

E-learning methodologies

A guide for designing and developing e-learning courses



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Many of the glossary terms in this publication are reproduced with permission from the American Society for Training & Development (ASTD).

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OVERVIEW

The purpose of this guide is to provide detailed guidance on designing and developing an e-learning course for trainers and instructional designers who are new to e-learning design. It also provides basic concepts and information on the processes and resources involved in e-learning development, which might be of interest to capacity-development managers.

The information in this guide is based on consolidated instructional design models and learning theories and incorporates FAO's experience in delivering 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 can be defined as the use of computer and Internet technologies to deliver a broad array of solutions to enable learning and improve performance.

This guide focuses on formal learning, specifically on structured courses designed to meet job-related training goals.¹ It does not address needs assessment or evaluation stages of a training project, but rather the design, development and delivery activities which 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 adult learners, i.e. learners who have completed their formal education, but who are still motivated to improve their job-related tasks and knowledge. 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 have to learn something);
- > like to learn experientially;
- > approach learning as problem-solving;
- > learn better where they can see the immediate value and application of content; and
- > prefer to study at a time, place and pace convenient for them.

The guide is articulated into four main sections:

Part I: Introduction

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

Part II: Designing an e-learning course

Part II (chapters 3 and 4) provides guidance on how to design an e-learning course (from the needs, target and task/topic 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 really match learners' needs.

¹However, e-learning is not limited to formal, well-defined courses. It also encompasses other forms of learning, such as learning at home or learning at work through e-mentoring and e-coaching, for example.

Part III: Creating interactive content

Part III (chapters 5, 6 and 7) provides detailed guidance on creating interactive content (from the application of learning strategies and media to courseware development). This chapter addresses instructional designers and subject matter experts involved in content development as well as all those who want to know more about the methodology and tools used to create e-learning content.

Part IV: Managing and evaluating learning activities

Part IV (chapters 8 and 9) provides an overview of online collaborative learning, evaluation methods and learning platforms used to host online courses. This addresses training managers, facilitators and instructional designers who want to know how to conduct and evaluate an online course and how learning platforms can support course delivery and communication among participants.

The guide also includes a glossary, a bibliography, and a number of templates 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 IS A GOOD SOLUTION. IT ALSO DISCUSSES THE STAGES OF DEVELOPING AN E-LEARNING COURSE, THE RESOURCES AND TECHNOLOGY REQUIRED, THE MAIN TYPES OF E-LEARNING AND E-LEARNING COMPONENTS AND SOME EXAMPLES OF E-LEARNING COURSES DEVELOPED BY FAO AND ITS PARTNERS.

1. GETTING STARTED



Salim is a senior manager in a non-governmental organization.

Among its activities, the organization provides training on food security to practitioners from several developing countries.

Because of the increasing number of requests for training from different countries, Salim is considering the option of including e-learning in the organization's training plan.

He now would like to know if e-learning is a convenient option for the organization, and if it can ensure the same effectiveness as traditional training.

This chapter will introduce you to the following topics:

- > The main reasons for developing e-learning;
- > The basic types of e-learning courses and their components;
- > How to combine e-learning with traditional face-to-face training; and
- > Examples of e-learning courses developed by FAO.

1.1 WHY DEVELOP E-LEARNING?

Many organizations and institutions are using e-learning because it can be as effective as traditional training at a lower cost.

Developing e-learning is more expensive than preparing classroom materials and training the trainers, especially if multimedia or highly interactive methods are used. However, delivery costs for e-learning (including costs of web servers and technical support) are considerably lower than those for classroom facilities, instructor time, participants' travel and job time lost to attend classroom sessions.

Moreover, e-learning reaches a wider target audience by engaging learners who have difficulty attending conventional classroom training because they 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;
- > located in conflict and post-conflict areas and restricted in their mobility because of security reasons;
- > limited from participating in classroom sessions because of cultural or religious beliefs;
- > facing difficulties with real-time communication (e.g. foreign language learners or very shy learners).

E-learning can offer effective instructional methods, such as practising with associated feedback, combining collaboration activities with self-paced study, personalizing learning paths based on learners' needs and using simulation and games. Further, all learners receive the same quality of instruction because there is no dependence on a specific instructor.

CAN E-LEARNING BE USED TO DEVELOP ANY TYPE OF SKILL?

A training program may aim at developing different types of skills:

- > **cognitive skills**, which can involve knowledge and comprehension (e.g. understanding scientific concepts), following instructions (procedural skills), as well as applying methods in new situations to solve problems (thinking or mental skills);
- > **interpersonal skills** (e.g. skills involved in active listening, presenting, negotiating, etc.); as well as
- > **psychomotor skills**, involving the acquisition of physical perceptions and movements (e.g. making 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, thinking skills may require more interactive e-learning activities 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, interactive role playing with appropriate feedback can be used to change attitudes and behaviours.

Some questions to ask when choosing among e-learning, face-to-face instruction or other types of informal or on-the-job learning include:

- > What is the relative cost of each type of training?
- > Is learning best delivered in one unit or spread out over time?
- > Does it address a short-term or a long-term learning need?
- > Do participants have access to needed computer and communications equipment?
- > Are participants sufficiently self-motivated for e-learning or self-study modes of learning?
- > Do target participants' time schedules and geographic locations enable classroom-based learning or other types of synchronous learning?

E-LEARNING IS 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;
- > learners are required to develop 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 aims to build cognitive skills rather than psychomotor skills;
- > the course addresses long-term rather than short-term training needs²;
- > 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. The most cost-effective application of e-learning may be to complement conventional training in order to reach as many learners as possible.

1.2 E-LEARNING APPROACHES

There are two general approaches to e-learning: self-paced and facilitated/instructor-led.

Self-paced learners are alone and completely independent, while facilitated and instructor-led e-learning courses provide different levels of support from tutors and instructors and collaboration among learners.

Often, e-learning courses combine both approaches, but for simplicity it is easy to consider the two separately.



Self-paced e-learning

Learners are offered e-learning courseware (also called Web-based training (WBT)), which can be complemented by supplemental resources and assessments.

Courseware is usually housed on a Web server, and learners can access it from an online learning platform or on CD-ROM.

Learners are free to learn at their own pace and to define personal learning paths based on their individual needs and interests.

E-learning providers do not have to schedule, manage or track learners through a process.

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. It must provide as much learning support as possible (through explanations, examples, interactivity, feedback, glossaries, etc.), in order to make learners self-sufficient. However, some kind of support, such as e-mail-based technical support or e-tutoring, is normally offered to learners.

When self-paced e-learning is offered through an Internet connection, there is the potential to track learners' actions in a central database.

²Developing an e-learning programme requires more time than preparing a traditional training course. When instruction needs to be provided urgently, a series of training sessions might be the right solution.



Instructor-led and facilitated e-learning

In this model, a linear curriculum is developed that integrates several content elements and activities into a chronological course or syllabus.

The course is scheduled and led by an instructor and/or facilitator through an online learning platform.

E-learning content for individual study can be integrated with instructor's lectures, individual assignments and collaborative activities among learners.

Learners, facilitators and instructors can use communication tools such as e-mails, discussion forums, chats, polls, whiteboards, application sharing and audio and video conferencing to communicate and work together.

At the end, a final step typically includes an exercise or assessment to measure learning.

1.3 E-LEARNING COMPONENTS

As we have seen, e-learning approaches can combine different types of e-learning components, including:

- (a) e-learning content;
- (b) e-tutoring, e-coaching, e-mentoring;
- (c) collaborative learning; and
- (d) virtual classroom.

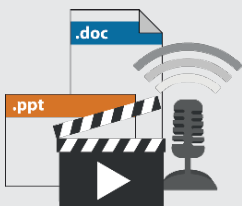
Let's have a quick look at these components.

(a) E-learning content

E-learning content can include:

- > simple learning resources;
- > interactive e-lessons;
- > electronic simulations; and
- > job aids.

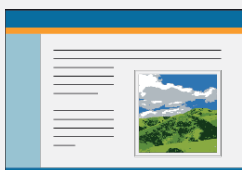
Simple Learning Resources



Simple learning resources are non-interactive resources such as documents, PowerPoint presentations, videos or audio files. These materials are non-interactive in the sense that learners can only read or watch content without performing any other action.

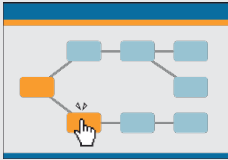
These resources can be quickly developed and, when they match defined learning objectives and are designed in a structured way, they can be a valuable learning resource even though they don't provide any interactivity.

Interactive e-lessons



The most common approach for self-paced e-learning is Web-based training consisting of a set of interactive e-lessons. An e-lesson is a linear sequence of screens which can include text, graphics, animations, audio, video and interactivity in the form of questions and feedback. E-lessons can also include recommended reading and links to online resources, as well as additional information on specific topics.

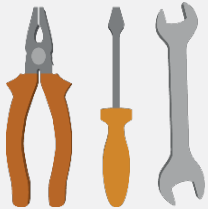
Electronic simulations



Simulations 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 immerse the learner in a real-world situation and respond in a dynamic way to his/her behaviour.

Job aids



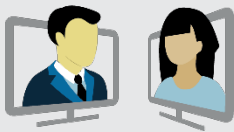
Job aids provide just-in-time knowledge.

They can take several forms and be delivered on different platforms (e.g. computer, printed document, mobile phone). They usually provide immediate answers to specific questions, thus helping users accomplish job tasks. 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.

(b) E-tutoring, e-coaching, e-mentoring

Services which provide human and social dimensions can be offered to learners to support them through the learning experience.

E-tutoring, e-coaching, e-mentoring



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

(c) Collaborative learning

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

Online discussions



Synchronous and asynchronous 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.

Collaboration



Collaborative project work implies collaboration among learners to perform a task. Collaborative activities can include project work and scenario-based assignments.

(d) Virtual classroom

A virtual classroom is the instructional method most similar to traditional classroom training, as it is led completely by an instructor.

Virtual classroom



A virtual classroom is an e-learning event where an instructor teaches remotely and in real time to a group of learners using a combination of materials (e.g. PowerPoint slides, audio or video materials). It is also called synchronous learning.

This method requires the least amount of effort to convert materials (but instructors still have to prepare them). Appropriate technology must be in place for both the learners and providers (e.g. software for the virtual classroom and good connectivity).

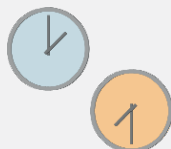
1.4 SYNCHRONOUS AND ASYNCHRONOUS E-LEARNING

E-learning activities can be synchronous or asynchronous.



Synchronous

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



Asynchronous

Asynchronous events are time-independent. A self-paced course is an example of asynchronous e-learning because online learning takes place at any time. E-mail or discussion forums are examples of asynchronous communication tools.

Synchronous

- > Chat and IM
- > Video and audio conference
- > Live webcasting
- > Application sharing
- > Whiteboard
- > Polling

Asynchronous

- > E-mail
- > Discussion forum
- > Wiki
- > Blog
- > Webcasting

The flexibility of Internet technology creates gray areas around the concepts of synchronous and asynchronous.

For example, video and audio sessions can be recorded and made available for learners who cannot attend a live event.

1.5 QUALITY OF E-LEARNING

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

- > **learner-centred content:** E-learning curricula 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 assimilation of new knowledge and to 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 the learners' progress and performance individually.

ASSESSING THE QUALITY OF E-LEARNING PROGRAMMES

In 2010, an international quality standard for e-learning programmes – “Open ECBCheck” – was officially released. ECBCheck is an accreditation and quality improvement scheme for e-learning programmes which supports organizations in measuring the success of their programmes and allows for continuous improvement through peer collaboration. It was developed through an innovative and participative process involving more than 40 international, regional and national capacity-development organizations.

ECBCheck provides a set of quality criteria to assess e-learning programme design, development, management, delivery and evaluation, as well as the quality of learning materials, methodology, media, technology and e-tutoring.

For more information: <http://www.qualityfoundation.org/openecbcheck/>

1.6 EXAMPLES OF FAO E-LEARNING COURSES

The following e-learning solutions were designed to incorporate low bandwidth and technical PC requirements.

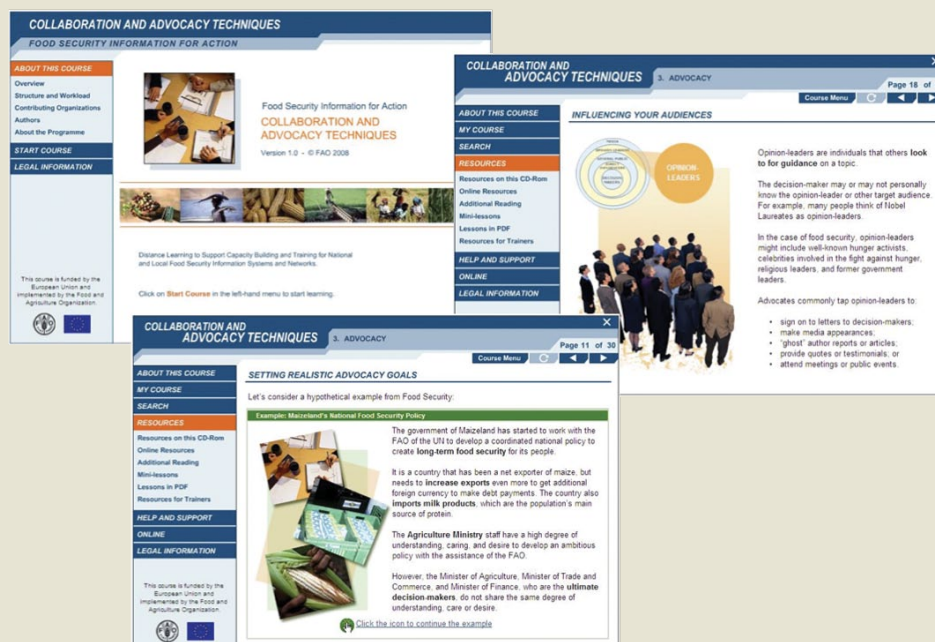
1 - Self-paced courses on food security

An e-learning curriculum on food security, developed by international experts to support capacity development, is part of the “EC/FAO Programme on Linking Information and Decision-making to Improve Food Security”. It is led by FAO and funded by the European Union's Food Security Thematic Programme (FSTP). The media (e.g. images and small animations) can be viewed by low-performing computers. The curriculum is comprised of a set of courses³ in English, French and Spanish, and is available free of charge from the programme Web site (<http://www.foodsec.org>).

³The following courses are available as of August 2011: Food Security Information Systems and Networks; Reporting Food Security Information; Availability Assessment and Analysis; Baseline Food Security Assessments; Food Security Concepts and Frameworks; Collaboration and Advocacy Techniques; Livelihoods Assessment and Analysis; Markets Assessment and Analysis; Nutritional Status Assessment and Analysis; Food Security Policies - Formulation and Implementation; Targeting; Vulnerability Assessment and Analysis; Communicating for Food Security.



Learners need to register in order to take the courses and can choose between studying online, downloading the course on their computers or ordering a CD-ROM.



Courses consist of interactive lessons including text, images, animations 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.

REPORTING FOOD SECURITY INFORMATION

FOOD SECURITY INFORMATION FOR ACTION

Course Menu | Start Course

ABOUT THIS COURSE

MY COURSE

SEARCH

RESOURCES

HELP AND SUPPORT

Getting Started Tutorial

FAQs

System Requirements

Browsers and Readers

E-mail Us

ONLINE

LEGAL INFORMATION

This course is funded by the European Union and implemented by the Food and Agriculture Organization.

BROWSERS AND READERS

In order to view and access the on-line resources and guides noted in each lesson, you need to have a web-browser and the Acrobat Reader installed on your computer. If not, you may install them from the list below. Please make sure that you install the versions best suited to your computer.

SOFTWARE LIST

Name:	Microsoft Internet Explorer 6.0
Type:	Internet Browser
Name:	Mozilla Firefox 2.0
Type:	Internet Browser
Name:	Adobe Acrobat Reader 8.1.2
Type:	Reader
Name:	Adobe Acrobat Reader 7.0.5
Type:	Reader
Name:	Adobe Acrobat Reader 6.0.2
Type:	Reader
Name:	Adobe Acrobat Reader 4.05
Type:	Reader

INSTALLATION

Click on the logo to install Microsoft Internet Explorer 6.0

DETAILS

Minimum software:
Windows 95 or above

Minimum hardware:
Pentium-class processor
16 to 32 MB RAM
12 MB free disk space

Visit the [Microsoft website](#) for more information and other versions.

Minimum technical requirements are:

- > Software: Windows 98 or above, Acrobat PDF reader version 4.0, Mozilla Firefox 1.0 or later, Netscape version 4.0 or later, or Internet Explorer version 4.0 or later
- > Hardware: Pentium-class processor, 64 MB RAM, 800x600 screen resolution with 16-bit colour depth

Software required to display the course is provided as part of the CD-ROM resources.

Trainers can easily adapt a set of provided resources to design and deliver classroom sessions using high-quality content which was developed and reviewed by international experts.

The tools we are going to present can be used to:

- reflect on the multi-stakeholder nature of food security information systems and programs
- help strengthen work, shared thinking and learning

Learning Objectives

At the end of this lesson, you will be able to:

- understand techniques for analyzing needs, relationships and knowledge flows between individuals and groups, and
- understand the techniques for facilitating and improving group work.

Introduction

This lesson deals with improved collaboration, knowledge sharing and learning focusing on tools and methods that have been used to facilitate improved knowledge and learning in the development and humanitarian sectors.

When working together with others, the total effort often proves to be less than the sum of the parts, why?

Frequently, there is not enough attention paid to facilitating effective collaborative practices and

The tools we are going to present in this lesson can be used for:

- reflecting on the multi-stakeholder nature of food security information systems and programs and
- strengthening group work, shared thinking and learning.

Material developed for the e-learning course has been used to create:

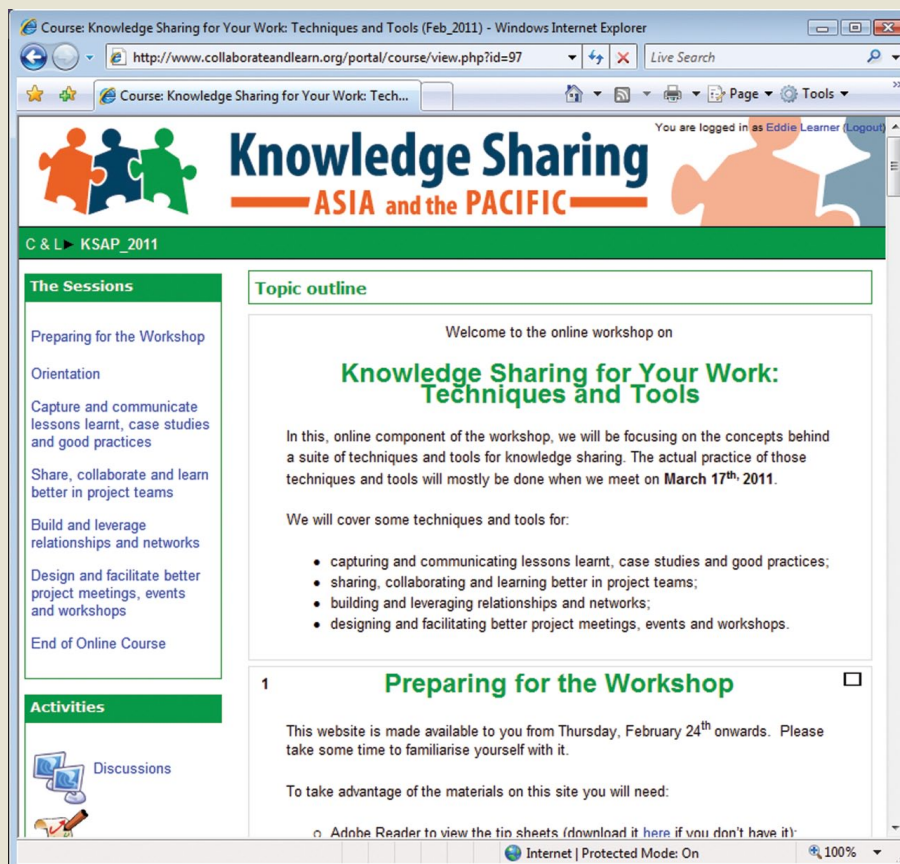
- > a set of slide presentations that trainers can use;
- > a printable document with the complete e-lesson content that trainers can distribute to participants after the training session.

Course lessons also can be integrated in facilitated courses on different e-learning platforms.

2 - Online facilitated course about knowledge sharing

The online course, "Knowledge Sharing for Your Work: Techniques and Tools," focuses on the concepts behind a suite of techniques and tools for knowledge sharing. The course adopts a facilitated and collaborative approach, using a combination of learning materials and asynchronous collaboration tools. The course is delivered through the Modular Object-Oriented Dynamic Learning Environment (Moodle), an open-source web-based learning platform.

Learners have weekly deadlines to accomplish activities and assignments, but they are free to schedule study sessions anytime during that week. The course uses a variety of tools, including learners' profiles; discussion forums; wiki spaces; glossaries; class bulletins; chats (using Skype); podcasts; videos; short e-lessons; and support materials (e.g. getting started, editing the profile, using discussion forums, and a course syllabus).



From the left-hand menu, learners can access sessions, activities (e.g. for discussions or to share reflections) and resources.

The main section, in the middle of the page, shows learning activities in chronological order.

1.7 BLENDED LEARNING

Blended learning combines different training media (e.g. technologies, activities and events) to create an optimum training programme for a specific audience. The term "blended" means that traditional instructor-led training is being supplemented with electronic formats.⁴

Bersin (2004) identifies two main models of blended learning:

- > **Programme flow model:** Learning activities are organized in a linear, sequential order and learners have deadlines to accomplish the various assignments; this is similar to traditional training, but some of the activities are conducted online.
- > **Core-and-spoke model:** A major course (e-learning or F2F) is provided and a set of supplemental materials are available to reinforce the main course; these materials are optional and not scheduled.

⁴Bersin J. (2004). *The Blended Learning Book*. San Francisco: Pfeiffer.

The programme flow model is more suited for observable outcomes and assessment purposes (including certification), since it enables formal tracking of learners' progress. Each step can be easily monitored by instructors and facilitators. Programmes can be designed using one of several approaches:



To optimize the efforts to design and produce e-learning courses, the materials designed for e-learning can be adapted and reused by trainers in classroom sessions and training workshops. Media elements, such as illustrations and diagrams, as well as textual content, can be reused to create presentations for trainers and materials for learners.

An FAO blended learning programme for country teams and food security working group members

A blended learning programme was designed to provide members of national food security teams with the knowledge and skills required to design and implement country agriculture and food security investment plans⁵.

The programme includes the following components:



- > **Pre-workshop preparation:** A questionnaire is submitted to participants a few days before the online phase. Participants are asked to describe their role in the national food security system and their areas of expertise. The questionnaire helps facilitators tailor the activities to participants' profiles and allows participants to understand each other's roles and responsibilities.
- > **Online workshop (core component):** The workshop includes individual study with interactive e-lessons on food security topics and online activities supported by facilitators and subject matter experts. Both synchronous and asynchronous communication are used for online discussions and group work. The main outcome of the online component is an individual work plan that will help participants reflect on their country situation and will serve as a supporting resource for F2F workshop activities.
- > **Bridge period:** This is a period between the two core components of the course. Online support is provided to participants to complete their preparation prior to the F2F workshop.
- > **Face-to-face workshop (core component):** The F2F workshop consists of classroom events where participants can present and discuss their previous work, practise communication principles and techniques and further develop their work plan with the assistance of a subject matter expert.
- > **E-mentoring service and online resources:** After completion of the course, a question-and-answer service and additional online resources are available to facilitate the transfer of knowledge to the job setting.

