solution to deliver the training.

The needs analysis enables the identification of general, high-level course goals.

Target audience analysis is another crucial step. The design and delivery of e-learning will be influenced by key characteristics of the learners (e.g. their previous knowledge and skills, geographical provenance, learning context and access to technology).

Analysis is also needed to determine the course content:

- Task analysis identifies the job tasks that learners should complete and the knowledge and skills that need to be developed or reinforced. This type of analysis is mainly used in courses designed to build specific job-related skills.

- Topic analysis is conducted to identify and classify the course content. This is typical of courses that are primarily designed to provide information.

2. Design

The design stage encompasses the following activities:

- formulating a set of learning objectives required to achieve the general, high-level course objective;

- defining the order in which the objectives should be achieved (sequencing); and

- selecting instructional, media, evaluation and delivery strategies.

The outcome of the design stage is a blueprint that will be used as a reference to develop the course. The blueprint illustrates the curriculum structure (e.g. its organization in courses, units, lessons, activities); the learning objectives associated with each unit; and the delivery methods and formats (e.g. interactive self-paced materials, synchronous and/or asynchronous collaborative activities) to deliver each unit.

3. Development

In this stage, the e-learning content is actually produced. The content can vary considerably, depending on the resources available. For example, e-learning content may consist of only simpler materials (i.e. those with little or no interactivity or multimedia component, such as structured PDF documents), which can be combined with other materials (e.g. audio or video files), assignments and tests. In that situation, storyboard development and the development of media and electronic interactions would not be conducted.

The development of interactive e-learning content comprises three main steps:

- content: writing or collecting all the required knowledge and information;

- storyboard: organizing the content into a structure by choosing appropriate instructional methods and creating a storyboard, i.e. an intermediate product where all the components of the final object are defined, including images, text, interactions, assessment tests; and

- courseware: finalizing the product by developing media and interactive components and generating the final version in the required delivery format(s).

4. Implementation
At this stage, the course is delivered to learners. The courseware is installed on a server and made accessible for learners. In facilitated and instructor-led courses, this stage corresponds to the actual delivery of the course to a group of participants, and it also includes managing and facilitating learners' activities.

5. Evaluation
An e-learning project can be evaluated for specific purposes. You may want to evaluate learners' reactions, the achievement of learning objectives, the transfer of job-related knowledge and skills, and/or the impact of the project on the organization.

2.2 The team

"*Design and development of good e-learning is a complex undertaking. It requires content knowledge and expertise in a wide range of areas, including text composition, illustration, testing, instruction, interactivity design, user interface design, authoring or programming, and graphic design. It's rare to find a single person with all these skills, and even when such a person is available, training needs can rarely wait long enough for a single individual to do all the necessary tasks sequentially.***"** (Allen, 2016 p.55).

Creating a team for designing and developing e-learning is a common solution, although some of the roles described in this section could be covered by a single team member. The composition of the team depends on factors such as:

- the size of the project;

- the amount of work outsourced;

- the capacity of team members to cover different roles; and

- the specific media and technologies required.

The roles described below are required to perform the ADDIE model's activities:

➔ **Project manager**
This managerial-level person conducts needs and audience analyses before starting the e-learning project, coordinates all activities and roles in the different stages of the process, and evaluates the degree of transfer on the job and the results for the organization/institution.

➔ **Instructional designers**
Instructional designers (IDs) are responsible for the overall instructional strategy.

They work with managers to understand the training goal, collaborate with subject matter experts (SMEs) to define which skills and knowledge need to be covered in the course, choose the appropriate instructional strategy and support the team in defining delivery and evaluation strategies.

IDs are also responsible for designing specific e-learning activities and materials that will be part of the course, including storyboard development. At this stage, content provided by SMEs is pedagogically revised and integrated with instructional techniques and media elements, which will facilitate and support the learning process. In large self-paced e-learning projects, a lead ID may delegate the design of specific lessons to other designers.

➔ **Subject matter experts**
Subject matter experts are the knowledge keepers. They contribute the knowledge and information required for a particular course. They collaborate with IDs to design a course and define evaluation strategies.

In self-paced e-learning, SMEs can be tasked with preparing the text of specific e-learning lessons, while in facilitated or instructor-led e-learning, SMEs can act as online instructors, leading or supporting online classroom activities. They can prepare and present material, assign tasks to participants and answer their questions.

➔ **E-learning courseware developers and graphic designers**
E-learning developers and graphic designers are responsible for developing self-paced courses. They assemble course elements, develop media and interactive components, create the courseware, and install it on a web server.

Servers/database programmers may be needed to install and configure databases and to collect learners' data.

➔ **Learning management system administrators, online facilitators and tutors**
These are roles involved in the delivery of facilitated or instructor-led e-learning courses. Learning management system (LMS) administrators create the course space in the learning management system, manage learners' subscriptions and provide technical support.

Online tutors and facilitators support participants' learning activities, motivate learners during the course and facilitate and mediate participants' exchanges.

In addition to project managers and team members, other stakeholders need to be involved at different stages of the project. In particular, project sponsors (those who set the goal for the project and allocate resources) should be involved at the start of the project, when resources, tasks, activities and timelines are defined; they are often in charge of providing the final approval for project release.

Representatives of the target audience are also important stakeholders and their involvement in the first stages of the process is crucial to ensure that the course matches the needs of prospective learners.

Areas of responsibility for key roles in the ADDIE process

| ID | SME | | ID | SME | | ID | SME | | LMS Administrator | | ID | SME |

Developers and graphic designers

Tutor/facilitator

SME

| Analysis | → | Design | → | Development | → | Implementation | → | Evaluation |

Project manager
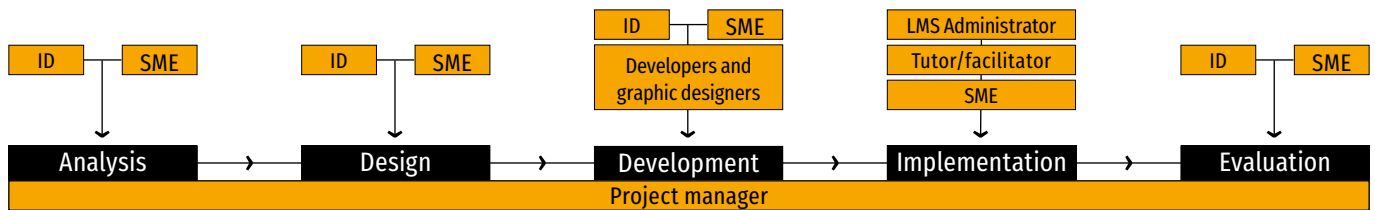
2.3 The technology

Technology is required to produce and deliver e-learning. Digital tools and technologies are used in a variety of ways to support learning, teaching and assessment. A mix of digital learning tools, devices, platforms and applications is making learning more flexible and convenient.

Mobile technologies have proved to be useful for learners travelling in remote locations. Outreach benefits of such technologies are evident for learners living in remote areas and facing limited access to conventional learning.

With the use of authoring tools, organizations can put together different resources into interactive packages formatted in a standardized way to be easily updated, repurposed, delivered and accessed by unlimited numbers of learners.

Some projects may require a learning management system to track and administer learners' activities and manage e-learning content. Learning management systems are efficient administration tools, not only for profiling, monitoring and tracking learners and their progress and behaviour, but also as a central resource repository system for easier updates and cataloguing of instructional materials.

Full featured video conference tools are just one example of how learning experiences are being improved. Skype, Zoom, MS Teams, GoToMeetings, WebEx, Google Hangout, and similar services allow one-to-one, one-to-many and many-to-many working groups to share experiences with one another and interact inexpensively in real time, via PC or mobile devices.

Geographically dispersed trainers and learners can fully explore new virtual experiences thanks to features such as: high-definition video, screen sharing, file sharing, instant messaging and lesson recording. The mixture of audio and visual impact faithfully replicates and emulates natural immersive face-to-face learning.

2.4 Case study: The FAO elearning Academy workflow

The following steps are taken to design, develop and deliver self-paced e-learning courses at FAO and are presented here as a suggested process that could be followed when developing similar courses:

1. Analysis and course design

A learning needs assessment is organized to review the course goal, identify learners' groups and their needs, and define course content by conducting a task analysis. Participants at this meeting include the project sponsor, project manager, instructional designer, subject matter expert and, when the project allows it, representatives from the target audience and other stakeholders.

A smaller group, composed of the instructional designer and the subject matter expert(s), develops a draft course outline to be shared with all relevant stakeholders.

2. Content and storyboard development

If content has to be produced from scratch, subject matter experts are commissioned as content providers for a series of lessons, in their area of expertise. They are also needed to provide glossary terms and a list of resources for each lesson. Content authored by them is peer reviewed by other experts in the field.

If the e-learning course is based on existing training materials, subject matter experts are required to provide suggestions and any additional content needed to adapt existing materials to e-learning.

The instructional designer determines the overall approach and instructional strategy to be used for each lesson, and produces a first draft of the lesson (storyboard). The storyboard is subjected to a subject matter expert review. The expert reviews the storyboards to check that the content has been correctly reworked by the instructional designer.

Graphic layout for the overall course is designed and a first sample lesson finalized for validation by sponsors and relevant stakeholders.

3. Courseware development and delivery

Each lesson is finalized by the graphic designers and courseware developers, through refinement and the addition of multimedia and interactivity components. The instructional designer checks the work of the graphic artists and developers, to make sure that the final product conforms to the instructions provided in the storyboard.

Lessons are then packaged into the course interface, along with the glossary and other resources.

The English version of the course is edited by a mother tongue language editor. Quality control of the course is conducted and the English version is published on the FAO elearning Academy learning management system.

4. Production of language versions

Course text is extracted from the English version and provided to experts to be adapted and translated into other FAO languages. This is followed by integration of the translated text into the course interface for each of the language versions.

2.5 In summary

Key points for this chapter

→ A series of activities are required to develop e-learning. They can be grouped into five main categories: analysis, design, development, implementation, evaluation.

→ The following roles are generally required at different stages of the process (but some of them can be combined into a single job profile): project manager; instructional designer; subject matter expert; e-learning course developer and graphic designer, learning management system administrator, online facilitator and tutor.

→ Technology is needed both to create e-learning material and make it accessible to learners. Some projects may require the use of a learning management or other type of learning platform to track and administer learners' activities and manage e-learning content.

Part II
Designing an e-learning programme

The initial stages of the e-learning project are essential to ensure course effectiveness. Understanding learners' needs, identifying appropriate content, and finding the right mix of learning activities and technical solutions is crucial to creating an effective and engaging course.

Analysis

Implementation ↔ Evaluation ↔ **Design**

Development
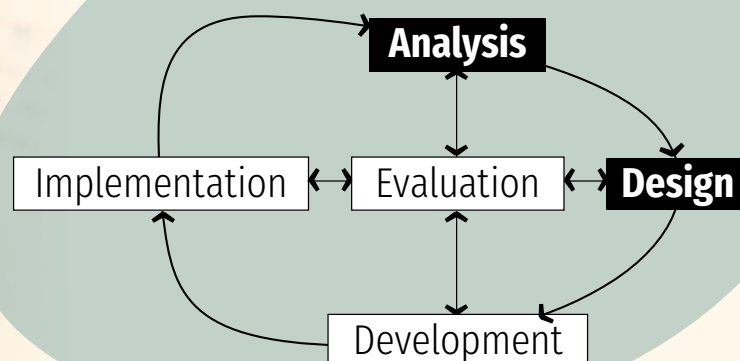
3. Analysing learning needs

Who are the learners?

What do they have to learn?

Clara, the training manager, has organized a frst meeting with the senior manager and the team, to define the content of a course aimed at improving food security analysis.

David, the subject matter expert, observes that there are several important topics that may be relevant. However, not all of them can be covered by a single course, and probably not all of them are really needed.

Richard, the instructional designer, suggests a few methods to prioritize the content, according to the goal and the learners' needs.

This chapter provides guidance on how to identify learning needs. It will introduce the following topics:

➜ reviewing the overall goal;

➜ understanding the target audience; and

➜ carrying out a task analysis.

3.1 What is the goal of the programme?
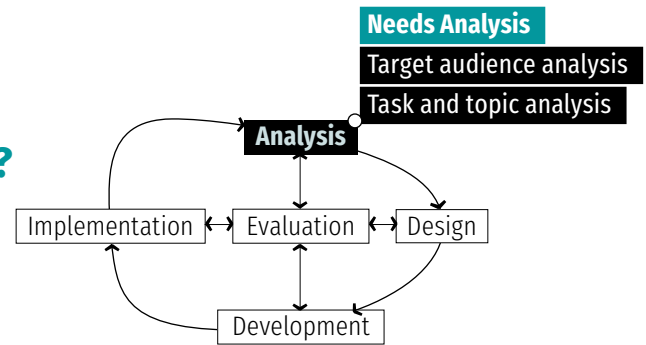
Without a clearly defined goal, it is very unlikely that an e-learning project will achieve its results and justify the required investment.

A needs analysis is crucial to validate the need for an e-learning programme, and to provide important information regarding which gaps need to be addressed and what the overall goal of the programme should be.

Although it often happens that the overall goal is assumed to be well known, it is advisable to formulate this clearly, together with the project sponsor and other relevant project stakeholders, at the beginning of the project.

This initial analysis should answer the following questions:

- What is the organizational problem to be addressed?

- Is training required to fill the gap?

- Is e-learning the best solution to deliver the training?

In fact, there might be several causes of a capacity problem, and an organization's capacity to achieve its goals can be affected by many factors, including:

- factors in the enabling environment: policy and legislative frameworks, rules and norms internal to an organization and political will;

- organizational aspects: the organization's formal and informal incentive and support structures, staff, equipment and finances; and

- individual capacity of people working in the organization to perform their job tasks.

A learning initiative can only help to solve the problem in the latter case, when lack of individual capacity is the issue to be addressed. Moreover, not all individual capacity problems are learning problems, i.e. they are not always due to a lack of knowledge or skills. A common assumption is that if an individual is not performing well, then training or other learning activities are the solution. Frequently, however, performance problems result from a lack of support in the work environment, such as bad data, worn-out tools or poor incentives (de Rosa, 2011).

Also, not all learning problems can be addressed through e-learning. As stated in Chapter 1, it is crucial to understand whether e-learning is appropriate for the learning goals identified.

If an e-learning initiative is considered to be a suitable solution to address the identified performance gap, then the programme goal should be defined around desired performance outcomes (Torrance, 2019). For example, a programme goal could say: 'Food security analysts produce high-quality analysis and report it effectively to policy-makers'.

3.2 Who is the target audience?

Needs Analysis
Target audience analysis
Task and topic analysis

Analysis

Implementation ← Evaluation → Design

Development
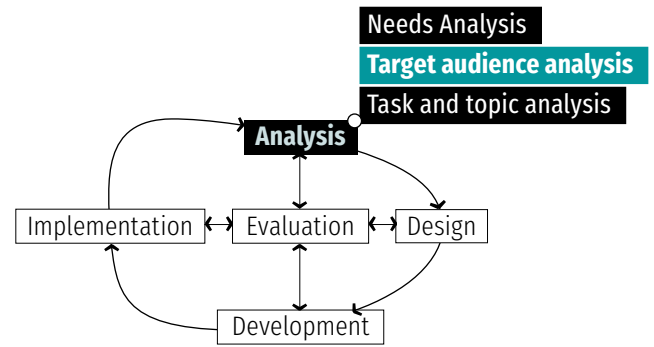
Once we know what we want to achieve through the learning programme, the next step is to focus on the intended learners.

A target audience analysis is needed to identify a variety of factors that will influence the course design. Some of them are presented below.

Factor to be considered	Why is it important?
Region or geographical area in which learners reside.	This is needed to define language and cultural issues and to inform choices between synchronous and asynchronous tools (learners located in different time zones will have difficulty communicating in real time).
Kind of organization or institution in which learners work and their professional role(s) within them.	This will help to identify specific learning objectives for each target audience group.
Learners' previous knowledge and expertise on the subject.	In general, learners with substantial prior knowledge do not need the same kind or level of training support as novices. This regards the technical level and depth of the content, as well as the way that the content is presented.
Learners' computer skills and technical expertise.	This will help to define the complexity of the computer-based interactive activities.
The amount of time available for e-learning and the learning context.	This information influences the amount of content to be provided and the need for grouping the content into small chunks. Knowing the learning context can help to understand whether an e-learning course, microlearning content or performance support tools may be appropriate.
The location where learners will participate in e-learning and from where they can access it. Do they study at home, at work or in e-learning centres? Are they in front of a computer, or do they work primarily on a tablet or a smartphone?	This influences the choice of course format. For example, there could be a need to provide materials offline in a downloadable format, or in a mobile-responsive format that can be properly visualized on tablets and mobile phones.
Network bandwidth.	Bandwidth limitations may slow application performance and reduce user productivity. In certain situations, low bandwidth applications may be preferred, since they take less time to transmit.

3.3 What should the programme cover?

Needs Analysis

Target audience analysis

Task and topic analysis

Analysis

Implementation ↔ Evaluation ↔ Design

Development
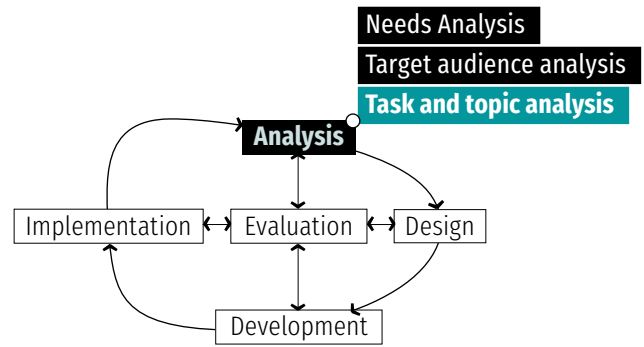
A programme goal, such as 'Food security analysts produce reliable analysis and report it effectively to policy-makers', provides an initial definition of the content and a focus for the course design. Now, how to move from this general goal to a definition of course content and activities?

The fundamental question to ask is: what knowledge and skills should learners acquire to be able to achieve the overall programme goal? In our example, the question is: what knowledge and skills should food security analysts develop, in order to improve the quality of their analysis and effectively present the results to policy-makers?

For programmes designed to build specific job-related skills, conducting a task analysis can be an effective way to identify the knowledge and skills to be addressed, starting from the desired performance outcome expressed by the course goal, combined with available information on learners' previous knowledge.

What is a task analysis?

In the context of instructional design, a task analysis is a detailed analysis of actions and decisions that a person takes to perform a task, which includes identifying the knowledge needed to support those actions and decisions.

What is a task?

A task is a unit of work that is accomplished in order to get a product, provide a service or obtain a result.

A task analysis approach can help designers to:

- create a learning course that is job-centred and addresses different professional profiles;
- focus attention on skills and competences; and
- create case-based scenarios that build on realistic job contexts.

As a result, learners can better integrate the new knowledge into their daily practice.

How does the task analysis work?

The task analysis can involve different steps, for example:

STEP 1:
INVENTORYING TASKS

Identify the tasks that learners should learn or improve in, to achieve the desired performance outcome expressed by the course goal.

For example: What tasks should analysts perform to produce quality analysis?

STEP 2:
PRIORITIZING TASKS

Usually, it is not feasible to develop training for each task involved in a job. From the identified tasks, select those that have priority in terms of criticality, frequency, or organization preference.

These would be the tasks on which to focus the analysis and the development of the learning programme.

STEP 3:
BREAKING UP THE TASKS

Having decided which tasks to analyse further, break down selected tasks into their component parts.

You will need to identify the operations (both observable and mental) required to complete the task.[6]

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[6] See the book *Task Analysis Methods for Instructional Design* by D.H. Jonassen, M. Tessmer and W.H Hannum to learn more about task analysis process and functions and techniques used to perform task analysis.

STEP 4:
IDENTIFYING REQUIRED KNOWLEDGE

Identify the knowledge needed to perform the operations identified in the previous step, and that should be provided as part of the learning programme (Clark, 2007).

EXAMPLE # Task analysis

Let's use our example of an e-learning course aimed at improving food security analysis and promoting its use in decision-making. The course targets professionals involved in the collection, analysis and reporting of food security information.

STEP

1

Inventorying tasks

Discussions with several food security experts and representatives of the target audience reveal that the tasks involved in producing food security information relate to: the selection of assessment methods and indicators; analysis of the collected data; and, importantly, the preparation of effective food security reports to communicate research findings to decision-makers.

Therefore, in this case, the following job tasks need to be performed:

1. Select the most appropriate method to assess food security in a given context.

2. Select indicators for different food security dimensions.

3. Use standardized analysis methods.

4. Produce effective reports for decision-makers, providing them with recommendations based on analysis results.

STEP

2
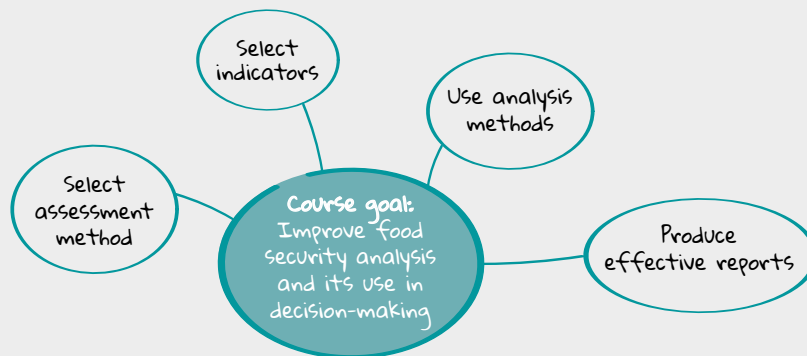
Prioritizing tasks

Given resource constraints, it would not be feasible to develop training for all four of the tasks, so the instructional designers decide to focus on task 4 (producing effective reports), which is considered as the most critical one.

Indeed, the task is important to improve the use of information by decision-makers, and there is evidence that this is not generally performed in a satisfactory manner.

STEP

3
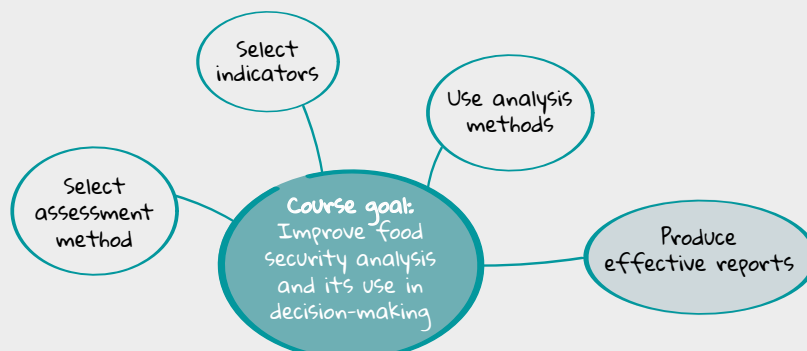
Breaking up the tasks

Next, we need to identify the operations that learners should follow to accomplish the task correctly.

STEP

4
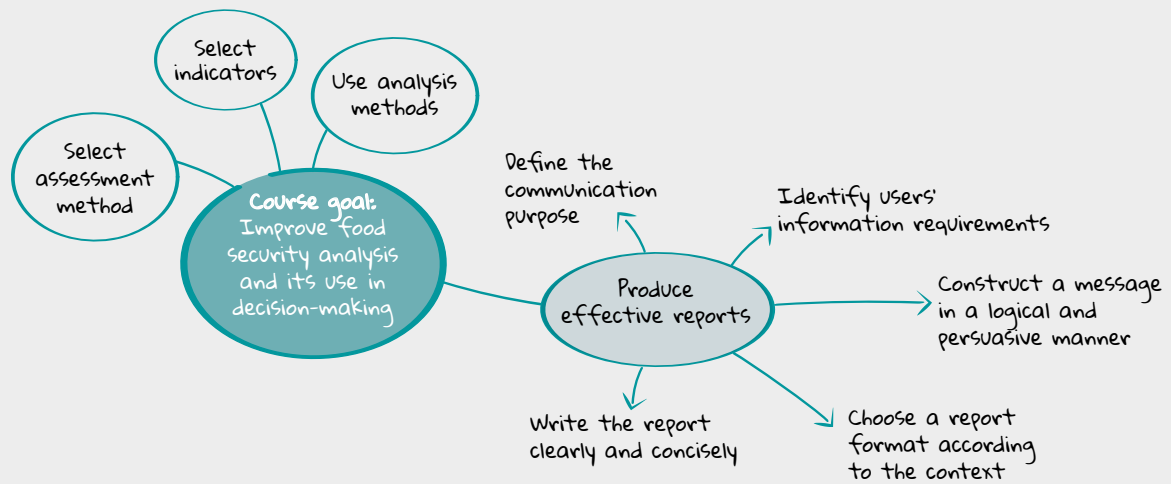
Identifying required knowledge

What do the food security professionals need to know to perform the operations identified?

As an example, let's focus on the component: 'Construct a message in a logical and persuasive manner'.
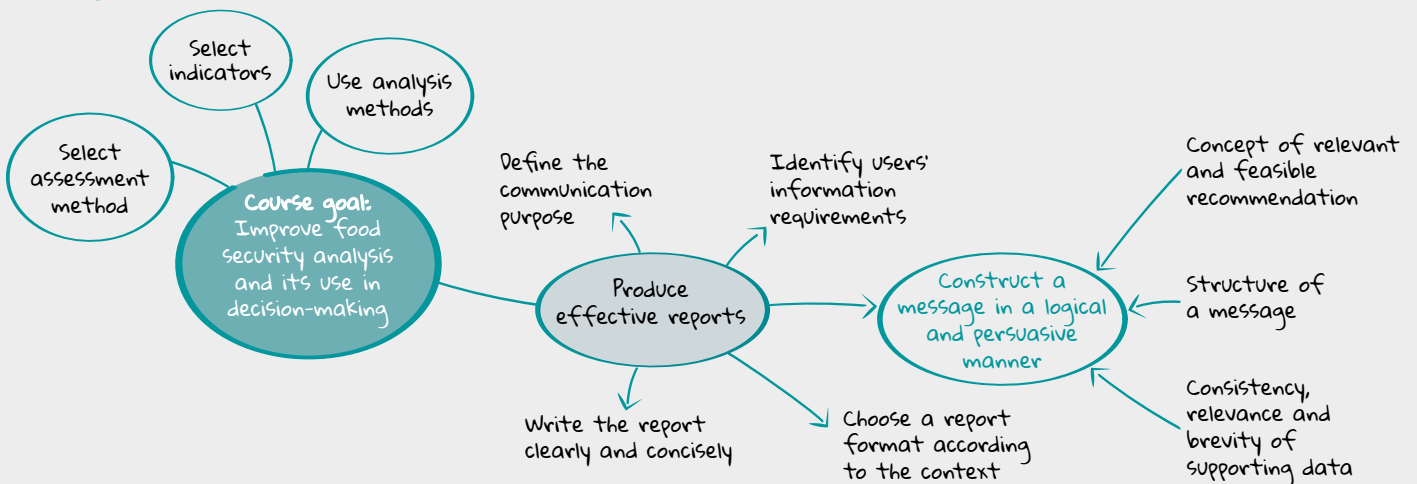
Who should conduct the task analysis?

The analysis should be conducted at the very least by the instructional designer and the subject matter expert. This process helps the instructional designer to become familiar with the content; it forces the expert to work through each individual task and indicate the most important and challenging aspects that should be considered. During this process, both the designer and expert have the opportunity to view the content from the learner's perspective.

Other stakeholders may be involved, including the project sponsor, other organization/institution stakeholders, and especially, representatives of the target audience.

Topic analysis

The knowledge elements identified can be further analysed to recognize connections among them.

This will help the instructional designer to identify topics that will subsequently be organized in a logical structure. It will also increase his or her understanding of the content and prepare for the design phase.

If the course is not job-oriented, the team will skip the task analysis and directly conduct a topic analysis to define the major topics and subtopics for the course.

The appropriate level of detail for each topic is defined based on the analysis of the target audience and/or on the prerequisite knowledge required to access the course (Clark, 2007).

3.4 Case study: Identifying content of a series of e-learning courses on SDG indicators

With its strategic framework broadly aligned with the Sustainable Development Goals, FAO is supporting countries in strengthening their capacities to collect data and monitor the 21 (out of a total 230) SDG indicators for which FAO is 'custodian'.

In 2016, FAO statistics and capacity development divisions started the process of supporting the different FAO SDG indicator teams in developing a series of e-learning courses, with the aim of ensuring capacity development in a coordinated and harmonized manner.

E-learning was selected by FAO as one of the delivery methods, as it makes it possible to:

1. reach a wider target audience and give access to these educational resources to geographically dispersed individuals;
2. increase impact, because once the e-learning resources are developed, these can be delivered in a 'blended' manner, in combination with other methods; and
3. have a greater return on investment.

A one-day clinic was organized to assess the status of the indicators methodology and identify the content of the e-learning courses.

A preliminary analysis of the course target audience groups was conducted, together with their key tasks and knowledge needs. The SDG indicator teams were invited to identify their target audiences and describe them in terms of job responsibilities.
For each target audience group, teams were asked to identify the key job tasks that these should learn or improve vis-à-vis three main proposed functions: Data collection, Analysis, Reporting.

SDG indicator teams were asked to conduct this analysis individually, using a template. The analysis was further discussed and finalized by the teams in the following weeks, with the support of an instructional designer. This process enabled a common, harmonized approach to be adopted in the subsequent development of the e-learning courses. Indeed, although a specific course outline was developed for each indicator course, all of them addressed five main content areas:

1. overview of the specific SDG target and underlying topics;
2. indicator description, how it can be used and interpreted (policy implications);
3. how to collect data (data sources and data collection methods);
4. how to analyse data and compile the indicator; and
5. how to report on the indicator.

All courses shared a similar graphic layout and each was linked to a final assessment to provide certification through digital badging.

All SDG e-learning courses are available free of charge at the FAO elearning Academy
elearning.fao.org

3.5 In summary

> ### Key points for this chapter
>
> ➜ A first step is to develop a clear statement of the goal of the e-learning course.
>
> ➜ The likelihood of developing an effective e-learning course increases when more relevant information is collected on learners (e.g. job profiles, prior knowledge, learning context).
>
> ➜ When a course is job-oriented, conducting a task analysis is a good way to ensure the inclusion of relevant content. If the course is not job-oriented, a topic analysis must be conducted, to clarify relationships among concepts.

4. Organizing your content

How should the course be structured?

Now that the team knows what content is required and which skills should be developed, it is time for them to define specific learning objectives and organize them in a logical structure.

This chapter provides guidance on how to define the course content and organize it into a structure. It will introduce the following topics:

➜ defining learning objectives; and

➜ defining the course sequence.

4.1 Defining learning objectives
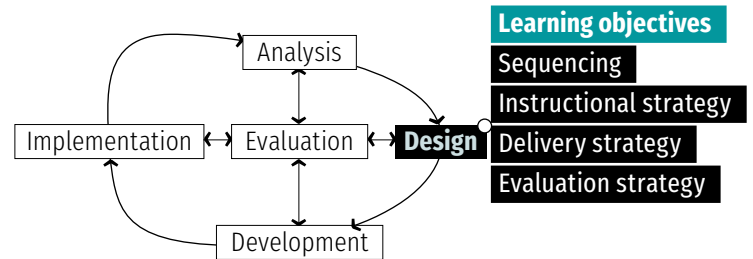
Learning objectives determine the expected outcome of each learning unit. For example, will learners be able to memorize the steps of a procedure, or will they be able to perform it?

What is a learning objective?

A learning objective is a statement describing a competency or performance capability to be acquired by the learner. Objectives should be specified for the course, as well as for each single activity.

Learning objectives combine two main elements:

- the expected level of performance (through an action verb, such as 'describe' or 'explain'); and

- the learning content (i.e. the type of knowledge or skills that must be learned, such as 'the main objectives of a food security information system').[7]

The two taxonomies below can help you to identify the expected level of performance and the type of learning content that you are going to present to learners. This reflection will also be useful in subsequent stages, when you define the best instructional techniques to use in presenting your content, and the assessment and evaluation tests.

Performance levels for the cognitive domain (adapted from Anderson & Kratwohl, 2001)

According to the revised Bloom's taxonomy[8] of the cognitive domain, learning objectives can imply six different types of cognitive performance, ranging from the lowest performance level (remember) to the highest (create).

Remember	The learner is able to recognize or memorize information
Understand	The learner is able to reformulate a concept
Apply	The learner is able to use the information in a new way
Analyse	The learner is able to decompose and define relationships among components
Evaluate	The learner is able to justify a decision according to a criterion or standard
Create	The learner is able to realize a new product or approach

Other taxonomies have been developed for the affective and psychomotor domains.[9]

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7 Learning objectives can also include performance conditions (i.e. the context in which the behaviour will be performed, such as 'orally'); and performance criteria (i.e. how well the behaviour will be performed, such as 'with a maximum of five errors').

8 Bloom's taxonomy is a classification system used to define and distinguish different levels of performance within the cognitive, affective and psychomotor domains. The one reported here is a revised version of the Bloom taxonomy of the cognitive domain.

9 See the Tools section at the end of this document.

Types of learning content	
The following classification[10] identifies six main types of content: facts, procedures, concepts, principles, interpersonal skills and attitudes.	
Facts	Unique, specific information that answers the questions: who, where, when? Facts are shown, exhibited or indicated. Examples: data, lists, historical events
Procedures	A procedure is a series of clearly defined steps, aiming to perform a task. Procedures answer the question: 'How to …?' Example: 'instructions for compiling an Excel spreadsheet'
Concepts	A concept is a group of objects, entities or ideas that: are defined by a single word or term; share common characteristics; differ in unimportant characteristics; require a definition; and answer the question: 'What is …?' Example: the concept of 'climate change'
Principles	A principle (or rule) describes a relationship between two concepts. For example: 'As price increases, the supply increases'. Some principles can be translated into strategic guidelines that can guide decisions and complex tasks. Example: 'guidelines for facing price volatility'.
Interpersonal skills	Verbal and non-verbal skills for interacting with other people. For example, content related to 'negotiating' or 'solving group conflict'.
Attitudes	Predispositions to behaviour. Example: content related to appreciate the 'importance and urgency of adopting measures for limiting the negative impacts of climate change'.

From the task analysis to the learning objectives

By looking at the tasks and related knowledge elements previously identified, it is possible to translate the overall course goal into a series of specific learning objectives.

Let's go back to our task analysis example.

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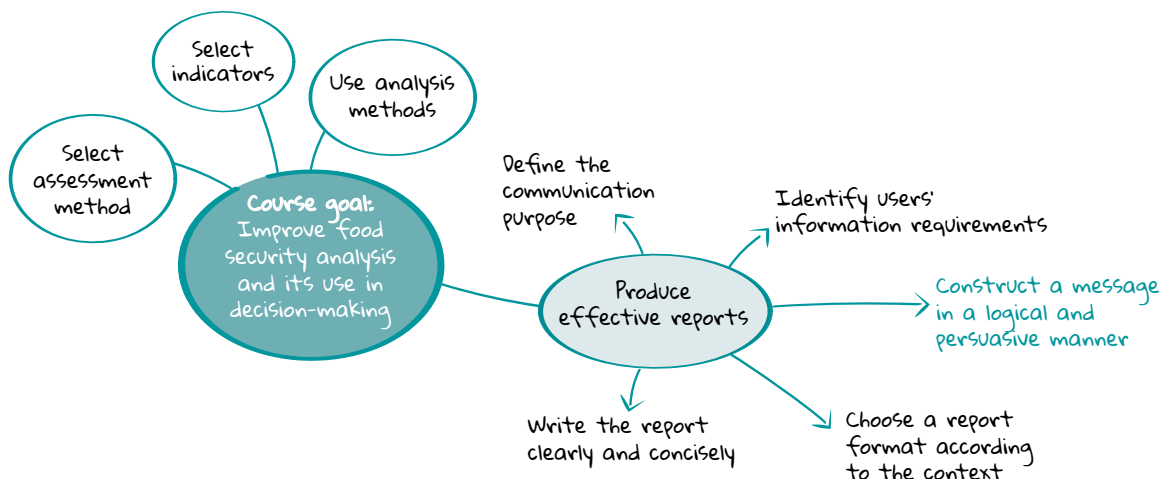
10 A content classification should be seen as a pragmatic tool to support course design. Several classifications have been developed by various authors (such as Horn, Merrill, Anderson & Krathwol, Morrison, Kemp & Ross, Clark), according to specific needs. The one presented here is a simplified version of the classification of Morrison, Kemp & Ross (2001).

One of the operations identified was 'construct a message in a logical and persuasive manner'. Various pieces of knowledge were considered critical for performing this operation, i.e.:

- Which recommendations are relevant and feasible?

- Structure of a message: current situation, problem, questions, response needed.

- Consistency, relevance and brevity of supporting data.
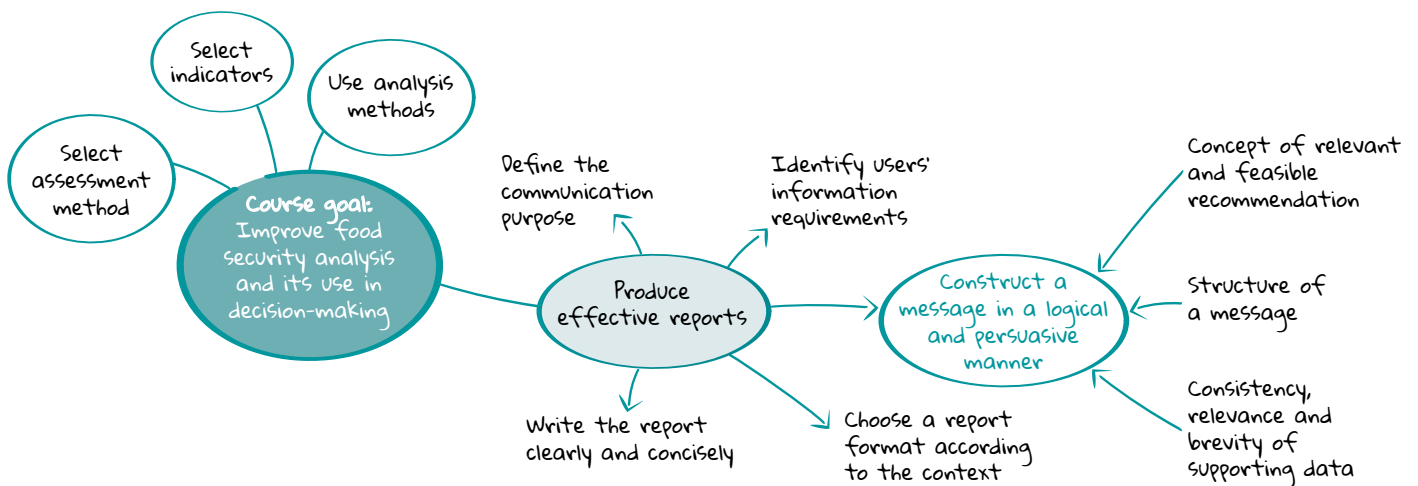
In this example, the higher-level learning objective for a learning unit could derive from the identified operation and may be formulated as follows:

- At the end of this unit, learners should be able to construct a logical and persuasive message.

Other learning objectives, related to the knowledge identified, can support the achievement of the higher-level objective. For example:

- Identify appropriate (relevant and feasible) recommendations.

- Describe the structure of the message.

- Select appropriate (consistent, relevant and brief) supporting data.

As the example shows, it is possible to create a hierarchy among learning objectives by using the results of the task analysis. Lower-level learning objectives are prerequisites for higher-level objectives.

Learning objectives hierarchy
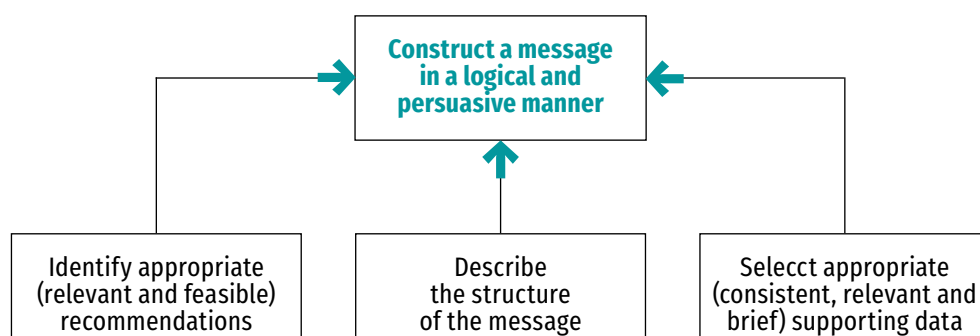
Verifying the alignment of learning objectives, activities and tests

Clear learning objectives enable the development of learning activities that are truly focused on learners' needs, and provide the basis for evaluation tests.

It is important to ensure that learning activities and evaluation tests aim to develop and assess the same type of performance and learning content as expressed in the learning objectives; in other words, they need to be aligned with the learning objectives.

For example, if the learning objective is to 'understand the main components of a food security information system (FSIS)', the course designer should adequately illustrate the FSIS concept and develop tests to assess the learners' understanding (not only memorization) of that concept, as shown in the table below:

	Learning objective: Learners will understand the main components of an FSIS	**Learning activity:** After reading the definition of FSIS, learners will look at two examples of an FSIS and will identify their main components	**Test:** Learners will describe the main components of their own country's FSIS.
Remember			
Understand	■	■	■
Apply			
Analyse			
Evaluate			
Create			

4.2 Defining the course sequence
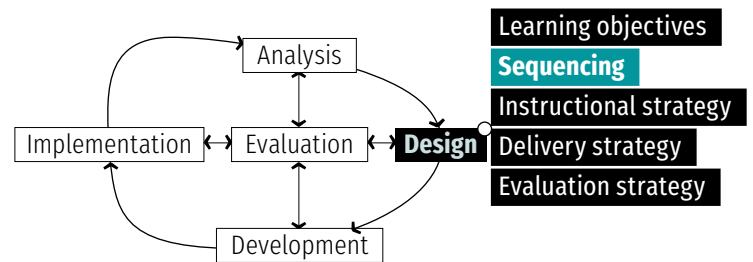
How should the learning objectives be sequenced when structuring a course?

One of the methods used to define the course sequence is the prerequisite method. This method uses a learning objectives hierarchy, first teaching those skills that seem to be prerequisites for all other skills.

Thus, for example, our e-learning unit on constructing a logical and persuasive message could be structured as follows:

Constructing a persuasive message

Main learning objective:

- Apply criteria to develop a logical and persuasive message

Second-level learning objectives:

- Identify appropriate (relevant and feasible) recommendations
- Describe the structure of the message
- Select appropriate (consistent, relevant and brief) supporting data

Learning steps:

- Introduction
- What is a relevant and feasible recommendation?
- Components of a message
- Supporting data
- Build your message (exercise)
- Conclusion

Other sequencing methods

There are several other methods that can be used to organize and sequence the content, and different methods can be integrated to design the best structure for your course. Some of these other methods include the following:

➜ In a job-oriented course, the content can be organized to follow the order of the actions in the real job environment.

➜ In a non-job-oriented course, concepts can be organized according to their structural connections, such as by:

- describing the characteristics of a class before describing its members;

- providing examples first, then definitions; or

- starting with concrete or simple information, and then proceeding to abstract or complex concepts.

➜ If learners' profiles (e.g. general characteristics, job profiles, educational background) are well-known, concepts that are most familiar to learners can be presented before those that are far removed from learners' experience.

➜ The curriculum can start with a more general overview, then focus on specific topics, and at the end go back to the general conclusion.

➜ The curriculum can revisit the basic ideas, repeatedly building on them until the learner understands them fully.

The outcome of sequencing is a course structure where each element corresponds to one or more learning objectives and contributes to achieving the overall course goal.

Personal learning paths

Developing the course using a modular approach enables the definition of a number of personal learning paths that respond to different individual interests and learning needs.[11]

The task analysis helps to establish a connection between learners' needs and specific course elements. This enables learners to select a subset of sessions within the main course.

Entry tests or task-related questions can be submitted to learners to help them identify the right subset of relevant course elements.
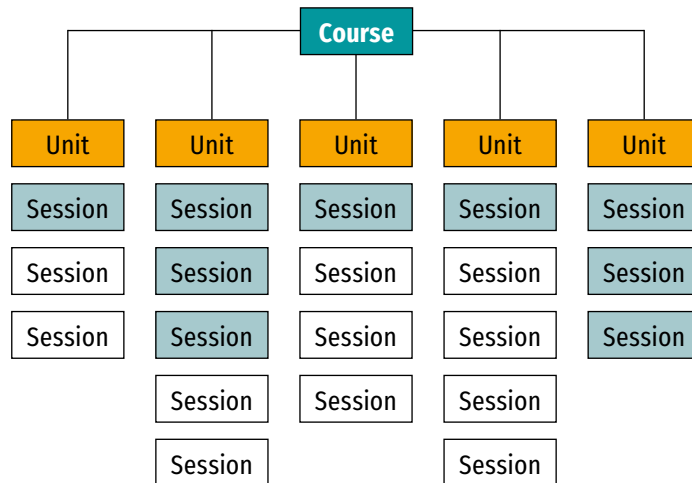
4.3 Case study: Structuring an e-learning curriculum

The following case study shows how a course outline was developed using the results of a task analysis.

A consultative workshop entitled *Capacity development on Nutrition and Food Systems* was held at FAO in 2015.[12] The workshop brought together 44 experts and representatives of the target audience from 31 organizations to assess learning needs for a series of courses to support capacity-development for designing, implementing, monitoring and evaluating nutrition-sensitive food and agriculture policies and programmes.

Prior to the workshop, a team of two subject matter experts and one instructional designer had developed a draft task analysis, which was then revised and completed by workshop participants.

Participants were divided into subgroups to discuss the learning needs of three different target audience groups: policy formulators, investment planners and programme designers and managers.

For each target audience group, some general functions were identified.

For example, for programme designers and managers, the following four functions were pinpointed:

➜ **Function 1:** Assess political and nutritional context

➜ **Function 2:** Programme design

➜ **Function 3:** Programme implementation

➜ **Function 4:** Demonstrate impact

---

11 A modular curriculum is made up of standardized units that can be separated from each other and rearranged or reused.

12 The workshop was organized by FAO with the support of the Improved Global Governance for Hunger Reduction programme, funded by the European Union and the Bill & Melinda Gates Foundation.

©FAO

Within these functions, specific tasks that policy formulators should perform to implement nutrition-sensitive policies were defined and linked to the required knowledge and skills.

A similar analysis was conducted for each of the target audience groups.

At the end of the workshop, a discussion was held about the curriculum framework.

After the workshop, the subject matter experts and the instructional designer analysed all the tasks and knowledge identified for the different target audience groups, and organized them into a series of learning objectives, which were sequenced as summarized in the diagram below.

**BASIC
KEY CONCEPTS**

Course 1

Nutrition,
food security and livelihoods:
basic concepts

Course 2

Improving Nutrition through
agriculture and food systems:
why is it important?
What does it imply?

**POLICY/PROGRAMME
CYCLE**

Course 3

Assess the institutional and legal
framework for nutrition

Course 4

Nutrition situation analysis

Course 5

Design, implement and monitor
nutrition-sensitive policies
and programmes

Considerations on sequencing

The two first courses (1 and 2) provide basic concepts as common prerequisites for all the other units of the course (i.e. the prerequisite method).

The next three courses (3, 4 & 5) follow the order of the actions in the real word. They address the different nutrition-related steps/activities to be performed along the policy/programming cycle, at both programme and policy level.

More specifically, courses 3 and 4 cover different aspects of the analysis stage, while course 5 addresses the main activities to be included in the design, implementation and monitoring of nutrition-sensitive policies and programmes.

An outline document was produced and subsequently used by the authors as guidance for developing lesson content.

EXAMPLE

Extract from the course outline

In order to assist authors in formulating and developing learning content, the course outline provides details and guidance for each lesson as follows:

Lesson learning objectives describe the knowledge and skills that the learners will have acquired by the end of the lesson.

Learning steps indicate the topics that are covered in the lesson.

Scope notes for each learning step provide advice to authors on the information to include and the topics and concepts to be developed in detail.

Resource pointers for each lesson provide additional sources of information, which may be useful to both content authors and learners.

Lesson 3.2: Assessing the existing institutional and legal framework for nutrition

Learning objectives

At the end of the lesson, learners should be able to:

- Identify the institutional arrangements and key actors for nutrition in their local context

- Identify opportunities for collaboration with existing policies, programmes and legal framework relevant to nutrition in their local context

Notes for the author

This lesson will look at how to assess the enabling environment for nutrition (institutions; coordination mechanisms; policies, programmes and legal framework in place...).

Make a reference to the global institutional arrangements in Module 2 Lesson 6.

Learning steps	Scope notes for the author
Governance schemes relevant to nutrition	Assess the major institutions and stakeholders related to agriculture, food systems and nutrition at different levels (local, national and regional level). Examples of different types of institutional arrangements for nutrition that promote multi-sectoral work
What policies/programmes/ legal frameworks exist in support to nutrition	Assess what policies, programmes and legal framework related to agriculture, food systems and nutrition, at different levels are the most relevant

Resources [To be expanded]

Global Panel on Agriculture and Food Systems for Nutrition, Technical brief How can agriculture and food system policies improve nutrition? November 2014. www.glopan.org/sites/default/files/Global%20Panel%20Technical%20Brief%20Final.pdf

REACH stakeholder mapping.www.reachpartnership.org/web/94591/toolkit/stakeholdermap

FAO Food Security Commitment and Capacity Profile (FSCCP). www.fao.org/economic/esa/publications/details/en/c/243084/

HANCI. www.hancindex.org/

REACH facilitator toolkit: www.reachpartnership.org/documents/312104/377b09bd-d84c-445a-a35b-946502feaa9b

FAO Plataforma para la seguridad alimentaria y nutricions *(Latin America)*. http://www.plataformacelac.org/

The State of Food Insecurity in the world (SOFI). 2014. Definition of an enabling environment for Food Security and Nutrition. www.ids.ac.uk/idspublication/fighting-maternal-and-child-malnutrition-analysing-the-political-and-institutional-determinants-of-delivering-a-national-multisectoral-response-in-six-countries

Hoddinott, J.; Gillespie, S.; Yosef, S., 2015. Public-Private Partnerships to Reduce Undernutrition in Developing Countries: Evidence and Ethics. Draft paper

FAO e-learning course: www.fao.org/elearning/#/elc/en/course/F2 (Lesson 2: Institutional context)

4.4 In summary

Key points for this chapter

➜ A learning objective is a statement describing a competency or performance capability to be acquired by the learner.

➜ Defining learning objectives clarifies expectations about outcomes from learners.

➜ Objectives should be specified for the course, as well as for each single activity.

➜ Learning objectives and relevant topics are organized in a logical structure, using various sequencing methods.

5. Defining delivery, instructional and evaluation methods

Are we providing a self-paced course or an online workshop using online communication tools?

Are we using synchronous or asynchronous communication tools?

Once the objectives have been defined, it's time to decide how the course will be made accessible to learners.

Clara, the training manager, is concerned about development time and budget constraints. The team is also aware that there are some technology issues to be addressed.

This chapter provides guidance on how to make decisions about the overall course design. It will introduce the following topics:

➜ delivery formats;

➜ instructional methods; and

➜ evaluation methods.

5.1 How to deliver the learning?
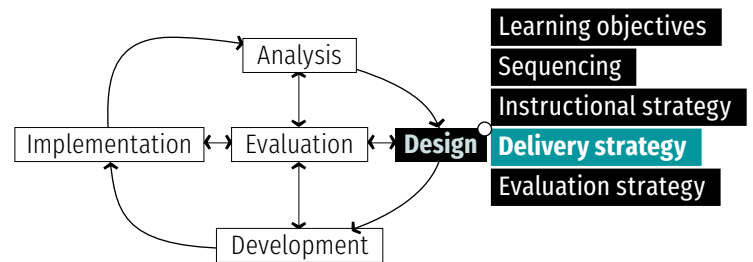
The choice of delivery format for a specific course is linked to the type of instructional method selected (discussed in the next chapter), as well as to factors related to learners' characteristics, technological and organizational constraints (e.g. budget), and the time available.

Learner-related factors

The following are important factors to consider about learners:

Learners' comfort with delivery channels
Audio and video conferencing (i.e. synchronous e-learning) make it easier to develop a social presence and can enable more spontaneous exchanges to be generated. However, time limitations mean that not everyone can be available to participate all the time, especially in large classes and if there are dominant personalities. Also, audio and video conferencing can be frustrating for non-native language learners. Conversely, everyone can participate in asynchronous discussions and forums.

Learners' level of technical expertise
If they have only recently experimented with e-mail, learners may have difficulty working with whiteboards and video conferencing. It is important to consider how much technical support can be offered to them.

Learners' available time
In general, asynchronous learning allows more flexibility regarding time management. Learners can take lessons and contribute to discussions at the time that is most convenient for them, and review materials as often as needed. If learners are busy, are in different time zones, or cannot conform to rigid schedules because they can only access a shared computer during certain hours, asynchronous tools may be preferable. Also, carefully designed self-paced material may be shorter and more concise than a presentation given in a live session (Stein and Graham, 2014).

Technology aspects

The capacities of learners' computers, as well as their infrastructure and connectivity, need to be considered before making any decisions on technology.

Understanding whether learners have easy access to network systems is crucial when deciding on the delivery format. Being aware of bandwidth limitations is particularly important. In the event of limited Internet access, for example, it may be necessary to provide materials offline in a downloadable format, or to deliver training through mobile technology. In this latter case, a mobile-responsive format – which can be properly visualized on tablets and mobile phones – may need to be adopted.

It may also be important to consider what kind of computers and software programmes learners use, especially when creating e-learning courses in development contexts. Technical requirements, including multimedia capabilities, influence the selection of the media mix. However, it should be noted that using several different media tools does not necessarily improve the

effectiveness of an e-learning activity. Good instructional design is more critical to achieving learning effectiveness than using sophisticated multimedia effects.

If delivery on mobile phones is considered, you may want to collect information about the type of smartphone used by participants, and the data plan that they have agreed with the telephone company.

Organizational requirements and constraints

A range of organizational requirements and constraints, such as the time and budget available, will influence the choice of delivery formats.

Developing self-paced learning will generally require more time than preparing a virtual classroom. When instruction needs to be provided in the least amount of time, a series of large virtual classes may be the best solution. Investing in the development of a self-paced course makes sense to meet long-term training goals, rather than immediate, urgent training needs.

However, it is important to bear in mind that development costs for interactive content have dramatically declined due to the development of new authoring tools. Moreover, e-learning materials can be reused several times in different versions of the same online course, or as components of different online courses.

Knowing the number of learners and how many learning events are planned in the future is therefore important in assessing the cost impact.

If planning a facilitated course, the organization must have appropriate resources to ensure facilitation and subject matter experts' support throughout the course.

Using a learner management system can be a valid option for the organization, if there is a need to track learners' activities by following their participation and performance, for example their contributions to online discussions, use of learning materials and online evaluation test results.

Good practices

By making use of asynchronous and synchronous learning and collaborative tools, it is possible to define e-learning solutions that match specific needs. Some good practices include:

➜ **Combining structured and ad hoc solutions**
For example, an extensive curriculum on food security analysis can be developed as a stand-alone course, while short virtual workshops can be used to illustrate updates to a methodology or guidelines, to address a recently emerged problem.

➜ **Localization**
If you have a diverse and geographically dispersed learner group for which translation and cultural adjustments are required, you might decide to develop a large self-paced e-learning course in English for all learners, followed by virtual classes in the local language to deal with local issues, challenges related to the environment and context, and cultural differences.

➜ **Allowing downloads**
Even in contexts with highly developed infrastructures, learners do not have continuous access to the Internet. They should be able to download online content and work on it offline.

5.2 Defining instructional methods
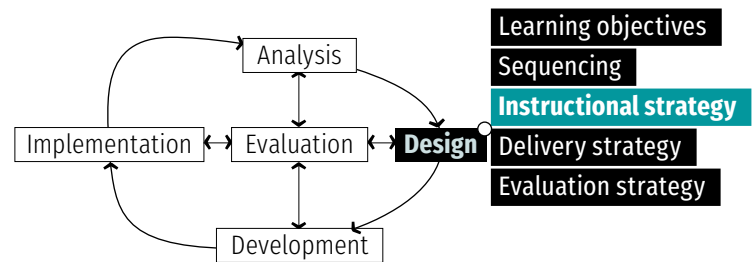
As with traditional face-to-face training, any e-learning programme will probably use a combination of different instructional methods. These can be grouped into three main categories:

Expositive methods – which emphasize the 'absorption' of new information. Expositive methods include presentations, case studies, worked examples and demonstrations.

Application methods – which emphasize the active processes that learners use to perform procedural and principle-based tasks and build new knowledge. Application methods include the demonstration-practice method, job aids, case-based or scenario-based exercises, role play, simulations and serious games, guided research and project work.

Collaborative methods – which emphasize the social dimension of learning and engage learners in sharing knowledge and performing tasks in a collaborative way. They include online guided discussions, collaborative work and peer tutoring.

Each method can be delivered in different formats, using different types of media and communication tools. For example, a presentation can be delivered as a PowerPoint file or as a recorded (or live) video presentation. An online discussion can be conducted in a discussion forum or through a Skype call.

Since it is very likely that an e-learning project will use a blend of asynchronous and synchronous formats, the different instructional methods are presented below, with their corresponding asynchronous and synchronous delivery formats.

Expositive methods

Expositive methods require learners to listen and read or observe. An instructor delivers knowledge on a given topic, which can be complemented by tests and exercises to evaluate learners' memorization and/or understanding of the content.

Expositive methods are used for acquiring information, but they can be combined with other methods to create different types of learning courses. In those courses, the expositive component is normally used to provide orientation and basic concepts before going into more practical and complex stages.

Presentations, especially in video formats, can also be used to sensitize learners and influence their attitudes towards specific subjects.

Expositive methods include:

- **Presentations:** organized information on a specific topic.
- **Case studies:** real, significant cases related to the topic.
- **Worked examples:** examples of the topic, with comments and explicit reference to the theory.
- **Demonstrations:** illustrations of how a task can be performed.

In e-learning, these methods can be delivered through a number of formats, as shown below.

E-LEARNING FORMATS FOR EXPOSITIVE METHODS

Asynchronous

- Simple learning content, such as PDF documents and PowerPoint presentations, with no interactivity.

- Interactive e-lessons using text, images, audio, animations.

- Recorded audio or video lessons, i.e. lessons developed by an expert or instructor, which are recorded for learners to watch at any time. The lessons can be recorded in both video and audio formats (podcasts).

Synchronous

- Presentation through video conference, virtual classroom: the instructor presents the content to a group of learners, who are connected to the platform at the same time. Learners can interact with the instructor, ask questions and receive feedback using video conference, audio conference or chat.

- The instructor can use special software that usually includes a range of synchronous tools such as whiteboard, application sharing, audio conference and chat. Learners can use these tools to interact with the instructor and other learners, ask and answer questions, vote, etc.

Application methods

Application methods involve the learners in practical activities, which can range from simple exercises (such as the demonstration-practice method) to more complex methods, such as simulations or research activities.

When using these methods, it is helpful to have a tutor or instructor to provide guidance and facilitate reflection for learners.

Application methods include:

- **demonstration-practice method**
- **job aids**
- **scenario-based exercises**
- **role play**
- **simulations based on mathematical models (symbolic simulations)**
- **guided research and project work.**

Demonstration-practice method

This method is used to teach a procedure – usually a software procedure, such as how to generate a map using geographic information system software – using directive learning. A procedure is first demonstrated by an expert or instructor, then learners are asked to practise the procedure by interacting with the system or software.

In e-learning, this method can be realized through two formats, as shown below.

E-LEARNING FORMATS FOR DEMONSTRATION-PRACTICE METHOD

Asynchronous	**Synchronous**
■ Interactive e-lessons using a combination of animations and operational simulations (based on a sequence of operations) that allow learners to interact with the system and receive feedback on their actions.	■ Virtual classroom, in which the instructor shows the application using application-sharing tools and allows learners to take control of the application to practise it.

Job aids

Job aids provide just-in-time knowledge. They usually offer immediate answers to specific questions, helping users to accomplish job tasks. For example, learners may be provided with a checklist to help them draft a communication strategy for a specific audience.

This method can be realized through the following delivery formats.

E-LEARNING FORMATS FOR JOB AIDS

Asynchronous	**Synchronous**
■ Checklists, technical glossaries and manuals available as documents or as online tools.	■ Live chat assistant.
■ Online help or more sophisticated interactive online systems.	

Scenario-based exercises, experiential simulations and learning games

Scenario-based exercises, experiential simulations and learning games are used to develop cognitive skills in a specific domain. Learners are asked to apply knowledge and principles to a concrete situation. Typically, they present a challenging situation where learners are required to make decisions by choosing from different options.

This instructional method can be realized through the following delivery formats.

E-LEARNING FORMATS FOR SCENARIO-BASED METHOD

Asynchronous

- Interactive e-learning lessons where feedback is provided to learners through comments on the appropriateness of their choices, after which they proceed to the next situation.

- Experiential simulations based on branched scenarios. The feedback to each learner's choice is provided through a follow-up situation that produces some more choices.

- Serious learning games, i.e. experiential simulations involving a competitive component, a challenging goal and a set of rules and constraints. They can also make use of virtual reality.

- Tutored activities with challenges to solve, either individually or in groups using forums and wikis. The tutor can provide feedback during and at the end of the work.

Synchronous

- Activities with challenges to solve, either individually or in group, using whiteboards, polls, breakout rooms for group work. The instructor can provide feedback during and at the end of the work.

Role play

Role play is used to develop interpersonal skills. Learners are asked to apply behaviour-related principles (e.g. communication principles) to a concrete situation. Feedback is provided to learners about their behaviour.

For example, learners may be divided into groups of two people – one is designated as the policy-maker and the other as the food security expert. The expert must convince the policy-maker to take action based on the expert's recommendations. After the simulation, the tutor/instructor comments on the learners' performance. In e-learning, this method can be realized through the following delivery formats.

E-LEARNING FORMATS FOR ROLE-PLAY

Asynchronous

- Experiential simulations based on branched scenarios. The feedback to each learner's choice is provided through a follow-up situation that produces some more choices. Experiential simulations can also make use of virtual reality.

- Role play conducted as a group activity by learners using discussion forums; a specific role is assigned to each learner. Learners interact with each other to achieve individual objectives and/or a common goal.

Synchronous

- Role play conducted as a group activity by learners using chats, audio or video conferences. A specific role is assigned to each learner. Learners interact with each other to achieve individual objectives and/or a common goal.

Simulations based on mathematical models (symbolic simulations)

Symbolic simulations are used to develop scientific understanding of complex systems (e.g. ecosystems) or strategic management skills in organizations. Learners can interact with the system to understand the underlying dynamics.

Symbolic simulations, based on the mathematical model of a system, can simulate a natural, social or economic system.

For example, if learners need to analyse crop status through seasons, they can play with the system to see the main crop stages based on rainfall and vegetation data, and to observe the consequences of vegetation stresses.

Guided research and project work

The tutor or the instructor can task learners with conducting research on a specific subject. The instructor can guide the learner in collecting and organizing information (guided research). For example, learners may be asked to conduct research on the food security information systems (FSIS) in their own countries. The instructor provides suggestions to learners on how to find the required information and how to illustrate the FSIS using a Venn diagram.