1.8 IN SUMMARY

KEY POINTS FOR THIS CHAPTER

- > E-learning is a convenient option for organizations in certain situations (e.g. when there is a need to reach many geographically dispersed learners).
- > In a self-paced e-learning course, learners can study course materials at any time they wish. This requires that learners have access to a set of interactive and self-contained materials. Facilitated or instructor-led e-learning takes place at a specific time and usually integrates self-study with collaborative activities such as discussions or group work.
- > Facilitated and instructor-led e-learning courses use communication tools which allow learners to communicate with facilitators and other participants. Tools can be asynchronous, such as e-mail or discussion groups, as well as synchronous, such as chat and audio conference.
- > Both facilitated and self-paced e-learning activities and content should conform to a set of quality standards to ensure the effectiveness of the learning programme.
- > In a blended approach, e-learning sessions can be integrated with face-to-face traditional activities using a variety of approaches.

⁵The learning programme has been developed by FAO in collaboration with the German Agency for International Cooperation (GIZ) and in consultation with regional organizations (CILSS, NEDAP, ASEAN) as part of the project "Improving the abilities of Regional Organizations to develop, implement and monitor food security training programs".

2. WHAT IS NEEDED TO DEVELOP AN E-LEARNING COURSE?



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 which will reach dozens 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 content and deliver the course through the Internet.

This chapter will introduce the following topics:

- > The ADDIE model for e-learning;
- > The 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. In traditional training, the largest effort is in the delivery of training sessions, while in e-learning, it is in the design and development of structured materials which must be self-contained and able to be used multiple times without making ongoing adjustments.

REUSING COURSE COMPONENTS

Well-developed e-learning courses can be delivered many times to different learners using the same materials.

In addition, individual course components (e.g. units, lessons and media elements such as graphics and animations) can be reused in different contexts. For example, interactive e-lessons developed for a given self-paced e-learning course can be integrated into facilitated courses or can become part of another self-paced e-learning curriculum.⁶

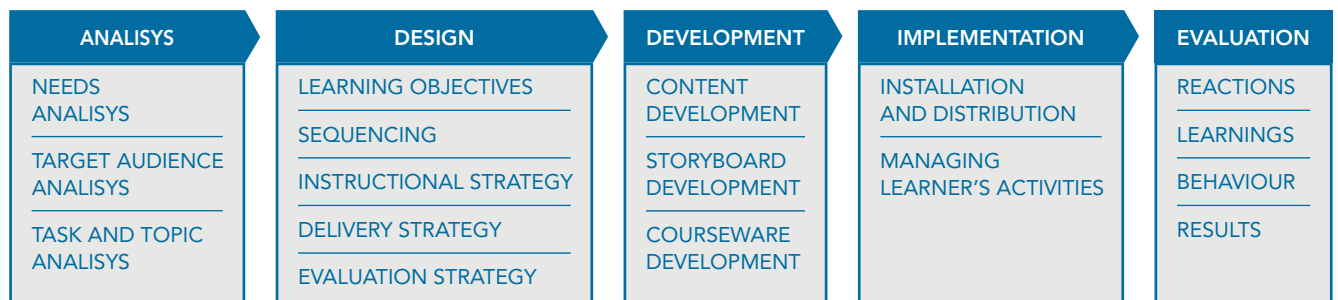
An instructional design model can be used to define the activities that will guide e-learning development projects.

Instructional design is the systematic development of specifications using learning and instructional theory to ensure the quality of training. In job-related training, the aim of instructional design is to improve employee performance and to increase organizational efficiency and effectiveness.

⁶Reusable course components are also called "reusable learning objects (RLOs)". A learning object is the smallest reusable collection of content supporting a specific learning concept or objective.

There are many instructional systems design models, most of which are based on popular ones such as the ADDIE model, which is diagrammed below. The ADDIE model includes five stages: Analysis, Design, Development, Implementation and Evaluation.

The ADDIE model for e-learning



A NOTE ON THE PROCESS

Adapting existing models to match specific needs is wiser than proceeding without any plan. However, flexibility is needed to select and adapt a model to a given situation.

E-learning projects vary considerably in complexity and size. The process described below is comprehensive – it covers all the options that can be included in a complex learning project. However, some of the steps can be skipped or simplified according to project's objectives and requirements, such as budget, expertise or organizational constraints.

The five stages in the ADDIE process are described below:

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 allows 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 provenience, learning context and access to technology).

Analysis also is needed to determine the course content:⁷

- > Task analysis identifies the job tasks that learners should learn or improve 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 (also called "perform courses").
- > Topic analysis is carried out to identify and classify the course content. This is typical of those courses that are primarily designed to provide information (also called "inform courses").

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.

⁷See R.E. and Clark, R.C. (2005). *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning*. 2nd edition. San Francisco: Pfeiffer.

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 available resources. For example, e-learning content may consist of only simpler materials (i.e. those with little or no interactivity or multimedia, 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 multimedia interactive content is comprised of three main steps:

- > content development: writing or collecting all the required knowledge and information;
- > storyboard development: integrating instructional methods (all the pedagogical elements needed to support the learning process) and media elements. This is done by developing the storyboard, a document that describes all the components of the final interactive products, including images, text, interactions, assessment tests; and
- > courseware development: developing media and interactive components, producing the course in different formats for CD-Rom and Web delivery and integrating the content elements into a learning platform that learners can access.

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 also includes managing and facilitating learners' activities.

5 - Evaluation

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

2.2 THE TEAM

Participation in e-learning projects requires capabilities in certain areas – such as technology and media-related skills – that are not essential in traditional education or training.

Moreover, people may have to diverge from their traditional roles and perform new tasks. For example, a subject matter expert (SME) in an e-learning project still provides the required knowledge for the course, but does not directly teach the learners. Instead, the SME interacts with another professional, the instructional designer (ID), who defines the activities and e-learning content formats and develops the e-learning products.

Some of the roles described in this section could be combined into a single job profile.

In fact, 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:

> Human resources/Capacity development 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 (IDs)

IDs are responsible for the overall instructional strategy. They work with managers to understand the training goal, collaborate with 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 also are responsible for designing specific e-learning activities and materials that will be part of the course, including storyboard development⁸. 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 (SMEs)

SMEs 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 charged with writing the text of e-learning lessons (i.e. content development), 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.

> Web developers and media editors

Web developers and media editors are responsible for developing self-paced courses; they assemble course elements, develop media and interactive components, create the courseware, adapt the interface of a learning platform (e.g. Moodle) and install the courseware on a Web server.

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

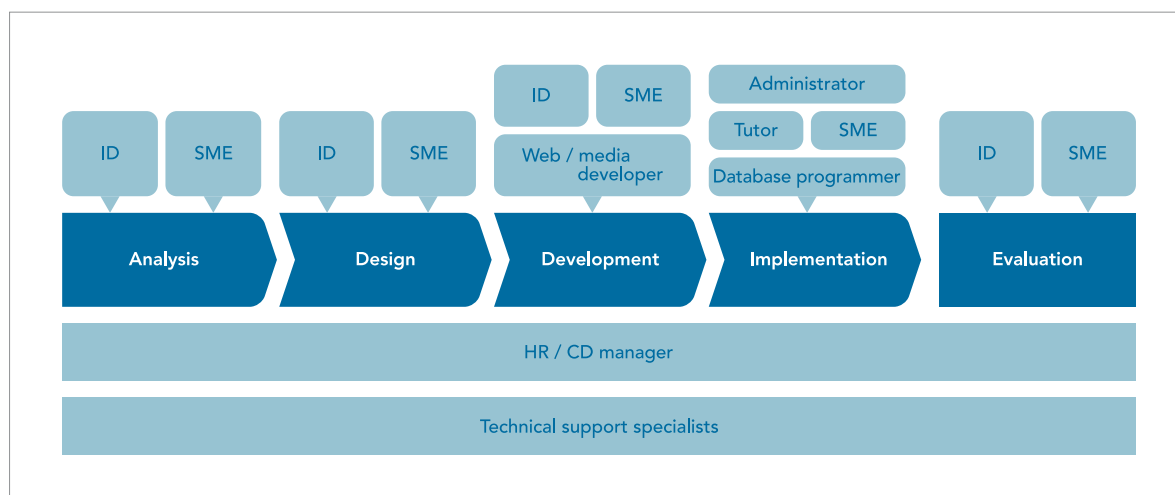
> Course administrators, online facilitators and tutors

These are roles involved in the implementation stage. Course administrators manage learners' subscriptions. Online tutors and facilitators support participants' learning activities and motivate learners during the course. They create an environment that inspires participants' confidence in the learning process, assure the flow of information among the different stakeholders, motivate participation and facilitate and mediate participants' exchanges.

> Technical support specialists

Technical support specialists usually are required to assist both producers and users of e-learning courses at every stage of the process.

Areas of responsibility for key roles in the ADDIE process



⁸See chapter 6 of this guide for more information on storyboard development.

2.3 THE TECHNOLOGY

Technology is required to produce and deliver e-learning. Different tools can be used to produce e-learning content, depending on which file formats will be used and the nature of the desired final product.

Microsoft PowerPoint or even Word can be sufficient to create simple learning resources like a presentation or a tutorial. However, more sophisticated tools are required if you want to create interactive content.

Courseware authoring tools are special-purpose tools that create interactive e-learning content. They add text, graphics and other media, but also provide a framework to organize pages and lessons for reliable navigation. While most of these tools are stand-alone packages that incorporate assessment and quiz capabilities, some integrate those functions from other programs. To create media components, authoring tools need auxiliary software (e.g. Adobe Photoshop for bitmap graphics, Adobe Illustrator for vectoral images or Adobe Flash for animations) and other tools for video and sound creation and compression.⁹

Organizations and education institutions increasingly are turning to learning platforms to deliver courses to learners and manage their online activities. A learning platform is a set of interactive online services that provide learners with access to information, tools and resources to support educational delivery and management. They provide access and services to a wide user base through the Internet.

Learning platforms are usually referred to as a learning management system (LMS) or a learning content management system (LCMS), terms which often are used interchangeably. There are a variety of learning platforms with different levels of complexity, and despite their differences, they also have many features in common.¹⁰ Their most important features include:

- > learning content management: creation, storage, access to resources;
- > curriculum mapping and planning: lesson planning, personalized learning paths, assessment;
- > learner engagement and management: learner information, progress tracking; and
- > tools and services: forums, messaging system, blogs, group discussions.

2.4 CASE STUDY: THE IMARK WORK FLOW TO PRODUCE AND DELIVER E-LEARNING CONTENT

The ADDIE model was adopted by the Information Management Resource Kit (IMARK), an e-learning initiative in agricultural information management developed by FAO and partner organizations (www.imarkgroup.org).

The following steps were taken to design, develop and deliver the IMARK self-paced e-learning modules and are presented here as a suggested process that could be followed when developing a similar course:

1 - Analysis and curriculum design

FAO and its partners analyse the learning needs and characteristics of the target learner groups and produce a module outline which defines the areas of content to be addressed in each module.

An SME, who has a broad understanding of the content areas to be addressed, is hired or appointed as a module coordinator to develop a draft module plan in consultation with an ID, other experts and institutions.

A consultative workshop with SMEs and potential partners is held to review, revise and approve the draft module plan, incorporating the views of a wide range of external experts and potential users.

2 - Content development, storyboard development and translation

The approved plan is revised by the module coordinator with the guidance of the ID into a series of stand-alone lessons of fixed length (30 minutes) suited to asynchronous self-paced learning.

SMEs are commissioned as content authors to develop lessons, or a series of lessons, in their area of expertise. Authors also are needed to provide knowledge assessment tests, glossary terms and a list of resources for each lesson. Content authored by SMEs is peer reviewed by other experts in the field.

⁹See chapter 7 for more information on authoring tools.

¹⁰ See chapter 9 for more information on learning platforms.

The materials are then provided to one or more IDs who determine the overall approach and instructional strategy to be used for each lesson. The lesson is then storyboarded and subjected to an SME review. The SME reviews the storyboards to check that the content has been correctly reworked by the ID.

An English version of the storyboard is provided to experts to adapt and translate it into the other four FAO languages. This is followed by limited testing and proofreading for each of the language versions.

3 - Courseware development, CD production and roll-out

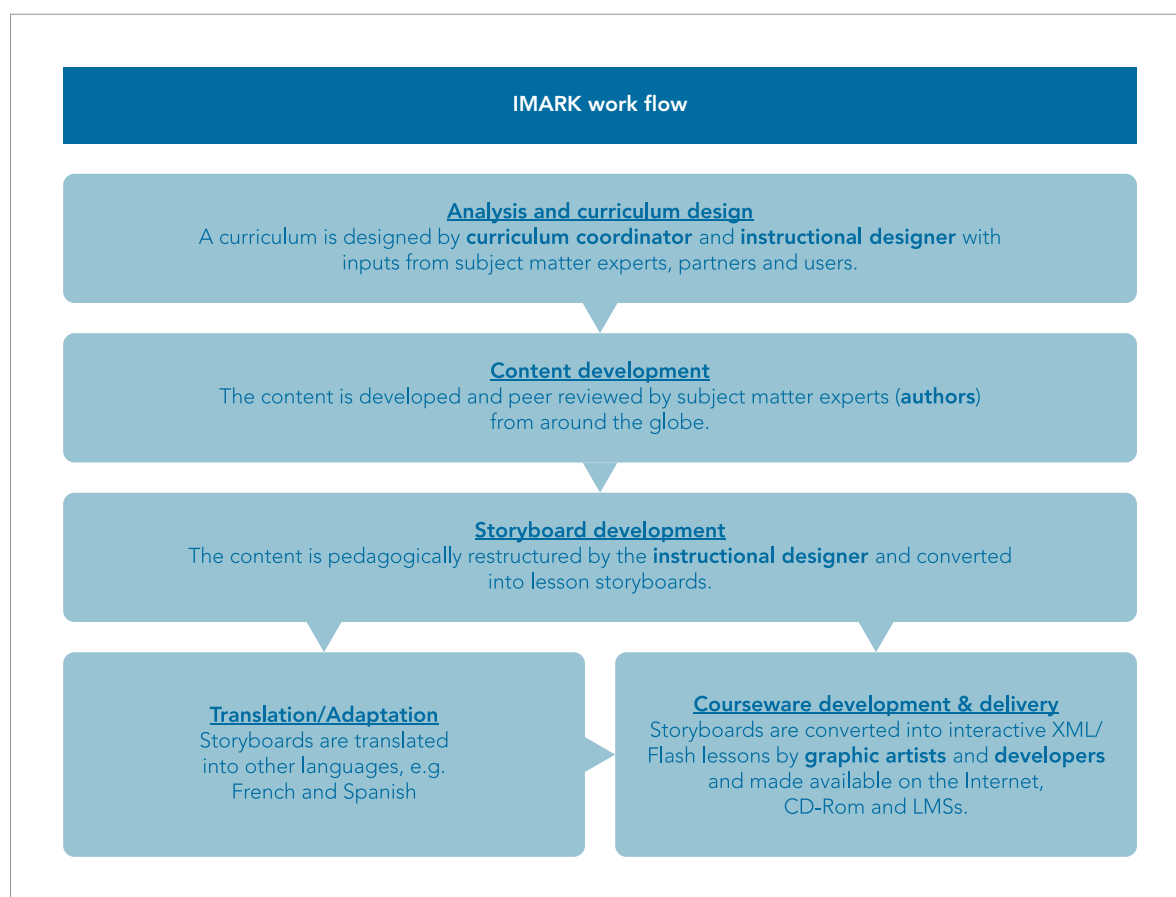
The lessons are then embedded in the IMARK learner interface, along with the glossary terms, software and manuals, resources, case studies and sample datasets. The IDs will check the work of graphic artists and developers to make sure that the final product conforms to the instructions provided in the storyboard.

A CD is published for alpha testing in-house at FAO. Once tested, and revised if necessary, the Version 1.0 CD is produced in English.

The module CDs are disseminated directly by FAO and through: i) partner organizations, ii) national, regional, and international agricultural and food security organizations, iii) distance education faculties and universities, and iv) selected development projects and programmes.

The module release is announced on the IMARK and partner institution Web sites, and through the IMARK on-line community. A learner support e-mail is set up at FAO.

The IMARK work flow for e-learning development



2.5 IN SUMMARY

KEY POINTS FOR THIS CHAPTER

- > A series of activities are required to develop e-learning. According to the ADDIE model for instructional design, they can be grouped into five main stages: 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; online administrator; e-tutor/facilitator; web developer; media editor; technical support specialists.
- > Technology is needed both to create e-learning material and make it accessible to learners. Big projects may require the use of an LMS or other type of learning platform to track and administer learners' activities and manage e-learning content.

PART II — DESIGNING AN E-LEARNING COURSE



THE ANALYSIS AND DESIGN STAGES ARE ESSENTIAL TO ENSURE COURSE EFFECTIVENESS AND LEARNERS' MOTIVATION AND PARTICIPATION. ANALYSING LEARNERS' NEEDS AND LEARNING CONTENT, AND FINDING THE APPROPRIATE MIX OF LEARNING ACTIVITIES AND TECHNICAL SOLUTIONS IS CRUCIAL TO CREATING AN EFFECTIVE AND ENGAGING COURSE.


COURSE EFFECTIVENESS AND PARTICIPANTS' MOTIVATION DEPEND ON SEVERAL ELEMENTS, INCLUDING THE:

- > RELEVANCE OF THE CONTENT AND COURSE OBJECTIVES FOR THE PARTICIPANT: DO THEY MEET EXISTING NEEDS?
- > TYPE OF LEARNING ACTIVITIES OFFERED BY THE COURSE: ARE THEY INTERESTING, INSPIRING AND WELL-MATCHED TO THE LEVEL OF THE PARTICIPANTS?
- > COURSE DURATION, TIMING AND NUMBER OF HOURS TO BE INVESTED: DO THEY FIT WITH THE PARTICIPANTS' AVAILABILITY?
- > TECHNICAL ASPECTS: IS THE TECHNICAL SOLUTION APPROPRIATE TO LEARNERS? ARE THE TECHNICAL ELEMENTS (E.G. THE LEARNING PLATFORM AND ITS FUNCTIONS) CLEAR AND UNDERSTANDABLE TO PARTICIPANTS?

THIS SECTION WILL ILLUSTRATE THE ANALYSIS AND DESIGN ACTIVITIES INVOLVED IN COURSE DESIGN.

3. IDENTIFYING AND ORGANIZING COURSE CONTENT

Which topics will the course cover? And in which order?



Jin, food security expert

Richard, instructional designer

Jin, the SME, and Richard, the ID, are brainstorming about which topics to cover in an e-learning course aiming to improve food security analysis and promote its use in decision-making.

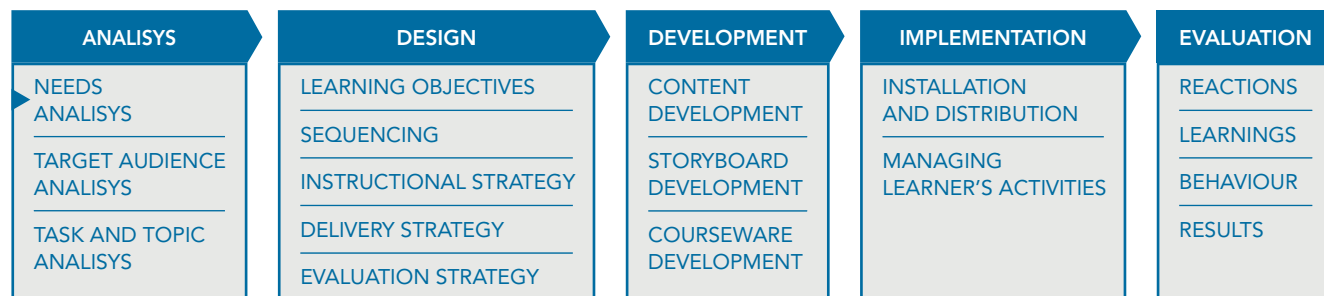
Jin asserts that there are several crucial topics – ranging from climate change to communication techniques – that are relevant to the course objective. However, not all of them can be covered by a single course and probably not all of them are really needed.

Richard suggests a few methods to prioritize the content and organize it into a logical flow.

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

- > Identifying course content based on learners' needs;
- > Defining learning objectives; and
- > Defining the course structure.

3.1 NEEDS ANALYSIS



This document does not focus on conducting needs analysis; however, this kind of analysis is crucial to validate the need for an e-learning intervention and to provide important information regarding which gaps need to be addressed to ensure that the intervention is targeted to organizational needs.

Before designing an e-learning course, a needs analysis should be conducted 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.

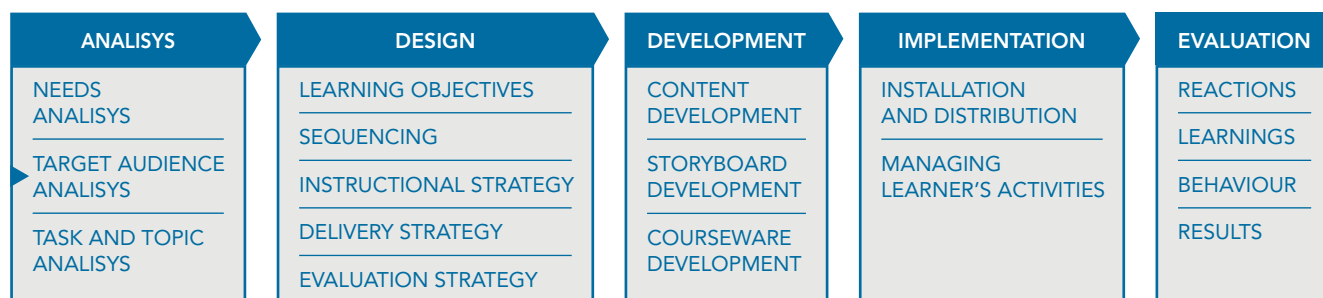
In fact, there might be several causes of a capacity problem, and an organization's capacity to achieve its goals can be affected by many factors, including:

- > 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;
- > individual capacity: the skills, knowledge and attitudes of individuals working in the organization.

Moreover, not all individual capacity problems are learning problems. The traditional 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.¹¹

Also, not all learning problems can be addressed through e-learning. It is crucial to understand whether e-learning is appropriate for the identified learning goals.¹²

3.2 ANALYSING THE TARGET AUDIENCE



Let's assume that a learning goal has been defined and e-learning has been indicated as an appropriate solution to achieve that goal.

For example, the course goal could be "improving food security analysis and promoting its use in decision-making".

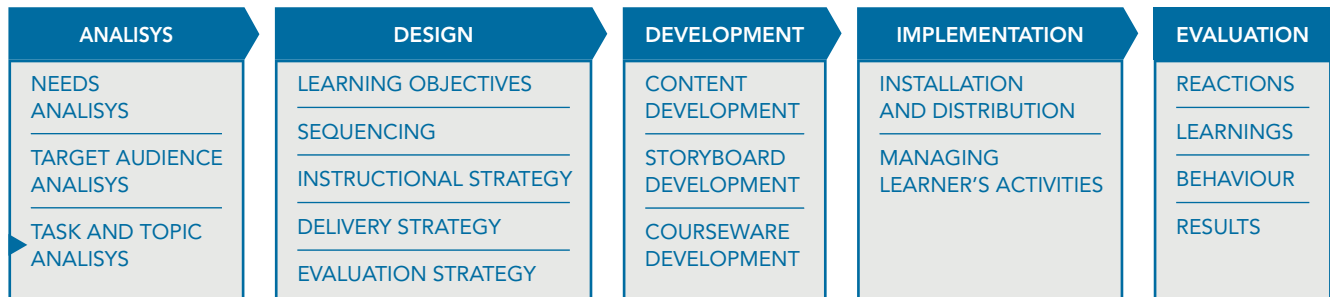
At this point, analysing the target audience is required to identify a variety of factors that will influence the course design. Some of these factors are shown below.

FACTOR TO BE CONSIDERED	WHY IS IT IMPORTANT?
Region or geographic 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 a lot of prior knowledge do not need the same kind or level of training support as novices.
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 chunking the content into small units.
The location where learners will participate in e-learning and from where they can access the Internet; can they study at home, at work or in e-learning centres?	This determines how much connection time is required for the course and whether learners can download plug-ins from the Internet.
Network bandwidth.	Bandwidth limitations may slow application performance and decrease user productivity. In certain situations, low bandwidth applications may be preferred since they take less time to transmit.
Computer and software capabilities, such as screen size, number of colours they can display, sound playback, RAM (amount of memory), processor type and speed .	Technical requirements, including multimedia capabilities, influence the selection of the media mix and plug-ins.

¹¹ de Rosa C., *FAO's Reference Manual on 'Good learning practices for effective capacity development'*. Learning Module 3 of the Capacity Development Learning Programme series, Office of Knowledge and Capacity for Development (OEKC), FAO 2011.

¹²See chapter 1 of this guide.

3.3 IDENTIFYING COURSE CONTENT



A course goal, such as “improving food security analysis and promoting its use in decision-making”, provides an initial definition of the content and a focus for the course design.

Now, it is very important for the ID to identify the detailed course content in order to achieve that goal.

Content analysis is probably the most critical step in the instructional design process. If the designer does not include accurate and relevant content, then there is little value in finding the best instructional methods and media to transfer the information to learners.

The analysis must consider the learners’ relate factors (e.g. previous knowledge and skills) which emerged from the target audience analysis.

Content analysis is a prerequisite for developing specific learning objectives and the curriculum outline.

SMEs and IDs work together to perform the analysis. This process helps the ID to familiarize with the content; moreover, it forces the SME to work through each individual content element and indicate the most important and challenging aspects that should be considered. During this process, both of ID and SME have the opportunity to view the content from the learner’s perspective.

Content identification and analysis can be done by applying the following methods:

- > **Task analysis** identifies the job tasks that learners should learn or improve and the knowledge and skills that need to be developed or reinforced.
- > **Topic analysis** is carried out to identify and classify the course content.

Depending on the circumstances, one of these methods may be preferred:¹³

- > Task analysis is used mainly in courses designed to build specific job-related or interpersonal skills (also called “perform courses”).
- > Topic analysis is appropriate for courses that are primarily designed to provide information or achieve broader educational objectives (also called “inform courses”).

Task analysis

Task analysis helps to define content for job-oriented learning courses that aim to develop or reinforce job-related skills.

What is a task analysis?

Task analysis is defined differently in different contexts. In the context of instructional design, a task analysis is a detailed analysis of actions and decisions that a person takes to perform a job task (i.e. a well-defined unit of work), which includes identifying the knowledge and skills needed to support those actions and decisions.

¹³Clark R.C., Mayer R.E., *e-Learning and the Science of Instruction - Proven Guidelines for Consumers and Designers of Multimedia Learning*, Second Edition, Pfeiffer 2005

Identifying course content through task analysis allows designers to:

- > create a learning course that is job centred;
- > focus attention on skills; 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.

The task analysis consists of four main steps:

Step 1: Identifying tasks

Identify and describe the tasks that learners should learn or improve to achieve the course goal.

Step 2: Classifying tasks

Classify tasks as either:

- > procedural (i.e. tasks that are performed by executing an ordered sequence of steps, such as "Create a table in Microsoft Word"); or
- > principle-based (i.e. tasks requiring judgments and decisions to be applied in different situations and under conditions that change every time, such as "Organizing a conference").

Step 3: Breaking up the tasks

Break each task into:

- > steps (for procedural tasks); or
- > guidelines that should be applied to perform the tasks (for principle-based tasks). For complex tasks, requiring the application of strategic or interpersonal skills (such as "adapting" or "solving group conflicts"), different points of view may be needed to identify the guidelines. These can be collected through interviews with several experts, e.g. by asking them about the approach they adopt in challenging situations and looking for commonalities among the various approaches to identify the skills that can help in those situations.

Step 4: Identifying required knowledge and skills

Identify the knowledge and skills needed to best perform those steps or apply those guidelines.

EXAMPLE OF A TASK ANALYSIS

Let's use an example of an e-learning course aimed at improving food security analysis and promoting its use in decision-making.

The course audience is composed of mid-level managers, technical staff and field personnel who are involved in collecting, managing, analysing and reporting food security information.

Step 1: Identifying tasks

Discussions with several food security experts reveal that the most critical aspects to be improved relate to: the selection of assessment methods and indicators; the 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 - Analyse assessment results using standardized analysis methods.
- 4 - Design and produce effective reports for decision-makers, providing them with recommendations based on analysis results.

Step 2: Classifying tasks

These tasks are quite complex; the manner in which they are carried out depends on the given context. This means that they are principle-based rather than procedural tasks.

Therefore, we want to provide learners with guidelines they can apply to specific situations, rather than give them step-by-step instructions on what to do.

Step 3: Breaking up the tasks

Next, we need to describe each task and a set of guidelines that learners should follow to correctly accomplish the task. As an example, let's focus on the fourth task:

TASK: REPORT RESULTS TO DECISION-MAKERS	GUIDELINES
Task description: Design effective reports for decision-makers, providing them with recommendations based on analysis results.	Define the communication purpose.
	Identify users' information requirements.
	Construct a message in a logical and persuasive manner.
	Choose a report format according to the context.
	Write the report clearly and concisely.

Step 4: Identifying required knowledge

What do the food security professionals need to know to apply these guidelines?

TASK: REPORT RESULTS TO DECISION-MAKERS	GUIDELINES	REQUIRED KNOWLEDGE
Task description: Design effective reports for decision-makers, providing them with recommendations based on analysis results.	Define the communication purpose.	Difference between explanation and advocacy
	Identify users' information requirements.	Potential readers of a food security report Difference between primary and secondary audience Methods to interact with users Timeliness of reporting
	Construct a message in a logical and persuasive manner.	Which recommendations are relevant and feasible Structure of a message: current situation, problem, questions, response needed Consistency, relevance and brevity of supporting data
	Choose a report format according to the context.	Components of: Baseline or Research Report, Early Warning Bulletins, Emergency Needs Assessments, Policy Papers or Briefs, Monitoring and Evaluation Reports
	Write the report clearly and concisely.	Report elements: summary, introduction, main body and conclusions How to write clear and concise sentences The editing process

The guidelines and associated knowledge elements will form the content of a unit on "Reporting food security information".

Topic analysis

The task analysis is usually completed by conducting a topic analysis.

If the course is intended primarily to provide information or achieve educational objectives broader than improving job performance, the ID will skip the task analysis and directly conduct a topic analysis to define the major topics and subtopics for the course.

The topic analysis aims to:

- > identify course content, and
- > classify content elements.

Identifying course content

For example, in a course entitled “Climate change and food security”, the ID first can ask the SME to identify the main content categories for the course, such as:

- > Climate change and its effects; and
- > Impacts of climate change on food security

Then, the ID can ask the SME to further detail each category. For example, this would result in a draft outline such as:

- > Climate change and its effects
 - > Climate variability
 - > Climate related disasters
 - > Impacts on agriculture
- > Impacts of climate change on food security
 - > Effects on rural livelihoods
 - > Specific impact on different locations and conditions
 - > Examples, such as the impact of water scarcity in Mauritania, the impact of extreme weather events in Bangladesh, etc.

Visual instruments, such as mind maps, concepts maps and process diagrams can help the ID and the SME clarify connections among content elements. Mind maps can be used to visualize and organize ideas. They can represent words, ideas, tasks, or other items linked to and arranged around a central key word or idea. Concept maps and causal maps are diagrams used to illustrate connections among concepts and cause-effect relationships, while process diagrams are commonly used to indicate the general flow of processes.

Classifying content elements

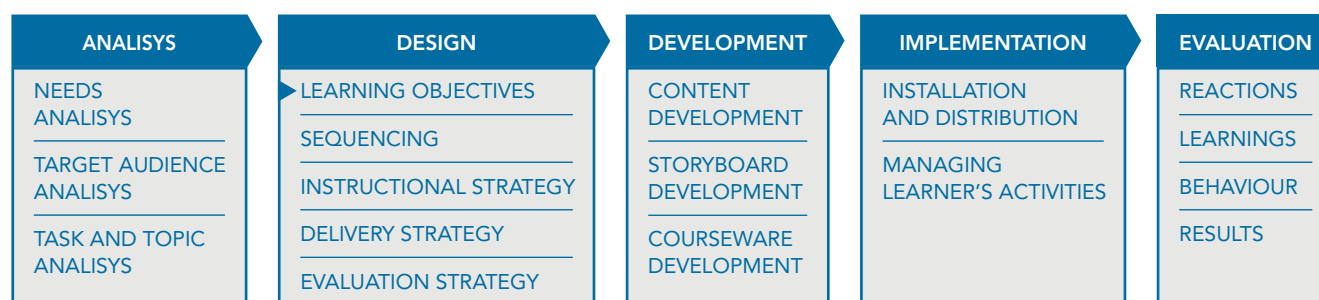
Classifying content elements helps to further recognize connections among them thus contributing to the refinement of the draft course outline.

Content elements can be classified according to the types of content they represent.

The following example¹⁴ identifies six main types of content: facts, procedures, concepts, principles, interpersonal skills and attitudes.

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, aiming to perform 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) describe 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"

3.4 DEFINING LEARNING OBJECTIVES



By looking at the tasks and content elements identified in the task and topic analyses, it is possible to translate the overall course goal into more specific learning objectives.

Learning objectives define the expected outcome of each learning unit. For example, will learners be able to memorize the steps of a procedure or will they actually 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.

¹⁴A 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).

Let's take an example from our task analysis table:

TASK: REPORT RESULTS TO DECISION-MAKERS	GUIDELINES	REQUIRED KNOWLEDGE
Design effective reports for decision-makers, providing them with recommendations based on analysis results.	Construct a message in a logical and persuasive manner	Which recommendations are relevant and feasible Structure of a message: current situation, problem, questions, response needed Consistency, relevance and brevity of supporting data

From this information, we can develop the following learning objectives:

- > Construct a logical and persuasive message.
- > Explain the concept of relevance.
- > Explain the concept of feasibility.
- > Describe the elements of a message (current situation, problem, questions, response needed).
- > Distinguish consistent from inconsistent data.
- > Explain the concept of brevity.

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")¹⁵.

According to the revised Bloom's taxonomy 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).

PERFORMANCE LEVELS FOR THE COGNITIVE DOMAIN ¹⁶	
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 domains¹⁷.

Verifying the alignment of learning objectives, activities and tests

Clear learning objectives allow the development of learning activities which are really 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.

¹⁵Learning 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").

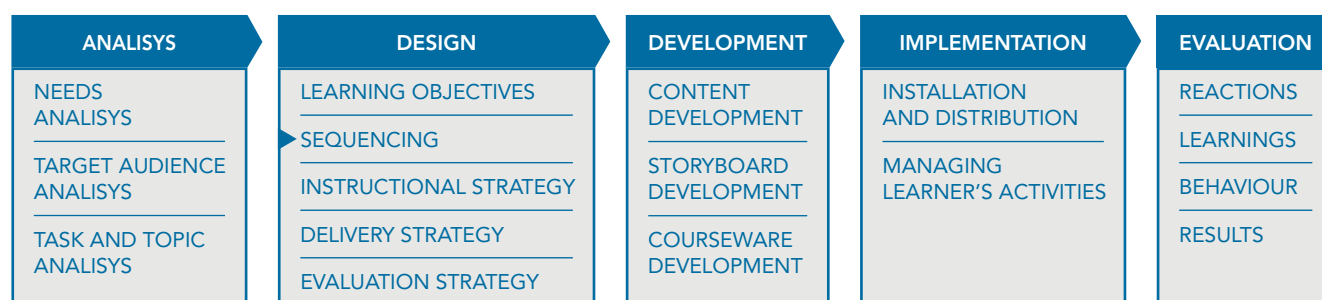
¹⁶ Adapted from: Anderson and Krathwohl, 2001

¹⁷ See the Appendix of this document

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 the memorization) of that concept, as shown in the table below:

	LEARNING OBJECTIVE:	LEARNING ACTIVITY:	TEST:
	Learners will understand the main components of an FSIS.	After reading the definition of FSIS, learners will look at two examples of an FSIS and will identify their main components.	Learners will describe the main components of their own country’s FSIS.
REMEMBER			
UNDERSTAND	X	X	X
APPLY			
ANALYSE			
EVALUATE			
CREATE			

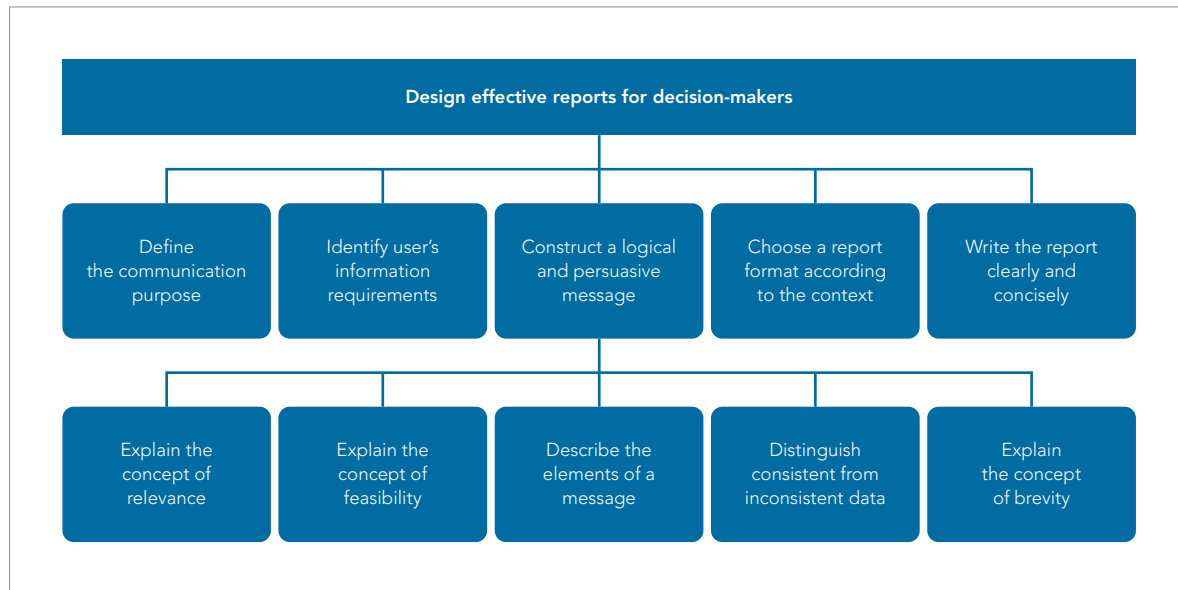
3.5 DEFINING THE COURSE SEQUENCE



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. That method uses a learning objectives hierarchy, teaching first those skills that seem to be prerequisites for all other skills.

It is possible to create a hierarchy among learning objectives by using the results of the task and topic analyses. The diagram below shows the hierarchy among the objectives that were formulated in the above example. The learning objective “Construct a logical and persuasive message” is at a higher level than the others. In fact, the other learning objectives (e.g. “Explain the concepts of relevance and feasibility”) are all prerequisites to being able to construct a logical and persuasive message.

Learning objectives hierarchy

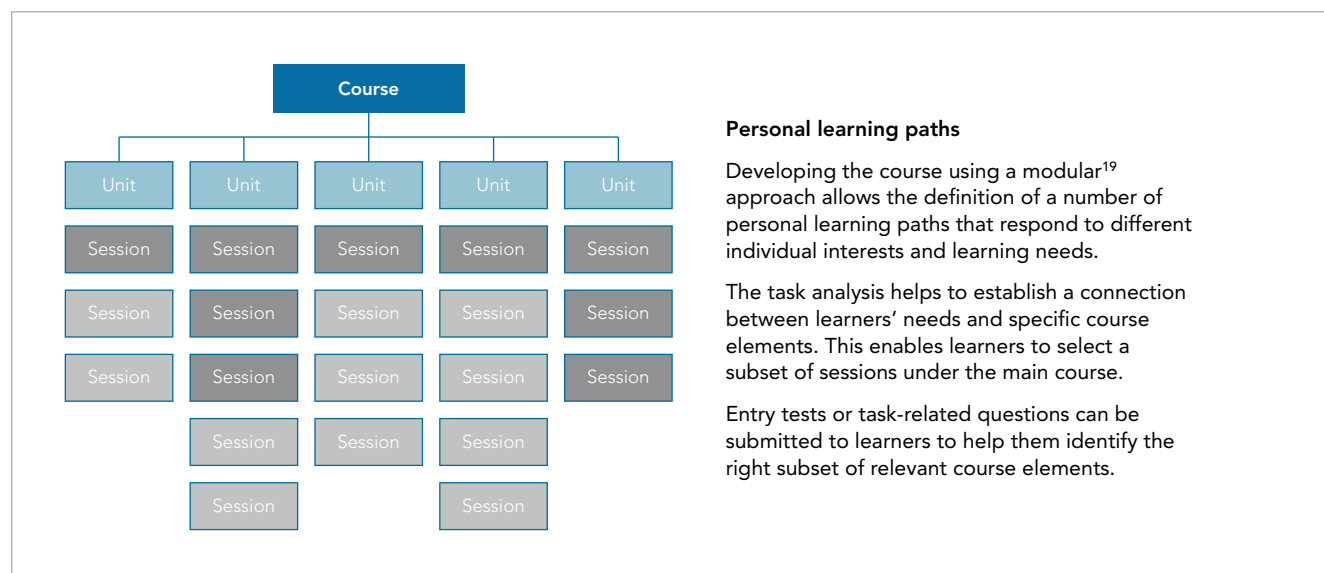
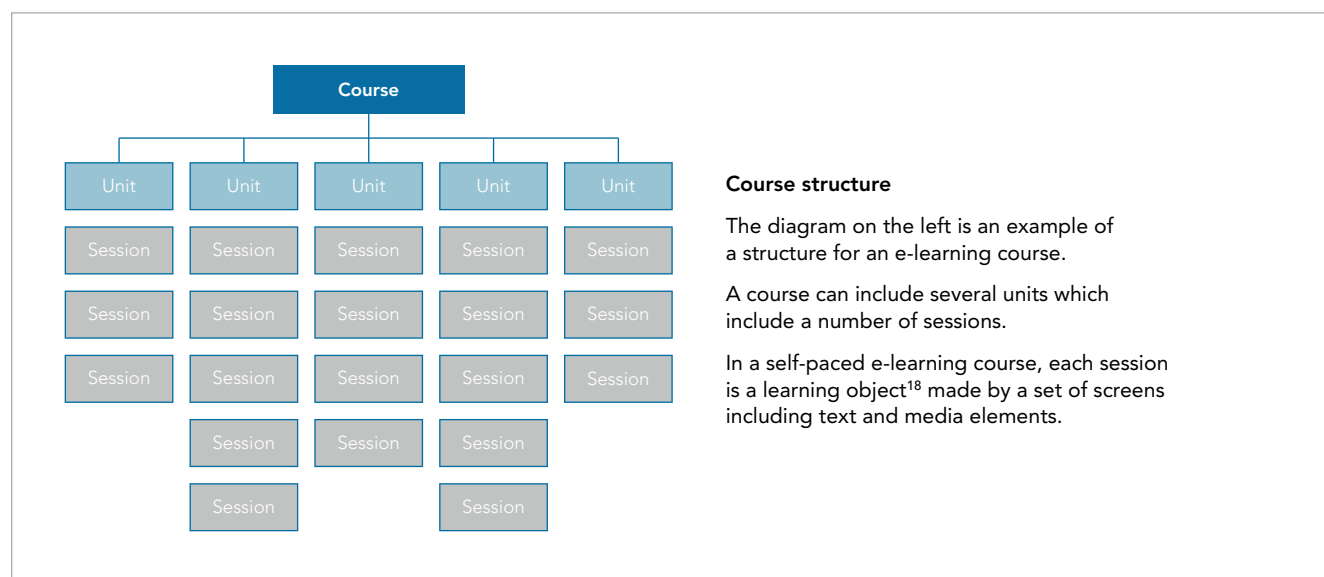


Other sequencing methods

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 (perform course), the content can be organized to follow the order of the actions in the real job environment; this is the job-context principle.
- > In a non job-oriented course (inform 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 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; this is the zoom principle.
- > The curriculum can revisit the basic ideas, repeatedly building upon them until the learner understands them fully; this is the spiral curriculum.

The outcome of sequencing is a course structure where each element corresponds to a specific learning objective and contributes to the achievement of the overall course goal.



3.6 CASE STUDY

Task analysis can be a very time-consuming activity, especially when it involves multiple interviews and document analysis. However, there are some techniques to reduce the time needed for the analysis. The following case study shows how a task analysis was conducted in a few days and its results used to develop a course outline.

¹⁸A learning object is the smallest reusable collection of content supporting a specific learning concept or objective.

¹⁹ A modular curriculum is made up of standardized units that can be separated from each other and rearranged or reused.

An e-learning course on “Impact Assessment of Large-scale Food Security Programmes”

FAO and Wageningen International collaborated in the development of a self-paced e-learning course on “Impact Assessment of Large-scale Food Security Programmes”. The goal was to design an e-learning course providing guidance to programme designers, programme managers and monitoring and evaluation officers on how to organize and implement impact assessments of large-scale food security programmes.



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As part of the process, a consultative workshop was organized in 2009 at FAO headquarters in Rome with 21 professionals working in national programmes for food security (from Central America, Indonesia, Nigeria, Pakistan and Sierra Leone), staff members from FAO and professionals from other international organizations (e.g. IFAD).

Prior to the workshop, a team of three SMEs and an ID developed a draft outline of a task analysis. A two-day consultative workshop then was organized to bring together field practitioners, trainers, experts and/or institutional representatives to review and complete the draft task analysis, and to consider which organizations or individuals could best assist in developing the learning materials.

Results of the discussions

The group divided the primary target audience into two main professional profiles:

- > **Group 1:** National programme directors, designers and managers, decision-makers and donors; and
- > **Group 2:** Monitoring and evaluation officers of food security programmes, technical advisors to the programme, statistical officers and external evaluators.

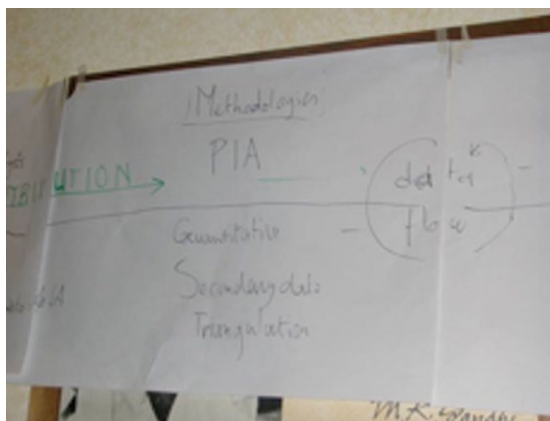
Lists were prepared for each target audience group that described the major tasks related to impact assessment and the fields of knowledge required for successful task performance.