Project work means that the tutor or the instructor asks learners to develop a product or a project by applying learned principles and concepts to his/her specific context. For example, learners may be asked to develop a food security report by applying the principles learned during the course.

In e-learning, guided research and project work can be realized through the following delivery formats.

E-LEARNING FORMATS FOR GUIDED RESEARCH AND PROJECT WORK

Asynchronous	Synchronous
■ Discussion forums, e-mails for communicating between learner and instructor or tutor. ■ Wikis, blogs and shared documents for presenting results.	■ Audio or video conferences for communicating between learner and instructor or tutor, and for presenting results.

 Collaborative methods

Collaborative methods are based on dialogue and discussion among facilitators and learners. They add a social dimension to the learning experience, applying the principles of social constructivism and collaborative learning. They allow learners to benefit from having discussion partners and receiving personal feedback.

Collaborative methods include:

- **online guided discussions**
- **collaborative work**
- **peer tutoring.**

Online guided discussions

Guided discussions are designed to facilitate learning and improve knowledge and skills. The facilitator asks learners questions to stimulate and guide reflection and critical thinking. These discussions usually complement other methods, such as a presentation, research or a case-based exercise.

Guided discussions also facilitate communication and knowledge sharing among learners. For example, after conducting individual research on food security information systems, learners may be asked to describe to the facilitator and the other learners how those systems work in their own countries.

In e-learning, this method can be realized through the following delivery format.

E-LEARNING FORMATS FOR ONLINE GUIDED DISCUSSIONS

Asynchronous	**Synchronous**
■ Discussion forums, e-mails.	■ Chats or audio or video conferences.

Collaborative work

Learners work together to perform different types of activity, such as evaluation, analysis or development of an assignment or a project. This method requires learners to collaborate, listen to each other, argue and negotiate; they develop interpersonal skills other than domain-specific and problem-solving skills.

For example, learners may be divided into small groups and tasked with evaluating the impact of a food security programme by applying the principles learned during the course. Each group must provide an evaluation report as an outcome of the assignment.

In e-learning, this method can be realized through the following delivery formats.

E-LEARNING FORMATS FOR COLLABORATIVE WORK

Asynchronous	**Synchronous**
■ Discussion forums, e-mails, wikis, blogs and shared documents.	■ Chats. Audio or video conferences using whiteboards, screen sharing and breakout rooms for group work.
■ Visual collaboration workspace platforms.	■ Visual collaboration workspace platforms.

Peer tutoring

Learners monitor and support each other. They have the opportunity to learn from each other's work and to practise tutoring methods. This is a useful method for train-the-trainer projects.

For example, each learner may be asked to review a food security report developed by another learner, and to provide suggestions on how to improve the document according to the principles learned during the course.

In e-learning, this method can be realized through the following delivery formats.
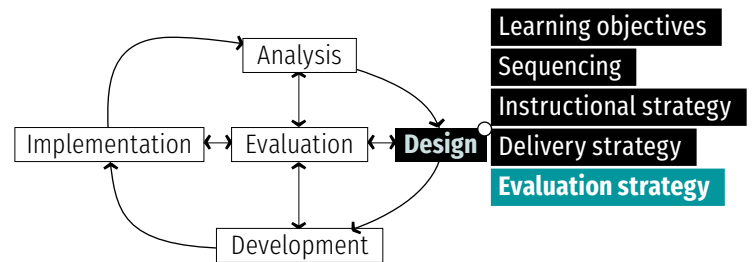
E-LEARNING FORMATS FOR PEER TUTORING

Asynchronous	**Synchronous**
■ Discussion forums, e-mails, wikis, blogs.	■ Chats, audio or video conferences.

5.3 Defining the evaluation strategy

Another important decision relates to the evaluation strategy for your course. It is very important to think about this from the design stage.

What is the purpose of evaluation?

Evaluation can be conducted to accomplish specific evaluation purposes. You may want to evaluate the course during the development stage to improve it before it is finalized, or do an evaluation at the end of the course to measure its effectiveness, or examine a past course, to see if it is still valid and can be reused in a new context.

In other words, you may want to evaluate a course:

→ during the development stage, to improve instructional courses or products (**formative evaluation**);

→ during or immediately after the implementation stage, to measure the effectiveness of education, training and learning (**summative evaluation**); and/or

→ some time after the course has been implemented, to understand if it is still valid or needs to be updated or modified (**confirmative evaluation**).

What can be evaluated?

According to the Kirkpatrick model (Kirkpatrick, 2006), evaluation can encompass four levels:[13]

- **learners' reactions**

- **learning**

- **behaviour**

- **results.**

Evaluating **learners' reactions** means understanding how those who participate in the programme react to it, if they participate actively and if they like the course. This can be measured through questionnaires and surveys, which are usually submitted to learners at the end of the course. In facilitated e-learning, learners' participation is monitored by the facilitator throughout the course period.

Evaluation (or assessment) of **learning** measures the achievement of intended learning objectives. Depending on the type of course, this can imply that participants have increased knowledge, developed skills, and/or changed attitudes as a result of attending the course.

Learning can be assessed through direct observation, assignments and tests.

It is crucial that assessment is aligned with learning objectives, i.e. that it measures the expected outcomes set at the design stage.

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[13] A fifth level of Kirkpatrick's evaluation model, the Return on Investment (ROI), has been introduced by Jack J. Phillips. According to Phillips, the ROI is a comparison between benefits and costs: ROI = Net Programme Benefits/ Programme Costs. See Philips, J .J. 1997. *Return on Investment in training and performance improvement programs.* Gulf Pub Co.

Assessing learning

According to the type of learning objective, different methods can be used to evaluate learning.

Changes in attitudes and development of relational skills can be measured through interviews, surveys or direct observation of participants' behaviour.

Thinking and cognitive skills can be measured through assessment tests. Assessment tests can consist of sets of questions or assignments designed to verify the achievement of a specific objective or the mastery of a given skill.

Assessment tests can be used for different purposes:

➜ **Prerequisite tests**
used to verify if learners have the minimum required knowledge to participate in a certain learning course.

➜ **Pre-assessment tests (or entry tests)**
used to assess a learner's knowledge and skills before beginning a course, in order to personalize learning activities.

➜ **Diagnostic tests**
used to assess the achievement of a unit's learning objectives after the completion of a specific learning unit.

➜ **Post-assessment test**
used to assess the achievement of the course's learning objectives after the completion of the entire course.

➜ **Certification tests**
used to verify specific skills and knowledge within the organization, and are not necessarily related to a learning course.

In self-paced e-learning, assessment tests mainly consist of 'closed-ended' questions associated with response options.[14] The most frequently used question formats include: multiple choice; multiple responses; matching; ordering; fill-in-the-blank; and short answer/essay. Learning platforms often include editors to create tests, questions and tools for reporting results.

In facilitated and collaborative e-learning, 'closed-ended' questions are integrated with different types of assignment, which are carried out during and/or at the end of the course. Questions and assignments are evaluated by the facilitator or instructor.

This is often associated with continuous monitoring of individual and group activities during the course.

A further level of evaluation is the evaluation of **behaviour**. Evaluating behaviour means understanding the extent to which participants' behaviour has changed as a result of the training programme: for example, if they use the acquired knowledge and skills on the job or in other practical situations. This can be done by observing learners' performance on the job.

Finally, evaluating **results** consists of identifying the final results that occurred in the organization as a result of the participants attending the programme. The final results may include increased production, improved quality, reduced costs, and fewer accidents.

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14 See Chapter 6 for guidance on how to develop practice and assessment tests for self-paced e-learning.

5.4 Certifying competences with digital badges

Digital badges, also called digital credentials or micro-credentials, are online visual representations of skills and competences earned through learning.

FAO digital badges

Several courses in the FAO elearning Academy are linked to a final certification test, aimed at verifying the acquisition of skills and competences outlined in the e-learning courses. Certification is granted through the Digital Badges system.

A FAO digital badge offers learners a visible, verifiable and sharable recognition of their certification.

"*Digital badges now cross multiple fields and are used in informal learning settings, corporate settings, government settings, and in all levels of education from K-12 to higher education*" (Stefaniak and Carey, 2019) to recognize and communicate accredited and non-accredited learning in both formal and informal learning contexts.

Badges can be displayed on social media, websites, e-mail signatures and curriculum vitae to showcase relevant skills and competences acquired as part of lifelong learning.

The advantages of digital badges to learners and course providers can be summarized within three categories, and they can be used as motivation to encourage learners to enrol in and complete learning activities. Digital badges are:

1. verifiable

2. sharable

3. stackable.

Since adult learners are motivated by intrinsic factors, the three advantages listed above highlight the value of achieving badges for the learner and places the responsibility of lifelong learning in the hands of the learner.

1. Verifiable

Unlike paper-based certification, digital badges are embedded with metadata hard-coded into the badge image that **links back to the issuing authority, assessment criteria and learning outcomes**.

FAO digital badges' verifiability

FAO's digital badges conform to the Open Badges Standard,[15] which describes a method for packaging information about accomplishments, embedding it into portable image files as digital badges, and includes resources for web-based validation and verification.

The figure on the right shows FAO digital badge metadata:

Open badges can be verified through external platforms to ensure that the badge earner, **issuing authority and competency** corresponds to the badge image. The verification process, using the metadata included in the badge image, makes badges more reliable and secure than a paper-based certificate.

Badge verification process

Badgecheck.io[16] provides such a verification process, where either the badge image itself is uploaded onto the system, or the unique badge URL is used, with the badge earner's name used to verify the badge's authenticity. If the badge is validated, a link is provided back to the FAO badge website, as shown in the images.

15 www.imsglobal.org/activity/digital-badges

16 https://badgecheck.io/

2. Sharable

Badges can be displayed on social and professional networking platforms, such as LinkedIn, Facebook, Twitter and other organizational and personal webpages. They can be inserted onto traditional paper curriculum vitae and added to e-mail signatures.

"*Digital badges leverage many of the strengths of digital media, participatory cultures, ICT as well as foster mastery learning and the formation of positive STEM identities*" (Elkordy, 2016).

Digital badges exist at the intersection between certification, gamification and social media, providing a unique opportunity for learners to share their accomplishments, skills and competences and for employers to have a granular view of a learner's skills and competences.

The open badge standard links directly to Open Education,[17] which in turn reflects "*equity and transparency as well as recognition learning in diverse contexts*" (Elkordy, 2016).

Being able to share badges and skill and competency acquisitions on social media, personal websites and even on print curriculum vitae provides greater access to employment and recognition opportunities, especially for women, minorities and disadvantaged groups.

The sharability of badges allows learners to showcase their speciality in the form of acquired skills and mastery of new content in a field (Stefaniak and Carey, 2019). It also displays a learner's job-relevant (Finkelstein et al., 2013) and up-to-date skills and competences. Not only are digital badges sharable, they are also portable. They do not only have to exist on the learning management system where they were earned; they can be moved outside the organization or LMS to, for instance, social media platforms or badge wallets.

Badge wallets are online software applications designed to collect a learner's badges that have been earned from various organization or learning providers (e.g. Coursera, Udemy) in one place. From badge wallets, badges are easily shared to social media and other web locations, offering a complete view of a learner's skill and competency badge acquisitions.

Examples of badge wallets include the following: Badgr Backpack[18] and Badge Wallet App.[19]

EXAMPLE

Sharing badges

FAO badges can be shared to LinkedIn, badge wallets or any format required.
These screenshots show how badges can be added to LinkedIn under 'Licenses and Certifications'.
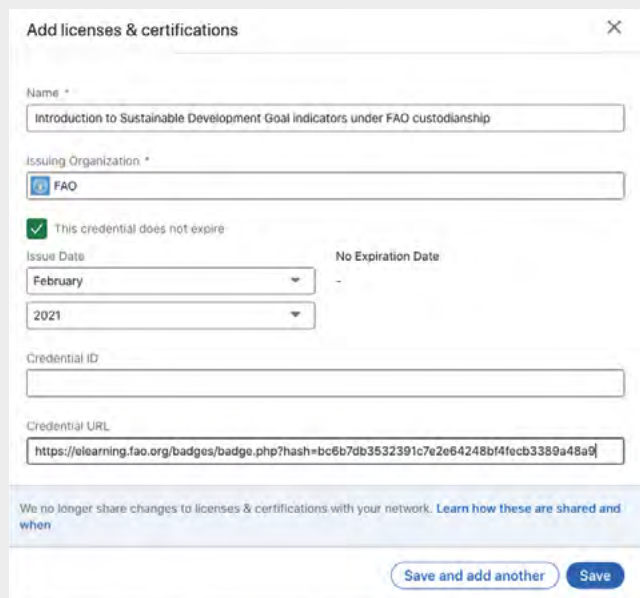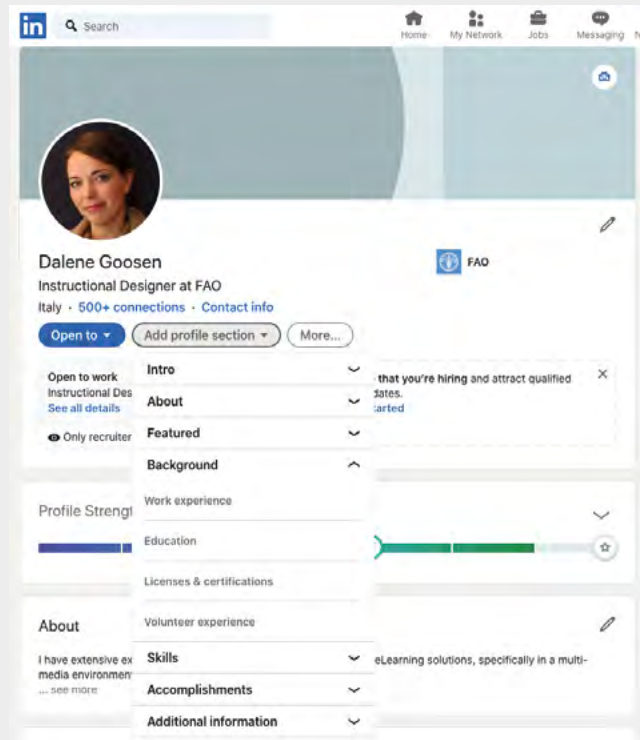
Clicking on the artifact in LinkedIn takes the user back to the FAO elearning Academy badge page.

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18 https://info.badgr.com/

19 www.badgewallet.eu/en/

3. Stackable

The stackability of badges refers to showcasing a granular collection of a learner's acquired skills and competences through learning activities.

"Recognizing learning and successes from any part of an individual's life— including achievements in both formal and informal settings not traditionally assessed or recognized— opens up possibilities for people of all ages to share a more complete narrative of their personal identity" (Finkelstein et al., 2013).

When badges are stacked together with an individual's work experience and formal education, it creates a more personalized learning or professional identity which, as discussed in the previous section, is more transparent.

Digital badge credentials differ from formal degree credentials in that they present a granular, skill-specific representation of skills and competences built up over time. With four-year degrees, for instance, it is not always apparent which particular skills or competences were included in the course.

Conversely, since badges are verifiable against their inherent metadata, and because of their sharability, they offer the opportunity to view, on a granular level, the skills and competences that a learner has acquired at any given time.

5.5 **In summary**

Key points for this chapter

➜ When deciding between using offline and online, synchronous or asynchronous approaches, it is important to consider learner-related factors (e.g. learners' technical expertise and available time) and technical aspects (e.g. hardware and software requirements and speed of Internet connection).

➜ Learning objectives can be achieved through a wide range of learning methods, such as self-paced interactive lessons, case-based or operational simulations, online discussions, collaborative activities, virtual classrooms, assessment tests and surveys. Special attention should be paid to technological and resource constraints.

➜ The overall evaluation strategy and the methods for assessing learners' progress should also be defined as part of the design stage.

➜ Evaluation allows you to assess learners' progress, the quality and effectiveness of the course, and improve future learning activities and content.

➜ Digital badges, also called digital credentials or micro-credentials, are online visual representations of skills and competences earned through learning.

Part III
Creating e-learning content

E-learning content must be accurately prepared and presented in order to be effective. Instructional techniques should be used creatively to develop an engaging and motivating learning experience.
This section will illustrate the process of developing e-learning content, including preparing the content, applying instructional techniques and media, and creating the final interactive product using appropriate software and authoring tools.

Analysis

Implementation ↔ Evaluation ↔ Design
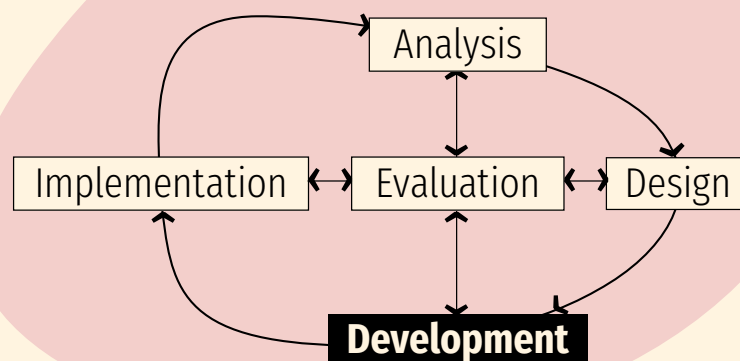
Development

6. The process of content development

How can we work together to produce content?

It's time to take action!

David, the subject matter expert, is in charge of providing **Richard**, the instructional designer, with all the required knowledge and information – the 'heart' of the course.

Once you know what you want learners to learn and have identified the formats that you will use, you need to start creating your learning resources.

The first step is to identify and collect the content, which may involve interaction with one or more subject matter experts. Once the required information and knowledge has been gathered, the instructional designer determines the way in which this content will be presented, by developing a storyboard.

This chapter addresses the following topics:

➜ preparing content for e-learning; and

➜ storyboard development.

6.1 How subject matter experts contribute to e-learning development

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              │      └──────────┘      │
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              └─────→│ Development  │←─┘
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                     │Content development│
                     │Storyboard development│
                     │Courseware development│
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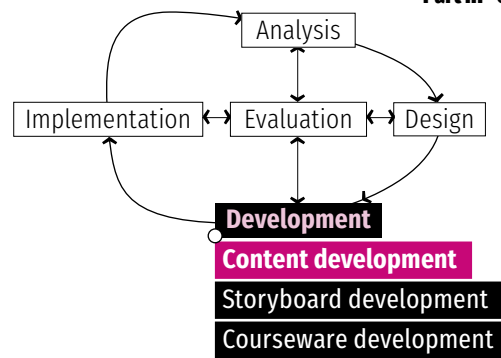
Collecting appropriate content to build e-learning materials may require interaction with a subject matter expert. The extent of a subject matter expert's contribution can vary, depending on the amount and quality of existing material.

In fact, it is very likely that a set of materials for a specific subject is already available. These may consist of:

- user manuals and technical documentation;
- classroom course handouts and lecture notes;
- presentations, such as PowerPoint slide shows;
- documented case studies;
- photographs, images, graphs, tables and other illustrative materials;
- training materials, such as self-study guides, web guides and other distance learning materials; and
- reference materials, such as specialized thesauri and glossaries.

Can existing materials be used as e-learning materials?

Unfortunately, existing training materials and documents cannot be automatically transformed into e-learning materials just by making them available from a website.

E-learning differs from face-to-face training and requires specific formats. For self-paced e-learning, in particular, material must be carefully designed and must embed adequate instructional support to allow learners to function independently throughout the course.

For example

➜ A PowerPoint presentation developed for face-to-face training sessions is not e-learning content, because it does not include all the explanations and examples that are supplied by the presenter in a traditional classroom.

➜ A 20-page article made available online is not e-learning content, because the way it is designed does not match specific learning objectives, and content is probably not adequately presented in chunks and organized according to instructional principles.

Although preparing materials is less demanding in instructor-led or facilitated e-learning, it is still necessary to adapt existing materials to the new learning environment.

When developing e-learning materials, there are generally two main scenarios. If appropriate content already exists, the instructional designer will integrate content taken from different sources and may request some inputs from subject matter experts (such as additional examples, glossary terms and relevant descriptions, recommended reading and resource pointers). Otherwise, one or more subject matter experts may be requested to write the content from scratch.

In either case, the subject matter experts must review the storyboard to verify that the content has been correctly interpreted by the instructional designer.

6.2 Tips for content development

When subject matter experts are in charge of developing content for e-learning lessons, they should refer to the course outline (or course plan), so as to be informed about the topics to cover and the approach to take in illustrating these (e.g. the level of detail, the language to use, the preference for illustrating concepts through examples or case studies).

The following are some tips for subject matter experts on authoring lesson content.

How many pages of content should the subject matter expert prepare, in order to create an e-learning lesson?

There are no precise rules on this; it depends on the level of complexity and on the number of questions and interactions in the lesson.

For a 30-minute e-learning lesson that includes 30 screens (using a rough estimate of 1 minute per screen), approximately 8–10 pages of content would be required.

Tips for content development

➜ Before developing the content for the assigned lessons, review the proposed learning objectives.

➜ Make sure that the content and knowledge assessment tests and exercises 'match' the lesson objectives at every step in the workflow process.

➜ Provide all the knowledge needed to meet the learning objectives, including information that may seem obvious to you, but may be new to learners.

➜ Use examples that are likely to be familiar to most, if not all, learners. People taking the course may have different backgrounds, so use a variety of examples. This will help learners to understand and remember concepts.

➜ Classify topics for each lesson as follows:

- **Must know:**
  a core part of the content; the learner needs to understand these concepts.

- **Nice to know:**
  the learner could get by without this information, but it could help to develop a better understanding of the subject or add interest for the learner.

Authoring content for e-lessons is not the same as writing books or scientific articles. The following tips on language style could be useful to subject matter experts when authoring content for e-learning lessons.

Tips on language style

➜ Write directly, simply and clearly. To accomplish this, keep sentences short. One rule of thumb is that a sentence should not be longer than 25 words. It is important not to give the reader more ideas or information than can be handled at one time.

➜ Avoid jargon.

➜ If you are addressing a multicultural audience, avoid culture-specific slang, colloquialisms and examples.

➜ Be sensitive to the fact that many learners are not native English speakers. Write as you talk. Informal language and contractions (e.g. don't, we're) can be used.

➜ Minimize the use of compound sentences. When you see a colon or semi-colon, examine the sentence to see if it could be made simpler and clearer by breaking it into shorter sentences.

➜ Use personal pronouns (e.g. 'you') to refer to learners. This personalizes instruction and involves your reader.

➜ Use bulleted lists when appropriate.

➜ Use gender-inclusive, non-sexist language (e.g. sexist: 'Over the years, men have continued to use non-renewable resources at increasing rates'; gender-inclusive: 'Over the years, people have continued to use non-renewable resources at increasing rates.')

➜ Use the active voice. In a passive construction, the agent of the action often disappears from the scene. Use the passive voice only when the active voice is unduly awkward.

➜ Spell out acronyms in full the first time they are used. Consider adding them to the glossary if appropriate.

6.3 Creating the storyboard

In most cases, the instructional designer creates a 'storyboard' (also called the script). This is the design document that details the content and behaviour of each element for each screen of a given lesson. These elements include text, images and other media, animations, tests and other interactive features.

Storyboards can be created using a variety of tools, including word processing programmes, PowerPoint and specific e-learning authoring tools.

The following is an example of a storyboard for an e-learning lesson, created with PowerPoint.

The storyboard can be reviewed by subject matter experts and other stakeholders, including representatives of the target audience when feasible.

Once comments from the expert and other reviewers have been integrated, the instructional designer can pass the lesson to the graphic designers and course developers, who finalize the lesson by developing media and interactivity features.

What is a storyboard?

The term 'storyboard' is taken from movie production, where it indicates a visual representation of the various scenes of a film. In e-learning, the storyboard describes screen-by-screen what will happen in the final lesson. The storyboard is not a final product. It is an intermediate product that is then used by web developers to create the final interactive e-lesson.

EXAMPLE

This PowerPoint slide presents the visual elements (text and graphics) that will appear on the screen of the final lesson.

It also shows the screen number and titles of the unit, lesson and learning step (or topic).

In the notes section of the page, the instructional designer writes information for developers about interactions, animations and audio associated with that screen.

6.4 **In summary**

Key points for this chapter

➜ The knowledge required to create an e-learning course can be collected from existing source materials or created from scratch.

➜ In both cases, some interaction with subject matter experts may be required, either to obtain the core content, specific inputs or expert review.

➜ It may be useful to provide some guidance to subject matter experts in their role as authors of e-learning content.

➜ Once the content has been assembled, the instructional designer will create a storyboard by integrating several instructional techniques.
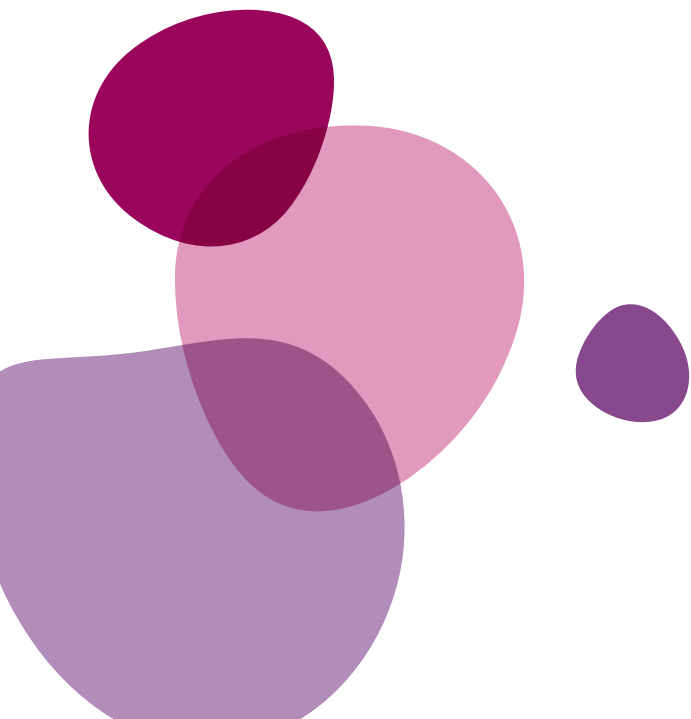
7. Using instructional techniques for content development

What techniques can we use to make the content clear, engaging and effective?

David, the subject matter expert, has passed information for each outlined lesson to **Richard**, the instructional designer.

Now, it's up to Richard to transform that information into engaging e-learning content!

This chapter provides guidance on applying different instructional techniques to create engaging and effective e-learning content. The chapter starts with an overview of fundamentals elements of instructional design, which are at the core of any e-learning course, such as:

➜ presenting different types of content;

➜ using examples to improve learning;

➜ developing practice and assessment tests; and

➜ using media (text, graphics, animations, audio and video).

Then, some more specific instructional techniques for presenting e-learning content are introduced, namely:

➜ pedagogical agents

➜ toolkit approach

➜ demonstration-practice method

➜ storytelling

➜ case-based scenarios and serious learning games

➜ gamification

➜ microlearning.

7.1 Presenting different types of content
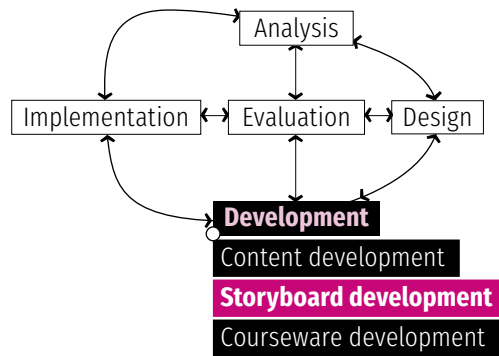
Analysing the different types of knowledge elements that constitute the content can help the instructional designer to present the content properly, in order to facilitate understanding by learners. The table below offers some tips for presenting different types of content:

	Types of learning content	Tips for presenting content
Facts	Unique, specific information that answers the questions: who, where, when? Facts are shown, exhibited or indicated. **Examples:** data, lists, historical events.	Provide a clear statement of the fact. Use visuals and infographics if feasible.
Procedures	A procedure is a series of clearly defined steps, aimed at performing a task. Procedures answer the question: 'How to …?' **Example:** 'instructions for creating a table in Microsoft Word'.	Make clear the various steps of the procedure, e.g. by using diagrams, tables or illustrations. For complex procedures, provide a map that clarifies which step are you currently describing, and/or a summary of the steps at the end. For software procedures, consider using the demonstration-practice method. ✈ **see Chapter 7.7 on this technique**.
Concepts	A concept is a group of objects, entities or ideas that: are defined by a single word or term; share common characteristics; differ in unimportant characteristics; require a definition; and answer the question: 'What is …?' **Example:** the concept of 'climate change'.	Provide a definition of the concept. Especially for complex or abstract concepts, it is crucial to provide one or more examples, and non-examples. ✈ **see Chapter 7.2 on using examples**. Use visuals to support understanding of complex or abstract concepts, showing relationships between elements.
Principles	A principle (or rule) describes a relationship between two concepts. For example: 'As price increases, the supply increases'. Some principles can be translated into strategic guidelines, which can guide decisions and complex tasks. **Example:** 'guidelines for facing price volatility'.	Clearly state the principle or rule. Provide one or more examples, and non-examples. ✈ **see Chapter 7.2 on using examples**. Use visuals to support understanding of cause-effect relationships. Consider using a scenario-based approach and serious learning games for teaching strategic guidelines. ✈ **see Chapter 7.9 on this technique**.
Interpersonal skills	Verbal and non-verbal skills for interacting with other people. **Example:** content related to 'negotiating' or 'solving group conflict'.	Make learners practise rather than just providing principles and guidelines, for example, by using experiential simulations. Virtual reality has strong potential for developing interpersonal skills. Consider using storytelling, scenario-based learning and serious learning games. ✈ **see Chapters 7.8 and 7.9 on these techniques**.
Attitudes	Predispositions to behaviour. **Example:** content related to appreciate the 'importance and urgency of adopting measures for limiting the negative impacts of climate change'.	Use examples, scenarios and stories showing the importance of applying a given behaviour, and the negative consequences of not applying it. Pictures and videos have strong potential to influence attitudes.

Adequate practice tests should be linked to each type of content, to increase the effectiveness of learning.

See Chapter 7.3 for more details on practice tests.

## 7.2 Using examples to improve learning

Adding examples is crucial to facilitate an understanding of concepts and the application of strategic principles.

Examples should always be present in your e-learning content, as they can help learners to make sense of concepts. They are particularly relevant when you need to explain abstract concepts, or to show the concrete application of a given process or procedure.

Examples can be used in deductive and inductive ways:

➜ to illustrate a concept or show the steps of a procedure that has been previously introduced (deductive); or

➜ to stimulate thinking and reflection before providing definitions and principles (inductive).

Deductive and inductive sequences

DEDUCTIVE SEQUENCE		INDUCTIVE SEQUENCE	
Definition (theory) ➜	Example or case	Example or case ➜	Definition (theory)
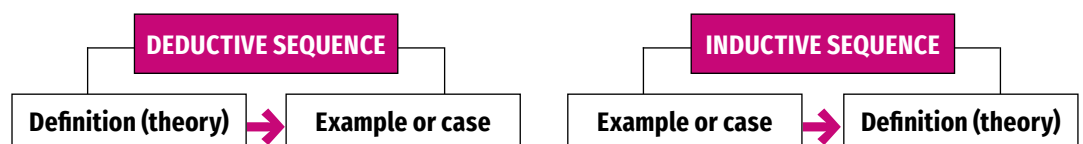
Deductive sequences reflect a behavioural approach, which emphasizes response strengthening, while inductive sequences reflect a constructive approach, where the emphasis is on the active processes that learners use to build new knowledge.

EXAMPLE

Using examples in a deductive way

In this lesson of a course on Food Security Cluster Coordination, a concrete example is shown to illustrate the complex process of contingency planning, which has been described in the previous screens.

Lesson 2.6 Contingency planning, preparedness and capacity-building
Contingency planning and the Contingency Response Plan (CRP)

Example: Pakistan Food Security Cluster Contingency Plan 2012

The FSC contingency plan was jointly developed in 2012 by FAO and WFP, in line with the inter-agency contingency planning process led by the Office for the Coordination of Humanitarian Affairs (OCHA).

It was developed by national institutions in consultation with FSC partners, including national and international national humanitarian organizations.

FSC Pakistan Contingency plan 2012

Click on the forward arrow to read more.

1 of 4 >

Page 7 of 21

You can see this lesson at
https://elearning.fao.org/mod/scorm/player.php?scoid=683&cm=366

Using examples in an inductive way

This screen, from a course on Monitoring and Evaluation (M&E) of programmes, illustrates one of the criteria used to assess the quality of M&E indicators.

The quality criterion ('Does the indicator measure what it should?') is introduced by an example, with an associated question.

The criterion (i.e. theory) is formulated in the feedback to the correct answer.

You can see this course at:
https://elearning.fao.org/mod/scorm/player.php?scoid=975&cm=210

Examples can bridge the gap between theory and practice. You can give learners an example of how to accomplish a task, together with an explanation of the underlying procedure or principle; afterwards, you can ask them to answer questions about the examples to stimulate their reflection, or to accomplish a similar task on a new example, to prepare them for actual performance. The following is an example of this type of application.

EXAMPLE

Using examples to prepare learners for performance

This course provides guidance to assess a country's legal framework against gender-related criteria.

First, a series of features, i.e. the criteria for making the assessment, are provided.

Then, an example of assessment of a specific provision, which uses the above criteria, is presented.

Finally, the learner is asked to make the assessment on a new sample provision, by applying the learned criteria to identify to which 'scenario' the provision belongs.

This exercise is repeated on the following screens, using different examples.

You can see this course at:
https://elearning.fao.org/mod/scorm/player.php?scoid=840&cm=597

> ### Tips for developing examples
>
> → Integrate different media to present the example (e.g. a picture and text or audio narration).
>
> → If the example is long or complex, break it up into smaller components.
>
> → Try also to use non-examples, e.g. examples of incorrect application of principles.
>
> → Use a realistic job context for your example; this will support transfer of the knowledge to the job.
>
> → For strategic skills, use at least two examples that illustrate the same underlying principle in different contexts. Then, ask learners to compare them and identify the common principles.

7.3 Developing practice and assessment tests

Practice and assessment questions should be designed to reinforce the achievement of learning objectives.

As mentioned in Chapter 4, it is important that questions for practice and tests are aligned with learning objectives and learning activities, in order to correctly assess the right level of expected performance and content.

Questions play an important role in involving learners and keeping their attention, so you should try to use them as part of your core content, as well as for pre- or final testing.

In a job-oriented course, the questions should be placed in a job-realistic context, to build knowledge and skills that can be transferred to the job.

Developing practice and assessment tests for different types of knowledge

Different types of practice and tests are required for different types of content. The table below offers some tips for promoting and assessing:

→ memorization of facts;

→ understanding of concepts and processes; and

→ application of procedures and strategic principles.

Tips for developing practice and tests	
Type of content	**Tips**
Facts	Have learners recall features or specifications. Have learners identify pictures or objects.
Concepts	Have learners discriminate between examples and non-examples. Have learners reformulate the concept.
Procedures	Have learners practise through operational simulation. Have learners actually perform the procedure.
Principles	Ask questions about the principles underlying a worked example. Have learners apply guidelines to solve a job-contextualized problem or case study.
Interpersonal skills	Have learners apply behavioral guidelines to an interpersonal communication problem or case study.
Attitudes	Ask questions to reflect on a given behaviour.

Question formats

In self-paced e-learning, practice and tests mainly consist of questions associated with response options and feedback. They generally have the following structure:

- a question or statement;

- an operational message that indicates to the learner how to perform the required operation (e.g. click, drag, press a key);

- a series of options;

- the correct answer; and

- feedback for the correct and incorrect answers.

The most frequently used question formats include:

- true or false

- multiple choice

- multiple responses

- matching

- ordering

- fill-in-the-blank

- short answer/essay.

The following table summarizes the main characteristics of each type of question.

Types of questions

True or False

A statement with two options
(true/false or yes/no), where only one is correct.
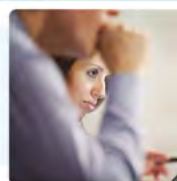
This type of interaction allows different feedback
to be provided for each selected option.

Pros	Cons
Easy to create	Learners have a 50 percent chance of selecting the right option
Can differentiate feedback for each option	The answer is not created by the learner

Multiple choice

A statement that provides different options;
only one is correct.

Like true/false, multiple choice allows different
feedback to be provided for each selected
option.

Pros	Cons
Very flexible (can be used for several purposes)	Difficult to create (you have to develop credible wrong options and write different feedback for each of them)
Can differentiate feedback for each option	The answer is not created by the learner

Multiple responses

The correct answer consists of more than one
option, all of which must be selected.

Pros	Cons
Very flexible (can be used for several purposes)	Quite difficult to create (you have to develop credible wrong options)
	The answer is not created by the learner

Lesson 1.3 The Global Food Security Cluster — Background and Objectives
What is food security?

Matching
This type of interaction presents two series of elements. The learner must link each element of the first series with one from the second list.

The example shows a drag-and-drop exercise.

Pros	Cons
Quite easy to create	Risk of being too easy for learners
	The answer is not created by the learner

Lesson 2.3 Planning and strategy development
Coordinated project planning

Ordering
The learner has to order several elements in a sequence, e.g. the logical sequence of several phases, steps or operations to be performed.

Pros	Cons
Quite easy to create	The answer is not created by the learner

Fill-in the blanks
This can be an incomplete statement to be completed by learners; or a sentence with one or more missing words or numbers. The learner must fill in the blank spaces with the appropriate terms.

The response is checked by the system, which provides relevant feedback.

Pros	Cons
Easy to create	Rarely appropriate
	Difficult to measure

Lesson 1.1 Humanitarian Coordination and Cluster Approach
The Transformative Agenda

Short answer/short essay
The learner is free to choose his/her own words, to formulate the response to the question.

Although the learner's response will not be checked by the system, an answer developed by an expert can be proposed for comparison, or the essay can be saved and submitted to an online tutor.

Pros	Cons
The answer is created by the learner	Very difficult to measure

Developing questions

The following guidelines are valid for every type of interactive question.

Tips for developing questions

→ Practice questions should be created for all critical topics or tasks.

→ The text of the question must be as clear and unambiguous as possible.

→ Incorrect options should be plausible. An obviously wrong option does not play any useful role and reduces the learner's interest.

→ Incorrect options should aim not to distract learners, but to anticipate common errors, so that useful information can be provided in the feedback.

→ Provide textual responses of about the same length for each option. If one of

the responses is much longer than the others, the learner will think that is the correct one.

→ Provide explanatory feedback: after the learner responds to a question, provide feedback saying whether the answer is correct or incorrect, with a succinct explanation. For example, feedback on incorrect answers can clarify the missed concept or point learners back to course sessions that explain those concepts. Feedback on correct answers should go beyond a simple reiteration or reformulation of the correct answer. It should further elaborate or connect the concept to future course sessions.

7.4 Using media elements

A number of different media can be combined to create compelling e-lessons. Pay careful attention when integrating media elements into your storyboard, to avoid overloading learners' working memory, as this can be detrimental to the learning process (Clark and Mayer, 2016).

Media elements: Text

Written text is an important 'medium' for communicating learning content. Some learning resources are completely text-based. The power of text-based resources is that learners can browse the text and find just what they need.

Careful attention should be given to the text's graphic display and integration with images.

Tips for using text

→ Display on-screen text to provide the best readability and clarity.

→ If possible, use diagrams, graphs and flow charts to help the learners understand the content.

→ Use graphic conventions consistently; for example, italic style must always be used for the same purpose.

→ Use lists or tables to help learners organize the information.

→ Use list points or blank spaces to separate items in a list, or focus attention on them.

→ Consider word and row spacing to improve text readability.

Media elements: Graphics

Graphics include illustrations, pictures, diagrams and icons. They can range from photographic, realistic images to schematic representations or even tables.

Graphics can serve different communication functions, including adding aesthetic appeal or humour, depicting an object in a realistic fashion, providing retrieval cues for factual information, and supporting understanding of relationships between different elements and changes of an object over time (Clark and Lyons, 2010).

Graphics can play a crucial role in promoting learning. They should not only be used to add aesthetic appeal or visual interest to a screen. In e-learning, relevant graphics can facilitate learning by:

- drawing attention to a specific content element;

- suggesting analogies between new content and familiar knowledge;

- supporting the understanding of concepts;

- simulating the work environment and real situations; and

- motivating learners by making materials more interesting.

Tips for using graphics

➜ Try to avoid graphics that have no real function in complementing the information in your text. Purely decorative graphics do not help learners to understand the text and should be minimized.

➜ Images, tables and graphs should be clear and easy to read. Provide text alternatives for non-text content to make content accessible for people with disabilities.

➜ Use images that are sensitive to gender and reflect diversity.

➜ Use pictures when creating a realistic context and suggesting analogies to real-life situations.

➜ An animated illustration can be used to show a series of procedural steps or the stages of a process.

➜ A matrix, conceptual map or tree diagram can show relationships among content.

➜ Line charts can demonstrate trends and enable learners to make comparisons between two or more variables.

➜ Bar graphs are useful for comparing quantities and dimensions.

➜ Pie charts show relationships between the parts and the whole, and are particularly useful for showing proportions and ratios.

➜ Flow charts are recommended to describe complex procedures.

➜ Diagrams can provide organization and meaning and are therefore recommended when you are trying to help the learner store and retrieve verbal information.

➜ When developing a text table, ensure that sequential relationships are accurately reflected, and arrange sequences so that they are represented from left to right and from top to bottom on the page. Working contrary to this 'natural' flow can create confusion. When using text tables, provide instructions on how to interpret and use the table.

➜ Ensure that diagrams, graphics and screenshots correspond to their descriptions.

EXAMPLE # Types of graphics

Pictures

These pictures illustrate slow and rapid-onset natural disasters.
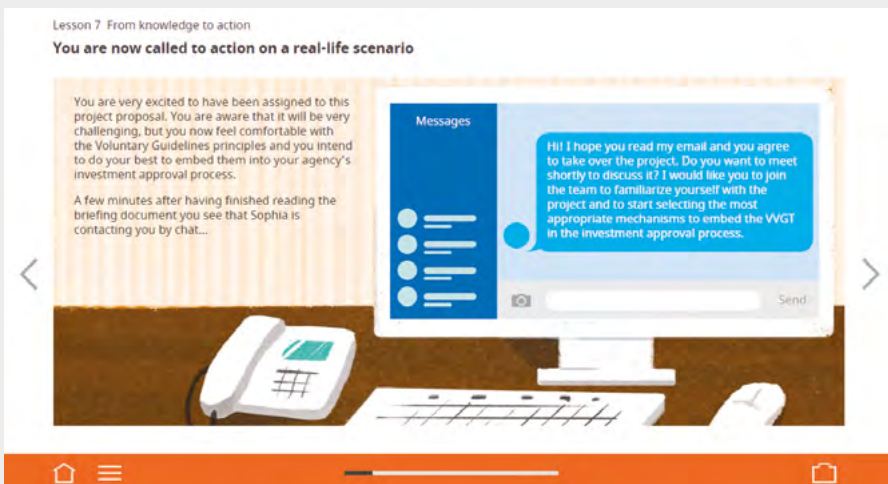
Realistic illustrations

The illustration on the left describes a realistic situation in a work environment.

Icons

The icons introduced in this screen are used throughout the course to help learners to recall these three key themes.

Conceptual illustrations

The weight scale on this screen depicts the relationship between risk, likelihood and impact of an event.
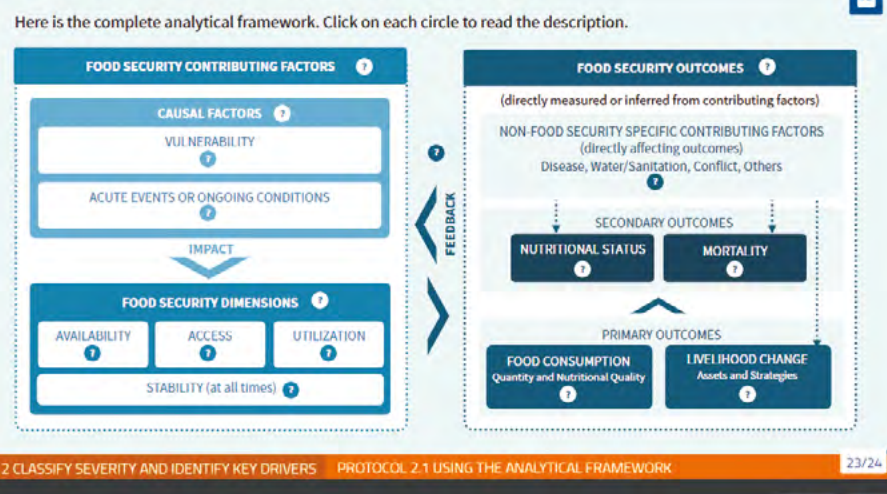
Diagrams

This diagram illustrates cause-effect relationships among food security causes and outcomes.

Media elements: Animations

An animated illustration can show a series of procedural steps or transformations.

Tips for using animations

➜ Allow learners to focus on only one object at a time.

➜ Use arrows to steer attention to selected details or motion direction.

➜ Segment long or complex animations and allow learners to access each chunk at their own pace, rather than playing all the steps continuously (e.g. by adding Play and Pause buttons).

➜ Limit the use of animation effects on text because they do not have any instructional function and can irritate learners.

Media elements: Audio

Appropriate use of audio can greatly increase the effectiveness of a course. However, you need to carefully evaluate if your project really needs audio narration. In general, audio narration works best when used to explain or describe on-screen visuals, rather than to read on-screen text. You can use audio for the entire course, or only for specific parts of it, such as dialogues and scenarios.

Tips for using audio

➜ Keep the audio short.

➜ Use audio to complement the visual elements on the screen. For example, during a procedural demonstration, audio can be used to explain animated steps.

➜ It is critical that audio narration is synchronized with on-screen text, visuals or animation. This is especially important for complex animations and animated videos.

➜ Do not use audio to simply 'read' the text on the screen; instead, combine audio narration with on-screen text to summarize or expand on key points, or to accompany video sequences.

➜ Use written text for key messages that need to remain on the screen for as long as desired, so that learners can refer to that information over time.

➜ You can also consider using audio interviews to increase credibility and authenticity to your course by adding the voices of experts, specialists, or colleagues performing similar tasks.

Media elements: Video

Video is the only media tool that makes it possible to reproduce behaviour, processes and procedures the way that they appear in real life.

It can be used to present a case study, and is especially effective in role play to illustrate communication between people, especially if there is emotion involved.

Using a video as a trigger event for a scenario

This course uses a video to simulate a trigger event (the occurrence of a typhoon communicated by a TV reporter) for the scenario that will be used throughout.

You can see this course at:
https://elearning.fao.org/mod/scorm/player.php?scoid=683&cm=366

Video interviews can also be a powerful feature to use in a course as a way of reinforcing the link between the concepts presented in the lessons and the real experience of experts, colleagues or peers.

Using video interviews as testimonials

This course uses video interviews to present testimonials by practitioners from different geographical areas, who are undertaking the same task that is presented in the course, i.e. reporting on an SDG indicator.

All interviewees answer the same two questions about challenges encountered and strategies adopted to overcome those challenges.

You can see this course at:
https://elearning.fao.org/course/view.php?id=348

Video can also be used in an interactive way, for example to realize experiential simulations, i.e. simulations based on branched scenarios, where each learner's choice produces a consequence that generates feedback.

Tips for using video

➔ Consider using videos to show anything that happens over time, like processes or procedures, or to show dialogue between people.

➔ Avoid using video only to show a trainer speaking.

➔ Video sequences should always be accompanied by comments, in either written text or audio narration. Include closed captions or a full transcript to increase video's accessibility.

➔ In situations with limited bandwidth connections, a video sequence can be replaced by a sequence of pictures.

7.5 Using pedagogical agents

A simple technique to add a human sense to the content is the use of pedagogical agents – characters that guide learners through the course. If well designed, pedagogical agents can have a motivating effect and facilitate learning.

When should pedagogical agents be used?
Pedagogical agents can be used with any type of content, including information-oriented (rather than job-oriented) courses where other more job-oriented techniques such as storytelling and case-based scenarios cannot be applied.

Tips for using pedagogical agents

➔ Pedagogical agents can take the form of coaches or tutors to guide learners through the course. For adult learners, it can be more motivating to choose an informal role such as a peer (e.g. a more experienced colleague) instead of a more formal, authoritative role.

➔ Characters should be used sparingly, rather than being present in every screen.

➔ Characters should use a conversational style in addressing the learner. Emphasize first- or second-person forms of address (e.g. 'you' and 'your') rather than third-person forms. Include comments directed at learners, such as "Let's take a look at the result of our analysis".

➔ Although expressive gestures and emotions may increase learners' motivation, avoid displaying irrelevant gestures, facial expressions or motion: learners may be overloaded and consequently pay insufficient attention to the learning material due to the extraneous cognitive load caused by an engaging but distracting pedagogical agent.

➔ Be careful about gender and cultural issues when developing your characters.

E-learning course using pedagogical agents

The topics of the course *Climate Change Adaptation and Mitigation in Fisheries and Aquaculture* are introduced by Julia, an expert in fisheries and aquaculture. She guides the learner through the various course sessions.

Climate Change Adaptation and Mitigation in Fisheries and Aquaculture
Meet Julia and get started

Hello! My name is Julia. I am an expert in fisheries and aquaculture. I am currently analysing the impacts of climate change on fisheries and aquaculture, as well as relevant adaptation and mitigation strategies. Before starting, click on the tabs below for some tips on course features and navigation elements, or in case you need help and support.

Quick **tutorial**   Help & **support**

You can see this course at:
https://elearning.fao.org/mod/scorm/player.php?scoid=1204&cm=4598

7.6 Toolkit approach

What is a toolkit approach?
E-learning content can take the form of a toolkit, which allows learners to select from a set of independent topics, rather than follow a sequential approach. Learners are invited to choose the topics that interest them the most.

When should a toolkit approach be used?
The toolkit approach is a good option when you have to present short pieces of content that belong to the same category, but are quite independent from each other. The content pieces can be descriptions of tools, steps of a procedure, stages of a process, or frequently asked questions on a given topic.

Learners are invited to navigate the toolkit in a non-linear fashion, since a logical order is not necessary and learners may only be interested in some of the tools.

Tips for developing a toolkit lesson

➜ Provide an introduction before the menu page with an overview of the various tools, to orient learners in selecting the menu options.

➜ Present each tool in a systematic way, such as by providing the same categories of information (e.g. description; purpose; example; strengths; weaknesses) for each tool.

Toolkit lesson

This short lesson illustrates the main characteristics of several food security indicators used by the Integrated Food Security Phase Classification.

Learners can access indicator descriptions from the menu screen. Each indicator is presented in a systematic way by providing main features, potential applications and limitations.

IPC INDICATORS FOR FOOD SECURITY OUTCOMES

IPC INDICATORS

FIRST-LEVEL OUTCOMES: FOOD CONSUMPTION AND LIVELIHOOD CHANGE	SECOND-LEVEL OUTCOMES: NUTRITIONAL STATUS AND MORTALITY
DIETARY ENERGY INTAKE	GLOBAL ACUTE MALNUTRITION BY WHZ
HOUSEHOLD DIETARY DIVERSITY SCORE (HDDS)	GLOBAL ACUTE MALNUTRITION BY MUAC
FOOD CONSUMPTION SCORE (FCS)	BODY MASS INDEX (BMI)
HOUSEHOLD HUNGER SCALE (HHS)	CRUDE DEATH RATE (CDR)
REDUCED COPING STRATEGIES INDEX (rCSI)	UNDER-FIVE DEATH RATE (U5DR)
HOUSEHOLD ECONOMY ANALYSIS (HEA)	FOOD SECURITY CONTRIBUTING FACTORS

IPC INDICATORS FOR FOOD SECURITY OUTCOMES

REDUCED COPING STRATEGIES INDEX (rCSI)   GO TO INDICATOR LIST

rCSI is an indicator of household food security based on five questions about **how households manage to cope** with a shortfall in food for consumption.

The score reflects current and perceived future food security status. With frequent data collection, rCSI can be used e.g. for monitoring and early warning purposes.

HOW TO USE IT FOR IPC

LIMITATIONS

You can see this lesson at: **https://elearning.fao.org/course/view.php?id=526**

7.7 Demonstration-practice method

What is the demonstration-practice method?
The demonstration-practice method is used to teach a procedure. You first demonstrate the procedure, then you ask the learner to practise it by interacting with the system.

When should the demonstration-practice method be used?
This method can be used to teach procedures, typically software procedures.

Tips for developing a demonstration-practice lesson

➜ You can use an animation (e.g. a flash animation) to demonstrate the procedure. This should be accompanied by a detailed verbal explanation, in the form of written text or audio comment.

➜ Allow the learner to control the animation by providing play, pause, stop and reload buttons.

➜ Develop an operational simulation to have learners practise the procedure.

➜ The operational simulation allows the learner to perform a number of actions (e.g. selecting options or typing text). If the learner performs a wrong action, the system provides an error message; if the learner performs the right action, the system allows him or her to go to the next step, until the end of the procedure.

Below you can find an example of a lesson using the demonstration-practice method.

EXAMPLE

E-learning lesson using the demonstration-practice method
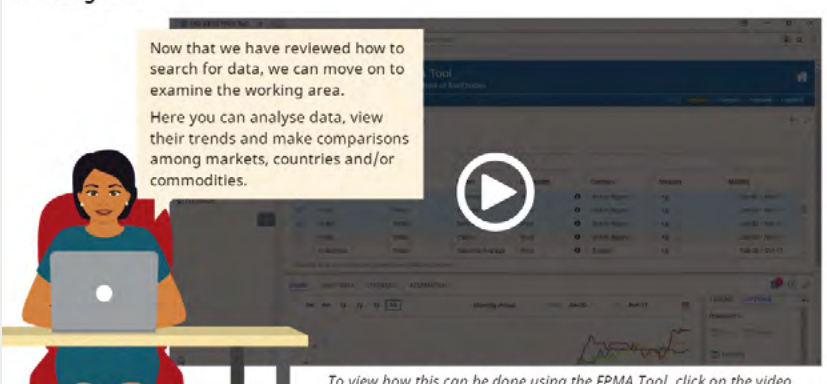
The lesson teaches how to analyse prices using the Food Price Monitoring and Analysis Tool.

The lesson is divided into several steps. At each step, the task is presented both verbally and through software animation with voice-over...

...then the learner is asked to perform the task by interacting with the system.

The system provides specific feedback on incorrect choices, or final positive feedback if the learner makes no mistakes.

Working area
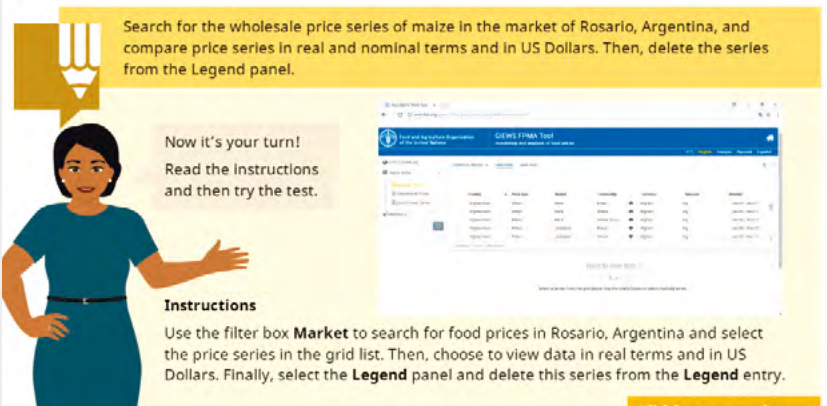
Now that we have reviewed how to search for data, we can move on to examine the working area.

Here you can analyse data, view their trends and make comparisons among markets, countries and/or commodities.

To view how this can be done using the FPMA Tool, click on the video
You can also read the detailed instructions of the procedure illustrated in the video in the corresponding PDF file from the "Resources" tab at the top of the page.

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Nominal and real prices

Search for the wholesale price series of maize in the market of Rosario, Argentina, and compare price series in real and nominal terms and in US Dollars. Then, delete the series from the Legend panel.

Now it's your turn!
Read the instructions and then try the test.

Instructions
Use the filter box **Market** to search for food prices in Rosario, Argentina and select the price series in the grid list. Then, choose to view data in real terms and in US Dollars. Finally, select the **Legend** panel and delete this series from the **Legend** entry.

Click here to start the test

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You can see this course at:
https://elearning.fao.org/course/view.php?id=362

7.8 Storytelling

What is storytelling?
Storytelling provides information through a story narrative that places content in a realistic context and illustrates the actions and decisions of one or more characters. It can use illustrations, pictures or video sequences.

When should storytelling be used?
The storytelling technique can be useful when you need to:

- provide job-specific knowledge;

- describe complex processes, where different actors perform different actions. The story can clarify who does what and helps learners to follow the flow of events;

- add a human aspect to the lesson, since learners can follow the stories of real people; and

- highlight the usefulness of the knowledge, since storytelling allows you to show how this knowledge can be integrated into a real situation.

Tips for using storytelling

→ Create a realistic and credible context. This is important for motivating learners, as it enables them to identify with the characters in your story. Learners need to feel that the story is similar to their own experience, and that the challenges faced by the characters could also happen in real life. This will help them to appreciate the usefulness of the knowledge that you are presenting.

→ Characters do not need to be present in every screen. 'Story screens', which show characters' actions and dialogue, can be alternated with 'theory screens' – i.e. screens providing concepts and guidelines. Story screens can be used to focus learners' attention on specific issues. For example, you can use them to:

- introduce a new topic: a story screen can present a topic (e.g. a specific task or a new problem that characters have to address), which is then followed by two or three theory screens to illustrate that topic; a story screen can then

be used again to introduce the next topic;

- illustrate critical actions or decisions – a story screen can describe important actions and decisions that often lead to common mistakes and doubts;

- develop practice exercises – a story screen can be used to ask the learner questions about the story, applying guidelines to that specific situation.

→ Be careful about gender and cultural issues when developing your characters. Know your target audience to better define the story characters' geographical provenience, names and style of dress. Dialogue among characters should be gender- and culture-sensitive.

→ Try to make dialogue realistic by keeping sentences short and using informal language. Complex explanations should be provided in theory screens, rather than included in a dialogue.

The following is an example of an e-learning course using storytelling:

EXAMPLE

E-learning course using storytelling

This course 'How to monitor and promote policy changes on governance of tenure' provides guidance for monitoring government implementation of the principles for responsible governance of natural resources tenure. The course mainly addresses representatives of civil society and NGOs.

The course starts with a short description of a scenario in which a community of fishers asks the help of Maricel, who works for an NGO promoting legal recognition of subsistence fishers. Maricel will have to set up a monitoring initiative with the support of Kamal, a monitoring expert.

Lesson 1 Introduction. Land monitoring as a tool for change in governance of tenure
The background

The local fisherfolk have reached out to local non-governmental organizations (NGOs) and international organizations to support them in addressing this situation.

Maricel works for an NGO promoting legal recognition of subsistence fisherfolk so that their access to fishing in local waters can be guaranteed.

Kamal is a data analyst with extensive experience in monitoring initiatives. He is collaborating with Maricel's NGO to promote a serious monitoring and evaluation of the reconstruction operations.

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7.9 Case-based scenarios and serious learning games

What are scenario-based and learning game approaches?

Case-based scenarios are built around a plausible situation. Typically, the scenario is a situation that presents a realistic challenge. Unlikely storytelling, this approach implies that the learner is the main actor, who must respond to the challenge by making a series of choices and decisions. Feedback is provided to the learners for each option.

Using branched scenarios can be an effective way of using this approach, as the feedback to learners' choices is provided through a follow-up situation that produces more choices, thereby showing the effects of learners' decisions.

Serious learning games can be considered as a specific type of experiential simulation that involves a competitive component, a challenging goal and a set of rules and constraints.

If resources allow, scenario-based content and serious learning games can also make use of virtual reality.

When should scenario-based and serious game approaches be used?

This approach allows learners to learn strategic principles by applying them to a concrete situation and observing the consequences of their decisions.

The scenario-based approach can be useful when you need to:

■ develop problem-solving or interpersonal skills;

■ teach strategic principles rather than conceptual and factual knowledge; or

■ develop an interactive exercise at the end of a conceptual unit, i.e. as a practice lesson following a set of lessons that provide underlying concepts and principles.

The two characters are used to introduce the various topics throughout the course, and, at the end of each lesson, their story is used as an example, to show the application of the theory to a concrete situation.

You can see this course at:
https://elearning.fao.org/mod/scorm/player.php?scoid=585&cm=329

This type of approach requires strong collaboration between the instructional designer and the subject matter expert, as the former needs to have enough information to design a realistic situation, provide learners with the information for the decisions that they must take, and provide appropriate feedback on their choices.

Tips for using a scenario-based approach

→ Involve a subject matter expert in the creation of a scenario, which must be work-realistic, relevant and credible.

→ Make the scenario engaging and immersive. This can be made by using images, characters, short videos, and defining challenging situations that motivate the learner to take action, for example a mismanaged situation that needs to be repaired.

→ The trigger event, i.e. the initiating event that sets the scene for scenario, should mimic the reality of the learner.

→ To respond to the challenge, the learner will have to make a series of decisions. The subject matter expert can help you to understand which decisions a person would make in that situation, and can share different experiences and possible outcomes.

→ Each critical decision will have possible choice options. Choices should not be obvious. Provide detailed feedback for each option by commenting on the choice, or showing its consequences.

→ To make the various decisions, the learner will need some information on the situation. Make sure to provide the learner with all the information required.

→ Avoid creating too complex scenarios that include unnecessary information.

→ The information can be provided as part of the scenario description, or it can be made available on demand, so that learners can freely explore and interpret it.

→ Additional support can be provided to help learners to make the right decisions, for example through checklists, guiding questions or tips.

→ If developing a serious game, develop rules of play and formulate the content in terms of outcome rules and strategies (Allen, 2016).

Below are two examples of courses that use a scenario-based approach.

EXAMPLE

A scenario-based e-learning course on conducting nutrition situation analysis

The course *How to conduct a nutrition situation analysis* uses a scenario-based approach to illustrate the activities required to carry out an analysis of the nutrition situation in a given area, so as to improve the design of agricultural programmes.

The course starts with a trigger event: a call to action to revise the design of an agricultural programme, in a fictional country called Namambar.

The Maize Intensification Programme (MIP)

We need your help to revise the design of a programme that focuses on increased maize production.

Hello! This is Jaden from Namambar.

Let me give you some background information on the situation...

Click to start

This is followed by some background information on the area. An evaluation team is discussing the impact of the previous programme on the nutritional status of the population. The results are not satisfactory, but there is good news: the donor will be financing a second phase of the programme with a stronger focus on nutrition.

The learner has been appointed as nutritional focal point for this phase; his/her task will be to conduct a nutrition situation analysis.

Malnutrition factors

This is because there are many other factors influencing the nutritional status of a population besides staple crop production.

Right. If we want the programme to positively impact nutrition, we need to consider those other factors and address them when the programme is being designed.

The task involves collecting data from different information sources, analysing them and drawing conclusions on the nutrition situation of Namambar.

During the course, the learner will visit different areas of Namambar to interview key informants and make decisions on what to include in the final report.