The following are a few of the identified tasks and associated knowledge for Group 2:

TASKS	KNOWLEDGE NEEDED
Recommend the most appropriate approach according to the context	<p>The different options for assessing impact, including tools (e.g. household survey to measure quantitative indicators; existing data to monitor nationally-defined indicators; Participatory Impact Assessment - PIA)</p> <p>Advantages and disadvantages of each approach, including costs</p> <p>The most important information that can be obtained from the different approaches</p> <p>How to determine the best approach to measure the impact of the programme, taking into consideration the financial, technical and human resources available, as well as the main questions we want to answer</p> <p>How to present the proposal in a user-friendly form</p> <p>How to combine different approaches (triangulation)</p>

TASKS	KNOWLEDGE NEEDED
Design and conduct a sound survey	The definition of the attribution gap and how to overcome it in a survey (How can we answer the question about whether the programme had impact, considering other influences/events and conditions?)
	The characteristics of a survey, including the different types of surveys (e.g. sampling methods) and how to choose among them (e.g. criteria)
	How to choose a comparison group
	The biases inherent in the survey design (e.g. selection bias) which may limit the ability to make plausible links between the programme and outcomes (attribution)
	How to ensure that the collected data and information are of high quality
	How to analyze the data (e.g. skills and software required)
Design and conduct a Participatory Impact Assessment (PIA) and analyse data	The definition of participatory impact assessment
	The definition of the attribution gap and how to overcome it in a PIA (How can we answer the question about whether the programme had impact, considering other influences/events and conditions)
	What PIA can tell us that other approaches and methods cannot; what can we learn by implementing a PIA
	What types of indicators can be used for a PIA
	What resources are needed to carry out a PIA
Use existing data from national data collection systems	What types of data are available in the country
	The definition of the attribution gap and how to overcome it when using national data (How can we answer the question about whether the programme had impact, considering other influences/events and conditions)
	How to use existing data to measure programme impact on food security

Workshop participants produced drawings and diagrams to illustrate relationships among tasks and concepts.



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Design of the course plan

After the workshop, the lead SMEs and the ID analysed workshop results to define a set of learning objectives and developed the following course structure:

COURSE: IMPACT ASSESSMENT OF LARGE-SCALE FOOD SECURITY PROGRAMMES	
Unit and lesson title	Description
Unit 1. Impact Assessment in Food Security Programmes	The unit illustrates the relevance of impact assessment in food security programmes. It provides basic concepts of food security, describes different types of food security programmes and explains the importance of integrating impact assessment into programme design.
Lesson 1.1 - Introduction to Impact Assessment	The lesson outlines the basic concepts of impact assessment, why it is done and the importance of being able to attribute observed change to the programme.
Lesson 1.2 - Food Security Concepts and Frameworks	The lesson reviews different food security-related conceptual frameworks used by programme planners for designing food security programmes.
Lesson 1.3 –Large-scale Food Security Programmes	The lesson reviews different types of food security programmes and discusses implications for assessing their impact.
Lesson 1.4 - Impact Assessment in Programme Design	The lesson describes the importance of integrating impact assessment into programme design in order to be able to measure major achievements of the programme.
Unit 2. Methods and Approaches for Assessing Impact	The unit illustrates principles of quantitative, qualitative and participatory methods and approaches to assess impact and shows the main elements to consider when deciding on the impact assessment design.
Lesson 2.1 - Overview of Methods and Approaches	The lesson reviews the main features of a rigorous impact assessment and the different methods and approaches.
Lesson 2.2 - Quantitative Methods: Household Surveys	The lesson describes the main issues to consider when designing and carrying out a quantitative household survey.
Lesson 2.3 - Quantitative Methods: Secondary Data	The lesson outlines when and how to use secondary data in assessing programme impact.
Lesson 2.4 - Qualitative Methods	The lesson introduces qualitative assessment techniques, their advantages and drawbacks in impact assessment and the importance of stakeholder participation.
Lesson 2.5 - Selecting Methods and Approaches	The lesson provides a rationale for choosing the most appropriate methods and approaches to carry out impact assessment within the context and constraints of the programme.
Unit 3. Interpreting and Communicating Impact Assessment Results	The unit provides guidance on drawing conclusions from the impact assessment and communicating the results to stakeholders.
Lesson 3.1 – Analysing and Interpreting Impact Data	The lesson illustrates basic concepts of analysing and interpreting quantitative and qualitative data in order to attribute observed changes to the programme.
Lesson 3.2 - Documenting and Reporting Results	The lesson provides guidelines for presenting results of impact assessment in the most appropriate way to respond to the needs of programme stakeholders.

CONSIDERATIONS ON SEQUENCING

The first unit provides basic concepts as common prerequisites for all the other units of the course (i.e. the prerequisite method).

The other units follow the order of the actions in the real-world (i.e. the job-context principle).

In Unit 2, both the prerequisite and zoom principles have been applied:

- > Lesson 2.1 provides an overview of the three methods which are individually analysed in lessons 2.2, 2.3 and 2.4 (i.e. the zoom principle).
- > Lesson 2.5 covers the higher level objective of selecting an assessment method. Thus, the information provided in lessons 2.1 to 2.4 is a prerequisite for the objective of lesson 2.5 (i.e. the prerequisite method).

An outline document was produced and used afterwards by the authors as a model for developing lesson content.

Course Plan

UNIT 1: IMPACT ASSESSMENT OF FOOD SECURITY PROGRAMMES	
Learning objective At the end of this unit, learners should be able to understand what impact assessments, the contexts in which impact assessment is carried out, how that is related to routine monitoring and evaluation, and its major limitation i.e.: inability to fully attribute impact to programme activities,	
Lesson 1.1: What is Impact Assessment?	
Learning objectives At the end of this lesson, learners should be able to: <ul style="list-style-type: none"> • define the concept of impact assessment; • understand the purpose of an impact assessment; and • describe the relationship between impact assessment and monitoring and evaluation. 	
Main target audience All the target audience groups.	
Guidelines for the author This lesson introduces the basic concepts of impact and impact assessment in the context of food security. It is addressed to all the target audience groups, however, it specifically aims at sensitizing decision makers, programme managers and designers on the importance of carrying out impact assessments to improve FS programmes.	
Learning steps	Scope notes for the author
What is Impact Assessment?	Provide a definition of impact assessment. Include description of its components such as: outcomes, baseline assessment/impact Indicators (add the screens on the characteristics of indicators from the course on nutritional status assessment/targets). Stress the importance of understanding the big picture (not just measurement of indicators...).
Attribution gap	Stress that the principal objective of an impact assessment is to identify changes that are attributable to the programme. Explain what are the limitations of impact assessment which makes it impossible to fully attribute measurable changes to programme activities.
Purpose of doing an Impact Assessment	Explain the various contexts in which an impact assessment is done (i.e. for accountability/auditing purposes or for learning (programme steering and lessons learnt to influence other programmes and policies).
Resources (see last page for full citations) WB overview; WB "what is the role of impact evaluation in M&E?" FANTA p3-4, box 4, box 6 ; FAO-WB ; Feinstein p 7-9, 20; Hoddinott p 107 ; "What would the situation have been if the intervention had not taken place?" counterfactual. FAO-WB ; Feinstein p20; Hoddinott p 107 GTZ p.2, fig on p. 6; Carletto and Morris p.10-3, p 10-6	

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

Unit objectives describe the main skills learners will have acquired by the end of the unit.

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

Main target audience indicates the primary target audience group for the lesson (Group 1 and/or Group 2, according to the previous definition of the target audience groups).

Guidelines for the author help define the scope and the approach of the lesson.

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

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

3.7 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 that you are including relevant content. If the course is not job-oriented, a topic analysis must be conducted to clarify relationships among concepts.
- > Defining learning objectives clarifies expectations about outcomes from learners.
- > Learning objectives and relevant topics are then organized in a logical structure using various sequencing methods.

4. DEFINING INSTRUCTIONAL, EVALUATION AND DELIVERY STRATEGIES

Are we providing a self-paced or an online workshop using online communication tools? Which level of interactivity will the course have? What kinds of media will be used? Audio, video or just text and graphics?



The content for the course has been decided. But before starting the development stage, decisions must be made about the way in which the course will be made accessible to learners.

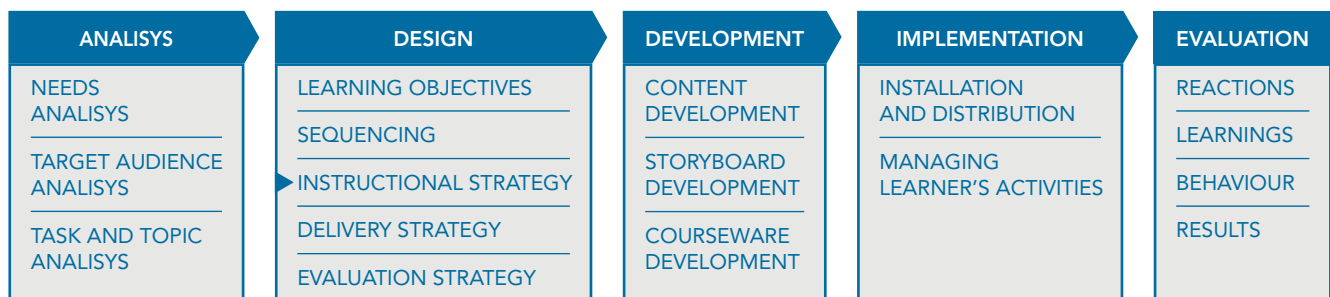
Richard, the instructional designer, suggests creating interactive content for self-study, with graphics, animations and tests, and also providing some opportunities to learners for online socialization and discussion.

Clara is concerned about development time and budget constraints. The team is also aware that there are some technology constraints to verify. For example, it would be completely useless to provide the course through a synchronous virtual classroom if learners don't have a good Internet connection!

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

- > Instructional methods for e-learning;
- > Delivery formats; and
- > Evaluation methods.

4.1 DEFINING INSTRUCTIONAL METHODS



Once the course structure has been defined, the ID must propose the best mix of methods and techniques for a specific e-learning course.

The design of an e-learning course will involve using a combination of the following instructional methods:

- > **Expositive methods** - which emphasize "absorption" of new information. Expositive methods include presentations, case studies, worked examples, demonstrations.
- > **Application methods** - which emphasize the active processes learners use to perform procedural and principle-based tasks and build new knowledge. Application methods include demonstration-practise method, job aids, case-based or scenario-based exercises, role play, simulations and serious games, guided research, project work.
- > **Collaborative methods** - which emphasize the social dimension of learning and engage learners sharing knowledge and performing tasks in a collaborative way. They include online guided discussions, collaborative work and peer tutoring.

Instructional methods

EXPOSITIVE METHODS	APPLICATION METHODS	COLLABORATIVE METHODS
Presentations Case studies Worked examples Demonstrations	Demonstrations-practise methods Jobs aids Case-based exercises Role plays Simulations and serious games Guided research Project work	Online guided discussion Colaborative work 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 Power Point file or as a recorded (or live) video presentation. An online discussion can be carried out in a discussion forum or through a Skype call.

Delivery formats are selected based on additional factors related to learners, technological and organizational constraints (e.g. budget) and available time.

Expositive methods

Expositive methods require learners to listen and read or observe. A SME or 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.

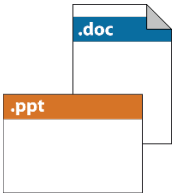
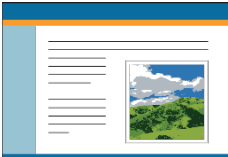


Expositive methods are used for acquiring information, but they can be combined with other methods to create different types of learning courses. In those courses, the expositive component is normally used to provide orientation and basic concepts before going into more practical and complex stages.

Presentations, especially in video formats, can also be used to sensitize and influence learners' attitudes toward 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.

DELIVERY FORMATS FOR EXPOSITIVE METHODS	
	Simple learning content, such as documents and PowerPoint presentations, with no interactivity.
	Interactive e-lessons using text, images, audio, animations and practice (i.e. questions and feedback).
	Presentations made by an expert or instructor which are broadcast in real time or recorded for learners to watch at any time. The lessons can be recorded in both video and audio formats (podcasts).
	<p>Webinar and virtual classroom</p> <p>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.</p> <p>The instructor can use special software called “virtual classroom software”. These programs usually include 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.</p>

Application methods

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

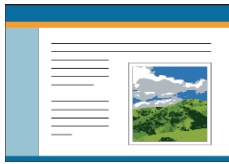
When using these methods, it is helpful to have a tutor or instructor to provide guidance and facilitate reflection for learners.

> Demonstration-practise method

This method is used to teach a procedure – usually a software procedure, such as how to generate a map using geographic information system (GIS) software – using directive learning. A procedure is first demonstrated by an expert or instructor, and 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.

DELIVERY FORMATS FOR DEMONSTRATION-PRACTISE METHODS



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 his/her 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 provide immediate answers to specific questions, helping users 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 format.

DELIVERY FORMATS FOR JOB AIDS



Printed documents such as checklists, technical glossaries and manuals
Online help or more sophisticated interactive online systems

> Case-based or scenario-based exercises

Case-based exercises are used to develop cognitive skills in a specific domain. Learners are asked to apply knowledge and principles to a concrete situation. Typically, this method is built around a scenario, e.g. a challenging situation where learners are required to make decisions by choosing among different options.

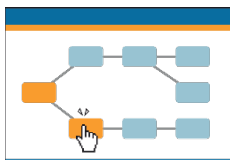
For example, learners may need to select the best method for assessing the impact of a food security programme. They are provided with an overview of the different assessment methods, criteria and information about the specific programme to be assessed. An expert then comments on the learners' choices.

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

DELIVERY FORMATS FOR CASE-BASED METHODS



E-learning linear lessons using text, images, audio, animations and practise (questions and feedback); feedback is provided to learners by comments on the appropriateness of their choices, after which they proceed to the next situation.



Electronic simulations, based on branched scenarios (also called experiential simulations); each learner's choice produces a consequence that generates feedback. The feedback is provided through a follow-up situation that produces more choices.



Tutored individual activities in which a challenging situation is presented together with the information and tools required to develop a solution to the problem; each learner is asked to develop his/her own solution by using the available information. The tutor can provide feedback during and at the end of the work.



Activities that are performed by a group rather than an individual; this also provides the opportunity to practise interpersonal skills (e.g. negotiation skills).

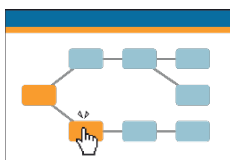
> Role play

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 in 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 two delivery formats.

DELIVERY FORMATS FOR ROLE-PLAY



Electronic simulations, based on branched scenarios (also called experiential simulations); each learner's choice produces a consequence that generates feedback. The feedback is provided through a follow-up situation that produces some more choices.



Role plays conducted as a group activity by learners using communication tools such as chats, audio or video conferences and discussion forums; a specific role is assigned to each learner. Learners interact with each other to achieve individual objectives and/or a common goal.

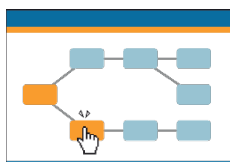
> Symbolic simulations and serious games

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.

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.

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

DELIVERY FORMATS FOR SIMULATIONS AND SERIOUS GAMES



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

Learning games are simulations involving a competitive component, a challenging goal and a set of rules and constraints.

> Guided research

The learners are charged by the tutor or the instructor to conduct research on a specific subject. The instructor can guide the learner in collecting and organizing information. 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.

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

DELIVERY FORMATS FOR GUIDED RESEARCH



Discussion forums, e-mails, chats and audio or video conferences for communicating between learner and instructor or tutor.

Wikis, blogs and shared documents for presenting results.

> Project work

The learner is charged by the tutor or the instructor 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, this method can be realized through the following delivery formats.

DELIVERY FORMATS FOR PROJECT WORK



Discussion forums, e-mails, chats and audio or video conferences for communicating between learner and instructor or tutor.

Wikis, blogs and shared documents 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 getting personal feedback.

> 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 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.

DELIVERY FORMATS FOR GUIDED DISCUSSIONS



Discussion forums, e-mails, chats or audio or video conferences.

> Collaborative work

Learners work together to perform different types of activities, 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 charged to evaluate 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.

DELIVERY FORMATS FOR COLLABORATIVE WORK



Discussion forums, e-mails, chats or audio or video conferences to communicate among learners.
Wikis, blogs and shared documents for collaborative work.


> 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.

DELIVERY FORMATS FOR PEER-TUTORING



Discussion forums, e-mails, chats, audio or video conferences, wikis, blogs and shared documents.

A summary of the instructional methods and formats

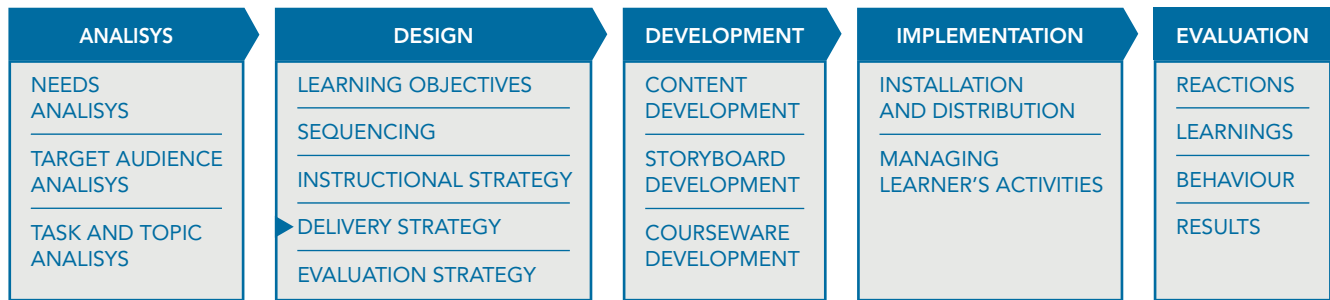
The following table summarizes the main uses and the pros and cons of the various instructional methods. Most courses combine two or more e-learning methods, using different types of e-learning formats.

	METHOD	USED TO	DELIVERY FORMATS	PROS	CONS
Expositive methods	Presentations, case studies, worked examples, demonstrations	Facilitate knowledge acquisition (mainly conceptual and factual knowledge), orientation, motivation, attitudinal change	Simple learning resources (documents and PPT presentations)	Quick to develop	No interactivity-passive learning
			Interactive e-learning lesson	Flexible: allows the use of various instructional techniques	Low/ medium interactivity-risk of passive learning Correct use of instructional techniques and media elements is needed to avoid this risk
			Webcasting (video lessons and podcasts)	Quite easy to develop	No interactivity-passive learning Need to consider available learners' Internet connection
			Webinars (video conference, audio conference, chat-based)	Allows interaction between instructor and learners Requires low effort to convert materials	The instructor must be prepared to teach online and use adequate supporting materials Need to consider available learners' Internet connection
			Virtual classroom		

	METHOD	USED TO	DELIVERY FORMATS	PROS	CONS
Application methods	Demonstration-practise method	Develop procedural skills	Combination of animation and operational simulation	Allows learners to practise	Mainly used for software and simple medical procedures
			Virtual classroom (using application sharing)		Need to consider available learners' Internet connection
	Job aids	Provide just-in-time information and guidance	Printed documents such as checklists, technical glossaries, templates, manuals	Promote transfer of learning to workplace performance	Sophisticated expert systems require complex design
			Online help and expert systems		
	Case-based exercises	Develop job-specific cognitive skills	Interactive e-learning lesson	Good level of interactivity	Quite time-consuming to design
			Electronic simulation based on branched scenarios	Highly interactive	Time-consuming to design Multimedia simulations can be costly to produce Need support of an online tutor or instructor
			Individual tutored activity	Highly interactive + personalised feedback	Time-consuming to design Need support of an online tutor or instructor Need to consider available learners' Internet connection
			Online group activity	Highly interactive + social dimension	Time-consuming to design Need active support of an online facilitator Need to consider available learners' Internet connection
			Interactive e-learning lesson	Good level of interactivity	Quite time-consuming to design
			Electronic simulation based on branched scenarios	Highly interactive	Time-consuming to design Multimedia simulations can be costly to produce
			Online group activity	Highly interactive + social dimension	Time-consuming to design Need for considering available learners' Internet connection Need active support of an online facilitator
	Role plays	Develop interpersonal skills Stimulate attitudinal change	Interactive e-learning lesson	Good level of interactivity	Quite time-consuming to design
			Electronic simulation based on branched scenarios	Highly interactive	Time-consuming to design Multimedia simulations can be costly to produce
			Online group activity	Highly interactive + social dimension	Time-consuming to design Need for considering available learners' Internet connection Need active support of an online facilitator

	METHOD	USED TO	DELIVERY FORMATS	PROS	CONS
Application methods	Simulations and serious games	Develop deep understanding of complex system	Symbolic simulations	Highly interactive Allow to practice high cognitive performance level (apply, analyse)	Time-consuming and costly to design and produce Need active support of an online tutor or SME
			Learning games	Highly interactive Allow to practice high cognitive performance level (apply, analyse)	Time-consuming and costly to design and produce Need appropriate design to be effective Need active support of an online tutor or SME
	Guided research	Active knowledge construction	Discussion forum, e-mail, chat, audio and video conference Wiki, blog, shared documents	Allow to practice high cognitive performance level (analyse, create)	Need active support of an online facilitator to provide help and feedback
	Project work	Active knowledge construction	Discussion forum, e-mail, chat, audio and video conference Wiki, blog, shared documents	Allow to practice high cognitive performance level (analyse, create)	Need active support of an online facilitator to provide help and feedback
Collaborative methods	Online guided discussion	Stimulate critical thinking and reflection Facilitate communications among learners Develop interpersonal skills Stimulate attitudinal change	Discussion forum, e-mail, chat, audio and video conference	Allows for reflection, socialization and knowledge sharing	Less effective than collaborative project work to achieve learning objectives Need to consider available learners' Internet connection
	Collaborative work	Stimulate critical thinking and reflection Develop problem solving skills Develop interpersonal skills Stimulate attitudinal change	Discussion forum, e-mail, wiki, blog, chat, audio and video conference, shared documents	Allows learners to make their knowledge explicit through argumentation	Need active support of an online facilitator to provide help and feedback Need to consider available learners' Internet connection
	Peer tutoring	Stimulate critical thinking and reflection Develop interpersonal skills Stimulate attitudinal change	Discussion forum, e-mail, wiki, blog, chat, audio and video conference, shared documents	Good for train-the-trainer projects	May need to be facilitated Need to consider available learners' Internet connection

4.2 DEFINING THE DELIVERY STRATEGY



When selecting **delivery formats**, a number of factors must be considered, including:

- > learner-related factors;
- > technology aspects; and
- > organizational requirements.

Learner-related factors

The following are important factors to consider about learners:

- > their comfort with delivery channels – Audio and video conferencing can be frustrating for non-native language learners; e-mail or discussion forums are more appropriate since they allow learners to take the time they need to read and write.
- > their level of technical expertise – If they have only recently experimented with e-mail, they may have difficulty working with whiteboards and video conferencing. It is important to consider how much technical support can be offered to them.
- > their available time – If learners are busy, are located in different time zones or cannot conform to rigid schedules because they can only access a shared computer during certain hours, asynchronous tools will be preferred.

Technology aspects

Learners' computers' capabilities, infrastructure and connectivity need to be considered before making any technology decisions. Understanding whether learners have easy access to network systems is important. Some activities can be carried out only with the support of an Internet connection, while others can be developed for self-paced e-learning. If there is limited Internet connectivity, consider using CD-ROMs and other offline formats to allow learners to take all or parts of the course offline.

Knowing bandwidth limitations helps you to choose the right delivery format. The following is a rough estimate of connection speeds required by various e-learning formats:

E-LEARNING FORMAT	SPEED OF INTERNET CONNECTION REQUIRED TO DISPLAY/USE
Video conferencing, live webcasting	From 100 Kbps to 2 Mbps
Audio conferencing	From 56 Kbps to 128 Kbps
Application sharing, animations	From 256 Kbps to 1 Mbps
Whiteboard, slides	From 56 Kbps to 384 Kbps
Chat, instant messaging	128 Kbps
E-mail, discussion forums, screens with text and images	From 56 Kbps to 128 Kbps

Source: <http://support.apple.com/kb/ht2020> - Last visited: 30 June 2011

It is also important to consider what kind of computers and software programs learners use, especially when creating e-learning courses in development contexts. Technical requirements, including multimedia capabilities, influence the selection of the media mix and plug-ins.