By clicking on the icons at the bottom of the page, the learner can consult a series of guidance tools whenever required. These include job aids (guiding questions and information sources), tips from the coach, tools for the analysis, and a course map.

In Namambar

The programme has had an impact on both rural and urban areas of the province of Western Namambar. Let's take a closer look...

You can see this course at
https://elearning.fao.org/mod/scorm/player.php?scoid=911&cm=704
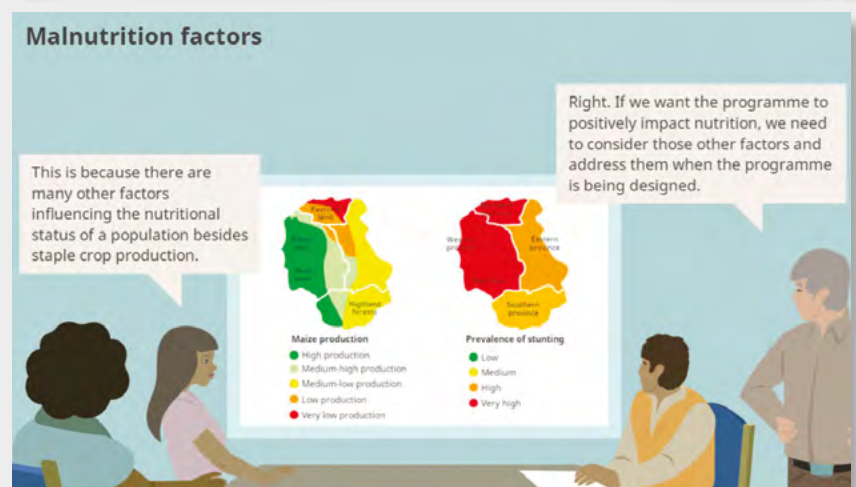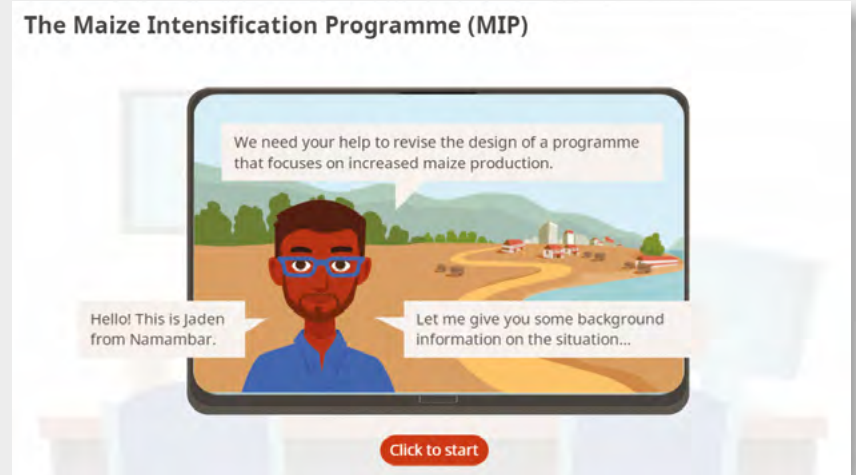
EXAMPLE

A scenario-based assessment on co

The mobile-responsive course *Investing responsibly in agricultural land* illustrates a series of principles that private investors should follow in order to invest responsibly in agricultural land. The course ends with a scenario-based test, where the learner is asked to apply those principles to a concrete case.

At the beginning, the case is presented to the learner.

The learner is asked to choose his/her avatar before starting the scenario.

INVESTING RESPONSIBLY IN AGRICULTURAL LAND

ARE YOU A RESPONSIBLE INVESTOR?

You are the director of a large international rubber company.

Your company is considering a new investment in a developing country, where it has not previously operated and that your research team has identified as having great potential for rubber.

You have planned to establish a top-quality rubber trees plantation and build a processing facility.

This investment could be very profitable for your company.

Will you be able to apply the VGGT principles and take the right decisions to conclude a responsible investment?

If you reach the threshold of 75 points, you will be granted a digital badge certification for this e-learning path "Investing responsibly in agricultural land".

Choose your avatar to get started.

George

Sophia

Start >

nducting responsible investments

INVESTING RESPONSIBLY IN AGRICULTURAL LAND

Are you a responsible investor?

Meeting at the National Investment Promotion Agency

You have contacted the national investment promotion agency (NIPA), the government's "one-stop-shop" for foreign investors, asking their assistance for leasing some land.

On the basis of your preliminary project design, **you need about 1,200 hectares to establish a rubber plantation** that can provide enough latex to keep the rubber processing plant operating at full capacity.

Today you have a meeting with Abena, the person at NIPA assigned to work with you.

Watch the video below and then scroll down to answer a question. If you prefer to skip the video, you can read the dialogue between you and Abena by clicking the button below the video.

Video transcript

Which of the investment options proposed by Abena do you consider less risky and thus a better potential option for your investment project?

○ The land formerly used by the state-owned company

○ The land partly occupied by the two communities

Submit >

At each step, the learner is provided with case information and is invited to meet some key stakeholders through a video.

Based on the information collected and on the principles learned in the previous course units, the learner can make his/her decision and proceed in the scenario.

A score and succinct feedback is provided for each choice.

The final score will determine whether or not the learner has passed the test.

You can see this course at:
https://elearning.fao.org/course/view.php?id=514

7.10 Gamification

What is gamification?
Gamification is the inclusion of elements and techniques that are typical of games, such as:

- points

- levels

- rewards

- timers

- badges

- competition.

Adding game elements can increase motivation to engage in learning events. This should not be confused with developing serious learning games, which are designed to develop strategic skills by allowing learners to make decisions and witness the consequences of these, as described in the previous chapter.

When should gamification be used?
There are no specific restrictions on the use of game features in e-learning. They are very easy to implement with authoring systems. However, it is important to use gamification exclusively to support learning objectives; otherwise they risk becoming distractions. In addition, it should be remembered that: "*gamifying e-learning doesn't substitute for an effective instructional approac*h" (Allen, 2016, p.366).

7.11 Microlearning

What is microlearning?
Microlearning is a recent concept that can particularly apply to those contexts where professionals have limited time for learning, although they are expected to constantly acquire new information and apply new knowledge.

Microlearning is short-form content that can provide learners with just-in-time information. Specifically, it can be defined as content that addresses one main learning objective, and can be consumed in less than 10 minutes.

Microlearning characteristics, including its brevity and design for just-in-time learning, make it particularly suited to delivery on mobile devices.

Microlearning materials do not differ substantially from those described in the previous sections. They can consist of simple text-based resources, or short e-learning courses that apply some of the techniques, graphics (including infographics), audio or video elements described so far. The key difference, in terms of format, is that microlearning materials are shorter and may be less interactive than other e-learning materials.

Examples of microlearning include:

- short documents (max five pages), especially suitable for technical content that learners can easily browse;

- job aids (checklists, guiding questions, templates, if-then diagrams, etc.);

- short e-learning courses (max 10 minutes), that can use different media, including audio and video; unlike standard e-learning lessons, these may not need practice questions and exercises;

- short quizzes (questions & feedback);

- short videos;

- infographics, which are quick to understand; and

- short podcasts, i.e. audio recordings.

When should microlearning be used?
Microlearning can be used as a stand-alone piece of learning; to complement other types of training – for example to reinforce prior learning or prepare for a training event (especially for technical training); as a performance support tool to be used on the job; or to keep learners updated on a matter with which they are already familiar (Torgerson and Iannone, 2020).

7.12 In summary

Key points for this chapter

→ Analysing the different types of knowledge elements to be included in an e-lesson can help the instructional designer to present the content effectively, so as to facilitate understanding by learners.

→ Using examples is crucial, especially where conceptual knowledge has to be understood, as they can help to bridge the gap between theory and practice.

→ Practice and assessment tests facilitate the achievement of learning objectives. In self-paced e-learning, practice exercises and tests mainly consist of questions linked to response options and feedback. Questions should be created for critical topics or tasks, and should use explanatory feedback to reinforce learning.

→ Different media can be used to illustrate content. It is essential to use them appropriately to avoid overloading the working memory of learners.

→ A range of instructional techniques can be used to present content. You may want to add gamification features or a pedagogical agent to guide the learner through the content and add a human presence. Alternatively, you can use techniques aimed at developing skills, such as storytelling, case-based scenarios and serious games, demonstration-practice methods, or even a toolkit approach to support rapid information finding.

→ Microlearning is short-form content that can provide learners with just-in-time information. Its characteristics make it particularly suited to delivery on mobile devices.

8. Courseware development

Which tools should we use to create interactive e-learning courses?

Clara, the training manager, is evaluating whether to use one of the existing authoring tools to make the course interactive and publish it online.

The development team will use this tool to create the final interactive e-lessons.

This chapter provides information on the last step of the development stage, the creation of the final interactive courseware. The chapter will illustrate the following topics:

➔ authoring tools to produce e-learning courseware;

➔ authoring tools for mobile learning; and

➔ how to select the right authoring tool.

8.1 What does courseware development involve?
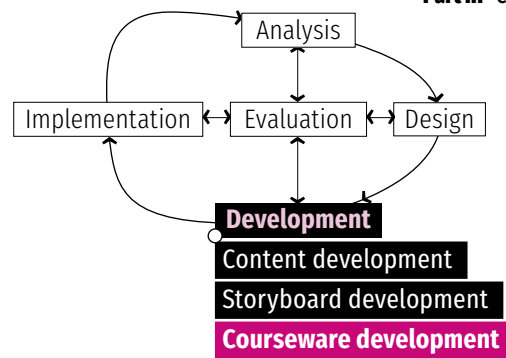
Courseware development can involve several activities. Specifically, these are:

➜ the creation of a graphical layout for the course, including graphical user interface and recurrent elements such as icons and standard pages (e.g. lesson cover, introductory page, test pages, summary page);

➜ the development of media (audio, video, animations, illustrations) and interactivity for each screen; and

➜ quality assurance testing.

The effort and time required at the courseware development stage depends on how complex your interactive content is, and the combination of tools and media that are necessary for its creation. Nowadays, a variety of tools are available to support the creation of the course, as well as the development of specific media elements.

8.2 Authoring tools

The e-learning authoring tool market offers numerous options for educators to assemble a range of diverse features, such as text, illustrations, animations, audio, video and interactivity, to create their own courseware.

E-learning authoring tools significantly reduce the time and cost related to content production, thanks to rapid authoring features such as the WYSIWYG editing space or multiple output preview. Eliminating the technical complexity of writing codes and scripting in a programming editor, these are suited to independent authors, e-learning professionals and educators.

At the simplest level, presentation tools, such as PowerPoint (PPT) or even word processors, are regarded as e-learning tools. Nevertheless, their limited interactive features, linear navigation structure and lack of support for e-learning standards, make such tools unsuited for learning management systems to track user progress and completion.

In their early phases, many authoring tools were simple PowerPoint 'add-ons', able to convert a set of slides directly from PowerPoint. For example, iSpring Converter Pro[20] or Presenter360[21] are commonly used to rapidly convert PPT presentations to highly engaging, interactive e-learning courses.

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20 www.ispringsolutions.com/ispring-converter

21 https://articulate.com/

EXAMPLE

Presenter360

The **Articulate** tab is nested inside the PowerPoint ribbon. This add-on extends the interaction capabilities of presentation-based slides and transforms them into online or mobile courses. A variety of elements could easily be embedded in slides, such as: video/audio, media files, web objects, quizzes, surveys, decision making activity and other interactive content.
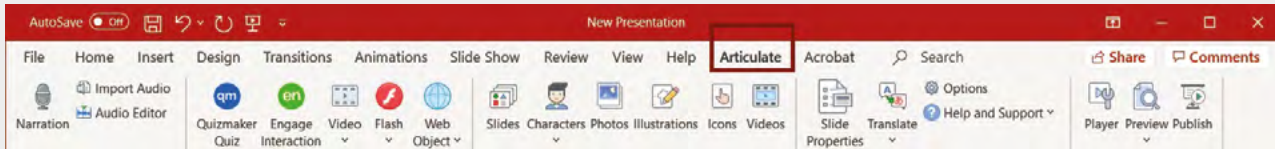
In addition, the Presenter360 responsive player dynamically adapts to every screen size and optimizes screen real estate. It offers different publishing formats and outputs, such as HTML5, Flash, PDF or CD-ROM. Outputs are compatible with standards such as SCORM 1.2, SCORM 2004, AICC and Tin Can.

iSpring Converter Pro
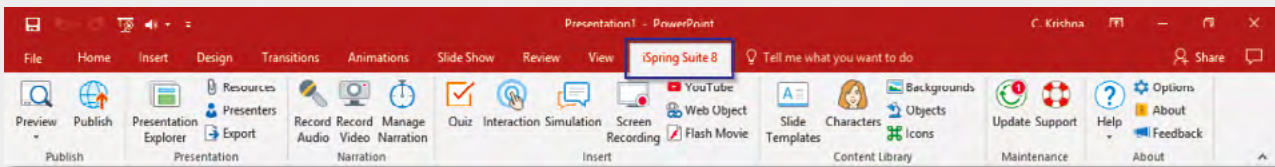
iSpring Converter Pro is shipped as a PowerPoint add-in. The iSpring installer adds a tab to the PowerPoint ribbon, where you can convert your presentations to HTML5.

Adobe Captivate[22] (now part of the complete toolbox for developing professional e-learning content) was born as simulation and demonstration software, but with its object styles and rich interactive elements, it has now evolved into a multipurpose development tool.

Authoring tools fall into many categories, depending on their features, level of customization complexity and installation site (i.e. desktop or cloud), ranging from simple PowerPoint converters, built-in tools inside LMS (such as eFront[23] or aTutor),[24] to powerful stand-alone packages that give educators the freedom to create the entire e-learning course within just one integrated toolset.

Some core functionalities of authoring tools include:

- **navigation**
  linear or custom navigation, menu-driven content and ability to move throughout the content;

- **simple and conditional branching**
  ability to move to another course section based on the result of if-then decisions or events;

- **editing**
  content publisher for easier changes/updates;

- **visual programming**
  use of buttons, icons, drag-drop graphics;

- **media capabilities**
  insert, modify, store, trigger audio, video image assets;

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[22] www.adobe.com/products/captivate/

[23] www.efrontlearning.net/

[24] http://atutor.ca/

- **assessment features**
  use of a variety of question types, question randomization, assessment tracking;

- **animations and interactions**
  for a more engaging experience, enhancing the instructional value;

- **templates, skin types**
  formatting, modifying, sharing templates to personalize the course;

- **programming with a scripting language**
  support scripts to collect user input and responses, create triggers;

- **preview**
  ability to see or test an ongoing project;

- **cross-platform interoperability**
  able to run on all platforms;

- **cross-browser interoperability**
  able to run on different browsers;

- **integration**
  with leading e-learning applications and compliance models, such as Sharable Content Object Reference Model (SCORM) and Aviation Industry CBT [Computer-Based Training] Committee (AICC), for LMS delivery;

- **multiple publishing options**
  SCORM for LMS, Web, CD-ROM, mobile and MS Word; and

- **localization and multilinguals**
  to easily localize course content.

Navigation options

Enabling the learner's control over the process is particularly relevant in adult learning. Navigation is the ability to consume the content in a certain order, usually intended by the course creator. Typically, one of the simplest authored navigations makes it possible to control pacing within a lesson and move from one instruction to another with the use of next/previous swipe/buttons. Using responsive HTML5 tools, content is scrollable and displayed vertically on mobile devices. Alternatively, learners can use menu navigation, when selecting specific lessons and topics within the course. Ultimately, instructors can also enable learners to use non-linear navigation, allowing them to select their own order of information and activities, as opposed to the one displayed on the screen, so as to have a more personalized learning experience.

The SCORM model

In order to be appropriately uploaded and made accessible from an LMS, e-learning lessons and courses must conform to a set of technical and instructional standards.
For example, SCORM (Sharable Content Object Reference Model) encompasses the following standards:
- packaging standards that allow courses to run under different LMSs;
- runtime specifications on how LMSs can launch courses, and how they report results back to the system;
- metadata standards to create and publish metadata records about courses, lessons and topics.

Authoring tools are rapidly evolving and revamping their features. For example, rich **asset libraries**, now integrated in many authoring suites, offer a set of customizable and professionally ready-made templates and skins, illustrated characters, royalty-free images, videos, interactions, assessment templates, etc. for more engaging and visually consistent learning experiences. Also, some authoring environments contain a basic media editor to create, edit and/or modify images, video or audio components. This feature enables course creators to easily modify media files with no need to use dedicated software. In addition, some online user-friendly hosted services, such as those set up by the Articulate Online or Course Lab communities, allow content to be published, delivered and tracked online. In this case, hosted services act as LMSs and allow educators to set course parameters, structure and eventually invite other users to view published courses.

Storyline 360 publishing options and formats

Storyline 360 publishing options include: web, hosted online service, video, LMS, CD or MS Word.

Adobe Captivate 2019 publishing options and formats

This tool publishes non-responsive projects for computers, and responsive projects for devices that support HTML5 and can be easily adjusted to various screen sizes, such as tablets and smartphones.

8.3 Authoring tools for mobile learning

Mobile learning (m-learning) and microlearning are growing trends in the e-learning sector.

Modern authoring tools can create device- and platform-friendly learning content. Thanks to the industry-leading HTML5 format, e-learning projects that are primarily designed for desktop/laptop layout can easily be adapted to different mobile device screen size and orientation.

Some mobile-first authoring tools, such as Rise360[25], Elucidat[26], Gomo[27], Lectora[28], DomiKnow[29], Adapt[30] and Upside learning[31] use Fluid Boxes design functionality to make e-learning projects fully responsive and scalable. Content is fluidly repositioned, restructured and readjusted on small or large mobile devices.

EXAMPLES

Responsive authoring tools

Mobile Portrait
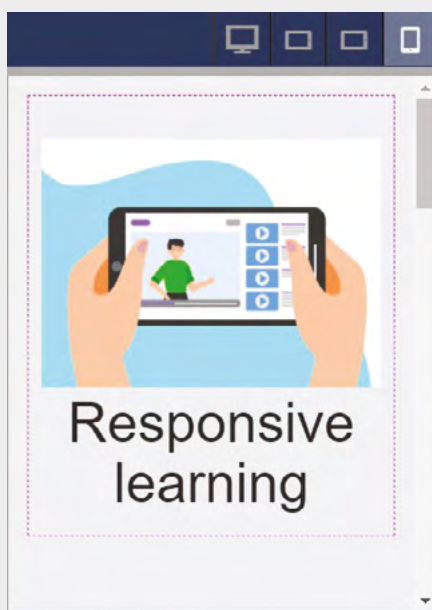
DominKnow | ONE authoring tool – Screen size responsive behaviour: responsive buttons simulate the project appearance for each device.
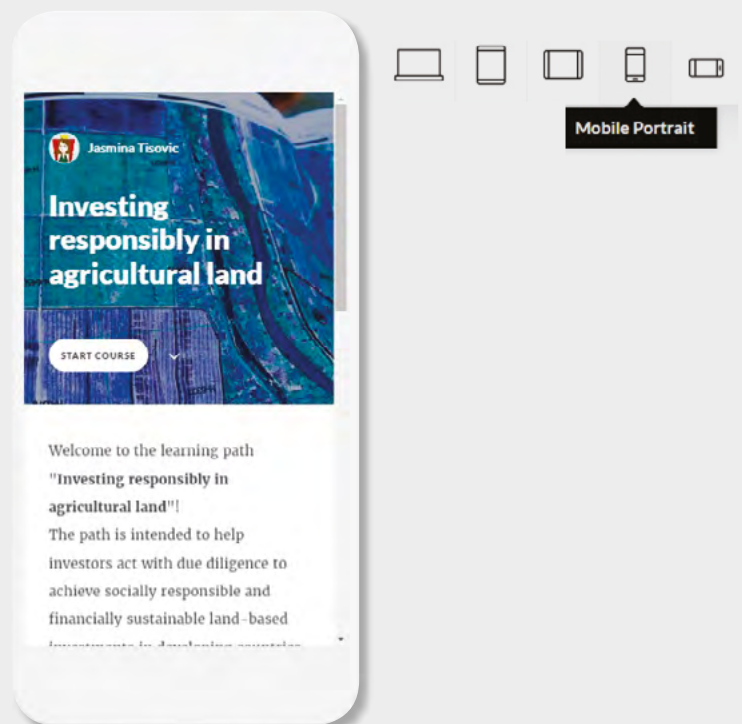
Rise 360 authoring tool – simple and elegant drag-and-drop block builder. Instead of a traditional 'Next' button, the tool uses a 'Click here to view more' arrow to navigate vertically through a course.

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25 https://articulate.com/360/rise

26 www.elucidat.com

27 www.gomolearning.com

28 www.lectoraonline.com

29 www.dominknow.com

30 www.adaptlearning.org

31 www.upsidelearning.com

8.4   Selecting an authoring tool

There is no right or wrong authoring tool – the best choice is the one that meets your business needs and supports your instructional approach.

Before identifying a suitable solution, an organization must have a thorough understanding of its training goals and objectives, as well as the learners it aims to reach and the variety of content types it seeks to develop. Selecting e-learning authoring tools is a long-term investment, so it is important that the best fit is not only suitable for current authoring needs, but also for business challenges and opportunities in the future.

To accomplish this, an organization needs to take into consideration the learners' needs and goals, for instance, their geographical location – whether they live or travel in remote areas, their age, gender, cultural/educational level, bandwidth potential, preferred device, difficulties that they may face with some technologies, etc. A clear vision of who will consume the learning is fundamental to understanding the detailed core functions and abilities of a potential e-learning tool, so as to create the desired educational resources. For instance, it may be important to consider if the tool is able to create sufficiently effective and engaging videos and/or simulations, or perhaps, personalized learning paths, rich media content, simple slides or mobile apps.

The following are some important factors to consider in order to make the right choice. Items are not ranked according to their importance and the list is not exhaustive; many other decisive elements (such as localization abilities for multilingual content or mobile device output) could also be examined:

➜ **Authoring features and functions**
   The starting point when it comes to a tool selection is to create a requirement list, grouping all must-have prerequisites and functions required to support desired instructional patterns. If an organization opts for its own code-based authoring tool, the requirements list may serve as the software requirements specifications. For off-the-shelf solutions, the must-have requirements list can be compared with the products' features. Almost all vendors give detailed descriptions of their product's main characteristics and components, organize demonstrations and offer trial versions.

➜ **Ease of use**
   The more user-friendly and intuitive an authoring tool is, the more likely that a pool of potential authors can grow. In this context, a good combination of rapid functional advantages that do not require advanced technical knowledge may speed up the production process and facilitate educators when creating content that meets evolving learner needs, such as rapid editing through a content publisher, robust panel management features, intuitive paths for performing authoring functions, a library of reusable components, templates, graphical assets editing, etc.

➜ **Pricing and plans**
   The available budget should match the licence/subscription cost or development cost if an organization opts for its own authoring tool. Some key considerations related to budgets for the tool are: installation/deployment options, i.e. whether the tool is installed locally, on a specific device, or accessed from a web browser; upgrading and updating modalities; number and volume of projects; whether it allows collaborative or team authoring – multiple authors working together on a single project, etc. Rapid tool vendors have developed a range of pricing and subscription-based services to accommodate practically any business need: pay per author, pay per audience, pay per project, pay per gigabyte; perpetual, one-time, limited time licence, volume and upgrade discounts, etc. Freeware authoring tools may also be an option for tight budgets or for a limited number of projects.

It might be worth considering a freemium, a recent business model whereby basic functionalities are granted free of charge, while updates, access to repository and add-ons are changed separately.

➔ **Packaging formats**
This feature determines the way that learning content is delivered and made ready to be consumed by the end users. The output format should be packaged to run smoothly, not only on the organization training delivery infrastructure, but also on the user operating system and browser. Output packages are mainly determined by an organization's training delivery methods and needs. Options may include SCORM packages for training methods via LSM; CD-ROM or printable formats to reach learners with low or unstable connectivity; and offline mobile learning apps for a workforce travelling in remove locations. Video (or work-related video) that combines visuals with learning information can be a strategic method to increase retention levels. MOOCs and virtual classrooms make use of text, video and other formats.

Mobile learning is a relatively new delivery method for 'anytime, anywhere' learning. According to the current trends and growing demand, learners expect an identical browsing experience on the multiple end devices that they use (PC, tablet or smartphone). In order to fulfil learners' expectations, it is important to consider whether content can be delivered satisfactorily on any or all of these devices.

➔ **Industry/community support and training**
Having 24/7 support available worldwide is essential for troubleshooting, problem-solving and acquiring useful tips. Also, the more widely-used tools are supported by online forums and user groups and blogs, which provide free technical support to users, publish manuals and guidelines and organize web seminars and online classes. Some examples of product communities include: Articulate Community,[32] CourseLab Community,[33] Adobe Captivate Community,[34] Elucidat Blog[35] and Lectora blog.[36]

Robust support documentation, including tutorials, examples, references and user material is essential. In addition, many vendors deliver web-based or on-site customized training sessions.

➔ **Collaborative or individual authoring**
Some complex development projects require centralized development in terms of multiple author collaboration, as opposed to individual authoring and sequential tasks. Similarly, a good production workflow must support content creators to interact and share content and collect consolidated feedback from reviewers, SMEs and other stakeholders. It is also worth considering whether to choose a collaborative or individual workflow system, as this not only determines the installation type of the potential tool, but can also streamlines the review/approval process and cut down on production time.

➔ **Courseware production team**
The number of team members, their skillsets and ability to handle different tasks are decisive factors when it comes to selecting or developing the tool. Rapid authoring tools covering all authoring needs are ideal for tight budgets, quick turnround projects, and/or teams without dedicated specialists in courseware design. Certain training formats or complex custom interactions require the use of highly specialized tools with a steep learning curve. This means that content creators may have to invest time in becoming proficient

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32 www.articulate.com/community/

33 www.courselab.com/db/cle/forum.html

34 https://elearning.adobe.com/

35 www.elucidat.com/blog/

36 www.trivantis.com/blog

in performing a wide range of actions and understanding a tool's full potential. The adoption period can be quite challenging for creators, who will slowly progress to more complex authoring tiers as their skills mature.

➜ **Creative authoring**
This feature refers to the ability of a tool to accommodate a variety of interactions, navigation elements, branching, quizzes and other instructions in course design. Highly customizable tools facilitate the creation of elaborated content in a fast and easy way, allowing course creators to build a more sophisticated learning experience. Conversely, tools with poor customization capabilities can impose constraints on instructional creativity.

➜ **Accessibility features**
Web accessibility means that websites, tools, and technologies are designed and developed so they can be used by everyone, including users with disabilities (adapted from UNICEF 2021). The Web Content Accessibility Guidelines (WCAG) set standards and guidelines for the web and web technologies. Web applications and tools are increasingly integrating accessibility features such as compatibility with screen readers, keyboard shortcuts, text alternatives for any non-text content (images, buttons, graphs), closed captioning for audio and video segments.

➜ **Integration**
This specifies whether a tool is compatible with leading LMS and/or other software, such as PowerPoint, or other media programmes and tools.

Specialized reviews and e-learning research institutes regularly perform exhaustive studies of all the currently available authoring tools. They establish criteria to guide you through the selection process and provide profiles and information on each tool's authoring process and rapid development features. Some examples include:

- The eLearning guild[37]

- The Centre for Learning and Performance Technologies[38]

- The Brandon Hall Group.[39]

8.5 In summary

Key points for this chapter

➜ Courseware development may involve the creation of graphical layout for the course, the development of media and interactivity for each screen, and quality assurance testing.

➜ Nowadays, a variety of tools support course creation, as well as the development of specific media features.

➜ When selecting your authoring tools, consider important factors such as team expertise, development costs, desired output, creative freedom and community or vendor support.

[37] www.elearningguild.com

[38] http://c4lpt.co.uk

[39] www.brandonhall.com/totaltech

Part IV
Managing and facilitating learners' activities

In facilitated online courses, several content elements and activities are organized into a chronological course that is scheduled and led by a trainer and/or facilitator through an online learning platform. E-learning content for individual study can be integrated with an instructor's lectures, individual assignments and collaborative activities among learners. Learners, facilitators and trainers can use discussion forums, chats, polls, whiteboards, application sharing and audio and video conferencing to communicate and work together. A variety of exercises and assignments can be used to measure learning. This section provides an overview of online collaborative learning activities and facilitation tasks, and how online communication tools can be used for e-learning. It also reviews learning management platforms that can host your course.

Analysis

Implementation   Evaluation   Design

Development
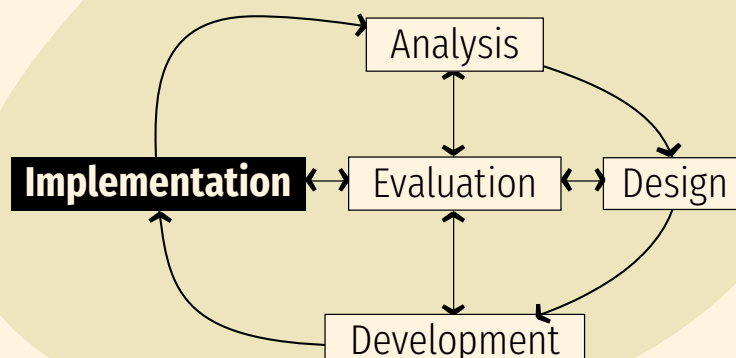
9. Delivering an online facilitated course

How will we manage and facilitate the course?

Sandra is a virtual facilitator. She has experience in designing and conducting online workshops and courses.

She will use synchronous and asynchronous communication tools to facilitate knowledge sharing and collaboration among learners.

This chapter provides guidance on how to manage learning activities in a facilitated online environment. It introduces the following topics:

➜ the facilitation team;

➜ preparing a facilitated online course;

➜ components of an online course;

➜ online facilitation tasks; and

➜ using synchronous and asynchronous communication tools.

9.1 The facilitation team

Analysis

Implementation — Evaluation ↔ Design

Installation and distribution

Development

Managing learners' activities
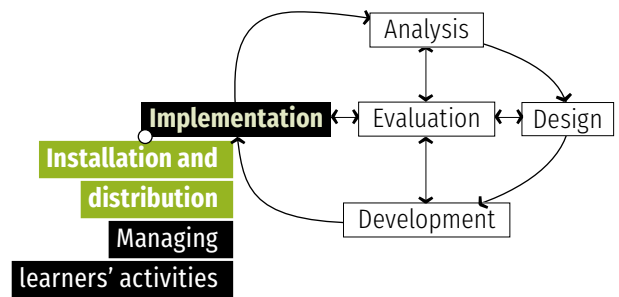
Different people with different skills are required to organize and deliver a successful online course. These are the key figures who should be involved.

- The **project manager** is responsible for the overall course, leads the participants' selection process and coordinates the team.

- The **instructional designer** works in collaboration with the subject matter expert (or trainer) and facilitator to design course sessions and learning activities, and – where required – e-learning content to be used in the course.

- The **subject matter expert (or trainer)** acts as an online instructor, leading or supporting online classroom activities. He/she can prepare and present material, assign tasks to participants and answer their questions.

- The **online facilitator** supports participants' learning activities, motivates learners during the course, and facilitates and mediates participants' exchanges.

- The **learning management system administrator** creates the course in the learning platform, manages learners' subscriptions and provides technical support.

- If development of e-learning materials is required, **e-learning developers and graphic designers** can also be involved.

Online trainer (or subject matter expert) vs. online facilitator

Ideally the facilitation team should include both a trainer, i.e. an expert in the subject matter, and an online facilitator. In some cases, these two profiles can be covered by the same person. However, it is important to note that the two roles have different tasks.

The subject matter expert is primarily involved in providing guidance on the subject, explaining concepts and principles and providing context-related examples, with the aim of supporting the acquisition and retention of knowledge.

9.2 Preparing the online course

Online courses are usually organized into sessions, which can be taken over one or more days, depending on the duration of the course and on participants' availability.

If the course is asynchronous, during a given session, participants can complete the learning activities at their own pace and from anywhere they like, but in general within the days assigned to that specific session. If live sessions through an audio or video conference are planned, participants will have to be present at the time required.

Learning about participants

As stated in Chapter 3 of this guide, the analysis phase is crucial for any e-learning project. In online facilitated courses, where participants need to follow a schedule, and in some cases to participate in live sessions, it is particularly important to understand factors related to the learners, such as the geographical area where they live, their mastery of the course language, the amount of time that they can dedicate to e-learning, their access to technology and the Internet, their computer skills and level of comfort with communication channels. It may be useful to prepare a questionnaire for prospective participants, to collect information on the above issues.

Planning learning sessions and activities

In designing the course, it is important to carefully plan all the activities (self-paced learning, discussions, assignments, quizzes, etc.) that will be part of it, and prepare the materials to be included.

The team should meet in advance to define the different course sessions and detail the activities that will be carried out in each session. If required, e-learning content will also be prepared, or existing content adapted to the specific needs of participants.

Developing a storyboard that describes all the activities for each session will facilitate the creation of the course on the learning management system. A Word document or an Excel spreadsheet can be used to develop the storyboard.

EXAMPLE

Storyboard for an online course on gender and land tenure

Storyboard for online course

Learning programme:
"Governing land for women and men" in KENYA Storyboard

Welcome

The learning programme **"Governing land for women and men"** has been designed to support countries throughout the world to achieve the goal of responsible governance of land tenure. We hope you will enjoy the programme, expand your network and increase your capacity to promote responsible governance of land in your country.

It is structured in **three components** that are closely connected and are built sequentially:

- An online workshop,
- A face-to-face workshop, and
- An online mentoring phase

Welcome to the first component of the learning programme: the online workshop!

ABOUT THE WORKSHOP

This online workshop will improve your knowledge about key issues of land tenure and gender equality that during the face-to-face workshop you can deepen and contextualize according to the reality of Kenya. In addition, this acquired knowledge will prepare you for the design of an action plan to support responsible governance of the land in your environment.

Online workshop duration:
The online workshop lasts from the 13th January to the 31st January 2020.

Workshop structure:
The workshop comprises six sessions. Each session will become accessible to you on the day it starts, according to the workshop calendar. Download the workshop syllabus for details.

Requirements for successful completion:
Each unit includes different learning activities: an interactive lesson, a short questionnaire and collaborative activities such as context mapping and discussions. To complete the workshop successfully and to be admitted to the face-to-face workshop, please carry out all the necessary activities for each unit, according to the calendar.

Please note: you are required to participate in the online discussion with at least three meaningful contributions.

Preparing for the course

Once the storyboard has been drawn up, and before the online course starts, several activities need to be carried out:

- If the course is being delivered on a learning management system, this will need to be installed. The course will be created on the LMS using the storyboard, and you will need to test all the functionalities.

- It may be necessary to train the subject matter expert and facilitator in using the LMS. For example, they may need to learn how to write in discussion forums, send messages, monitor participation, analyse quiz results and upload files. If live sessions are planned, they will have to become familiar with video-conferencing and any other online collaboration tools selected.

- You will need to enrol participants in the course and send them a message with log-in instructions, information on the starting date and calendar of activities, contacts for technical support and the facilitator's email. If possible, a kick-off event can be organized to introduce the course goals and the agenda. This should motivate the participants and provide an overview of the activities and methods that will be used throughout the course. The event could be an in-person meeting, or an audio or video conference.

- You will have to open the platform to participants. It is advisable to provide access to the platform a few days in advance, so that participants can become familiar with the course space and ask for assistance, if needed, before the course starts.

Session 1: Introduction to gender-equitable and socially-inclusive governance of land tenure
From 15th to 16th January 2020

Welcome to session 1!

You will learn about the concepts and principles of a gender-equitable and socially inclusive governance of land tenure.

You will also start working together to create a map of the country context in relation to gender and land issues. This is the foundation of our future activities in this course, and it is your essential preparation for the face-to-face workshop. Do get in touch with your facilitator or your trainer if you need clarification on any of the activities. Thank you, and enjoy the session!

Please note that when we talk about "gender-equitable land governance", we are also concerned about the different groups of women and men, such as older persons, or the very poor, or people with disabilities, or socially marginalized.

Enjoy the session!

Learning objectives
At the end of this session, you will be able to:

- Familiarize with the basic concepts of gender
- Understand the purpose of the Voluntary Guidelines
- Identify the features of responsible, gender-equitable governance of land tenure
- Understand the importance of equal rights to land for women and men
- Identify critical issues on gender equitable governance of land tenure in Kenya.

Lesson 1.1: Overview of gender concepts and principles
This lesson will provide you an overview of gender concepts that will be an essential basis for this learning programme.

Lesson 1.2: Introduction to gender-equitable governance of land tenure (30')
This lesson explains the meaning of responsible, gender-equitable governance of land tenure, and introduces you to the Voluntary Guidelines.

Quiz 1: Challenge yourself

Please complete all questions. The questions are based on Lesson **Introduction to gender-equitable governance of land tenure**, so please make sure that you have studied the lesson before attempting the quiz.

Q1
What is responsible governance of tenure?
1. It is the management of access to and control over natural resources, and thus of the rights and duties associated with land, fisheries and forests, in an equitable and responsible way.
2. It includes, among other things, how the competing priorities and interests of different groups of people in relation to resources are reconciled.
3. It is the way in which the government decides to assign land to different groups of people.

Feedback: correct 1,2
Responsible governance of tenure ensures recognition and respect for all tenure rights holders and their rights, and protection of all legitimate tenure rights against threats and infringements.

Q2
How would you describe the Voluntary Guidelines?

1. They are a set of recommended principles and practices on how to govern the tenure of land, fisheries and forests in an equitable and responsible way.
2. When adopted in a certain country, they replace existing laws, policies and treaty obligations in relation to governance of land tenure.
3. They have been drafted based on international consensus and on internationally recognized principles and good practices that are being used in various parts of the world.

Feedback: correct 1,3
The guidelines are voluntary, so they only apply if a country, or individuals or groups within a country, agree to follow them. They do not replace laws and treaties, nor do they reduce existing obligations under laws or treaties.

Q3
Which description of gender equality do you agree with?

1. Women and men enjoy equal rights, opportunities and entitlements in economic, social and political life in the State.
2. It advances the social status of women, at the expense of men.

9.3 Online course components

The following are typical components of an online course:

➜ pre-course learning activity

➜ cycle of learning events

➜ assessments

➜ feedback and conclusion.

Initial or pre-course learning activity

An initial learning activity can be proposed to participants before the course officially starts.

This pre-course activity could, for example, involve watching an introductory video or studying the first interactive lesson. It is important that the initial learning activity makes a good impression on participants, since it will be their first experience of the course and will help them to decide if they like it or not.

You may also ask participants to introduce themselves and upload their photo to their profile, so as to ensure a human connection.

This is a good opportunity for participants to get used to the online learning platform and for administrators to see if there are any technical problems. To help participants during this phase, it is critical to prepare a number of tutorials that explain the various activities and functionalities.

EXAMPLE

Pre-course activities in an online facilitated course on gender and land tenure

A few days before the course starts, a pre-course session provides access to introductory materials, support – including for connectivity issues – a forum for participants to get to know each other, and audio welcome messages.

Let's start

From 13th to the 14th of January 2020

Introduce yourself to the group
Let's get to know each other!

Welcome audios of your trainer and facilitator

Download the online workshop syllabus for details

Lesson: Introduction to the Voluntary Guidelines on Responsible Governance of Tenure (10')
This lesson provides an overview of the "Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security".

Video: Introduction to the Voluntary Guidelines on the Responsible Governance of Tenure
Click here is an introductory video about the Voluntary Guidelines.

The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security
Click here to download the complete version of the Voluntary Guidelines on the Responsible Governance of Tenure.

Downloadable version: if you have connectivity issues, click here to download the lesson

Cycle of learning events (core)

The course consists of a series of learning activities that can be scheduled on a weekly or daily basis. These may include self-study, as well as a range of individual and collaborative activities, such as:

→ **Reading, watching and self-study:** This can include different types of content, such as simple learning resources (documents and presentations), video and audio content, and interactive e-learning lessons. E-learning lessons enable the facilitator to track and control learners' behaviour, for example, seeing if they complete the lesson.

→ **Individual assignments and collaborative project work:** The facilitator asks learners to conduct project work or an assignment, either in a group or individually. Learners may also be asked to comment on each other's assignments. An assignment should be well-structured and possibly followed by a discussion on the strategies used to complete it.

→ **Sharing reflections:** Learners can comment and exchange ideas about course activities or contribute to group learning by sharing their knowledge about a specific domain.

→ **Asking questions:** Learners can ask specific questions to the facilitator or subject matter expert.

→ **Discussions initiated by the online facilitator:** The facilitator can ask learners from different organizations or contexts to give concrete examples of how the concepts learned during the course apply to their specific situations.

→ **Spontaneous discussions:** Discussions can be initiated by participants. It is important that the system tracks conversations so that online facilitators can review them afterwards and evaluate participants' involvement in the course.

EXAMPLE

Core learning activities in an online facilitated course on gender and land tenure

This course unit proposes a series of activities to participants: interactive e-learning lessons for self-paced study; a quiz assessing understanding of the lesson's concepts; and a forum to discuss the application of those concepts to participants' country contexts.

Introduction to gender-equitable and socially-inclusive governance of land tenure

From 15th to 16th January 2020

Welcome to session 1!

You will learn about the concepts and principles of a gender-equitable and socially inclusive governance of land tenure.

You will also start working together to create a map of the country context in relation to gender and land issues. This is the foundation of our future activities in this course, and it is your essential preparation for the face to face workshop. Do get in touch with your facilitator or your trainer if you need clarification on any of the activities. Thank you, and enjoy the session!

Please note that when we talk about "gender-equitable land governance", we are also concerned about the different groups of women and men, such as older persons, or the very poor, or people with disabilities, or socially marginalized.

Enjoy the session!

Learning objectives

At the end of this session, you will be able to:

- Familiarize with the basic concepts of gender
- Understand the purpose of the Voluntary Guidelines
- Identify the features of responsible, gender-equitable governance of land tenure
- Understand the importance of equal rights to land for women and men
- Identify critical issues on gender equitable governance of land tenure in Kenya

Lesson 1.1: Overview of gender concepts and principles
This lesson will provide you an overview of gender concepts that will be an essential basis for this learning programme.
Lesson 1.2: Introduction to gender-equitable governance of land tenure (30')
This lesson explains the meaning of responsible, gender-equitable governance of land tenure, and introduces you to the Voluntary Guidelines.
Quiz 1: Challenge yourself
Please complete all questions. The questions are based on Lesson "**Introduction to gender-equitable governance of land tenure**", so please make sure that you have studied the lesson before attempting the quiz.
Context mapping session 1: Critical issues in relation to gender and land
What are the critical issues in relation to gender and land in your country?
Discussion session 1: Critical issues in relation to gender and land
Please look at what the other participants have written in the context mapping exercise. What are your considerations?
Downloadable version:
If you have connectivity issues, click here to download the lessons.

Assessments

Some e-learning courses include a final assessment of learners, while others intersperse assessments throughout the course.

Assessments do not just measure learners' achievements; they can also provide learners with feedback and suggestions on how to improve learning during the course. In addition, they can be used by the trainer to revise future activities and adjust content and methods, based on the assessment results (Stein and Graham, 2014).

In a facilitated course, assessments can vary – they may consist of a set of questions (online quizzes) and/or be an evaluation of learners' assignments made by the trainer.

Online quizzes are sets of questions (such as multiple choice, multiple response, matching, ordering, fill-in-the-blank),[40] which provide automated feedback to learners' responses.

Most learning management systems offer the option to set up online quizzes, select different question types, add feedback, define time limits and number of attempts, set passing grades and other quiz parameters.

EXAMPLE

Online quiz in a facilitated course on food security analysis

The trainer can also assess learners' performance by evaluating their contribution to collaborative activities, and their completion of assignments.

Online gradebooks, available in most learning management systems, can help the trainer and facilitator to keep track of learners' performance and activities.

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40 Please refer to Chapter 7 of this guide for a detailed description of question formats.

EXAMPLE

Online gradebook in an online facilitated course on food security analysis

Feedback and conclusion

The last session of an online course usually includes an evaluation survey, which will provide course designers and facilitators with feedback from participants. This is a useful step as it allows designers to improve the course over time. It also gives participants the feeling that designers are interested in making the course more effective.

EXAMPLE

Feedback and conclusion in an online facilitated course on food security analysis

Once the course has finished, participants are asked complete an evaluation survey. They also have the opportunity to review the course content, access additional resources and listen to the after-action review, which is the analysis of what happened during the course, and how things could be done better in the future.

9.4 Using communication and collaboration tools for e-learning

E-learning activities can be realized by using a range of communication tools.

Learning platforms can integrate many different tools, both synchronous and asynchronous. Some of these features, such as chats, whiteboards and collaboration tools, have a strong social component and allow people to work together to create products, such as a project document.

The most common tools are:

ASYNCHRONOUS
→ E-mail-based tools
→ Discussion forums
→ Blogs
→ Webcasting

→ Surveys and polls
→ Whiteboard/ collaboration tools
→ Social networking tools

SYNCHRONOUS
→ Audio and video conferences
→ Chat and instant messaging
→ Application sharing
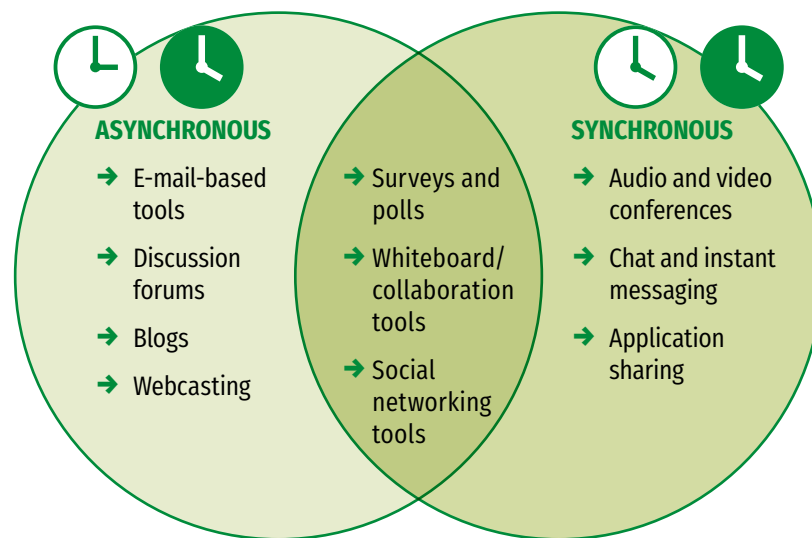
Generally speaking, asynchronous tools, such as forums and wikis, are more appropriate for tasks that require reflection and more time to accomplish. Asynchronous discussions are especially valuable where learners are too shy or lack language fluency to collaborate effectively in real-time conversations.

However, synchronous tools, such as chats or web conferences, offer a greater social presence. For example, in a live event, learners can use chats to make comments and answer questions during the session.

If you are organizing a synchronous (live) event, you may want to use some virtual classroom features. A virtual classroom mimics a traditional instructor-led classroom by integrating different types of synchronous tools, such as whiteboard, chat, breakout rooms, application sharing and video conferencing. Many video conference tools (for example Zoom, MS Teams, Google Meet™) incorporate virtual classroom options.

Synchronous and asynchronous tools and their applications to e-learning are described below.

E-mail-based tools

E-mail continues to be the most basic and popular way to communicate over the Internet. It works well in low- and high-bandwidth situations.

E-mail-based tools allow groups of people to be easily connected for discussions and information exchange. Specifically, mailing lists are used for group discussion and e-newsletters are used for one-to-many communication.

How e-mail-based tools can be used for e-learning

- E-mail is the simplest mechanism for direct, one-to-one communication between the facilitator/instructor and learner. It is used for asking and answering individual questions rather than for questions of general interest. If responding is optional and the subject is not critical, it is better to post the question in a forum. Also, e-mail can be used for responses which might embarrass the recipient if posted in a public space.

- Newsletters can be used for broadcasting a message to the group, such as to announce a change or an event to all participants (e.g. urgent class announcements and reminders, approaching tests, imminent deadlines, schedule changes). Only the instructor should broadcast messages this way, and should not do so too often.

- Mailing lists can be used for discussions and sharing documents in small groups (especially for those with limited Internet access). They facilitate group project work and collaborative activities.

Discussion forums

Discussion forums (also called message boards) are the primary tool for online discussion. They allow a number of participants to hold conversations in the form of posted messages. In other words, participants can communicate at different times by writing comments that remain in the forum for other participants who can read and respond to them. Each forum may contain one or more discussions, which can comprise one or more posts and replies.

How discussion forums can be used for e-learning

- Both learners and facilitators/instructors can leave messages, read and reply.

- Discussion forums can be used for topic-specific discussions, case study collaborative work, post-class commentaries, etc. Facilitators and subject matter experts can use them to generate dialogue, solicit feedback, provide direct answers to questions, and organize collaborative work.

- Discussion forums can also serve as informal spaces for team building and networking (The Compass, ITC ILO Blog).

- Compared with mailing lists, discussion forums can be more appropriate for large groups, as participants can freely join discussions by connecting to the learning platform, instead of receiving many email messages.

- In the pre-course phase, when learners need to become familiar with the online environments and meet the other participants, both facilitators and participants can use discussion forums to introduce themselves, and participants may be asked to describe what they expect from the course. You can also give participants the chance to ask preliminary questions about the course content.

- One application of discussion forums during the course is for guided discussions. Facilitators/experts propose a topic and asks learners questions to stimulate and guide reflection and critical thinking.

EXAMPLE

Discussion forum in an online facilitated course

- External subject matter experts can be invited as guests to conduct in-depth discussions and answer participants' questions on specific topics.

- When appropriate, participants can be divided into subgroups that have their own discussion forums. For example, subgroups can be organized for different country teams within a regional-level course, for different types of organizations or according to the different professional profiles of participants.

- Participants can share individual assignments and collaborative work in the discussion forum, and discuss it with peers and facilitators/experts. .

Blogs

A blog (shortened from web log), is an online chronological collection of personal commentary and links (The Compass, ITC ILO Blog). Blogs allow people to share, access and easily update information, without having any knowledge of computer programming. They were originally developed to present content as a simple list of entries, just like a diary.

A blog allows users to easily post content onto a website on a regular basis, in a standardized format. The posted information forms a commentary or stream of frequently updated ideas.

The key element of a blog is that it gives a voice to the blogger (individual or group) and allows a secondary voice from those who comment.

How blogs can be used for e-learning

- Blogs enable the sharing, accessing and easy updating of information. Learners can use them to submit their own assignments and to comment on those of the other participants.

- Participants can also use blogs as learning logs – a place for reflecting, gathering ideas and having smaller conversations with each other. Blogs are a place to help participants to 'make sense' of what they are learning.

Webcasting

The term 'webcasting' refers to audios and videos sent from a single source to multiple receivers. The typical application is the video lesson, where an expert talks to many learners simultaneously, without any interaction. Webcasting uses streaming media to transmit audio and video over the Internet. However, recorded webcasts can be provided for asynchronous use.

Podcasts are audio programmes that are broadcast over the Internet. They are audio files (such as MP3 or .wav formatted), which can be downloaded to a compatible digital audio player or a computer.
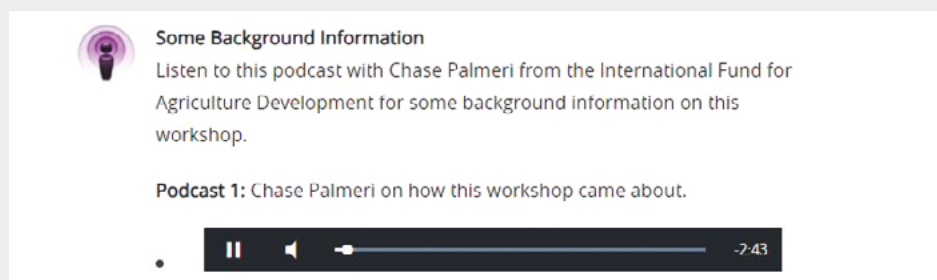
How webcasting can be used for e-learning

- Videos can be used by the facilitator to provide content (e.g. short video lessons where an expert talks), motivation or orientation. They are used to show moving objects or processes (e.g. assembling components of a machine), present real people talking (e.g. the instructor) and deliver emotional messages.

- Podcasts can be used by the facilitator to provide orientation and motivation, or by participants to provide personal introductions or contributions to online discussions. Audio can bridge literacy gaps, and the relatively small file sizes are easier to transmit than video files in low-bandwidth situations.

- Both videos and podcasts can be used for a mobile audience.

EXAMPLE

Podcasting in an online facilitated course

For example, the following podcast is used at the beginning of a facilitated course to provide background information.

Some Background Information
Listen to this podcast with Chase Palmeri from the International Fund for Agriculture Development for some background information on this workshop.

Podcast 1: Chase Palmeri on how this workshop came about.

⏸ 🔊 ●───────── -2:43

EXAMPLE

Video in an online facilitated course

In this course, a short video is used to welcome participants and introduce course topics.

Training of trainers "*Implementing the blended learning programme Governing Land for Women and Men*"

Welcome to the Training of Trainers "*Implementing the blended learning programme Governing Land for Women and Men*". This online training intends to support institutions working in gender and land in their efforts to build capacities for promoting responsible, gender-equitable governance of tenure, according to the principles of the Voluntary Guidelines on Responsible Governance of Tenure on Land, Fisheries and Forest. By providing all the necessary information to replica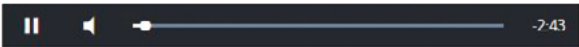te the learning programme, it intends to become a valuable tool for building capacities at the national level, so that those who are responsible for tenure governance can ensure it addresses the different needs and priorities of women and men.

Watch the welcome video of Husna Abdalla Mbarak, Programme Manager, FAO Kenya

Chat and instant messaging

Instant messaging is one of the most popular applications on the Web. It allows two or more people to exchange text-based messages in real time, using a web or desktop application.

How chat and instant messaging can be used for e-learning

- A group of people can start a text conversation online in a space commonly called a 'chat room'. In a typical chat session, everyone sees all the messages. However, some chats allow private messaging between two session members.
- Chat may be used as a back channel for questions and feedback during an online presentation or a meeting.
- Alternatively, chat can be used for a separate event (e.g. a study group meeting or role-playing simulation).
- With some tools, instructors can create breakout sessions, where small groups of learners conduct their own meetings.
- Chat sessions have the advantage of keeping track of the textual dialogue in a discussion.

Application sharing

Application sharing lets you share software applications with other people.

How application sharing can be used for e-learning

- Learners can watch the presenter's actions and take control of the display with permission from the facilitator.
- Application sharing should only be used for demonstrations that require

simple movements of the on-screen coursor, so as to not lose fluidity in the presentation.

Surveys and polls

With surveys and polls, you can ask people to provide their opinion about something. Examples of tools include Google Form and SurveyMonkey.

How surveys and polls can be used for e-learning

- Polls and surveys can be used to collect participants' information before the course.

- During the course, they can be used to support participants' engagement and assess knowledge (e.g. you can use a poll to assess participants' understanding of key points from a previous session, or to assess their knowledge of the topic that you are going to introduce).

- In a virtual classroom, a poll may be displayed on-screen, and every participant can reply anonymously.

Audio and video conferences

Audio and video conferences are sessions between two or more users at different locations, in real time. They are primarily used for meetings and project updates.

©FAO
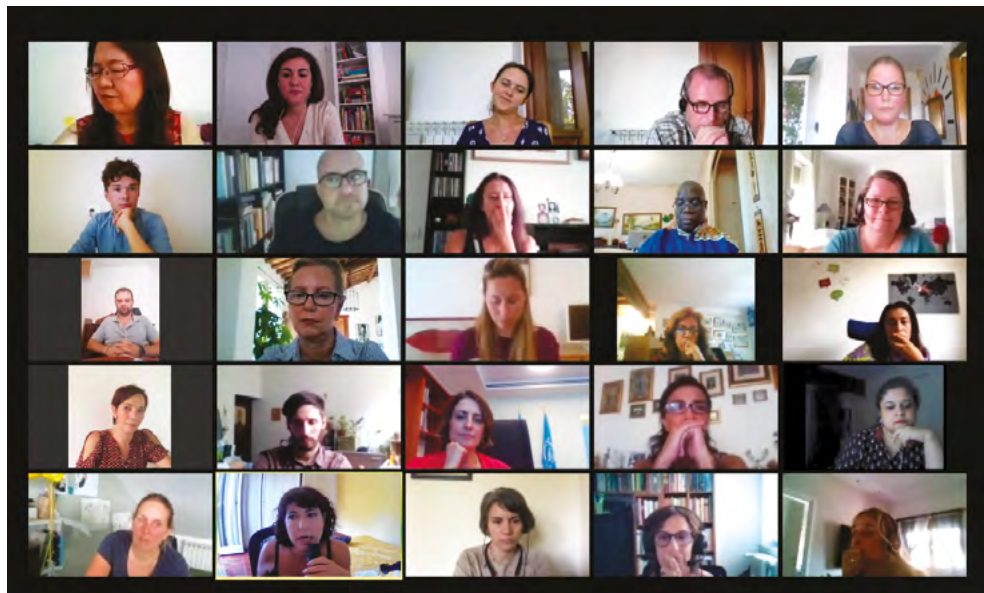
How audio and video conferences can be used for e-learning

- Audio conferences can be particularly useful for mobile learning (i.e. through cellphones).

- Audio conferences are well-suited to training topics where speaking and listening are crucial (e.g. language skills courses).

- Video conferences emulate face-to-face experience and human presence, so they can be used for lectures, presentations, brainstorming, role play and to develop communication skills.

- A useful feature of some video conference tools is the possibility to create breakout rooms, where two or more participants can meet during a larger live online session. Breakout rooms can be used to organize group-work activities and exercises in smaller and more manageable groups, to give everyone the opportunity to participate. This approach can be used, for example, for competitive problem-solving, brainstorming, preparing debates with pro and con groups, or developing alternative scenario resolutions.

- Many video conference tools (e.g. Zoom, MS Teams, Google Meet™) incorporate virtual classroom options, such as chat, breakout rooms, application sharing and polls.

- Recorded audio and video conferences can be made available as downloadable podcasts and videos for offline, asynchronous learning.

Collaborative writing tools

Collaborative writing tools (such as Google Workspace™ productivity and collaboration tools) allow multiple users to edit the same document online, both in an asynchronous and synchronous manner.

They are an effective way for people to work together on a common resource or project. They can be open for anyone to use and edit, or editing permissions can be restricted to registered users.

How collaborative writing tools can be used for e-learning

- Collaborative writing tools can be used to share ideas on a course topic.

- They can be used to support collaborative work, for example by having subgroups working on project documents.

Whiteboards

Whiteboards (e.g. MURAL, Conceptboard, Miro, GroupMap) are collaborative group-work tools that allow instant visual communication.

They allow instructors to display content and learners to interact with that content. Compared with collaborative writing tools, they are slightly more sophisticated and can be used by more experienced learners.

How whiteboards can be used for e-learning

Participants can complete a drawing started by the instructor, make annotations on specific parts of the screen, vote visually by indicating their choice on a graphic, write their names and arrows on a map, move post-its, etc.
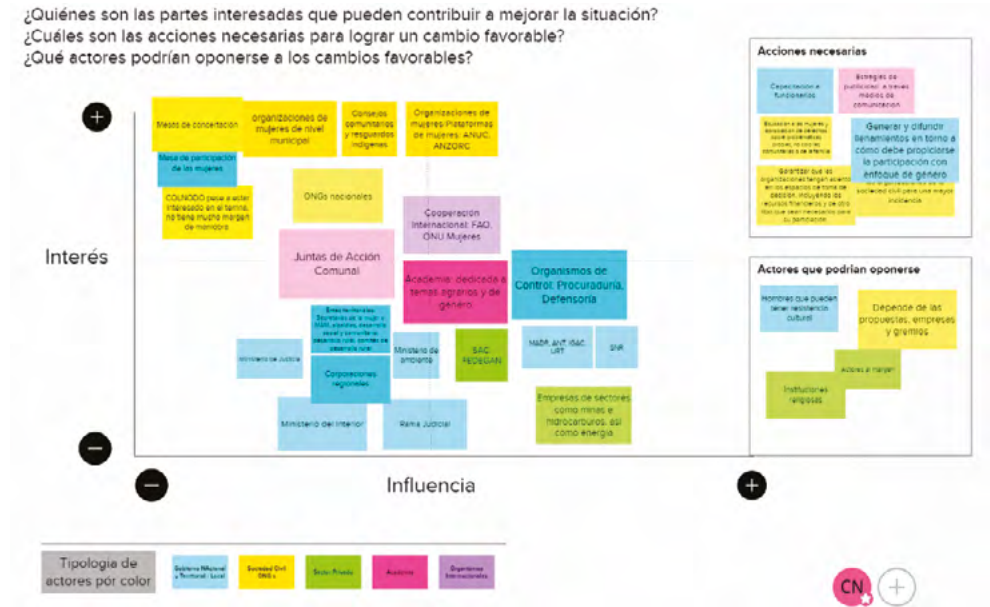
Collaborative work on MURAL (start.mural.co)

Social networking tools

A number of social platforms exist, such as Facebook, LinkedIn, Youtube, Twitter, Yammer, Instagram, Pinterest and Snapchat.

While most of them have been used purely for social interaction, they include features that can easily be leveraged for online learning applications, to supplement and complement the use of a traditional learning management system.

These platforms are widely available to anyone with an Internet connection, and are accessible from smartphones. Social networking tools can be used to publish or share content, promote learning activities, and create communities of practice and expert networks (The Compass, ITC ILO Blog).

However, as with more traditional learning management systems, it is important to accurately plan and facilitate e-learning initiatives that make use of social networking tools. Also, since not all audiences are technology and social media enthusiasts, you need to make sure that all the resources are easy to use and enhance the participation of more reserved learners.

Below are some examples of social networking tools and ideas of how to use them for e-learning.

Tool	What it is	How it can be used for e-learning
Twitter	Twitter is the most popular microblogging system. Microblogging is a technology that allows users to publish brief text messages online, usually less than 280 characters, as well as pictures, links, short videos and other media.	Microblogging can be used to brainstorm and share reflections on a topic. It allows users to share relevant materials and links to resources. It has the advantage of linking to or integrating current events (e.g. technology developments) in the training. It can also be used to organize synchronous events.
Facebook	Facebook is a social networking site that allows users, who sign up for free profiles, to connect with friends, work colleagues or people they don't know, online. Originally designed for college students, it is now the world's largest social network.	Facebook enables the use of live video, which participants can comment in real time. Participants can ask questions directly and interact with their online instructors. Facebook events can be used to announce e-learning events, such as upcoming meetings or e-learning courses. An online community can be created using Facebook groups, for example around an e-learning course, so that participants can share thoughts during and after the course. A Facebook page can be created for the course or group. Other features that can be used for e-learning are polls and private messaging for communication between learner and facilitator (Pappas, 2015).
WhatsApp	WhatsApp is an instant messaging application for smartphones, owned by Facebook. It requires users to share their phone number. It also has a desktop version.	A community can be created using Facebook groups. WhatsApp allows users to share resources, such as documents, audio and video. It also enables them to communicate through instant messages and video calls, both individually and within a group.