A multimedia training course can require the learners to have special hardware configurations (e.g. a large amount of memory, fast processors, high-resolution monitors, audio and video cards). Media players, also called plug-ins, (e.g. Adobe Acrobat Reader or Flash Player plug-ins) may be needed to display media and interact with the learner. If these are required, learners should be able to freely download them from the Web. Try to limit the number of media players needed by learners so that they don't have to do too many downloads. Alternatively, if you provide offline courses, such as on a CD-ROM, you can embed in the CD all the media players that are needed to display the course.

Using several media does not necessarily improve the effectiveness of an e-learning activity. Good instructional design is more critical to achieving learning effectiveness than special multimedia effects. For example, while audio is generally recommended, video and complex animations might not be required and could instead be replaced by a series of images.

Organizational requirements and constraints

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

Developing self-paced learning, especially with a lot of multimedia, can require much more time than preparing a virtual classroom. When instruction needs to be provided to as many people as possible in the least amount of time, a series of large virtual classes might be the right solution. Investing in the development of a complete self-paced course makes sense to meet long-term training goals more than immediate, urgent training needs. However, development costs for interactive content have dramatically decreased because of the development of new authoring tools.

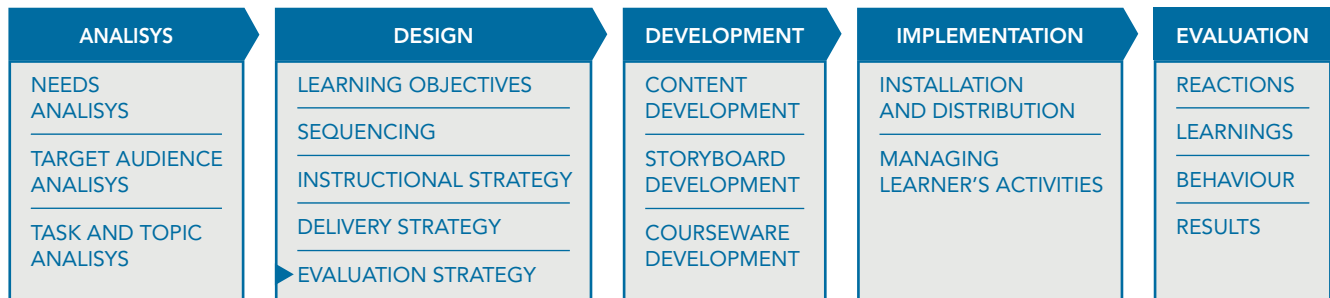
Instructor-led courses are cheap to develop but expensive to deliver, while self-paced courses based on interactive content are expensive to develop but cheap to deliver. Thus, knowing the number of learners is important in assessing the cost impact.

4.3 GOOD PRACTICES

By making use of asynchronous and synchronous learning and collaborative tools, it is possible to define e-learning solutions which 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 face 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 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.
- > **Asynchronous courses:** E-learning materials developed for self-paced e-learning can be combined with asynchronous collaboration facilities such as discussion forums and e-mail. This works well for learners who cannot conform to the rigid schedule of classroom training but want to enrich learning through discussion with other learners and a facilitator.

4.4 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.

First, you should establish the purpose of the evaluation. The purpose might be to: check the quality of the course to improve it before it is implemented (formative evaluation); measure the effectiveness of training and learning immediately after the course has been implemented (confirmative evaluation); or evaluate an old course to see if it is still valid or needs to be modified (summative evaluation).

Then, you will need to define if you want to evaluate learners' progress and/or provide certification. This will also influence the choice of the assessment tests that will be integrated into the course.

In fact, you may want to assess learners' knowledge and skills before the course starts, at a certain point in the course (e.g. middle evaluation) and/or after the completion of the entire course.²⁰

As already stated, it is important to ensure that the assessment tests are aligned with the learning objectives. For this reason it is advisable to start drafting the assessment tests from the first stages of the project, just after the definition of the learning objectives for each learning unit.

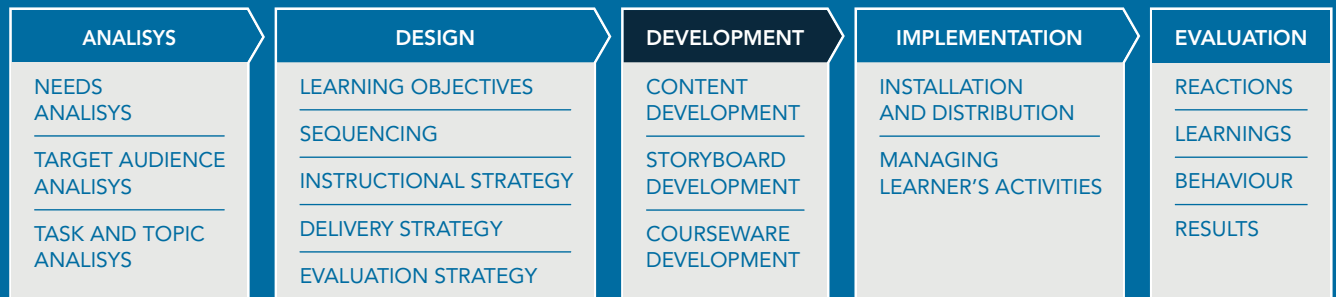
4.5 IN SUMMARY

KEY POINTS FOR THIS CHAPTER

- > The ID must propose the best mix of e-learning methods and formats to match specific learning needs. Special attention must be given to technological and resource constraints.
- > 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.
- > Different media elements can be used to create e-learning content, such as text, graphics, animations, audio, photographs and video sequences. The choice of the right media mix depends on the instructional approach as well as on technological and resource constraints.
- > When deciding between using offline and online, synchronous or asynchronous approaches, it is important to consider learner-related factors (e.g. their technical expertise and available time) and technical aspects (e.g. hardware and software requirements and speed of Internet connection).
- > The overall evaluation strategy and the methods for assessing learners' progress should also be defined as part of the design stage.

²⁰ See chapter 8.4 for more details on the different types of evaluation and on methods to assess learning.

PART III — CREATING INTERACTIVE 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.

WHILE E-LEARNING CONTENT CAN CONSIST OF DIFFERENT ELEMENTS, RANGING FROM SIMPLE LEARNING RESOURCES (E.G. DOCUMENTS AND PPT PRESENTATIONS) TO INTERACTIVE CONTENT, SIMULATIONS AND JOB AIDS, THIS SECTION WILL FOCUS MAINLY ON THE DEVELOPMENT OF INTERACTIVE E-LESSONS. INTERACTIVE E-LESSONS ARE THE MOST COMMON METHOD FOR DELIVERING E-LEARNING CONTENT. THEY OFFER A MEDIUM LEVEL OF INTERACTIVITY AND ALLOW DESIGNERS TO USE A VARIETY OF INSTRUCTIONAL TECHNIQUES AND MEDIA.

THIS SECTION WILL ILLUSTRATE THE PROCESS OF DEVELOPING E- LESSONS, INCLUDING PREPARING THE CONTENT, APPLYING INSTRUCTIONAL TECHNIQUES AND MEDIA AND CREATING THE FINAL INTERACTIVE PRODUCT USING APPROPRIATE SOFTWARE AND AUTHORING TOOLS.

5. PREPARING CONTENT

So, I am responsible for developing the course content. How should I proceed?



Jin, food security expert

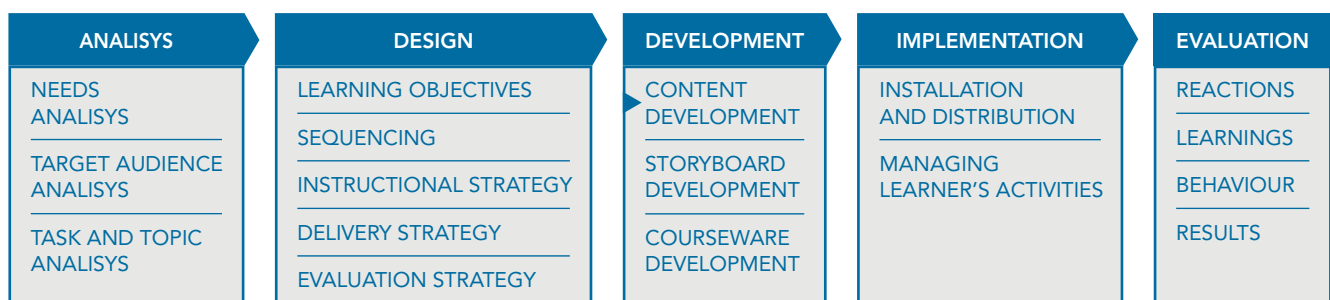
It's time to take action!

The e-learning course will include a set of self-paced e-learning lessons to illustrate basic concepts.

Jin, the SME, is in charge of preparing all the required knowledge and information –the “heart” of the course.

This chapter provides suggestions to SMEs on how to prepare and write content for e-learning. It will introduce the following topics:

- > How SMEs can provide the required information and knowledge; and
- > How to write content for e-learning.



5.1 HOW SUBJECT MATTER EXPERTS CONTRIBUTE TO E-LEARNING DEVELOPMENT

In traditional training, SMEs assemble material for learners and teach them directly, while in e-learning, SMEs provide IDs with the information and knowledge they need to prepare e-learning materials and activities. For courses where domain-specific knowledge and skills must be developed (e.g. for an e-learning course on food security analysis), SMEs must provide IDs with high-quality content. However, the extent of an SME'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 can 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 WITHOUT MAKING ANY CHANGES?

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

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 which are supplied by the presenter in a traditional classroom; or
- > a 20-page article made available online is not e-learning content because the way it is designed doesn't match specific learning objectives and because scrolling text pages is not the best way of reading online.

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

Two main situations can occur:

IF...	...THE SME MAY BE REQUIRED TO PROVIDE:	...THE ID WILL:
1) Existing materials provide high-quality content sufficient to cover each outlined e-lesson	<ul style="list-style-type: none"> > linkages between existing source materials and outlined e-lessons (for example, Chapter 1 of a manual on vulnerability analysis can cover the content for lesson 2.3 of an e-learning course on food security analysis). > practice exercises (i.e. questions and feedback) and additional examples where required by the ID. > glossary terms and relevant descriptions. > recommended reading and resource pointers for the lesson(s). 	<ul style="list-style-type: none"> > develop lesson storyboards which integrate content taken from different source materials, with practice exercises and examples provided by the SME.
2) Existing materials do not adequately cover the content of outlined lessons	<ul style="list-style-type: none"> > core content for the lesson which ensures that the learning objectives of the lesson are adequately covered. > practice exercises (i.e. questions and feedback) and additional examples where required by the ID. > glossary terms and relevant descriptions. > recommended reading and resource pointers for the lesson(s). 	<ul style="list-style-type: none"> > develop lesson storyboards which integrate lesson content, practice exercises and examples prepared "ad hoc" by the SME.

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management and institutional arrangements and therefore also in terms of assessing the impact, which would be simpler than for more heterogeneous programmes.

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How much content should an e-lesson include?

A single e-lesson should not take more than 30 minutes of learning time.

How many pages of content should the SME submit to create a single e-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-lesson that included 30 screens (using an estimate of 1 minute per screen of, for example, a text/image or a feedback window), approximately 10-15 pages of content would be required.

Lesson 1.3: Types of large scale programmes addressing food security

1. Description of large scale programmes addressing food security

1.1. What makes a programme different from a project and why is this important for impact assessment?"

[According to European definitions: pop-up window]"

A project is an indivisible operation, delimited in terms of schedule and budget, and usually placed under the responsibility of a single operator. The projects are usually characterised by:

- One main activity
- Implemented as a single content
- Intended for a single group
- A single direct result expected further group
- A single expected impact at a more global level.

A programme is a set of projects, grouped together to attain global objectives. It is less delimited in terms of schedule and budget and usually under the responsibility of a coordinating committee. It often encompasses heterogeneous but complementary interventions with a common objective. Programmes are complex objects in so far as they are designed with:

- Several activities (subsidies, direct investments, technical assistance, etc.)
- Implemented in several contexts (different geographical areas, different sectors, etc.)
- Targeted at several groups
- Expected to produce multiple results for the different groups
- But expected to generate one common impact at a more global level.

These differences between projects and programmes have implications in terms of impact assessment. Programmes may be – and usually are – composed by a set of projects (or sub-programmes) with different schedules, different beneficiaries, implemented and managed by different operators. This means that the interventions of the programme (whose impact we want to assess) may be quite heterogeneous and may also be starting – and ending – at different moments of time and involving different groups of beneficiaries, which makes the impact assessment of such a programme more complicated. This complexity will then determine the methodologies to be used. Another important difference between projects and programmes that may affect the choice of impact assessment methodology is that programmes usually have a broader approach to address the problem than projects – programmes are more likely to focus on strategic goals while projects tend to focus more on intermediate results.

Sometimes the distinction between "programme" and "project" is not as clear as we presented earlier. It may be that the a programme takes the shape of an "up-scaled large scale bag project", with several activities implemented in several contents but with a clear beginning and end, a well-defined budget and a single operator who implements it. In this case, the difference between a programme and a project is more on the scale and size of the intervention. Actually, this kind of programme is very close to projects in terms of

When SMEs are in charge of developing content for e-learning lessons, they should refer to the course outline (or course plan) to be informed about the topics to cover and the approach to take in illustrating those topics (e.g. the level of detail, the language to use, the preference for illustrating concepts through examples or case studies). With those instructions, SMEs can begin to write the content.

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 work flow process.
- > Provide all the knowledge needed to meet the learning objectives, including information that may seem obvious to you but may be unknown 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 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 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 SMEs when authoring content for e-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 to not 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.

5.3 IN SUMMARY

KEY POINTS FOR THIS CHAPTER

- > There are two main ways in which SMEs can provide the knowledge required for an e-learning course:
 - > they can provide IDs with references to source documents and materials; and
 - > they can actually write the content for an e-lesson.
- > In either case, they must check the storyboards and provide additional information where needed (for example, they might provide feedback on exercises or complete examples and scenarios created by the ID).
- > Content development is based on the course (or curriculum) plan, which describes learning objectives and topics to be covered.
- > In authoring the content, SMEs should provide all the knowledge needed to meet the learning objectives and avoid unnecessary information.
- > The language should be direct, informal, easily understood by diverse people and culture- and gender-sensitive.

6. CREATING STORYBOARDS

How can I structure and present this content to facilitate learning? How can I best explain and engage the learner at the same time?



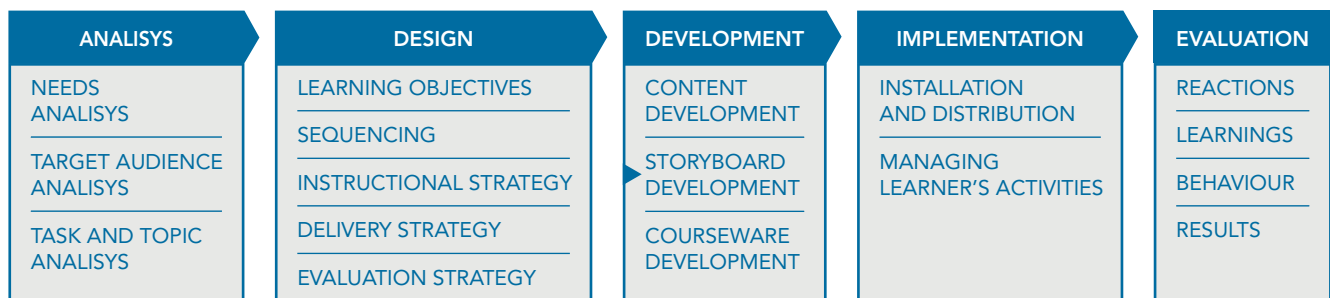
Jin, the SME, has passed information for each outlined lesson to Richard, the ID.

It is time for Richard to transform that information into engaging e-learning content!

He will use instructional techniques, media and interactive elements to develop the lessons' storyboards.

This chapter provides concrete guidelines on how to develop storyboards for e-learning interactive lessons by applying different instructional techniques and media elements. It will illustrate the following topics:

- > How to structure a lesson storyboard;
- > How to use instructional techniques to present lesson content;
- > How to add examples;
- > How to use media elements (e.g. text, graphics, audio, video, animations); and
- > How to develop practice and assessment tests.



6.1 WHAT IS A STORYBOARD?

The ID works on the content provided by the SME to design each e-learning lesson. The lesson's storyboard (also called the script), is the design document resulting from this activity.

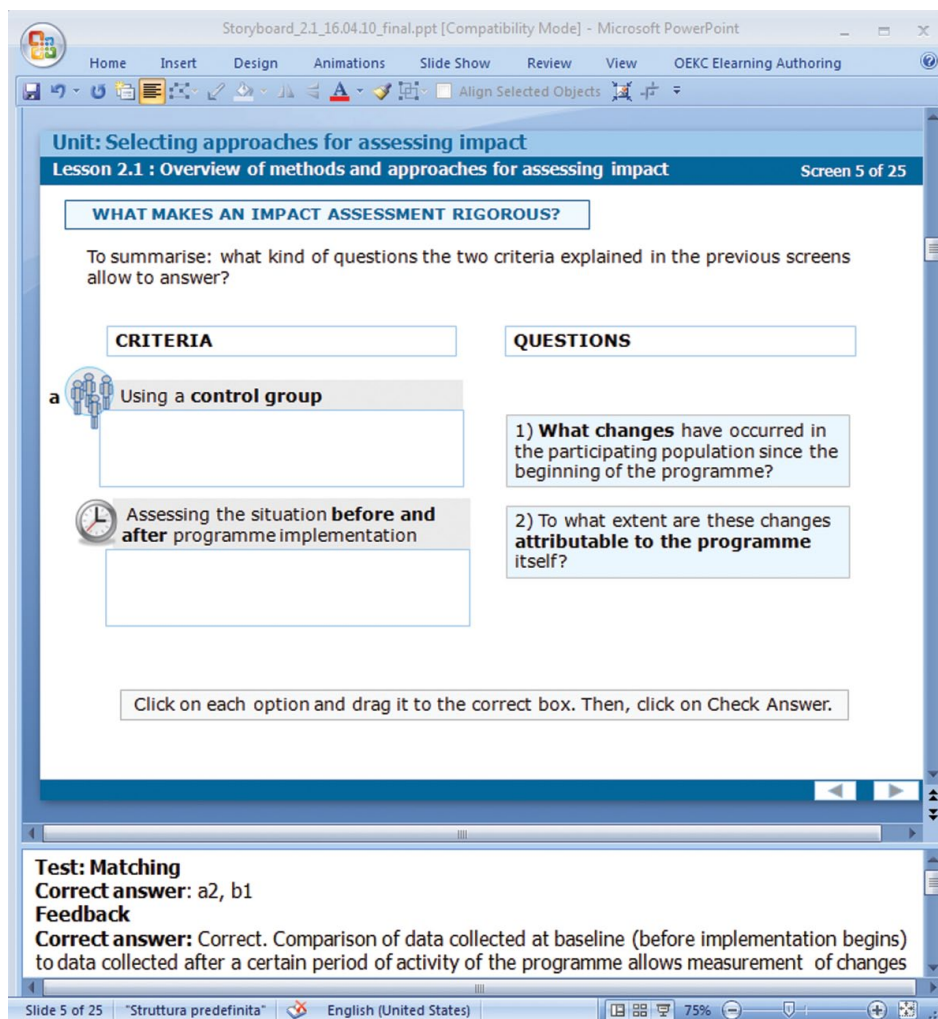
What is a storyboard?

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 e-lesson. The storyboard is not a final product. It is an intermediate product which is then used by Web developers to create the final interactive e-lesson.

More specifically, for each lesson, the ID:

- > reviews the content provided by the author;
- > selects the instructional technique which is more appropriate to present that type of content (e.g. storytelling, scenario-based approach, etc.);
- > determines the lesson's content sequence;
- > creates a storyboard which specifies which elements will appear in each screen of the e-lesson. These elements include: text, images and other media, interactive questions, "more information" windows and annexes.

The following is an example of a storyboard created with PowerPoint. However, storyboards also can be created using a word processing program.



The main PowerPoint slide presents the visual elements (text and graphics) that will appear in the screen of the final lesson.

It also shows the screen number and the titles of the unit, lesson and learning step.

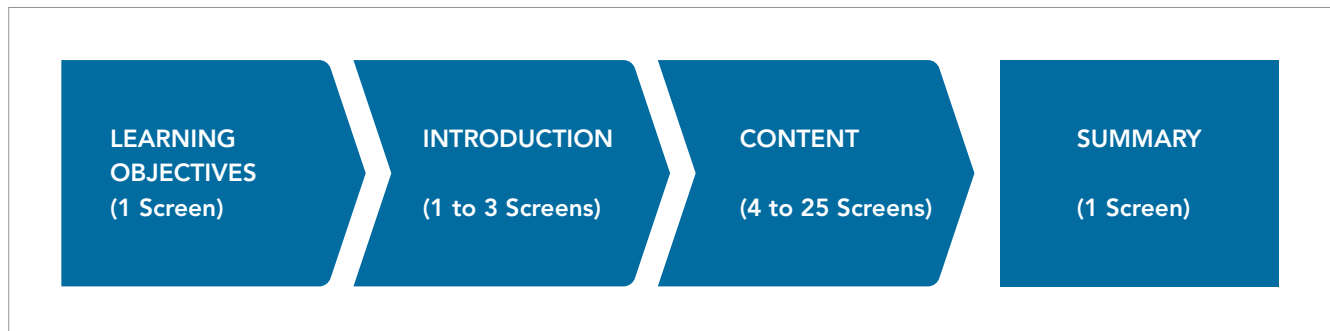
In the notes section of the page, the ID writes information for developers about interactions, animations and audio associated with that screen.

The next sections provide some guidance on how to use instructional techniques and integrate media elements and interactive questions to create a lesson storyboard.

6.2 STRUCTURE OF AN INTERACTIVE E-LESSON

In creating the storyboard for an interactive e-lesson, the ID reorganizes the content provided by the SME into a sequence of slides, which will correspond to the screens of the final interactive lesson.