9.5 Case study: FAO online training-of-trainers

FAO online training-of-trainers for institutions working in fostering responsible gender-equitable governance of tenure: the Kenya case

In 2015, the blended learning programme *Governing Land for Women and Men* was designed to enhance the capacities of national change agents, who can play an important role in promoting gender-equitable governance of land tenure, according to the principles of the *Voluntary Guidelines on the Responsible Governance of Tenure* (VGGT). From 2015 to 2020, the blended programme was implemented in seven countries in Asia, Africa and South America. To foster scalability and sustainability of the programme, an online training-of-trainers (ToT) initiative was designed to enhance the capacities of national institutions, working in gender and land.

The ToT was initially designed to be an in-presence workshop lasting two and a half days and based on participatory and experiential learning approaches. With this format, the ToT was successfully delivered in Colombia in 2019 and was due to be delivered in Kenya in the spring of 2020. However, due to the COVID-19 outbreak, the ToT was redesigned and converted into training that was entirely delivered online.

In Kenya, 18 participants were selected for the ToT from 9 institutions that are key in gender, land policy-making and other related land issues.

The online training comprised seven sessions (as shown in the box below) and was designed around a mix of synchronous and asynchronous sessions, which alternated over a period of three weeks:

The synchronous sessions were all conducted live through a video conferencing platform (*Zoom*), each lasting about 2.5 hours. During the live sessions, intensive participatory work was carried out using collaborative digital tools (such as whiteboards, digital workspaces for visual collaboration, and use of breakout rooms for group discussions), all facilitated by the learning team.

Asynchronous sessions were delivered through the *FAO Collaborative Learning Platform*, where different learning activities were combined, such as e-learning lessons, individual assignments and collaborative activities. Participants carried out their practical exercises remotely, using collaborative digital tools (*Moodle* native activities such as Forum, Feedback, Quiz, Assignment, or activities prepared on collaboratively editable *Google Docs™, Google Slides™* or *SurveyMonkey* questionnaires). In all practical exercises, participants were supported by the learning team and provided with feedback for improvement.

EXAMPLE # Online training-of-trainers sessions:

SESSION 1 (Asynchronous session)

This was an introductory session – delivered through the FAO *Collaborative Learning Platform* – that allowed participants to get to know each other, interact with the learning team and gain an understanding of the course structure. Participants introduced themselves to the group through the *Forum* and started to familiarize themselves with the collaborative learning platform through tutorials provided in PDF format.

SESSION 2 (Synchronous live session)

This session was live and focused on getting to know the activities of the institutions participating in the ToT, gaining an overview of the blended learning programme *Governing Land for Women and Men*, and introducing the actors involved in its delivery. During this session, the digital workspace for visual collaboration *MURAL* was used to map activities conducted by the different institutions in the areas of gender, land and capacity-development, with participants contributing simultaneously to the mapping exercise. By the end of the session, a complete picture had been drawn up and the participants were able to discuss it in plenary.

SESSION 3 (Asynchronous session)

This session entered into details of how to design, develop and implement the above-mentioned learning programme. It also focused on the importance of selecting the right audience for the programme and adapting it to the country context. To allow participants to put the knowledge gained into practice, participants were asked to identify which actors were essential for the programme in Kenya, and to add the names of the different institutions on *Google Slide™*, where all participants contributed remotely. An additional exercise asked them to identify new collaborative activities to be included in the potential replication of their programme, and to work jointly on a shared document. The participants then shared and discussed their exercises through a *Forum*.

SESSION 2
Live session presentation on *Moodle*

SESSION 3
Session presentation on *Moodle*

SESSION 4 (Synchronous live session)

This session was live and sought to help participants appreciate the difference between online and in-presence facilitation. It also focused on understanding the importance of developing an in-presence workshop on the basis of online workshop inputs.

During the live session, participants took part in virtual role play to experience the main challenges of virtual facilitation. This was conducted in the live *Zoom* session, through the FAO collaborative platform, and participants simulated the communication that usually takes place between the learning team and participants.

SESSION 5 (Asynchronous session)

This session focused on preparing for the in-person workshop. It provided an opportunity for participants to become familiar with the participatory approach of the in-presence workshop and with the sessions. To ensure meaningful and active engagement in the last online/live session, participants were requested to share in advance any questions on the workshop through a *SurveyMonkey* questionnaire.

SESSION 6 (Synchronous live session)

This session provided an opportunity to internalize the structure of the face-to-face workshop. It also allowed participants to understand the importance of the mentoring phase and to discuss windows of opportunity to jointly replicate the programme. Each organization was able to discuss and agree on its action plans in breakout rooms, while working on prepared templates on *MURAL*. Subsequently, breakout rooms were used to carry out a *Market Place exercise*, by moving the participants from one breakout room to another, while looking at the work carried out by the organizations on *MURAL*.

SESSION 7 (Asynchronous session)

This session was dedicated to finalizing institutional work plans and identifying areas for partnership and collaboration with fellow participants, so as to optimize the work and results of the institutional action plan. This activity was carried out through a *Forum* activity on the FAO collaborative platform.

SESSION 3
Collaborative mapping exercise for key actors on *Google Slides™ web-based presentation program*

SESSION 6
Action plans on *MURAL (start.mural.co)*

9.6 Example: Massive Open Online Course (MOOC)

The following is an example of an FAO MOOC, using both asynchronous communication and live events.

EXAMPLE

MOOC on Farm Data Management, Sharing and Services for Agriculture Development

A MOOC on Farm Data Management, Sharing and Services for Agriculture Development aimed to strengthen the skills of professionals who use and manage data for the benefit of farmers and farmers' organizations, by exposing them to the topics of data in the agriculture value chain. It also explored how new and existing technologies, products and services can leverage farm-level and global data to improve yields, reduce loss, add value and increase profitability and resilience. The online course was followed by more than 5 000 participants from 153 different countries.

The course was designed in a modular structure to accommodate different topics for different target audiences. It consisted of 4 modules with 15 lessons: Module 1 on data, services and applications; Module 2 on data sharing principles; Module 3 on using data; and Module 4 on exposing data. The modules were activated on certain dates to allow participants to follow the content in a systematic way. The content of each module was a mixture of downloadable PDF lessons, supporting audiovisual materials, a quiz dedicated to the module topics, and forum discussions to drive user engagement, so as to stimulate discussions and answer questions.

Participants were encouraged to use the forums in each module. Forum areas in an online course are used to launch discussions, ask questions and share experiences and knowledge. They also generate a network of peers for participants to connect with. Course facilitators moderate these forums and answer questions. In addition to forum discussions and quizzes throughout the course, participants were offered live webinars, to enable interaction and to reflect on the topics taught in the curriculum.

An online exam was held in the last week of the course, consisting of 40 questions. Participants were able to retake the exam as many times as they liked within the deadline, with the highest grade achieved taken into account. Participants were awarded a digital certificate, depending on the marks achieved.

Course participants were encouraged to share their feedback in the forum areas and via e-mail throughout the course, and through a course evaluation survey in the final week. To assess the impact of the course, participants were asked to complete a further survey after three months, explaining how they had used the knowledge and skills acquired.

9.7 **In summary**

Key points for this chapter

→ Actors who may be involved in implementing a facilitated online course include a project manager, instructional designer, subject matter expert (or trainer), online facilitator, and learning management system administrators.

→ Online facilitated and instructor-led courses may include the following components: a kick-off event, core learning activities (e.g. self-study, online discussions, group work, virtual classrooms), final assessment, conclusion and feedback.

→ A course syllabus should be developed that outlines sessions and learning objectives. A set of storyboards should detail the activities that will be carried out in each session.

→ Communication and social interaction can be realized using a range of tools, both synchronous and asynchronous, which are selected according to the learning objectives, learners' preferences and technical requirements.

10. Learning platforms

Which platform should we use to make the course available to learners?

Clara, the training manager, has heard about Moodle, an open-source online platform that is widely used, but she would like to know more about what Moodle and other learning platforms can offer her organization, to support the delivery of e-learning courses.

This chapter illustrates the different types of learning platforms that can be used to host e-learning courses and make them available to learners. It includes the following topics:

➔ different types of learning platforms (VLE, LMS and LCMS);

➔ proprietary and open-source learning management systems; and

➔ solutions for limited Internet connectivity.

10.1 What are learning platforms?
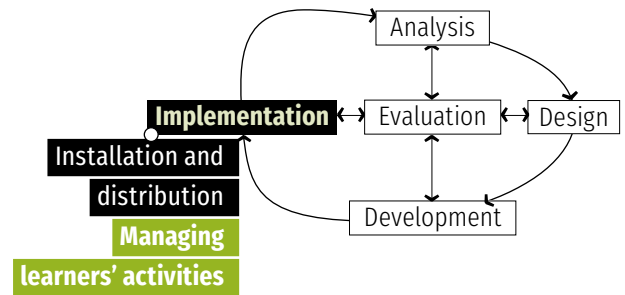
A growing number of organizations, educational and other institutions use learning platforms to deliver and manage their learning processes.

A learning platform is a set of interactive online services that provide learners and educators with access to information, tools and resources, to support educational delivery and management via the Internet.

Learning platforms are usually referred to as virtual learning environments (VLE),[41] learning management systems (LMS),[42] or learning content management systems (LCMS).[43] Despite differences between the platforms, these terms are often used interchangeably, since they have many features in common.

Learning management systems empower multiple end users to access online courses and instructions at the same time, regardless of their geographical or time zone. Likewise, fully functioning platforms empower organizations/institutions to:

■ centrally manage educational resources;

■ deliver training in an efficient, consistent and timely manner;

■ automate and optimize processes related to training delivery and administration; and

■ monitor learners' progress and performance.

Traditional platforms were strongly content-centric, i.e. focused on content management, enrolment and simple reporting related to course completion and tracking. The lack of personalized and flexible content and one-size-fits-all approach to learning often failed to engage learners.

With the advance of technology and constructivist-based pedagogies, the focus of instruction has gradually moved to learners and personalization of their learning experience. As active agents, learners are being held accountable for their own learning paths. Inside the learning environment they are expected to show creativity and collaborate with other cohorts through networking and sharing. The strength of this approach lies in making learners feel motivated and engaged to participate in discussions, brainstorming, problem-solving sessions, interactivity and/or gaming. By exploiting the competitivity and playful value of gaming, learners are increasing the possibility of mastering topics and reaching their learning goals effectively.

Additionally, rapid strides in technology have opened up possibilities for integrating extra components for sharing, collaboration and communication in support of growing business and training requirement: e.g. Customer relationship management (CRM), learning record store (LRS), virtual classrooms and multimodal e-learning delivery, off-the-shelf content, e-commerce, etc.

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[41] A virtual learning environment (VLE) is a virtual space that brings technology and content together for e-learning training. It is a website that involves LMS/LCMS web platforms and content.

[42] LMS training tool for administration, documentation, tracking, reporting, automation and delivery of educational courses/training programmes. The LMS user is the learner.

[43] LCMS provides tools for the creation and development and management of learning iand online course materials. The LCMS user is the learning content creator or multiple creators, working together to create content that can be published in a variety of formats.

A multitude of tools, components, processes and standards are connected in a learning ecosystem, as well as learners interacting with each other. Organizations aware of the interrelationship between the various components can create a sustainable learning environment that provides the greatest impact, both for the learner and organization (Spencer, 2013). A modern LMS can therefore serve as a backbone to such a learning ecosystem and bring it to a higher level.

The LMS industry offers a variety of learning platforms, with different levels of complexity. A full-featured LMS should include the following:

→ **Learning content management** – creation, storage, access to resources.

→ **Curriculum mapping and planning** – lesson planning, personalized learning experience.

→ **Content interoperability and portability** – set of standards for content objects (courseware packages) sharable and compatible on different platforms (e.g. AICC, SCORM, xAPI (formerly Tin Can, IMS LTI).

→ **Assessment and testing management** – a set of instruments for learner progress measurement.

→ **Progress tracking** – learning progress data, such as course and activity completion or competency levels.

→ **Reporting and analytics** – offering real-time and accurate information about learners, their activity, time and way they engage in training.

→ **Learner certification** – possibility of certifying users on course or test/learning path completion.

→ **Social learning tools/activities** – forums, wikis, assignments, quizzes, messaging systems, blogs, group discussions, and other formats for interaction with other learners and/or the teacher.

→ **Live web tools/social media integration** – link to Facebook, Skype etc.

→ **Rich media support** – i.e. video, audio and/or other interactive and engaging content.

→ **Gamification design techniques** – tools for game-based learning.

→ **Multi-device/mobile-responsive design** – with responsive design plug-ins, a seamless learning experience is delivered across multiple devices such as smartphones and tablets.

→ **Blended learning** support.

→ Skill and **competences management** – through the integration of HR and business planning to assess current competency levels against the capacity needed, so as to identify competence gaps and achieve business goals.

→ **Localization** – multilingual support.

→ **Support** services.

→ **E-commerce** integration.

Learning management systems are critical for organizational/corporate success and effective change. Corporate environments in which learning and development (L&D) is strictly aligned with performance use LMS to close skill gaps by upskilling and reskilling their workforce. During the past decade there has been a remarkable evolution from traditional LMS or content platforms to programme delivery platforms and learning experience platforms (LXP or LEP), focused on

a more dynamic and holistic learning experience. These more robust learning environments offer customizable content, career path solutions, combined contents form different sources, and personalized learning outcomes designed to enhance performance and efficiency, both for individual learners and the organization as a whole. The adoption of artificial intelligence, big data analytics and understanding of behavioural patterns opens up possibilities for an even more personalized e-learning experience and adaptive learning programmes.

Every year, leading experts in technology and market research (e.g. Brandon Hall Research,[44] Josh Bersin[45] and Forrester Research)[46] issue LMS yearly reports with in-depth profiles of the entire e-learning sector. Such resources offer structured and proven methodologies and advisory tools that can help organizations/institutions to identify their own requirements when selecting an appropriate LMS.

Academic and educational institutions are also integrating LMS, to enhance traditional teaching systems, and to create a bridge between traditional and high-tech generations.

10.2 Proprietary vs. open-source Learning Management Systems (LMSs)

Learning platforms exist as proprietary or open-source software:

- Proprietary LMS is licensed under exclusive legal rights, with restrictions for modification, further distribution, reverse engineering and other uses. They are closed source, with licence costs per user, or paid on a monthly/annual basis.

- Open-source LMS works under the terms of the GNU General Public License. The licence is intended to guarantee freedom to share and change the programme, and ensures that it is free for all users.

Open-source e-learning software packages include LMS/LCMS platforms, as well as authoring tools for courses and media features. Benefits of open-source software packages include:

- free distribution and licensing to unlimited users;

- modification and derived works are allowed;

- users worldwide are engaged in their development (i.e. community participation);

- ability to run on multiple platforms; and

- better and easier communication with other open-source languages, platforms and databases.

The most popular open-source LMSs have their roots in academia, and are mainly used in higher, primary and secondary education and learning-specific projects. The more successful LMSs have gradually expanded beyond the education environment, to the government and non-profit sectors, paving the way for use by small- and medium- business. LMS open-source initiatives are sometimes backed by non-profit associations and consortiums, such as: .LRN consortium,[47] Claroline

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44 www.brandon-hall.com

45 www.bersin.com

46 www.forrester.com/rb/research

47 https://learninglovers.org/2016/04/20/lrn-consortium

Consortium,[48] and the Apereo (Sakai).[49] These associations are committed to innovation in education technology through open-source principles and provide a base for software development and quality.

The **open-source LMS initiative** is constantly evolving with new reliable, interoperable and extendable packages and trends. The basic 'core system files' are easily accessible and offered to the community licence-free, released under the GPL licence.[50] This open model architecture means that developers and contributors can customize a platform according to the client's needs or develop new software components, known as modules and add-ons, to extend basic system functionalities. Many plug-ins and add-ons that enhance platforms are freely downloadable. For example, the Moodle **Plugin directory**,[51] has more than 1 600 plug-ins to add extra features and functionality, such as **H5P** (powerful authoring tool inside your LMS), **QUESTOURnament** (to engage learners in a game of questions), **game activity** (for game-based learning), and configurable reports (monitors learners' activities).

Open-source packages offer code modification freedom, with infinite customization options. However, there are some drawbacks to consider when evaluating open-source LMS solutions. Although there is no upfront licence cost, there may be some hidden costs. First, open-source programmes require a dedicated IT team with advanced technical skills to handle the set-up, installation and customization. In some cases, the total running cost of open-source LMS, including administration, support and maintenance, may even exceed the initial proprietary LMS licence fee. Relations between customization control and cost-efficiency must be seriously assessed.

	Proprietary LMS	**Open-source LMS**
Licence cost	Pricing models: **licensing** fee, renewable on yearly basis; **subscription** – a fee for each (active) user; or **freemium** (no charge for basic features, fee for add-ons).	No cost, no proprietary investment, leaving more budget for customization.
Source code	Locked for free use and developed by a professional developed team.	Open, developed by the community.
Development team	Professional developers.	Freelance developers, with different levels of expertise.
Ownership	Owned by vendor.	No vendor lock, owned by the community.
Ease of LMS implementation and deployment	Fairly easy.	Can be difficult and requires advanced technical skills.
Client support/ maintenance services	Dedicated support services provided by vendor.	Relies on community forums, online documentation, development community; more important LMS solutions offer services, training, and support from a variety of vendors.
Support/ maintenance cost	Included in licence (pricing model).	Paid support.
Ease of customization	Performed only by a vendor's developers.	The code is open, with customization performed by freelance skilled developers according to specific needs. Strong link with end-user groups/communities who suggest changes and modifications.

Based on their underlying instructional approaches, open-source LMS packages may be more suitable for education/academia, governments or business/corporate users.

Hosting options – self-hosted vs. Software as a Service (SaaS)

LMS software can be deployed internally within the organization's IT structure or hosted on cloud (SaaS), with functionalities hosted on the vendor's infrastructure and accessed by logging into its site, where all communication and training take place.

Each type has its pros and cons, so it is crucial to analyse all features included in the overall hosting cost, such as licence, scalability, total cost of ownership. SaaS effectively addresses many such challenges. For example, it offers a variety of subscription plans: pay-per-user fee, pay-per-use or one-time, upfront licence fee, or other plans to meet any business needs. In addition, costs of infrastructure, maintenance, ongoing support, care for regular backups and upgrades are entirely handled by the service provider. By contrast, self-hosting involves all implementation costs to be borne by the organization, and substantial technical knowledge is required to ensure that the platform is properly set up and updated.

10.3 Moodle and other open-source LMS solutions

Moodle is the world's most widely used open-source learning platform.[52] Although originally designed for higher education to help educators create online courses with a focus on interaction and collaboration, it has gradually and successfully been extended, and is now widely used by a range of other organizations and institutions, including K12 (kindergarten to 12th grade) education, and the health care, government, corporate and non-profit sectors.

A positive experience, highlighting Moodle flexibility and continued improvement, was acknowledged by numerous educational institutions. Reportedly, use of Moodle by MBA college students in India (Barge and Londhe, 2014) increased the involvement and satisfaction levels of students in ICT technology by utilizing the institute's IT resources and infrastructure, which in turn improved the return on investment of the IT resources.

Students of the Foundation Program in Oman also expressed their positive attitudes towards Moodle, which resulted in them having better and enhanced learning and improved understanding of the course material (Ahmad & Al-Khanjar, 2011).

English teachers and students from Suranaree University in Thailand agreed that Moodle facilitates student-centred learning and anytime-anywhere learning, makes course administration easier, and helps to reduce the cost and time of delivering instruction (Suppasetseree and Nutprapha, 2010).

The global network of certified partners who are experts in Moodle training, hosting and implementation is growing.[53]

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[52] http://moodle.org

[53] https://moodle.com/partners

Moodle runs without modification on Unix, Windows, MacOS and many other systems that support PHP scripting language and a database; it is compliant with SCORM and AICC standards.

By 2020, Moodle had reached more than 217 million users and almost 157 000 registered sites around the world. It was designed to be highly modular, so is fully customizable. Numerous modules extend its functionalities (e.g. graphical themes, authentication and enrolment methods, activities, resources and games to maintain learners' interest and enhance online engagement).

With the use of responsive design extensions, the platform is mobile-friendly, with seamless integration between the web and mobile experiences.

Certification and badgification plug-ins are some of the many tools designed to acknowledge and validate training achieved inside the Moodle platform. Certification and open badge requirements are strictly related to new HR policies, educational institutions and formal/informal education worldwide. In 2020, IMS Global learning Consortium[54] certified Moodle 3.8 and Moodle 3.9 as Open Badges v2.0 Issuers.[55] The feature awards learners with digital certificates and/or open badges to validate competences and achievements earned within the learning environment. They are automatically generated, information-rich, contained within a record about a learner, issuing institutions and training and assessment criteria. Such certificates are easily verified at any time on their own unique URL. Furthermore, earned badges are sharable via social media and collected in a learner's portfolio.

Following the rapid uptake of mobile technology, the Moodle Mobile application extends the learner experience to mobile technology. This feature offers reassurance that being offline or in conditions with limited Internet access will not prevent users from fully engaging in learning. Using the mobile offline apps, learners may view previously downloaded courses, submit assessments, create forums or wiki pages, add notes, and send messages to other cohorts, etc. Offline data and results are integrated and synced back when reconnected.

In addition to Moodle, other open-source LMS solutions include the following:

Canvas, is the fastest-growing LMS, especially in Canada and the United States of America. This open-sourced cloud-based application can create dynamic and engaging environments for both learners and teachers.[56] Designed for higher education, it also works well for the business sector. The tool comes with an intuitive, user-friendly interface. The apps are available for Windows, Linux, Android, iPhone/iPad, Mac, Web-based, and Windows Mobile. The MasteryPaths feature helps to differentiate students' learning pathways more efficiently. Many vendors (Microsoft, Blackboard, MHEducation) offer tools that can be easily integrated with Learning Tools Interoperability (LTI) standard.

LRN is a full-featured application for rapidly developing web-based learning communities.[57] Originally developed at the Massachusetts Institute of Technology (MIT), .LRN is now used worldwide by more than half a million users in the higher education, government, non-profit and K-12 sectors. It supports a variety of learning styles, ranging from traditional structured learning to group collaboration. Its customizable layout allows users to personalize the learning space. It is built as a platform for 'learning communities' rather than a narrow system for 'course management' or online learning. It has been internationalized to support multiple languages, dialects and time zones.

Sakai is an open-source project for education based on collaboration and the open sharing of knowledge, coordinated by the Apereo Foundation.[58] It offers

54 www.imsglobal.org

55 https://openbadges.org

56 www.instructure.com/canvas/

57 www.dotlrn.org

58 www.sakailms.org

a solid and robust platform, rich in functionalities for collaboration and communication, content development course management and external app integration. It is mostly used in the higher education sector.

ILIAS is free, open-source software and is published under the GNU General Public License (GPL).[59] It has been widely used in universities, companies, schools and the public service to implement individual learning scenarios and training courses since 1998. Its technology roadmap is overseen by the international ILIAS community and coordinated by the ILIAS association, while a network of professional service providers helps with implementation of the ILIAS projects. It has powerful course and material management tools for managers, as well as better engagement tools for students.

OpenOLAT is an Internet-based learning platform offering tools for teaching, learning, assessment and communication. Initially developed by the University of Zurich, especially for public institutions such as universities, academies or colleges, it has also become suitable for businesses companies.[60] The OpenOlat Academy offers rich documentation on how to operate the system.[61] Responsive design has been integrated, so that content can be correctly displayed and positioned according to the screen size of the device.

Open edX was created by the University of Harvard and MIT to be the world's biggest online learning portal in the world, and a learner-centric, cross-device, cross-platform, flexible solution.[62] It is released free as a Libre/FOSS (Free Open-source Software), with scalable technology to help organizations create private educational materials. Originally envisioned for MOOCs and engaging experiences with different topics, goals and learning scenarios, it soon evolved into a learning solution used, for instance, by Microsoft and IBM. It is easily integrated with multiple third-party systems and tools, such as SCORM, LTI and iFrame.

10.4 Solutions for limited or no connectivity

According to some reports on global broadband access (UNESCO, 2019), half of the world is still unconnected. Lack of digital inclusion, gender digital inclusion and unreliable electricity supplies are not the only obstacle for learners. People living in remote areas, with disabilities, low income, low social status and in crisis situations may have no or limited connectivity, so educational organizations and institutions need to evaluate and devise alternative solutions. The COVID-19 crisis has exacerbated educational disparities, revealing that not everyone is connected even in the developed world. For example, in Europe, 14 percent of households do not have access to the Internet and 22 percent do not have a PC (UNESCO, 2020). Offering a combination of digital and traditional media channels, i.e. educational programmes broadcast on television and radio, could be an alternative in such circumstances. Adding offline features to online tools also makes remote learning more accessible. For instance, Google has put together some ideas for learners and educators to use Google Workspace™, former **G-Suite** tools offline.[63]

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59 www.ilias.de

60 www.openolat.com

61 www.openolat.com/openolat-academy/

62 https://open.edx.org

63 www.blog.google/outreach-initiatives/education/offline-access-covid19/

Portable devices created for specific regions

The Commonwealth of Learning has designed Aptus,[64] a low-cost device for the Swat region of Pakistan, allowing educators and learners to connect and have access to content in the context of no electricity or Internet access.

Shared Portable LMS (Spoodle)[65]

A new, lighter, stand-alone, locally accessible version of Moodle works without Internet. Spoodle runs directly from a flash drive, and can load course material and all the related Moodle activities and resources along with it. The solution is handy when accessing learning resources. However, the social aspect of Moodle (forum) cannot be achieved without an Internet connection.

m-learning technologies

m-learning or mobile learning is a way of accessing learning content with mobile hand-held devices, such as mobile phones, tablets, notebooks and personal digital assistants (PDAs). m-learning and teaching have revolutionized the learning experience, rapidly gaining in popularity, especially among the millennial generation, which is attracted to mobile devices that are cheaper and easier to carry and handle than PCs.

Mobile technologies enable ubiquitous learning, which positions the learner in both the real and virtual world, regardless of time and place (Wan Ng, 2010). Learners can share lesson plans, exchange advice, opinions and tips or immediately apply their knowledge, such as in the case of on-the-job and just-in-time training for employees who are constantly on the go or work remotely.

Statistics (Statista, August 2020)[66] have revealed that almost 3 billion subscribers worldwide use mobile devices to access a series of services, including financial services, health and agricultural information, while 1.4 billion people use their phones to improve their education or that of their children –140 million users more than in 2017 – thereby contributing to achieving Sustainable Development Goal 4: Quality education (GSMA, 2019).[67]

Interest in 'anytime' and 'anywhere' learning via mobile devices is growing rapidly in developing countries, as a result of feature phones or flip phones becoming more affordable (for example, in sub-Saharan Africa). The increased number of mobile users has inspired EdTech start-ups across Africa to combine learning techniques and available technologies that work on basic mobile phones or with strong offline functionality (Sesinye, 2019). The following are some examples.

➔ The **Ad-Connect** organization has been in the forefront of pioneering mobile learning, together with Central University College in Ghana and University Nsukka in Nigeria, later expanding to other African countries.[68] The Ad-Connect platform enables educators to publish content for students on devices that include mobile phones, laptops, desktop and tablets, and which is accessible with/without the Internet.

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[64] http://oasis.col.org/handle/11599/695

[65] https://steve.moodlecloud.com/course/view.php?id=4

[66] www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/

[67] www.gsma.com

[68] https://ad-connect-africa.business.site/

→ **Kolibri**, ex KA lite, is an open-source platform that offers a vast, curated library of educational content from sources all over the globe, and makes the content available entirely offline, on low-cost devices.[69]

→ The **Rumie platform** distributes mobile-friendly, microlearning courses that can be completed in under 10 minutes.[70] It contains instructional PDFs, MP3s and videos, as well as other resources available for offline use, and is dedicated to unserved communities around the world.

→ The **BrainShare** educational platform is designed to connect teachers and students, using a downloadable app, useable on a laptop, tablet or phone.[71] Teachers can upload content, and offer coaching to students at no charge.

→ **Ustad Mobile** allows educators to upload learning materials, including rich media files, quizzes, and games, and make them accessible on almost any mobile device.[72] Students can access the learning content offline.

→ **M-Shule** is a personalized SMS learning platform for primary school students across Kenya and sub-Saharan Africa.[73] It works in low connectivity environments with basic mobile phone models. The platform's adaptive learning engine uses artificial intelligence to create tailored SMS lessons based on each individual child's competence. Following flexible learning pathways, lessons delivered are harder or easier, depending on the answers provided by students. Their progress and proficiency profile is updated and the data are used for reports on their performance.[74]

→ **Eneza Education** delivers educational content free of charge for students via basic low-end phones in Côte d'Ivoire, Ghana and Kenya.[75] After signing on, high school students get access to a database of revised examination papers via SMS or web, as well as other tools such as feedback to their questions, lessons, quizzes and offline Wikipedia. Additionally, in partnership with UNESCO, the platform provides a digital mentorship programme for students interested in science, technology, engineering and mathematics (STEM) subjects. The programme combines different media, enabling students to engage with mentors via radio and television, and to interact with tutors through the Ask a STEM Mentor Platform via SMS.

→ **Ubongo** offers free educational resources designed to improve school readiness for children, available as print materials and media-rich content (video, music, drama, quality animations) in six languages and delivered via TV, radio, mobile apps and digital media. The platform relies on prototype ideas coming from focus groups and audience to craft content to meet audience needs.[76]

Despite the potential and capabilities of mobile devices, numerous issues and challenges may arise when it comes to adopting m-learning practices (Bidin and Ziden, 2012). Some of these relate to mobile device features:

A. Usability

Screen size on some devices makes it difficult to access resources that require proper visualization, such as technical images, equations, or data input. Students from a Greek university participated in a survey, highlighting difficulties when

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69 https://learningequality.org/kolibri/

70 https://rumie.org

71 http://brainshare.ug/

72 www.ustadmobile.com/lms/

73 https://m-shule.com/

74 www.youtube.com/watch?v=8mbFCqVmkFM&feature=emb_err_woyt

75 https://enezaeducation.com/

76 www.ubongo.org

accessing their Moodle LMS via mobile phone due to limitations of screen size and reliability. The students expressed the need for more user-friendly mobile access. (Papadakis, Kalogiannakis, Sifaki and Vidakis, 2015).

B. Technical

- Design schemes and standards – different mobile devices runs different hardware/software, each with its own sets of rules. In educational settings, learners using different devices can experience problems, as applications may not be compatible with the platform that they use. There may also be limited storage for offline downloads.

- Poor battery life, especially when running gaming applications, or when running several applications at the same time.

- Technological obsolescence – mobile devices' lifespan is limited and depends on how a device is handled and used, often proving costly both for learners and the environment.

- Security and confidentiality of private information and other safety issues due to cybercrime, identity theft and cyberbullying. Protocols and technologies should be improved to accommodate m-learning requirements.

C. Users' expectations

- Cost can be a barrier to widespread use, especially for new generation, full feature models.

- Distracted learning – time spent in front of a screen can become addictive, and learners can be easily distracted by social media while learning.

Despite its strong potential, m-learning is fragmented and remains limited to single projects and initiatives. Poor digital infrastructure, digital illiteracy and irregular power supply, connectivity and technology provision are some of many aspects of the digital divide that limit m-learning, especially in developing/ underdeveloped countries. Lack of valuable content, especially in local languages, and inadequate national-level implementation policies are additional issues that prevent many learners from capitalizing on the full potential of m-learning.

Many countries now have policies in place to ensure that everyone has access to the Internet, and a range of initiatives and facilitation mechanisms have been supported by the international community and governments, working together with mobile operators, telecom providers and Internet service providers.

➜ Universal Service and Access Funds are public funds financed primarily through contributions made by mobile network operators dedicated to expanding Internet connectivity. In Columbia, *Computadores para Educar* is a government programme to make information and communications technology (ICT) accessible to educational communities.[77]

➜ US-based Mojo Networks is one of several companies trying to bring connectivity to the underserved regions of the world. It supplies Reliance Jio, a wireless telecom provider based in India that has more than 100 million subscribers, with Wi-Fi network access points at cost, thereby helping the wireless carrier to offer Wi-Fi hotspot access to consumers free, or at very low cost (Kirkpatrick, 2018).