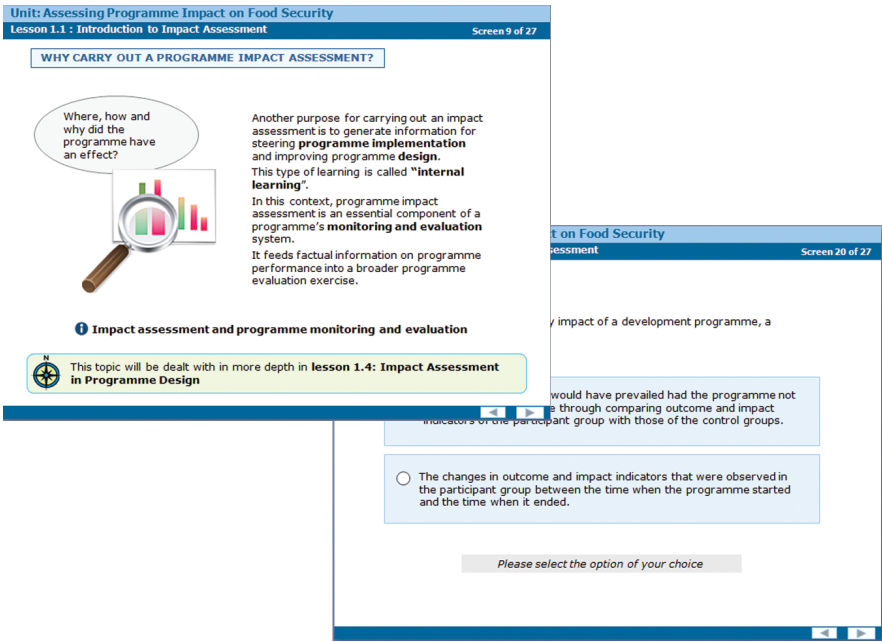

For example, the following is a typical e-lesson structure:²¹



Let's see a lesson's components in more detail:

LESSON COMPONENT	EXAMPLE
<p>1) Learning objectives</p> <p>A first screen containing a clear and informal description of learning objectives for the lesson.</p>	

²¹ The standard structure of an e-learning lesson reflects Gagné's nine events of instruction: 1) Gain attention; 2) Inform learner of objective; 3) Stimulate recall of prior knowledge; 4) Present the material; 5) Provide guidance for learning; 6) Elicit performance; 7) Provide feedback; 8) Assess performance; and 9) Enhance retention and transfer (See Gagné 1985)

LESSON COMPONENT	EXAMPLE
<p>2) Introduction</p> <p>One or more introductory screens describing how the knowledge gained from the course will be used and the benefits of having that knowledge.</p> <p>The purpose of the introduction is to motivate learners to proceed with the lesson.</p>	 <p>Unit: Assessing Programme Impact on Food Security Lesson 1.1 : Introduction to Impact Assessment Screen 2 of 27</p> <p>INTRODUCTION</p> <p>How has the programme improved the lives of participants?</p> <p>It is very likely that since you have decided to start this course, you have already made or intend to make a significant investment of time and resources in some form of action to improve food security.</p> <p>The purpose of this course is to explain how we can assess that our investments are generating the impact that we desired.</p> <p>This lesson will introduce you to the concept of impact assessment and the main reasons for conducting it.</p> <p>It will also introduce some of the main challenges of assessing impact of development programmes that address food insecurity, which will be covered in depth in the other lessons of the course.</p> <p> This icon will indicate where, in the course, some topics are covered more in depth.</p>
<p>3) Content (core of the lesson)</p> <p>A set of screens (from 4 to 25) which make up the core of the lesson. These combine:</p> <ul style="list-style-type: none"> > text; > media elements; > examples; and > practice questions. <p>Their purpose is to facilitate learning of knowledge and skills.</p> <p>A range of instructional techniques can be used to present the content. These techniques, as well as guidelines on how to use media elements, examples and exercises, are presented later in this chapter.</p>	 <p>Unit: Assessing Programme Impact on Food Security Lesson 1.1 : Introduction to Impact Assessment Screen 9 of 27</p> <p>WHY CARRY OUT A PROGRAMME IMPACT ASSESSMENT?</p> <p>Where, how and why did the programme have an effect?</p> <p>Another purpose for carrying out an impact assessment is to generate information for steering programme implementation and improving programme design. This type of learning is called "internal learning".</p> <p>In this context, programme impact assessment is an essential component of a programme's monitoring and evaluation system.</p> <p>It feeds factual information on programme performance into a broader programme evaluation exercise.</p> <p> This topic will be dealt with in more depth in lesson 1.4: Impact Assessment in Programme Design</p> <p>Impact assessment and programme monitoring and evaluation</p> <p>... impact of a development programme, a</p> <p>... would have prevailed had the programme not ... through comparing outcome and impact indicators of the participant group with those of the control groups.</p> <p><input type="radio"/> The changes in outcome and impact indicators that were observed in the participant group between the time when the programme started and the time when it ended.</p> <p>Please select the option of your choice</p>

LESSON COMPONENT	EXAMPLE
<p>4) Summary</p> <p>List of key points in the lesson.</p> <p>The purpose of the summary is to help the learner memorize the lesson's key points.</p>	

6.3 TECHNIQUES FOR PRESENTING CONTENT

When creating storyboards for e-lessons, IDs may choose among diverse techniques for presenting content, according to the type of content and the desired instructional approach.

This section presents an overview of the following techniques, including descriptions and guidance on when and how to use each one:

- > storytelling;
- > scenario-based approach;
- > toolkit approach; and
- > demonstration-practise method.

Storytelling

- > What is storytelling?

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

The following is an example of an e-lesson using storytelling:

EXAMPLE: AN E-LESSON USING STORYTELLING

This lesson is part of a course entitled "Communicating for Food Security".

The lesson follows the story of two communication specialists, Nur and Samir, and Paulo, an NGO communication officer, who is helping them to promote a new technology to raise yields.

Paulo will guide his colleagues through the process of organizing a communication campaign. The story provides learners with guidelines and relevant conceptual knowledge for organizing such a campaign.

COMMUNICATING FOR FOOD SECURITY

3. Communicating with policymakers
3.2 Lobbying for food security

Food Security Information for Decision Making

Course Menu Additional Info

INTRODUCTION

Samir and Nur are communication specialists with a research organization that helps run a food-security project in South Asia.

They are promoting a new irrigation technology to be used in Central Bagistan.

They have contacted international organizations and NGOs to get their support in convincing policymakers to take action.

One of the NGOs has demonstrated a strong interest on the project. Paulo, the NGO's communication officer, has offered his support to promote the new technology to raise yields.

We need a carefully thought-out communication campaign strategy if we really want to make a difference on this issue.

Paulo

Nur and Samir

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THE POLICYMAKING PROCESS

How can we influence this process?

When trying to influence policy, **timing** can be very important.

Policy-making can be a very long, drawn-out process - one that follows its own logic. Once a decision has been made, it can be very difficult to get it changed. You may have to wait several years for another opportunity to influence the policy.

That means you must **anticipate the policy decisions** and understand the timetable and processes that lead up to key decisions being made.

Let's see what policy windows you might use...

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> 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 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, because through storytelling you can show how this knowledge can be integrated into a real situation.

TIPS FOR USING STORYTELLING

- > Create a realistic and credible context. This is very 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 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 introduce 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 the topic; then, a story screen can be used again to introduce the next topic;
 - > illustrate critical actions or decisions – a story screen can describe important actions and decisions which often lead to common mistakes and doubts;
 - > develop practice exercises – a story screen can be used to ask the learner to answer 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' geographic 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.

Scenario-based approach

- > What is a scenario-based approach?

Lessons using this approach are built around a scenario. Typically, the scenario is a challenging situation in which learners are required to make decisions by choosing among different options. Learners are provided with all the information required to make the right decisions.

Feedback is provided to the learners for each option to explain why their choices are correct or incorrect. The feedback can also show the consequences of their decisions.

EXAMPLE: AN E-LESSON USING THE SCENARIO-BASED APPROACH

Let's consider a lesson on the steps involved in creating a digital library collection for a given scenario.


The lesson deals with creating a digital library collection of student dissertations in an engineering college.

At the beginning, the case is presented and the problem is introduced.

INTRODUCTION

Paula is a librarian working at the Engineering College.

Since the final semester is coming up, final semester engineering students always want to consult the Dissertations collection...




Paula, College Librarian

Good morning Paula!

I would like to consult a couple of these dissertations.

INTRODUCTION

I'm sorry but I gave out the last copy of these reports just yesterday...



Oh no! I need them to work on my project topic...

This is a frequent problem.

Sometimes students also complain of torn pages in reports due to frequent consultation.


The Library is unable to handle the situation satisfactorily...

The learner is asked to help Paula, the college librarian, make a number of decisions.

These decisions should be made according to presented information as well as colleagues' reactions.

Conceptual information is provided through feedback in a very succinct manner.

INTRODUCTION




Probably, the best way to solve the problem is to set up a digital library of dissertations and provide online access to these on the campus network.

PROJECT PLANNING

Document format for storage and delivery is a very important issue. The committee has identified the following criteria for format selection:

Many dissertations contain diagrams, formulas, non-Roman scripts, etc. It is important to retain the look and feel of the original dissertations, and reproduce the original content accurately.



The format should preferably be standards-based and non-proprietary.

The solution must be cost-efficient!

Based on the committee's considerations, which of the following is the more appropriate format for storage and delivery?

☐ PDF
☐ Microsoft Word
☐ XML

Please click on the answer of your choice.

> When should a scenario-based approach 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 which provide underlying concepts and principles.

This type of approach requires strong collaboration between the ID and the SME, as the ID needs to have enough information to design a realistic situation, provide learners with the information for the decisions they have to take and provide appropriate feedback on their choices.

TIPS FOR USING A SCENARIO-BASED APPROACH

- > Create a scenario. Think about how learners will use the information in the lesson, and build the scenario around it. Involve an SME to ensure that the scenario is relevant and credible.
- > Work with the SME to understand which decisions a person would make in that scenario. SMEs can share different experiences and possible outcomes.
- > Provide learners only with the information required to make decisions. This can be given as part of the scenario description; as part of the feedback to learners' responses; or as part of information available on demand (e.g. through a "more information" link to additional information).
- > Define possible choice options for each critical decision. Choices should not be obvious.
- > Each choice generates a consequence; provide detailed feedback for each option by showing its consequences.

Toolkit

> What is a toolkit lesson?

An e-lesson can take the form of a toolkit which allows learners to select from among a set of independent topics, rather than follow a sequential approach. Learners are invited to choose the topics that interest them the most.

EXAMPLE OF A TOOLKIT LESSON

This lesson illustrates the main characteristics of several collaboration tools. Learners can access tool descriptions from the menu screen. Each tool is presented in a systematic way by providing main features, potential applications, limitations and examples.



> When should a toolkit lesson be used?

Toolkit lessons are a good option when you have to present short pieces of content which 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 might be interested only 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.

Demonstration-practise method

> What is the demonstration-practise method?

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

EXAMPLE: E-LESSON USING THE DEMONSTRATION-PRACTISE METHOD

The lesson teaches how to import documents into a digital collection using the digital library software, Greenstone.

First, the task is shown both verbally and through an animation...

The screenshot shows the 'DIGITIZATION AND DIGITAL LIBRARIES' e-lesson interface. The left sidebar contains navigation links: ABOUT THIS MODULE, MY COURSE, SEARCH, RESOURCES, HELP & SUPPORT, IMARK ONLINE, and LEGAL INFORMATION. The main content area is titled 'STEP 1: GATHERING OF DOCUMENTS'. It features a text box explaining the process: 'Then, we click on OK to continue with the process. Another pop-up window comes up, showing the available metadata sets. Now we need to: - check the appropriate metadata set check, box e.g. Dublin Core (the DC elements appear in the lower half of the screen); and - click on OK to define the collection.' Below this text is a 'View Animation' button. To the right, a 'Create a new Collection.' dialog box is shown, with fields for 'Collection title: WordPDF' and 'Description of content: This collection demonstrates Greenstone's ability to handle d'. The dialog has 'OK' and 'Cancel' buttons.

...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.

The screenshot shows the 'DIGITIZATION AND DIGITAL LIBRARIES' e-lesson interface, page 12 of 24. The left sidebar is the same as in the previous screenshot. The main content area is titled 'STEP 1: GATHERING OF DOCUMENTS'. It features a large blue rectangular area. To the right, a text box says: 'Now it's your turn to do it! We have already installed Greenstone for you. Here is what you have to do...'. Below this is an 'Interactive Exercise' section with a mouse icon and the instruction: 'Use the Greenstone interface on the left for this exercise:'. The exercise steps are: 1) Create a new collection using GLI. 2) Define a collection based on a new configuration and having the following title and description (to save time, copy the two texts below): WordPDF. This collection demonstrates Greenstone's ability to handle documents in different file formats. 3) Select the Dublin Core Metadata set. At the bottom of the main content area, there are 'More Help' and 'View Solution' buttons.

- > When should the demonstration-practise method be used?

This method can be used to teach procedures, typically software procedures.

TIPS FOR DEVELOPING A DEMONSTRATION-PRACTISE 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 does a wrong action, the system provides an error message, and if the learner does the right action, the system allows the learner to go to the next step until the end of the procedure.

6.4 ADDING EXAMPLES

Adding examples is key to ensuring that learners can make sense of the illustrated concepts. Examples can be used in deductive and inductive ways:

- > to illustrate a concept or show the steps of a procedure which has been previously introduced (deductive); or
- > to stimulate thinking and reflection before providing definitions and principles (inductive).

DEDUCTIVE AND INDUCTIVE SEQUENCES

Deductive sequence

Definition (theory)

Example or case

Inductive sequence

Example or case

Definition (theory)

Deductive sequences reflect a behavioural approach, which emphasizes response strengthening, while inductive sequences reflect a constructive approach, where emphasis is on the active processes learners use to build new knowledge.

Examples can help 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 and prepare them for actual performance.

EXAMPLE: SELECTING LIVELIHOOD INDICATORS

Let's consider a lesson that provides guidance on how to select livelihoods indicators in specific contexts.

First, a sample situation is provided. Learners can open the PDF and read the situation of the Nias mountain people.

Learners also are provided with a list of indicators that an expert analyst has selected for that situation.

SELECTING LIVELIHOOD INDICATORS

Let's now have a look at how indicators have been selected in a specific context.

Example : Nias mountain people



[Description of the situation](#)

Click on the icon above to read the example

The following **indicators** have been selected for this livelihood group:

- Terms of trade between rubber and pig income and essential food and non-food purchases
- Access/income from rice cultivation/share cropping
- Access/income from labour in Nias town or Sumatra
- Disease outbreaks amongst pigs/other livestock
- Levels of stunting and anaemia amongst children

Why have these indicators been selected?

Then, the underlying principles used by the expert to select those indicators are presented.

SELECTING LIVELIHOOD INDICATORS

The livelihood indicators for the Nias mountain people have been selected for a number of reasons:

The mix of indicators covers **most aspects of livelihoods**, i.e. vulnerability, livelihood strategies, processes and outcomes.

Indicators reflect **sustainable livelihood strategies**.



They provide the **maximum amount of information on livelihood status**. Most income comes from pig and rubber sales, rice cultivation and labour in Nias and Sumatra. Thus, assessing terms of trade between rubber and pig sales and essential food and non-food purchases, as well as access and income from rice cultivation/share cropping and labour provide a comprehensive overview of livelihood status and current vulnerability.

The indicators are generally **easy to measure**. Price and wage information are fairly easy to collect while outcome information on stunting and anaemia (although costly) are easily obtainable. Swine disease outbreak information is also easily monitored.

The indicators can easily be **incorporated into a framework** to assess livelihood and food security status.

SELECTING LIVELIHOOD INDICATORS

Let's now have a look at which indicators have been selected for the following situations.

Example: Artisanal fishers in Benin



 [Description of the situation](#)

 [Livelihood indicators selected](#)

Example: Pastoralists in southern Somalia



 [Description of the situation](#)

 [Livelihood indicators selected](#)

Example: Agro-pastoralists in southern Somalia



 [Description of the situation](#)

 [Livelihood indicators selected](#)

Now, three new examples are provided, together with the list of indicators selected in each situation and an explanation of the reasons for that selection.

SELECTING LIVELIHOOD INDICATORS

Let's consider the example below.

Example : Hargeisa urban economy



 [Description of the situation](#)

 [Livelihood indicators selected](#)

Finally, using a new example, learners are asked to answer a set of questions regarding the selection of indicators in that specific situation.

Which of the following sentences better reflects the main way in which livelihood indicators of urban livelihood groups differ from those of rural populations?

- ☐ Urban populations have a more diverse set of livelihood strategies than rural populations.
- ☐ Urban populations are more market dependent than rural populations.
- ☐ Urban populations are less vulnerable to the effects of drought.

Please select the answer of your choice

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 to also 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 which illustrate the same underlying principle in different contexts. Then, ask learners to compare them and identify the common principles.

6.5 INTEGRATING MEDIA ELEMENTS

There are a number of different kinds of media elements that 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.²²

Media elements: Text

Written text is an important "media" for communicating course content. Great attention should be given to its graphic display and integration with images.

The following principles apply when displaying text on a lesson screen:

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 the 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 the following:²³

- > **decorative:** to add aesthetic appeal or humor;
- > **representational:** to depict an object in a realistic fashion;
- > **mnemonic:** to provide retrieval cues for factual information;
- > **organizational:** to show qualitative relationships among content;
- > **relational:** to show quantitative relationships among two or more variables (e.g. pie charts, line charts);
- > **transformational:** to show changes in objects over time or space (normally realized through animations and video); and
- > **interpretive:** to illustrate a theory, principle or cause-and-effect relationships.

Graphics can play a crucial role in promoting learning. They should not only be used to add 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.


²²Guidelines presented in this chapter take into account the cognitive load theory. Cognitive load theorists assert that since working memory is limited, cognitive overload will result if the complexity of instructional materials is not properly managed, and this will interfere with the learning process.

²³Clark R.C. and Lyons, C. (2010). *Graphics for Learning: Proven Guidelines for Planning, Designing, and Evaluating Visuals in Training Materials*. Wiley & Sons Ltd.

The following examples of graphics serve some of the communication functions listed above.

EXAMPLE: GRAPHICS WITH REPRESENTATIONAL FUNCTION

These realistic pictures illustrate plant components for a course on plant genetics.



Pre-breeding to build capacity
for effective use of plant genetic resources

1. Introduction to Pre-breeding
1.2 Pre-breeding in Context


Course Menu Additional Info

SOME EXAMPLES OF PRE-BREEDING


Let's move beyond the theoretical and look at some of the practical, real-world applications of pre-breeding.

The following examples provide ideas about the types of applications for specific crops.


Example: Maize




Example: Musa




Example: Sesame




Example: Cassava



Example: Sugarcane



Example: Common bean



Click on the pictures to view the examples

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

COMMUNICATING FOR FOOD SECURITY

3. Communicating with policymakers
3.1 Presenting information to policymakers

Food Security Information for Decision Making

Course Menu Additional Info

DELIVER YOUR MESSAGE

If you have **softcopies** of printed materials and presentations, you may...

- Send them an **email**. If you know the policymaker, then consider sending them an attachment. Make sure you include the subject and a short cover note: most people hate getting spam.
- Put it on your **website**.
- Distribute it (or announce it) via **email groups** or professional **social networking** sites.



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EXAMPLE: GRAPHICS WITH MNEMONIC FUNCTION

This visual list is provided at the beginning and at the end of each lesson to have learners recall the various steps of the process.

COMMUNICATING FOR FOOD SECURITY
1. Designing your communication strategy
1.1 Identify and analyse your audiences

Food Security Information for Decision Making
Course Menu
Additional Info

DEFINING YOUR AUDIENCES' INTERESTS AND INFORMATION NEEDS

By defining interests and information needs of your audiences, you have completed the first stage in the process of designing a communication strategy:



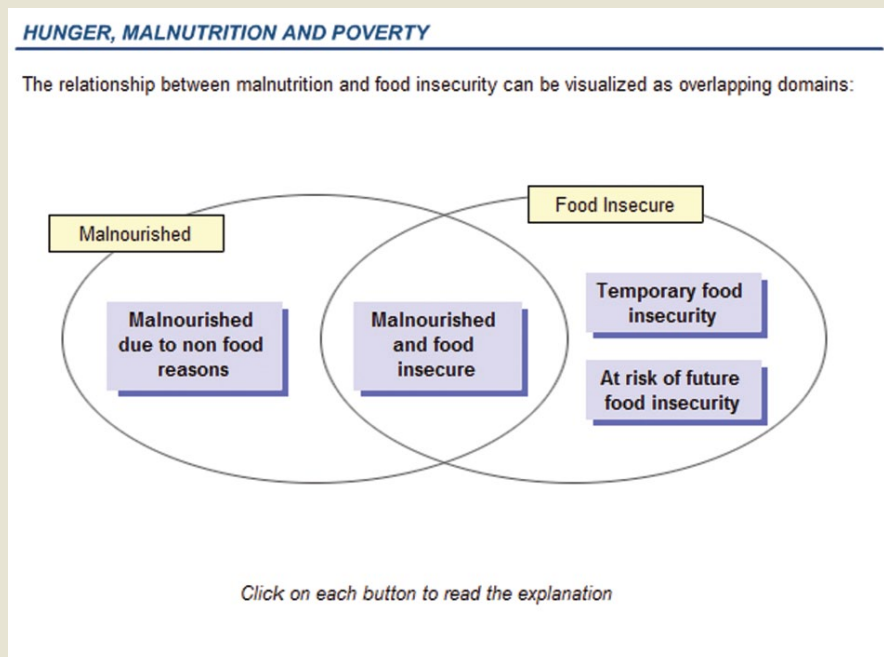
DESIGNING A COMMUNICATION STRATEGY

- Identify and analyse your audiences
- Define your communication objectives
- Decide on the messages to convey to your audiences
- Select the channels to use
- Create a communication workplan
- Evaluate your communication activities

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EXAMPLE: GRAPHICS WITH ORGANIZATIONAL FUNCTION

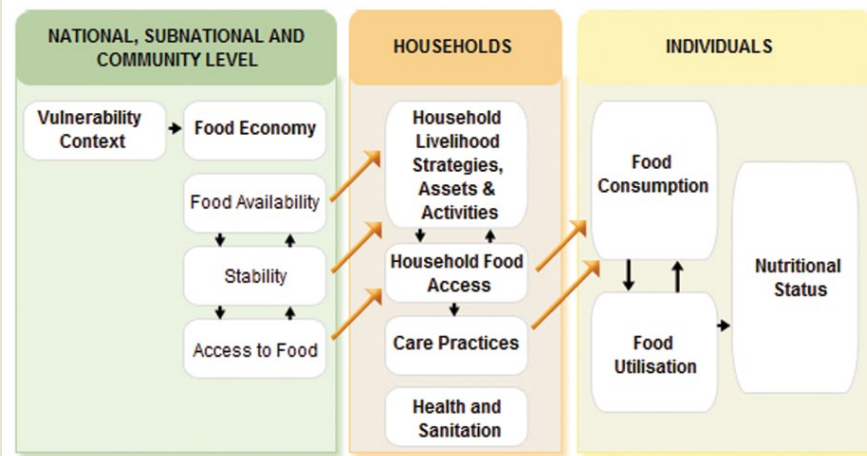
This simple diagram clarifies the relationships between the concepts of malnutrition and food insecurity.



CONCEPTUAL FRAMEWORKS

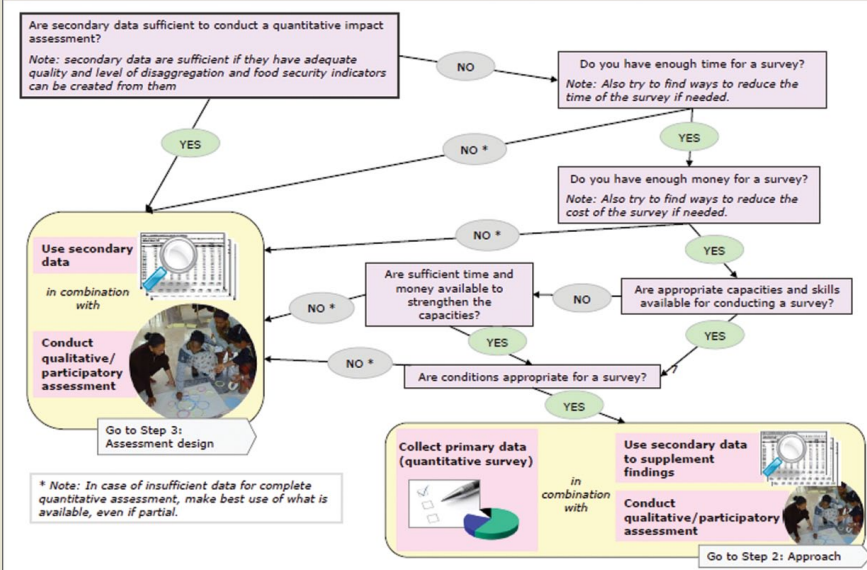
Let us start by looking at a food security conceptual framework in some detail. The diagram below illustrates the FAO-FIVIMS framework:

Please click each area for more information



This diagram illustrates cause-effect relationships among food security elements at national, household and individual levels.

STEP 1: Decision on sources of data to use



This flow chart illustrates a set of guidelines for deciding which type of data should be used for food security analysis depending on the context.

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 understand the text and should be minimized. Adding extraneous pictures can interfere with the process of understanding presented materials, thus jeopardizing the learning process.
- > If you use printed words to comment upon the graphics, place them near the parts of the graphics to which they refer, so that learners' attention is not divided.
- > If you use spoken words (narration), present corresponding graphics and spoken words at the same time so that learners' attention is not divided.
- > Use digitized photographs 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, a conceptual map or a tree diagram can show relationships among content.
- > Line charts can demonstrate trends and allow 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 that "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.

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

Effective use of audio greatly increases the effectiveness of a course. Audio can be used in combination with on-screen text to summarize or expand key points or to accompany video sequences.

Audio narration is more effective than printed text when providing comments on animations, video sequences or a series of static frames showing a transformation. Indeed, learners' visual channel can become overloaded if they have to process graphics and the printed words that refer to them.

TIPS FOR USING AUDIO

- > Keep the audio short.
- > Use audio to complement the visual elements of the screen. For example, during a procedural demonstration, audio can be used to explain animated steps.
- > If you use audio to comment on graphics and animations, present corresponding graphics and spoken words at the same time so as to not split the learner's attention.
- > Avoid redundant audio. Do not use it to "read" the text on the screen; instead, combine audio narration with textual summary.
- > Use written text for key messages which need to remain on the screen as long as desired so that learners can refer to that information over time.
- > Avoid adding "extraneous" audio, such as background music and sounds, to a narrated animation. If learners pay attention to sounds and music, they will pay less attention to the narration.

Media elements: Video

Video is the only media that makes it possible to reproduce behaviour, processes or procedures the way they appear in real life. It can be used to present a case study and is especially effective in role plays to illustrate interpersonal communication situations.

Video requires a lot of bandwidth. In many cases, graphics or animation can be an effective substitute for video.

TIPS FOR USING VIDEO

- > Video sequences should always be accompanied by comments in either written text or audio narration.
- > In situations with limited bandwidth connections, a video sequence can be replaced by a sequence of pictures.
- > Avoid using video only to show a teacher speaking.

This United Nations Development Programme course entitled "Prevention of Harassment, Sexual Harassment and Abuse of Authority in the Workplace" allows learners to display a role play scenario as a video or as a sequence of images.



Learners who select the "Images" version will see the scenario as a sequence of pictures with dialogue balloons.



6.6 DEVELOPING PRACTICE AND ASSESSMENT TESTS

Practice and assessment questions should be designed to reinforce the achievement of learning objectives. Questions play an important role in involving learners and keeping their attention, so you should try to use them as much as you can in your storyboard.

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
Fact	<ul style="list-style-type: none">> Have learners recall features or specifications> Have learners identify pictures or objects
Concept	<ul style="list-style-type: none">> Have learners discriminate between examples and non-examples
Procedure	<ul style="list-style-type: none">> Have learners practise through operational simulation> Have learners actually perform the procedure
Principle	<ul style="list-style-type: none">> Ask questions about the principles underlying a worked example> Have learners apply guidelines to solve a job-contextualized problem or case study

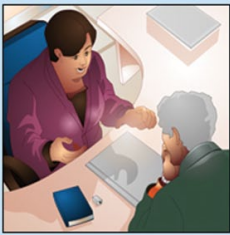
EXAMPLE OF PRACTICE: APPLICATION OF A COMMUNICATION PRINCIPLE

The lesson provides guidance on how to communicate with policy-makers to sensitize them about your initiative.

The screen on the right provides some guidelines on listening to a negotiation...

AT THE MEETING


Discuss your issue



Listen to the policymaker's **response**, and watch for body language and facial expressions that give you clues about his or her thoughts. If you do not understand what the policymaker says, ask for clarification.

Be prepared to **answer questions** and address any objections the policymaker may point out. But focus on your priorities and what you want him or her to do.

The meeting may turn into a **dialogue** or a **negotiation**. That is fine. You want to learn as much as you can about what the policymaker thinks. Be willing to negotiate, but be clear about how far you will or will not compromise.



Remember that you are not trying to win an argument.

You are trying to **exchange ideas**, influence the policymaker and **reach agreement**. So you need to **listen** as much as you speak. It is sometimes just as important to know why a policymaker opposes your position as it is to know if he or she supports you.

...and the exercise shows what happens when those guidelines are applied correctly and incorrectly.

AT THE MEETING

Paul has presented his message to Evelyn. Here is her first reaction:



But if we reduce the fees on lorries carrying goods in Bagistan, the government will not have enough money to repair the roads!

In your opinion, how should Paulo reply?

☐ That's not true! The police who collect the fees are corrupt and pocket most of the money!



☒ That's true - but reducing the fees will help boost production, so you will automatically make up the revenue through other forms of tax...



Please click on the answer of your choice.



Yes, this is the correct option. Instead of contradicting Evelyn, Paulo should allay her concerns. He could go on to provide evidence that higher production would offset the loss in revenue. He could also mention that reducing the fees would reduce the opportunity for corruption.

Questions formats


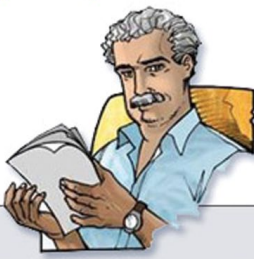

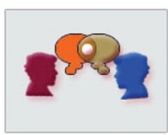

In self-paced e-learning, practice and tests mainly consist of questions associated with response options and feedback. They generally have the following structure:








- > a question or statement;
- > an operational message that indicates to the learner how to perform the required operations (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:


- > multiple choice;
- > multiple responses;
- > matching;
- > ordering;
- > fill-in-the-blank; and
- > short answer/essay.

The table below provides a short description and an example for each one of these formats.

TYPE OF QUESTION	EXAMPLE
<p>True or False</p> <p>A statement with two options (true/false or yes/no), where only one is correct.</p>	<p>WHAT IS NEW ABOUT THE RIGHT TO ADEQUATE FOOD?</p> <p>What is the added value of the right to adequate food to human development, food security and poverty reduction programmes? The definition of and the conditions for achieving food security bear close resemblance to the definition of the right to adequate food explained above.</p> <p> See the definition of Food Security</p> <p>How would you answer the question asked by this Food Security project manager?</p> <div data-bbox="510 571 954 743"> <p>I work in sustainable development. Our project focuses on food security, by taking into account the cross-cutting conditions of multiple sectors such as agriculture, nutrition, markets, etc. Am I doing everything necessary in order to realize the right to adequate food?</p> </div> <div data-bbox="1093 560 1348 817">  </div> <div data-bbox="510 761 1380 851"> <p><input type="radio"/> Yes <input checked="" type="radio"/> No</p> </div> <div data-bbox="510 862 1380 985"> <p> Correct. Even if the conditions required to achieve Food Security goals are also required by the Right to Adequate Food, a Right to Food approach complements the Food Security concept and programmes with the principles of human dignity, accountability, empowerment, non discrimination and participation.</p> </div>
<p>Multiple choice</p> <p>A statement that provides different options; only one is correct.</p> <p>This type of interaction allows for providing different feedback for each selected option.</p>	<p>PARTICIPATORY APPROACH</p> <div data-bbox="534 1131 702 1265">  </div> <p>Another approach consists in ensuring different degrees of local stakeholder participation in impact assessment.</p> <p>A participatory approach is aimed to enhance the participation of local people, agencies, and decision makers in the impact assessment process.</p> <p>In your opinion, when is an impact assessment fully participatory?</p> <div data-bbox="635 1310 1232 1496"> <p><input type="radio"/> When the programme participants are asked to answer some questions from their own perspective.</p> <p><input type="radio"/> When all stakeholders make decisions about how the impact assessment will be conducted and what information needs will be covered.</p> <p><input checked="" type="radio"/> When the assessment is based on application of qualitative data gathering techniques.</p> </div> <div data-bbox="534 1512 1356 1579"> <p> Using qualitative methods does not necessary mean that the impact assessment is participatory; also a participatory approach can be applied to use of mixed methods where the stakeholder input and ownership also shapes the content of the quantitative assessment.</p> </div>

TYPE OF QUESTION	EXAMPLE						
<p>Multiple responses</p> <p>The correct answer consists of more than one option, all of which must be selected.</p>	<p>WHO ARE POLICYMAKERS?</p> <div data-bbox="571 376 847 712">  </div> <p>Help Samir and his colleague Nur identify which policymakers they should focus on:</p> <div data-bbox="887 461 1366 712"> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Members of national food security coordination body <input type="checkbox"/> Staff of United Nations bodies <input type="checkbox"/> Traditional chiefs <input checked="" type="checkbox"/> Provincial commissioner <input type="checkbox"/> Heads of district agencies for food and agriculture <input checked="" type="checkbox"/> Presidential adviser on food security </div> <div data-bbox="571 741 1401 815"> <p>✓ Very good. Note that actors at one level may influence policy at other levels. For example, a local member of parliament may be an important influence on provincial and district policies as well as having a say in policies at the national level.</p> </div>						
<p>Matching</p> <p>This type of interaction presents two series of elements. The learner must associate each element of the first series with an element of the second.</p> <p>The example shows a drag-and-drop exercise.</p>	<p>WHAT MAKES AN IMPACT ASSESSMENT RIGOROUS?</p> <p>To summarise: what kind of questions the two criteria explained in the previous screens allow to answer?</p> <div data-bbox="571 994 1385 1335"> <table border="1"> <thead> <tr> <th>CRITERIA</th><th>QUESTIONS</th></tr> </thead> <tbody> <tr> <td>  Using a control group </td><td> What changes have occurred in the participating population since the beginning of the programme? </td></tr> <tr> <td>  Assessing the situation before and after programme implementation </td><td> To what extent are these changes attributable to the programme itself? </td></tr> </tbody> </table> </div> <p>Click each option, drag it and drop it in the corresponding box. When you have finished, click on "Check Answer".</p> <p>Check Answer</p>	CRITERIA	QUESTIONS	 Using a control group	What changes have occurred in the participating population since the beginning of the programme?	 Assessing the situation before and after programme implementation	To what extent are these changes attributable to the programme itself ?
CRITERIA	QUESTIONS						
 Using a control group	What changes have occurred in the participating population since the beginning of the programme?						
 Assessing the situation before and after programme implementation	To what extent are these changes attributable to the programme itself ?						

TYPE OF QUESTION	EXAMPLE																
<p>Ordering</p> <p>The learner has to order several elements in a sequence, e.g. the logical sequence of several phases, steps or operations to be performed.</p>	<p>PROGRAMME LOGIC</p> <p>In this sequence representing a programme logic, can you put the examples below in the right place?</p> <div><div><div>Resources/ Inputs</div><div>Activities</div></div><div><div>Outputs</div><div>Short term and immediate outcomes</div><div>Long term outcomes and impact</div></div></div> <div><div>Programme's planned work</div><div>Programme's intended results</div></div> <div><div>Farmers increase their income and food security through diversified production</div><div>Farmers adopt new techniques and diversify their production</div><div>Demonstrations carried out for farmers on vegetable production</div><div>Farmers' capacities and knowledge about vegetable production improved</div><div>Available staff, funds and materials to carry out the activities</div></div> <p>Click each option, drag it and drop it in the corresponding box. When you have finished, click on "Check Answer".</p> <div>Check Answer</div>																
<p>Fill-in the blanks</p> <p>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.</p> <p>The response is checked by the system which provides relevant feedback.</p>	<p>COVERAGE, EXCLUSION AND INCLUSION - HOW MANY PEOPLE?</p> <p>Can you calculate the coverage, exclusion and inclusion rates in this case?</p> <p>Use the table below.</p> <table><tr><th></th><th>Total</th><th>Beneficiaries</th><th>Non-beneficiaries</th></tr><tr><td>Total</td><td>100</td><td>20</td><td>80</td></tr><tr><td>Target group</td><td>30</td><td>Coverage = <input type="text"/> 19 %</td><td>Exclusion error = <input type="text"/> 11 % (or under-coverage)</td></tr><tr><td>Non-target group</td><td>70</td><td>Inclusion error = <input type="text"/> 1 %</td><td>69</td></tr></table> <p>Please insert the correct values. Then, click "Check Answer".</p> <div>Check Answer</div>		Total	Beneficiaries	Non-beneficiaries	Total	100	20	80	Target group	30	Coverage = <input type="text"/> 19 %	Exclusion error = <input type="text"/> 11 % (or under-coverage)	Non-target group	70	Inclusion error = <input type="text"/> 1 %	69
	Total	Beneficiaries	Non-beneficiaries														
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Non-target group	70	Inclusion error = <input type="text"/> 1 %	69														

TYPE OF QUESTION	EXAMPLE
<p>Short answer/ short essay</p> <p>The learner is free to choose his/her own words to formulate the response to the question. This makes it more difficult to check the learner's output as it is impossible to foresee all the possible answers. However, an answer developed by an expert can be proposed for comparison (see the example) or the essay can be saved and submitted to an online tutor.</p>	<p>THE IPC TECHNICAL WORKING GROUP</p>  <p>Now, Barbara and Thomas rethink of their <u>group</u>.</p> <p>Based on Alice's suggestions, what problem(s) does Barbara's group have concerning a well-formed IPC technical working group?</p> <div style="border: 1px solid black; height: 60px; width: 100%;"></div> <p>Please type your answers in the input box above and then press "View Answer".</p> <p>View Answer</p>

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

	PROS	CONS
True or False	<p>Easy to create</p> <p>Can differentiate feedback for each option</p>	<p>Learners have a 50 percent chance of selecting the right option</p> <p>The answer is not created by the learner</p>
Multiple choice	<p>Very flexible (can be used for several purposes)</p> <p>Can differentiate feedback for each option</p>	<p>Difficult to create (you have to develop credible wrong options and write different feedback for each of them)</p> <p>The answer is not created by the learner</p>
Multiple responses	<p>Very flexible (can be used for several purposes)</p>	<p>Quite difficult to create (you have to develop credible wrong options)</p> <p>The answer is not created by the learner</p>
Matching	<p>Quite easy to create</p>	<p>Risk of being too easy for learners</p> <p>The answer is not created by the learner</p>
Ordering	<p>Quite easy to create</p>	<p>The answer is not created by the learner</p>
Fill-in the blanks	<p>Easy to create</p>	<p>Rarely appropriate</p> <p>Difficult to measure</p>
Short answer/short essay	<p>The answer is created by the learner</p>	<p>Very difficult to measure</p>

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 decreases 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 for each option of about the same length. 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.

6.7 ADDITIONAL RESOURCES

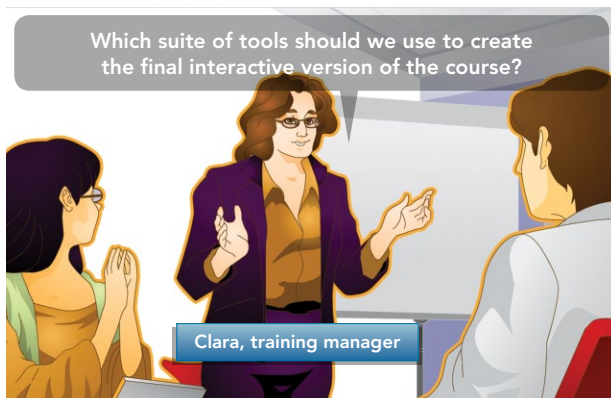
Additional instructional support can be designed as part of the lesson or the course. These resources may include, for example:

- > printable versions of the lesson content;
- > "getting started" tutorials, providing an overview of navigation features for new learners;
- > downloadable job aids (e.g. checklists, if/then tables);
- > glossary providing key terms and related explanations;
- > bibliography and/or links to Web resources, for learners to find out more about the topic; and
- > pop-ups or "mouse-overs" which provide additional information on specific topics without interrupting the flow of the lesson.

KEY POINTS FOR THIS CHAPTER

- > The typical structure of a storyboard for an e-lesson includes the following elements: learning objectives; introduction; content and practice (the core of the lesson); summary.
- > The core of the lesson is composed of a combination of text, media elements, examples and exercises.
- > A range of instructional techniques can be used to present the content, such as storytelling, scenario-based approaches, toolkits and the demonstration-practise method.
- > Adding examples is crucial to facilitate understanding of concepts and application of strategic principles.
- > Different media can be used to illustrate the content. It is very important to use them appropriately to avoid overloading the working memory of learners.
- > Practice and assessment tests facilitate the achievement of learning objectives. In self-paced e-learning, practice exercises and tests mainly consist of questions associated with response options and feedback. Questions should be created for critical topics or tasks and should use explanatory feedback to reinforce learning.

7. COURSEWARE DEVELOPMENT

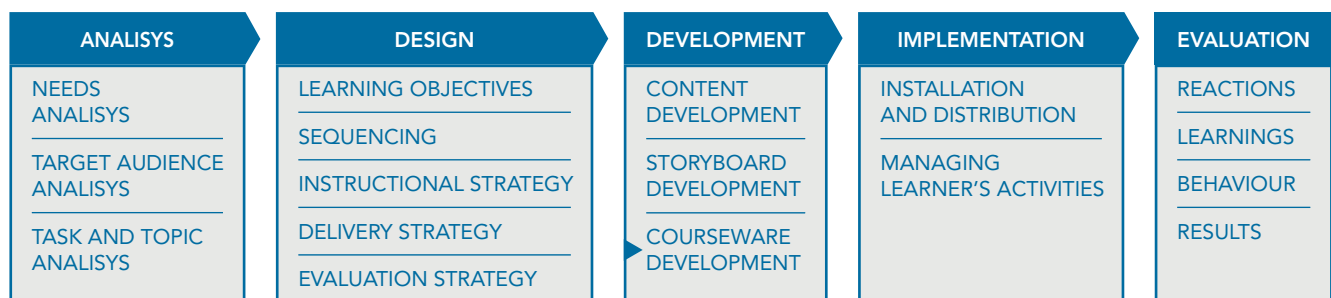


Clara is evaluating whether to use one of the existing authoring tools to make the course interactive and publish it online.

The development team will use this tool to create the final interactive e-lessons and embed them in a nice graphic interface which allows learners to access the course content.

This chapter provides information on the last step of the development stage, which is the creation of the final interactive courseware. The chapter will illustrate the following topics:

- > Authoring tools for producing e-learning courseware; and
- > How to select the right authoring tool.



7.1 WHAT DOES COURSEWARE DEVELOPMENT IMPLY?

Once the storyboards are ready, the development team creates the final interactive e-lessons. Alpha and beta versions are prepared for testing and review before distributing the course online and/or through CD-Rom.

Courseware development may require the work of a group of professionals. Specifically:

- > a course integrator to assemble all the course components and set up the course interface; this person may also be responsible for quality assurance testing;
- > graphics developers to create graphics and animations, including navigation buttons and icons;
- > multimedia developers for audio and video editing;
- > HTML/XML coders if there is a need to develop tailored templates; and
- > programmers to develop complex interactions.

Not all these roles are required in every case. It depends on the mix of media and on the required level of interactivity. For example, only a course integrator and graphics developers would be needed for courses composed of only text and images, with a medium level of interactivity and created using an authoring tool.

7.2 AUTHORIZING TOOLS

Various tools can be used to produce e-learning content, depending on the file formats you are going to use and the final product you aim to deliver.

In a very broad sense and at the simplest level, slide-based tools, like Microsoft PowerPoint or even word processors, are regarded as e-learning tools. While those tools are not appropriate to present interactivity, testing and scoring, they can be sufficient to create simple learning resources.

To develop interactive content, various elements are assembled (e.g. text, illustrations, animations, audio, video, interactivity). There are two main ways to do that:

- > use programming tools which have been created to develop web content (not only for e-learning) and customize them to specific e-learning needs; or
- > use special tools – known as authoring tools or authorware – which have been created specifically to develop e-learning courses.

Generally, programming tools (particularly those that are sophisticated and complex) require professional expertise and considerable development time, while authoring tools can be used by people without programming skills. The main advantage of authoring tools is that they are easier and faster to use, and they therefore shorten development time.

Other characteristics and differences between the two approaches are summarized in the table below.

	PROGRAMMING TOOLS	AUTHORING TOOLS
Skills required	Not user-friendly; requires advanced programming skills	User-friendly; programming skills are not necessary
Users	Used by developers/programmers	Used by content developers, IDs, non-technical staff
Ease of use	Difficult to use	Relatively easy to use
Learning curve²⁴	High	Relatively low
Development time	Require a lot of development time	Fast to develop and transfer; reduce technical overhead
Development cost	Inexpensive	Expensive if proprietary, but free software offerings exist
Instruction set architecture	Low-level program; needs to be compiled	High-level program with high-level visual tool
Run time	Program runs quickly	Programs runs slowly
Purpose of use	Can be used for open-ended, multi-purpose tools (such as Web sites)	Used to facilitate multimedia and instructional design
Control over e-learning environment	Complete control; source files are available for customization	Less control; no/limited access to source files

There are many categories of authoring tools which differ by their features, level of complexity, installation site (i.e. desktop or web-based) or visual graphic interface. These tools range from very simple Microsoft PowerPoint converters to powerful toolboxes for rapid e-learning. These more complex authoring tools, referred to as self-contained toolboxes, do not rely on other tools; the entire e-learning course is created within just one integrated toolset.

All authoring tools must have some key capabilities, including:

- > interactivity and navigation – menu-driven content and ability to move throughout the content;
- > editing – content publisher for easier changes/updates;
- > visual programming – use of buttons, icons, drag-drop graphic;
- > preview/playback – 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; and
- > delivery of learning content in multiple formats – able to use SCORM for LMS, Web, CD-ROM and Microsoft Word.

²⁴ Learning curve represents the period of time necessary to learn how to use the tool.

Navigation options

People may use different approaches to study: some may prefer to have a quick and overall look at the content and then go back to a specific unit, while others may want to follow a predefined order. Allowing learner's control over the process is particularly relevant in adult learning.

Course interfaces usually allow the following navigation techniques:

- > course and lessons menus, which allow learners to select specific lessons and topics within the course; and
- > previous, next and reload buttons to permit control of pacing within a lesson.

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.

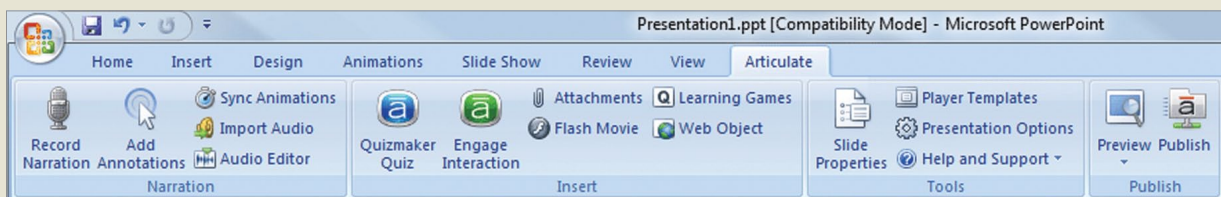
For example, the SCORM (Sharable Content Object Reference Model) model encompasses the following standards:

- > packaging standards that allow courses to run under different LMSs;
- > runtime specifications on how LMSs can launch courses and how they can report results back to the system; and
- > metadata standards to create and publish metadata records about courses, lessons and topics.

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 Presenter²⁵ or Articulate²⁶ transform standard PowerPoint presentations into Flash.

EXAMPLE: ARTICULATE PRESENTER

The articulate tool is nested inside PowerPoint.



Pressing on Preview > Preview slides or Publish, a PPT presentation is automatically converted into Flash.