➜ In 2019, Nokia delivered technology for improved network capacity, connectivity and coverage in many emerging and other markets, and the activity is due to be expanded to other areas, including Brazil, Egypt, Ethiopia, Malaysia and Pakistan.[78]

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[77] www.computadoresparaeducar.gov.co/es/nosotros/que-es-computadores-para-educar

[78] www.nokia.com/about-us/sustainability/our-approach/nokia-and-the-united-nations-sustainable-development-goals/

→ UNESCO YouthMobile aims to empower the next generation in 35 African countries and teach them how to create their own mobile apps for sustainable development.

→ The UNESCO/Microsoft Mobile Literacy for Out-of-School Children app aims to enhance the basic literacy and numeracy skills of the thousands of migrant, ethnic minority and stateless children in Thai-Myanmar border areas through the use of ICT devices (UNESCO, 2015).

→ From 2015 to 2018, UNESCO/Microsoft piloted the 'Advancing Mobile Literacy Learning' project in Bangladesh, Egypt, Ethiopia and Mexico.[1]

→ The Afghan Institute of Learning is reaching girls and women who cannot travel outside their home due to social restrictions with an SMS-based literacy programme (UNICEF, 2017).

10.5 **In summary**

Key points for this chapter

→ Learning platforms are used by organizations and institutions to deliver and manage their learning processes. A learning platform is a set of interactive online services that provides learners with access to information, tools and resources to support educational delivery and management.

→ Learning platforms exist as proprietary or open-source software. Proprietary learning management systems (LMS) are licensed under exclusive legal rights, restricted from modification, further distribution, reverse engineering and other uses. They are distributed as closed-source programmes with LMS licence costs based on a per-user fee. Open-source programmes work under the terms of the GNU General Public License, which is intended to guarantee freedom to share and change the programme, and ensure that it remains free for all users.

→ Solutions for low Internet connectivity are making advances, such as mobile learning technologies.

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.Glossary

ADDIE model*
Classic model of an instructional system design process that includes the steps Analysis, Design, Development, Implementation, and Evaluation from which the acronym is taken.

Add-on (LMS extension)
Software components that add specific capabilities to a larger software application.

Animation*
The rapid sequential presentation of slightly differing graphics to create the illusion of motion. Animation can have greater purpose in illustrating a process than a static visual, but it requires more information to be processed by the computer and thus higher bandwidth. Compare to audio, video, text, and graphic.

Assessment*
The process used to systematically evaluate a learner's skill or knowledge level.

Asynchronous learning*
Learning in which interaction between instructors and students occurs intermittently with a time delay. Examples are self-paced courses taken via the Internet or CD-ROM, Q&A mentoring, online discussion groups, and e-mail.

Audio conferencing*
Voice-only connection of more than two sites using standard telephone lines.

Bandwidth*
The information carrying capacity of a communication channel.

Bitrate
Speed of Internet connection or Bitrate describes the rate at which bits are transferred from one location to another. In other words, it measures the transmission of data in a given amount of time. Bitrate is commonly measured in bits per second (bps), kilobits per second (Kbps), or megabits per second (Mpbs).

Blended learning*
Learning events that combine aspects of online and face-to-face instruction.

Blog (Weblog)*
An extension of the personal Web site consisting of regular journal-like entries posted on a Webpage for public viewing. Blogs usually contain links to other Web sites along with the thoughts, comments, and personality of the blog's creator.

Bps (bits per second)*
A measurement of data transmission speed in a communications system; the number of bits transmitted or received each second.

Browser*
A software application that displays World Wide Web pages originally written in the text-based HTML language in a user-friendly graphical format.

Byte*
A combination of 8 bits.

Certification*
A process for increasing technical competencies through studies, testing, and practical application while also working toward a recognized designation.

Chat*
Real-time text-based communication in a virtual environment. Chat can be used in e-learning for student questions, instructor feedback, or even group discussion.

**CMS
(content management system)***
A centralized software application or set of applications that facilitates and streamlines the process of designing, testing, approving, and posting e-learning content, usually on Web pages.

Coaching*
A process in which a more experienced person, the coach, provides a worker or workers with constructive advice and feedback with the goal of improving performance. (See also mentoring, which focuses on career development and advancement.)

Competency-Based Learning*
An instructional approach that focuses on individual skills or outcomes, known as competencies (usually defined in a competency dictionary created from an occupational analysis of the skills required for successful performance). The approach is focused on individual learners who work on one competency at a time, with the ability to skip a learning module if they can demonstrate a mastery of the skills contained within it. It's applied most often to skills-based learning.

Courseware*
Any type of instructional or educational course delivered via a software program or over the Internet.

Delivery*
Any method of transferring content to learners, including instructor-led training, Web-based training, CD-ROM, books, and more.

Digital badge
Digital badges, also called digital credentials or micro-credentials, are online visual representations of skills and competences earned through learning.

Discussion boards*
Forums on the Internet or an intranet where users can post messages for others to read.

Distance education*
Educational situation in which the instructor and students are separated by time, location, or both. Education or training courses are delivered to remote locations via synchronous or asynchronous means of instruction, including written correspondence, text, graphics, CD-ROM, online learning, audio- and videoconferencing, interactive TV. Distance education does not preclude the use of the traditional classroom. The definition of distance education is broader than and entails the definition of e-learning.

Distance learning*
The desired outcome of distance education. The two terms are often used interchangeably.

**E-learning
(electronic learning)***
E-Learning (Electronic Learning) is a term covering a wide set of applications and processes such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration.

E-mail (electronic mail)*
Messages sent from one computer user to another.

E-mail list*
A form of one-to-many communication using e-mail; a software program for automating mailing lists and discussion groups on a computer network.

**ERP
(Enterprise Resource Planning)***
A set of activities supported by application software that helps a company manage such core parts of its business as product planning, parts purchasing, inventory management, order tracking, and customer service. Can also include modules for finance and HR activities. The deployment of an ERP system can involve considerable business process analysis, employee retraining, and new work procedures.

Evaluation*
Any systematic method for gathering information about the impact and effectiveness of a learning offering. Results of the measurements can be used to improve the offering, determine whether the learning objectives have been achieved, and assess the value of the offering to the organization.

F2F (face-to-face)*
Term used to describe the traditional classroom environment.

Facilitator*
The online course instructor who aids learning in the online, student-centered environment.

Feedback*
Communication between the instructor or system and the learner resulting from an action or process.

Firewall*
A technology that gives users access to the Internet while retaining internal network security.

GNU General Public Licence
A free license for software and other kinds of works.

Host*
(noun) A computer connected to a network; (verb) To store and manage another company's technology and/or content on your own servers.

Icon*
A simple symbol representing a complex object, process, or function. Icon-based user interfaces have the user click on onscreen buttons instead of typing commands.

**ILT
(instructor-led training)***
Usually refers to traditional classroom training, in which an instructor teaches a course to a room of learners. The term is used synonymously with on-site training and classroom training.

Informal/formal learning*
Formal learning is a class, a seminar, a self-study course. Informal learning is not formally defined learning at home, work, and throughout society, such as over the water cooler, at the poker game, asking the guy in the next cube to help out, collaborative problem solving, watching an expert, or sharing a terminal for e-learning.

Infrastructure*
The underlying mechanism or framework of a system. In e-learning, the infrastructure includes the means by which voice, video, and data can be transferred from one site to another and be processed.

Instant messenger (IM)*
Software that lists users' selected "buddies" (friends, family, co-workers, and so forth) who are online and enables users to send short text messages back and forth to them.
Some instant messenger programs also include voice chat, file transfer, and other applications.

Instructional design
The systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction.
In job-related training, the aim of instructional design is to improve employee performance and to increase organizational efficiency and effectiveness.

Instructional designer (ID)*
An individual who applies a systematic methodology based on instructional theory to create content for learning.

Internet*
An international network first used to connect education and research networks, begun by the US government.
The Internet now provides communication and application services to an international base of businesses, consumers, educational institutions, governments, and research organizations.

Intranet*
A LAN or WAN that's owned by a company and is only accessible to people working internally. It is protected from outside intrusion by a combination of firewalls and other security measures.

Job aid*
Any simple tool that helps a worker do his or her job (for example, a flow chart to follow when answering a customer service call). Job aids generally provide quick reference information rather than in-depth training.

LAN (local-area network)*
A group of personal computers and/or other devices, such as printers or servers, that are located in a relatively limited area, such as an office, and can communicate and share information with each other.

**LCMS
(learning content management system)***
A software application (or set of applications) that manages the creation, storage, use, and reuse of learning content. LCMSs often store content in granular forms such as learning objects.

Learning*
A cognitive and/or physical process in which a person assimilates information and temporarily or permanently acquires or improves skills, knowledge, behaviours, and/or attitudes.

Learning environment*
The physical or virtual setting in which learning takes place.

Learning game*
Learning games are simulations involving a competitive component, a challenging goal and a set of rules and constraints. The term "learning game" is also used to indicate simpler game-show quizzes used to support memorization of factual knowledge.

Learning object*
A reusable, media-independent collection of information used as a modular building block for e-learning content. Learning objects are most effective when organized by a metadata classification system and stored in a data repository such as an LCMS.

Learning objective*
A statement establishing a measurable behavioural outcome, used as an advanced organizer to indicate how the learner's acquisition of skills and knowledge is being measured.

Learning platforms*
Internal or external sites often organized around tightly focused topics, which contain technologies (ranging from chat rooms to groupware) that enable users to submit and retrieve information.

Learning solution*
1) Any combination of technology and methodology that delivers learning.
2) Software and/or hardware products that suppliers tout as answers to businesses' training needs.

Line chart
diagrams displays quantitative information or illustrates relationships between two changing quantities (variables) with a line or curve that connects a series of successive data points.

**LMS
(learning management system)***
Software that automates the administration of training. The LMS registers users, tracks courses in a catalog, records data from learners; and provides reports to management. An LMS is typically designed to handle courses by multiple publishers and providers. It usually doesn't include its own authoring capabilities; instead, it focuses on managing courses created by a variety of other sources.

Localization*
The tailoring of an offering to meet the specific

needs of a geographic area, product, or target audience.

Mentoring*
A career development process in which less experienced workers are matched with more experienced colleagues for guidance. Mentoring can occur either through formal programs or informally as required and may be delivered in-person or by using various media.

Microlearning
Microlearning is short-form content that is just long enough to give learners what they need at that moment and get on with their work. It can be considered as learning content that can be consumed in less than 10 minutes, such as, for example, a short text, a mini e-learning module, a video, an infographic, a podcast. *Adapted from 'Designing Microlearning (What Works in Talent Development)' by Carla Torgerson, Sue Iannone.*

Mobile Learning*
Learning that takes place via wireless devices such as smart phones and tablets.

MOOC
MOOCs (Massive Open Online Courses) are online courses made available to a very large number (up to hundreds of thousands) of learners. They are accessible to all for free.

Modular*
Made up of standardized units that can be separated from each other and rearranged or reused.

Multimedia*
Encompasses interactive text, images, sound, and color. Multimedia can be anything from a simple PowerPoint slide slow

to a complex interactive simulation.

Navigation*
1) Moving from Webpage to Webpage on the World Wide Web.
2) Moving through the pages of an online site that may not be part of the WWW, including an intranet site or an online course.

Offline*
The state in which a computer is in operation while not connected to a network.

Online*
The state in which a computer is connected to another computer or server via a network. A computer communicating with another computer.

Online learning*
Learning delivered by Web-based or Internet-based technologies. See Web-based training and Internet-based training.

Online training*
Web- or Internet-based training.

Open-source software*
1) Generally, software for which the original program instructions, the source code, is made available so that users can access, modify, and redistribute it. The Linux operating system is an example of open source software.
2) Software that meets each of nine requirements listed by the non-profit Open Source Initiative in its Open Source Definition.

OS (Operating System)
Programs and data that manage computer hardware resources and provide a software platform on top of which other programs (applications) can run.

PHP
Scripting language designed for web development to produce dynamic web pages.

Plug-in*
An accessory program that adds capabilities to the main program. Used on Web pages to display multimedia content.

Podcast*
A series of digital-media files which are distributed over the Internet using syndication feeds for playback on portable media players and computers. The term podcast, like broadcast, can refer either to the series of content itself or to the method by which it is syndicated; the latter is also called podcasting. The term derives from the words "iPod" and "broadcast;" the Apple iPod being the brand of portable media player for which the first podcasting scripts were developed.

Post*
To place a message in a public message forum. Also, to place an HTML page on the World Wide Web.

Proprietary software
Software owned by a vendor and licensed under exclusive legal rights that restrict users from modification, distribution, reverse engineering and other uses.

Rapid e-learning
A methodology to build e-learning courses rapidly. For example, an instructional designer or a subject matter expert can create slides in Powerpoint, record narration on top of the slides, use some easy-to-use software to add tests, and then upload the whole package to a learning management system or a Web site.

Real-time communication*
Communication in which information is received at (or nearly at) the instant it's sent. Real-time communication is a characteristic of synchronous learning.

Reusable*
E-learning content that can be transferred to various infrastructures or delivery mechanisms, usually without changes.

RLO (reusable learning object)*
A collection of RIOs, overview, summary, and assessments that supports a specific learning objective. (Pronounced "R-L-O").

ROI (return on investment)*
Generally, a ratio of the benefit or profit received from a given investment to the cost of the investment itself. In e-learning, ROI is most often calculated by comparing the tangible results of training (for example, an increase in units produced or a decrease in error rate) to the cost of providing the training.

Role play*
(noun) A training technique in which learners act out characters in order to try out behaviours, practice interactions, communicate for a desired outcome, and/or solve a dynamic problem. Role plays can reinforce learning and help people apply new information, skills, and techniques; (verb) To participate in a role play.

RSS (Really Simple Syndication)
A method of sharing and broadcasting content such as news from a Web site. Using XML markup language, items such as news articles can be automatically downloaded into a News Reader or published onto another Web site.

Saas (software-as-a-service)*
A model of software deployment where an application is hosted as a service provided to customers across the Internet. By eliminating the need to install and run the application on the customer's own computer, SaaS alleviates the customer's burden of software maintenance, ongoing operation, and support.

SCORM (Sharable Content Object Reference Model)*
A set of specifications that, when applied to course content, produces small, reusable learning objects. A result of the Department of Defense's Advance Distributed Learning (ADL) initiative, SCORM-compliant courseware elements can be easily merged with other compliant elements to produce a highly modular repository of training materials.

Self-assessment*
The process by which the learner determines his or her personal level of knowledge and skills.

Self-paced learning*
An offering in which the learner determines the pace and timing of content delivery.

Serious games*
A software application developed with game technology and game design principles for a primary purpose of learning.

Simulations*
Highly interactive applications that allow

the learner to model or role-play in a scenario. Simulations enable the learner to practice skills or behaviours in a risk-free environment.

**SME
(subject matter expert)***
An individual who is recognized as having proficient knowledge about and skills in a particular topic or subject area.

Storyboard*
An outline of a multimedia project in which each page represents a screen to be designed and developed.

Synchronous learning*
A real-time, instructor-led online learning event in which all participants are logged on at the same time and communicate directly with each other. In this virtual classroom setting, the instructor maintains control of the class, with the ability to "call on" participants. In most platforms, students and teachers can use a whiteboard to see work in progress and share knowledge. Interaction may also occur via audio- or videoconferencing, Internet telephony, or two-way live broadcasts.

Task analysis
In instructional design, it is a detailed analysis of actions and decisions that a person takes to perform a job task, including the identification of the knowledge needed to support those actions and decisions.

Template*
A predefined set of tools or forms that establishes the structure and settings necessary to quickly create content.

Training*
A process that aims to improve knowledge,

skills, attitudes, and/or behaviours in a person to accomplish a specific job task or goal. Training is often focused on business needs and driven by time-critical business skills and knowledge, and its goal is often to improve performance.

Videoconferencing*
Using video and audio signals to link participants at different and remote locations.

Virtual*
Not concrete or physical. For instance, a completely virtual university does not have actual buildings but instead holds classes over the Internet.

Virtual classroom*
The online learning space where students and instructors interact.

VoIP (voice over IP)*
Voice transmitted digitally using the Internet Protocol. Avoids fees charged by telephone companies.

Webcast*
(Web + broadcast) (noun) A broadcast of video signals that's digitized and streamed on the World Wide Web, and which may also be made available for download; (verb) To digitize and stream a broadcast on the World Wide Web.

Web conference*
(noun) A meeting of participants from disparate geographic locations that's held in a virtual environment on the World Wide Web, with communication taking place via text, audio, video, or a combination of those methods; (verb) To participate in a Web conference.

Webinar
The term is a short version for Web-based seminar.

A presentation, lecture, workshop or seminar that is transmitted over the Web. Can be video, audio or chat-based.

Web site*
A set of files stored on the World Wide Web and viewed with a browser such as Google Chrome or Microsoft Edge. A Web site may consist of one or more web pages.

Whiteboard*
An electronic version of a dry-erase board that enables learners in a virtual classroom to view what an instructor, presenter, or fellow learner writes or draws. Also called a smartboard or electronic whiteboard.

.Tools

The following section provides analysis and design tools presented throughout the guide, as well as checklists for a quality assessment of e-learning products and activities.

Template for task analysis

The task analysis can be used to identify knowledge and skills to be addressed.

Step 1: Job and task inventory

What is the overall goal of the learning initiative?
[This should relate to/be aligned with the organizational goals of the target audience]

What are the target audience's major responsibilities in relation to the goal?

What are the tasks that should be performed by the target audience, for the overall goal to be accomplished?

Write the tasks here:

1. ....

2. ....

3. ....

4. ....

5. ....

Step 2: Prioritizing tasks

Which are the most critical tasks?

Which are the most important tasks for the organization?

Which tasks should be prioritized?

Step 3: Breaking down the tasks

Describe each task and list the type of judgement, decisions or the steps that are required for each of the tasks. These represent how each task is accomplished.

Step 4: Identification of required knowledge

What does the target audience need to know to make those judgements, take decisions or undertake steps?

Learning taxonomies

Learning taxonomies can be used to:

- formulate learning objectives; and
- develop practice and tests.

Cognitive domain

Remember	The learner is able to recognize or memorize information.
Understand	The learner is able to reformulate a concept.
Apply	The learner is able to use the information in a new way.
Analyse	The learner is able to decompose and define relationships among components.
Evaluate	The learner is able to justify a decision according to a criterion or standard.
Create	The learner is able to realize a new product or approach.

Adapted from Anderson and Krathwohl, 2001.

Affective domain

Receiving phenomena	The learner is aware, willing to hear, attentive.
Responding to phenomena	The learner participates actively. He/she attends and reacts to a particular phenomenon.
Valuing	The learner attaches worth or value to a particular object, phenomenon or behaviour.
Organization	The learner organizes values into priorities by contrasting different values, resolving conflicts between them and creating a unique value system.
Internalizing values (characterization)	The learner has a value system that controls his/her behaviour. The behaviour is pervasive, consistent, predictable and characteristic of the learner.

Adapted from Krathwohl, D.R.; Bloom, B.S. and Masia, B.B. 1964. *Taxonomy of educational objectives: The classification of educational goals; Handbook II: The affective domain.* New York, David McKay.

Psychomotor domain

Imitation	The learner observes and patterns behaviour after someone else.
Manipulation	The learner is able to perform certain actions by following instructions and practising.
Precision	The learner refines his/her behaviour, becoming more exact.
Articulation	The learner is able to coordinate a series of actions, achieving harmony and internal consistency.
Naturalization	Having high-level performance becomes natural.

Adapted from Dave, R. H. 1975. *Developing and writing behavioral objectives.* (R. J. Armstrong, ed.). Tucson, Arizona, USA, Educational Innovators Press.

Types of content

The classification of different types of content can be used to:

- define a course outline;
- define the instructional strategy; and
- develop practice and tests.

Types of learning content	
Facts	Unique, specific information that answers the questions: who, where, when? Facts are shown, exhibited or indicated. Examples: data, lists, historical events.
Procedures	A procedure is a series of clearly defined steps, aimed at performing a task. Procedures answer the question: 'How to …?' Example: 'instructions for creating a table in Microsoft Word'.
Concepts	A concept is a group of objects, entities or ideas that: are defined by a single word or term; share common characteristics; differ in unimportant characteristics; require a definition; and answer the question: 'What is …?' Example: the concept of 'climate change'.
Principles	A principle (or rule) describes a relationship between two concepts. For example: 'As price increases, the supply increases'. Some principles can be translated into strategic guidelines, which can guide decisions and complex tasks. Example: 'guidelines for facing price volatility'.
Interpersonal skills	Verbal and non-verbal skills for interacting with other people. For example, content related to 'negotiating' or 'solving group conflict.'
Attitudes	Predispositions to behaviour. Example: content related to appreciate the 'importance and urgency of adopting measures for limiting the negative impacts of climate change'.

Based on Morrison G.R., Ross S.M. and Kemp J.E., 2001.

Quality checklist for self-paced e-learning courses

The following checklist has been developed by the FAO elearning Academy to assess the quality of self-paced e-learning courses.

Course navigation
☐ The course structure is well organized and easy to understand.
☐ The course contains a tutorial or Help section that explains the navigation icons and their functions.
☐ Learners can easily navigate the course. They always have quick access to the main menu, help and exit.
☐ Learners are free to access any section or content in the course.
☐ Learners are not forced to click on every object to advance in the course.
☐ Learners can always check their progress (sections completed, screens visited) and know where they are in the course.
☐ Navigation icons and buttons are used consistently.
☐ Clear instructions are provided for interactive activities.
☐ All external links work properly.

Text, graphics, audio, video
☐ Images, graphics, animation, audio and videos are relevant and meaningful and enhance the comprehension of content.
☐ Text, video, audio and imagery are sensitive to gender and reflect diversity.
☐ Font (type, size and colour) is legible and consistent throughout the course.
☐ The page layout is clear, well organized and contains enough empty space (not too much text on the page).
☐ Images, tables and graphs are clear and easy to read.
☐ Images and animations load quickly for low-bandwidth connections.
☐ Image credits and copyright statements are given for each photograph or illustration used.
☐ The audio complements the text and animations; it is not a mere duplication of on-screen text.
☐ Audio quality is clear. Learners can stop, replay and mute audio.
☐ Video quality is clear and the length is short (4 mins max).
☐ Videos load quickly and are suitable for low-bandwidth connections.
☐ Learners can pause, replay and stop the video.
☐ A written transcript of the audio and video segments is always provided.

Content

- ☐ The course addresses the target audience's learning needs.
- ☐ The content flow is logical.
- ☐ All concepts are clearly explained and supported with examples.
- ☐ The content is structured in self-contained 'chunks', enabling short study sessions.
- ☐ Learning objectives are provided at the beginning of each section; they are formulated from the learner's perspective.
- ☐ Content matches the learning objectives and enables learners to achieve them.
- ☐ Content features rich and relevant real-life examples, case studies and best practices when appropriate.
- ☐ Language is direct (using the active voice), simple, avoids jargon, and is suitable for a multilingual audience.
- ☐ Essential content is clearly presented on-screen, while 'nice to know' content is linked from the course as ad-ditional resources.
- ☐ The way the content is presented (storytelling, demonstration, scenario-based/game-based lesson) is appropriate for the content and target audience.
- ☐ Interactivity is used throughout the course to engage the learner.

Learning assessments

- ☐ Assessments are used throughout the course to reinforce learning and check the learner's knowledge of the content.
- ☐ Assessments are relevant and match the learning objectives.
- ☐ All assessments are explained through clear and appropriate instructions.
- ☐ When learners answer assessment questions, useful feedback is provided.
- ☐ The assessments comprise several types of exercise.
- ☐ The final assessment, if present, verifies the achievement of all the learning objectives.

Additional resources

- ☐ The course description and objectives are clear to users at the beginning of the course.
- ☐ A glossary of technical terms is included and provides a clear description, to ensure coherence and consistency in the course terminology.
- ☐ Checklists and job aids (if needed) are clearly related to the content and accompanied by appropriate instructions.
- ☐ The text-only (printable) version of the course (if needed) presents the same content covered in the course.

Quality checklist for facilitated e-learning courses and MOOCs

The following checklist has been developed by FAO to assess the quality of facilitated e-learning courses and MOOCs.

General
☐ A course description is provided, which describes the target audience, objectives, course outline, duration, strategy and assessment elements.
☐ A code of conduct is provided, and participants are required to comply with it (especially for MOOCs/ large number of participants).
☐ The course learning objectives are clearly stated for each course section.
☐ A course syllabus is provided to give an overall view of the course.
☐ Sufficient time is allocated for each course session to achieve the learning objectives.
☐ Activities support the achievement of the learning objectives.
☐ Both individual and collaborative learning activities are included.
☐ Clear instructions are provided for each activity.
☐ Learners can always check their progress and know where they are in the course.
☐ Pre-course activities allow learners to become familiar with the learning environment.
☐ A tutorial is provided to guide learners throughout the course.

Content
☐ Learning materials are relevant to the learning objective of each session.
☐ Learning materials are varied and include different types of content and format.
☐ Learning materials are brief and grouped into small sections.
☐ Learning materials introducing new knowledge are linked to an activity (practice, test or discussion).
☐ An offline version of interactive content is provided to address low-bandwidth connections.
☐ Learning materials are designed by applying quality criteria for e-learning content (see above Quality checklist for self-paced e-learning courses).

Social interaction

- ☐ Communication tools reflect learners' characteristics (e.g. familiarity with technology).
- ☐ Learners can introduce themselves and state their interests at the beginning of the course.
- ☐ Learners can ask questions of facilitators and subject matter experts.
- ☐ Learners can share reflections with other participants.
- ☐ Online discussions are guided by meaningful questions or instructions.
- ☐ Online discussions are monitored and moderated by facilitators and subject matter experts.
- ☐ Communication among the participants is monitored to avoid any offensive behaviour, e.g. use of swear words, discriminatory language (especially for MOOCs/ large number of participants).
- ☐ Virtual live events are carefully presented to learners, including instructions for participation.
- ☐ Virtual live events are conducted in a dynamic way, using a variety of tools (e.g. breakout rooms, chat, polls, collaborative working documents, whiteboards) in addition to experts' presentations.
- ☐ Learners are provided with a communication channel to continue networking and sharing experi-ence/knowledge, e.g. a mailing list.

Assessments

- ☐ Self-assessments are used throughout the course to reinforce learning.
- ☐ Practice exercises and assessments are aligned with the learning objectives.
- ☐ Assessments are explained through clear and appropriate instructions.
- ☐ The assessments comprise several types of exercise.
- ☐ When learners perform assessments, timely feedback is provided.
- ☐ If course activities (discussions, collaborative work) are used for assessment, this is clearly communicated to the learners.
- ☐ The final assessment, if present, verifies the achievement of all main learning objectives.
- ☐ A final certificate is provided to learners who completed the course successfully.

User feedback

- ☐ Learners are encouraged to share feedback on their course experience.
- ☐ Discussion forums are used and analysed to gather feedback from the learners.
- ☐ Course feedback survey is provided at the end of the course for an immediate impact assessment.
- ☐ Learners are followed up periodically after finishing the course via surveys and/or interviews, to determine if they applied what they learned in the course to real-life situations and to gather learner stories.

Checklist for organizing a webinar

The table below is only indicative and offers an overall idea of the most important steps to adopt when organizing, implementing and delivering a webinar. Timing and tasks may vary according to your needs.

Steps	When	Notes
Liaise with the expert and other organizers	**1 month** before the webinar	Decide the delivery dates and time, paying attention to time zone differences of the target audiences. Define webinar's layout, duration, topics, facilitator, audience etc.
Design webinar proposal in coordination with the expert and other organizers	**3 weeks** before the webinar	**Discuss possible breakout rooms, case studies and presentations**. Decide speaking order, facilitator and possible opening and/or closing remarks.
Create virtual space and link on the platform	**3 weeks** before the webinar	Speaker(s) and moderator information must also be added.
Book agenda for speakers and facilitator for webinar and for rehearsal	**3 weeks** before the webinar	**Book calendar for both events for speakers and facilitator.** Make sure that the facilitator also has access and will join the webinar from a silent environment.
Verify list of recipients for webinar announcement	**3 weeks** before the webinar	**Verify list of recipients** for invitation to the webinar and include any missing contacts.
Prepare webinar announcement	**3 weeks** before the webinar	Prepare an eye-catching webinar promo that incorporates the time, date and scope of the event, as well as details of the speakers.
Send webinar announcement	**2 weeks** before the webinar	Include the **date/hour, main learning objectives**, request to confirm participation accepting the invitation, and link to virtual room.
Take care of additional promotion with other focal points	**2 weeks** before the webinar	Contact separately, via e-mail, other focal points for wider dissemination and promotion of the webinar announcement. Share announce-ment in PDF, as well as the link and webinar banner photo.
Support speakers with their presentation	**1 week** before the webinar	Make sure that the presentation works correctly.
Send e-mail reminder to enrolled participants	**1 week** before the webinar	Include **link to the virtual space**.

Steps	When	Notes
Prepare talking points for facilitator and opening and/or closing remarks	**1 week** before the webinar	If needed, see if opening and/or closing remarks should be given by senior manager.
Run one-to-one rehearsal with speakers	**1 week** before the webinar	To ensure that they are familiar with the video-conferencing tool, and to ask them to join the session earlier on the day of the event for a final round of tests.
Create private group for organizers	**1 week** before the webinar	This could be done on various messaging apps.
Send second e-mail reminder to enrolled participants	**1 day** before the webinar	Include **link to the virtual space**.
Send third e-mail reminder to enrolled participants	**30 mins** before the webinar	Include link to the virtual space and ask participants to join the virtual meeting in advance, so that you can run all **technical checks**.
Run technical checks	**30 mins** before the webinar	It is strongly recommended to have at least two people providing technical support for the management of webinar sessions **with more than 100 participants**. The number of supporting staff should vary based on the number of total participants and support required. A good microphone should be available for the facilitator and speakers, and for the person running technical checks.
Set microphone rights only to speakers and facilitator	**30 mins** before the webinar	To avoid confusion, only speakers and facilitator should be entitled to using the microphone.
Take care of participants' connection issues via private messages	During the webinar	Ensure that: ■ They can click on the small triangle next to the microphone to adjust volume. ■ They close all programmes on their PC to avoid bandwidth issues. ■ They make sure that they only opened one virtual room in their browser. ■ They refresh the meeting room or re-access the link. ■ Participants' microphones are muted if sound does not work well. From the technical support side, this is normally more complicated to manage for sessions with more than 100 participants.

Steps	When	Notes
Record the meeting	During the webinar	Only when technical checks are completed.
Facilitate the meeting	During the webinar	Make sure that microphone access is disabled for participants.
Launch polls	During the webinar	It is usually recommended to launch polls and/or surveys to facilitate the inclusion of and interaction with participants. This would also allow for the retrieval of specific webinar data at the end of the session.
Send follow up e-mail to participants with final notes, recording link and presentations	**1 day** after the webinar	Include **link to** the dedicated webpage of the webinar. The link to the recording may be provided in the follow up e-mail.
Prepare final list of participants	Some days after the webinar	Create a final list with all the available information on the participants. This will be used to monitor attendance and share results.
Prepare and analyse webinar metrics	Some days after the webinar	It may be possible to analyse the data of all the webinar participants (i.e. geographical area, affiliation, gender etc.), depending on the programme used to deliver the webinar, which may offer reporting tools and the possibility of retrieving statistical data. This activity will be more time-consuming for sessions with more than 500 participants.
Liaise with speakers for Q&A	Some days after the webinar	Finalize the Q&A document with the active support of the webinar's speakers.

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