²⁵http://www.ispringsolutions.com/products/ispring_presenter.html

²⁶ <http://www.articulate.com/products/studio.php>

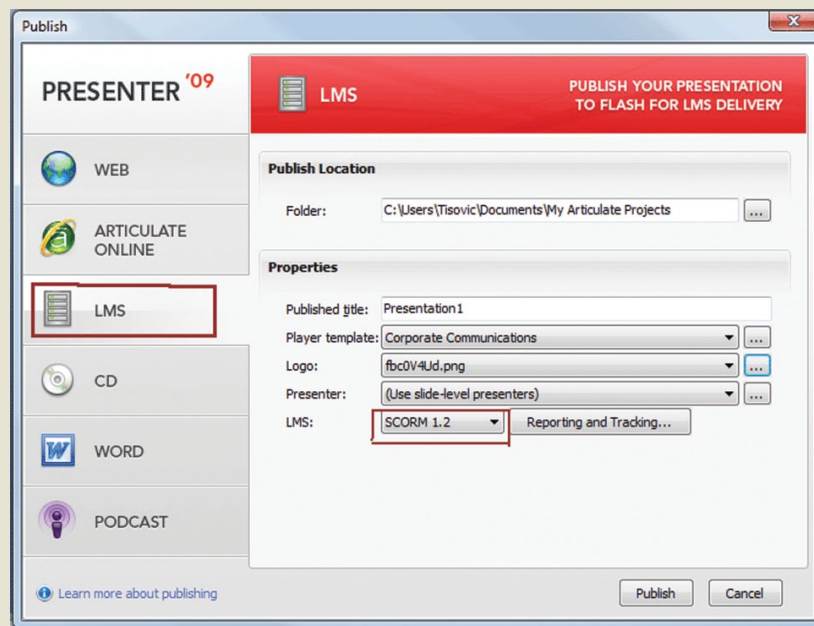
As authoring tools evolved, they integrated many other useful features and new easy-to-use templates to accommodate rich media interactions, quiz makers, video converter, etc. for more engaging and complete learning experiences.

Authoring tools generally allow choice among different outputs depending on the required product format. Several outputs can be produced by authoring tools: Web, CD-ROM or SCORM-compliant format for LMS (SCORM 1.2, SCORM 2004) delivery, and MS Word for hardcopy reference materials.

Moreover, some online user-friendly hosted services, like those set up by the Articulate or Course Lab communities, allow content to be published, delivered and tracked online. In this case hosted services act as LMS and allow users to set course parameters, course structure and eventually invite other users to view published courses.

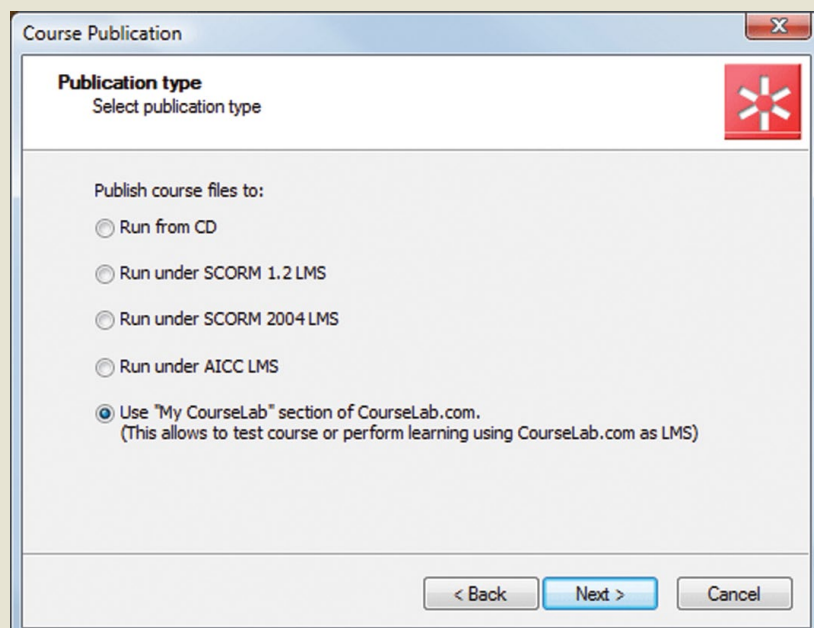
EXAMPLE: ARTICULATE ENGAGE PUBLISHING OPTIONS

Articulate publishing options in Articulate Engage include: Web, hosted online service, LMS, CD or MS Word.



EXAMPLE: COURSELAB PUBLISHING OPTIONS

Apart from CD/SCORM outputs, CourseLab offers a hosting service on My CourseLab.com server for course testing and learning.



Articulate offers the opportunity to change the look and feel (e.g. colours, test, layout, navigation) of the player.



Another tool, Adobe Captivate²⁷ (now part of the complete toolbox for developing professional e-learning content) was born as a simulation and demonstration software, but thanks to object styles and rich interactive elements, it has become a multipurpose development tool.

Some tools are directly incorporated into LCMSs, such as eFront²⁸ or aTutor.²⁹ They include authoring components and are able to create or add content and build online tests.

7.3 TYPES OF AUTHORING TOOLS

Authoring tools can be grouped under three main categories according to the architecture they use for authoring:

- > template-based tools;
- > timeline-based tools; and
- > object-based tools.

Many recent tools combine some of these. CourseLab³⁰, for instance, provides both template and object elements. Rapid Intake³¹ is a template-driven tool, but it also provides timeline-driven template source files (Flash FLA files), which enables developers to customize templates.

²⁷<http://www.adobe.com/products/captivate/>

²⁸<http://www.efrontlearning.net/>

²⁹<http://atutor.ca/>

³⁰<http://www.courselab.com/>

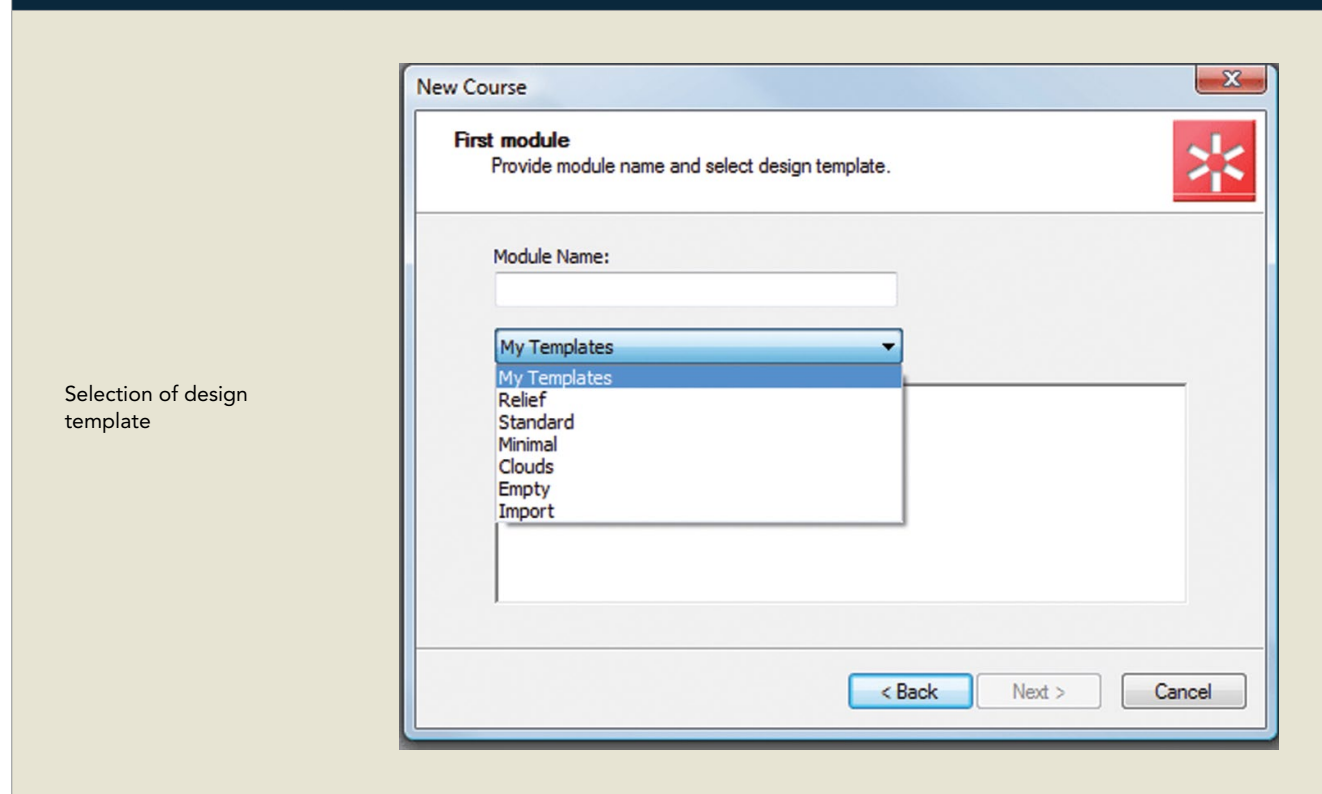
³¹<http://www.rapidintake.com/>

Template-based tools

The idea behind the template-driven system is to offer a gallery of pre-built, default templates for different types of screens, both static and interactive (e.g. tests and question screens). In template-based authoring systems, authoring/editing starts by selecting the right template which later will be filled with content using the visual content editor.

Interface, formatting and layout of the final product (player) are fairly easy to control by using customizable skins. Templates provide visual and cognitive consistency - all screens in one course will not be identical, but they will have very similar features, color schemes, themes, layout, etc. The template based system is beneficial for both course designers and learners. Using templates and skins dramatically reduces production time and simplifies workflow. For designers this ensures that course elements are consistently and appropriately added in each screen, while learners become familiar with course elements and structure, thus avoiding unnecessary efforts while navigating from one screen to another.

EXAMPLE: COURSE LAB



Despite the variety of templates, template-based systems may present certain limits to creativity and design. First of all, template layout may be rigid and inflexible with fixed dimensions and positioning of screen elements. More serious problems occur when a pre-made template collection does not meet some instructional needs.

Recent editions of software packages (e.g. Rapid Intake³² and CourseLab) manage to overcome this problem by embedding customization capabilities that can generate new, custom templates.

³²http://www.rapidintake.com/index.php?option=com_ccboard&view=forumlist&Itemid=110

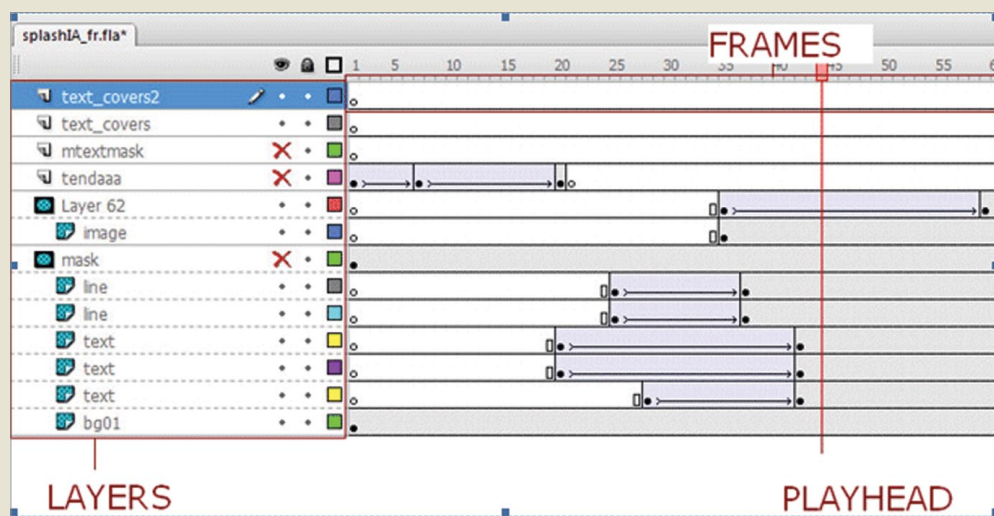
In addition, there are services which offer high-quality, interactive template solutions for e-learning professionals. E-Learning Templates³³ is a template market place that provides fully customizable Flash templates which are compatible with most authoring tools (e.g. Articulate, Captivate, Rapid Intake, Adobe Presenter).

Timeline-based tools

Timeline-based tools, such as Adobe Flash,³⁴ are widely used to create animations and robust interactive applications with their own scripting languages and timeline that organizes and controls content over time.

EXAMPLE: ADOBE FLASH USED FOR AN ANIMATED SPLASH SCREEN IN IMARK COURSES DEVELOPMENT

In the Flash screenshot below, content is organized into layers (see the column on the left side). Layers are positioned one after another, each containing a piece of content, images, text, etc. The central part represents an action divided into frames, each containing only a part of action. The playhead is an indicator of the frame currently visualized in the preview, where it moves from left to right along the timeline.



Object-based tools

Object-based tools build content using a set of ready to use objects that can be easily modified by changing their properties. Object library covers all screen elements, such as: forms, simulations, buttons, titles, textboxes, scenarios, etc

Object-based tools, such as SmartBuilder³⁵ or Course Lab, offer creative and flexible approaches to course design because they eliminate constraints imposed by templates. The authoring phase starts with empty on-screen real estate that is then populated by easily created, moved, resized or reused objects. However, object-based tools require more development time than template-based tools

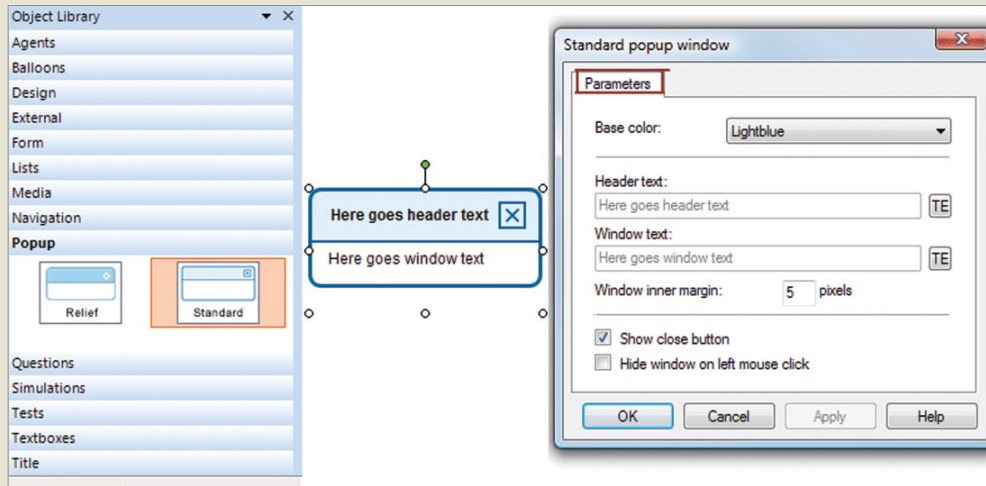
³³<http://e-learningtemplates.com/>

³⁴<http://www.adobe.com/products/flash.html>

³⁵<http://www.suddenllysmart.com/>

EXAMPLE: CREATION OF A POPUP WITH THE COURSELAB OBJECT LIBRARY

This example illustrates how to build a standard popup with the use of a popup object from the object library (Course Lab). A popup object is selected and dragged onto the screen. You can modify the objects appearance and behaviour by opening the object's property window..



7.4 SELECTING AN AUTHORIZING TOOL

There is no right or wrong authoring tool – the best choice is the one that meets your needs and best supports your instructional approach.

The best way to select an authoring tool would be to create a requirement sheet, grouping all prerequisites and functions that are required to support all instructional patterns.

If you opt for your own code-based authoring tool, this list may serve as the software requirements specifications. If you need to choose one or more off-the-shelf solutions, you can compare your requirements with the products' features. Almost all vendors give detailed descriptions of their product's main characteristics and components, organize demonstrations and offer trial versions.

The following are some important factors to consider when evaluating authoring tools:³⁶

- > **Editing/updating capabilities** – These can allow rapid editing through a content publisher. Fast editing and easier updating is time efficient.
- > **Development or product costs** – Your budget needs to cover proprietary license costs, hardware, infrastructure and deployment costs, or development costs, in the case of self-developed product. If the budget is tight, open-source authoring tools could also be considered.
- > **Delivery outputs** – Determine how an e-learning course is going to be delivered to end users. Authoring tools use one or more of the following outputs:
 - > LMS, if deployed on a learning management system. This output requires courseware to comply with SCORM technical standards;
 - > CD-ROM for stand-alone deployment;
 - > Web browser (interoperability should be considered);
 - > podcast;
 - > mobile devices; and
 - > MS Word – produces a printable version of reference materials.
- > **Learning curve** – This represents the amount of time needed to learn how to use the tool. Each tool requires time to understand how it works, its main characteristics, the actions it is able to perform, etc. While authoring tools reduce the time required to programme systems, they perform very complex tasks and therefore take some time to learn.
- > **Training opportunities** – You can learn about the tool through online guides, webinars, online support and forums. Also, many vendors deliver Web-based or on-site training sessions. With an internally developed authoring solution, prepare a well-documented training manual to allow other people to work with the tool.
- > **Integration** – This specifies whether a tool integrates well with leading LMS or/and other software, such as PowerPoint, or other media programs and tools.
- > **Creative freedom** – This is the ability to express and accommodate interactions, navigation elements, quizzes and other features into course design. Some tools without customization capabilities can impose constraints on your creativity.
- > **Team in charge of courseware production** – The number of team members, their expertise and their ability to handle different tasks are crucial factors in any selection process.
- > **Industry and community support** – Having available support is essential for troubleshooting, problem solving and getting useful tips. The more widely used tools are better supported by online forums and user groups, which provide free technical support to users, publish manuals and guidelines and organize Web seminars and online classes. Some examples of product communities or forums are: Articulate Community,³⁷ CourseLab Community,³⁸ and Rapid Intake.³⁹

Specialized reviews and e-learning research institutes perform exhaustive studies of all 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 guide;⁴⁰
- > Centre for Learning and Performance Technologies;⁴¹ and
- > Brandon Hall Research.⁴²

³⁶The list is not complete, as there may be other decisive elements to examine (e.g. localization abilities for multilingual content or mobile device output). Items are not ranked according to their importance.

³⁷<http://www.articulate.com/community/>

³⁸<http://www.courselab.com/db/cle/forum.html>

³⁹http://www.rapidintake.com/index.php?option=com_ccboard&view=forumlist&Itemid=110

⁴⁰<http://www.elearningguild.com/>

⁴¹<http://c4lpt.co.uk/Directory/Tools/instructional.html>

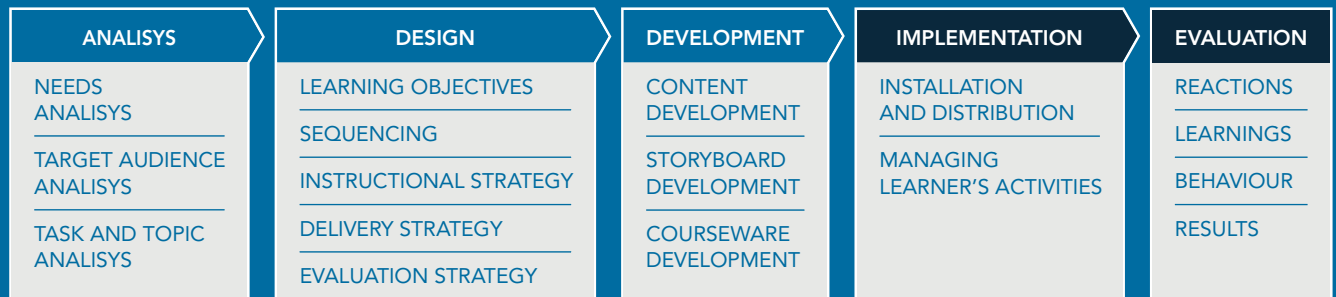
⁴²<http://www.brandon-hall.com/publications/LCRapidAT/LCRapidAT.shtml>

7.5 IN SUMMARY

KEY POINTS FOR THIS CHAPTER

- > Interactive e-lessons are created by the development team and assembled in courseware.
- > A number of authoring tools exist for producing courseware. Authoring tools are specifically designed for producing e-learning content without needing programming skills. However, media editors are usually needed to develop graphics and other media elements.
- > There are three main kinds of authoring tools: template-based, timeline-based and object-based. Compared with template-based tools, object-based tools offer more flexibility for content developers but require more development time.
- > When selecting your authoring tools, consider important factors such as team expertise, development costs, desired output, creative freedom and community or vendor support.

PART IV — MANAGING AND EVALUATING LEARNING ACTIVITIES



THE IMPLEMENTATION STAGE IS THE ACTUAL COURSE DELIVERY. THE COURSEWARE IS INSTALLED ON A SERVER AND MADE ACCESSIBLE FOR LEARNERS. IN FACILITATED AND INSTRUCTOR-LED COURSES, WHICH INTEGRATE CONTENT WITH E-TUTORING AND COLLABORATIVE LEARNING COMPONENTS, THIS STAGE ALSO INCLUDES MANAGING AND FACILITATING LEARNERS' ACTIVITIES.

EVALUATING LEARNING ACTIVITIES IS CRUCIAL FOR BOTH SELF-PACED AND FACILITATED ONLINE COURSES. EVALUATION ALLOWS YOU TO ASSESS LEARNERS' PROGRESS, THE QUALITY AND EFFECTIVENESS OF THE COURSE, AND IMPROVE FUTURE LEARNING ACTIVITIES AND CONTENT.

THIS SECTION WILL PROVIDE AN OVERVIEW OF ONLINE COLLABORATIVE LEARNING ACTIVITIES AND FACILITATION TASKS, AND HOW ASSESSMENT TESTS CAN BE USED TO EVALUATE LEARNERS' PROGRESS. THE SECTION WILL ALSO REVIEW LEARNING PLATFORMS WHICH CAN HOST YOUR COURSE..

8. COURSE DELIVERY AND EVALUATION



Clara has invited a new person to join the team. It's Sandra, an online tutor. Sandra 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 and evaluate learning activities. The chapter will introduce the following topics:

- > Structure of an online course;
- > Online facilitation tasks;
- > Using online communication tools, including social media (e.g. blogs, chat, podcast) for e-learning; and
- > Evaluating e-learning courses.

8.1 COMPONENTS OF AN INSTRUCTOR LED OR FACILITATED COURSE

Online facilitated and instructor-led courses are usually organized into sessions, which can be daily or weekly, depending on the duration of the course and on learners' available time.

The following are typical components of an online course:

- > Kickoff event
- > Pre-course learning activity
- > Cycle of learning events
- > Final assessment
- > Feedback and conclusion



> Kickoff event

The kickoff event introduces the course goals and the agenda. It should motivate the participants and provide an overview of the activities and methods that will be used through the course. This event can be an audio conference or a set of e-mails, and it can include a video or a podcast message.

> 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 be, for example, studying the first interactive lesson. It is very important that the initial learning activity makes a good impression on participants, since it will be their first experience with the course and will help them decide if they like the course or not. This is also a good opportunity for participants to get used to the online learning platform and for administrators to see if there are any technical problems.

PRE-COURSE PREPARATION IN A FACILITATED E-LEARNING COURSE ON ONLINE COMMUNITIES

A week before the course starts, a pre-course session provides a welcome message, the workshop agenda and some preparatory activities.

Course: Online Course: Introduction to Online Communities (20.11.06-08.12.06) - Windows Internet Explorer

http://www.collaborateandlearn.org/portal/course/view.php?id=8

Course: Online Course: Introduction to Online Co...

You are logged in as Eddie Learner

Virtual Workshop Introduction to Online Communities

C & L ► Array

Resources

- Discussions
- Purpose Checklist Wikis
- Learning Logs
- Case Studies Wiki
- Cybrary
- Glossary

People

- Participants

Online Users

(last 5 minutes)

Eddie Learner

Administration

- Profile

Pre-Course Preparation Welcome!

In these few days prior to the workshop, we are opening up the space so you can get oriented. You can tell us about yourself by filling out your profile and take some time to get comfortable with the site tools.

Please try to complete the following by Monday, 20 November:

- Listen to the Welcome Podcast
- Update your profile - click on your name in the "Online Users" section in the left navigation area to get started. Then click on the "edit profile" tab.
- Introduce yourself in the "Community Cafe", one of our ongoing discussions.
- If you have not done so already, please take the learning profile survey and post the results in the learning log we have set up for you. This is a good way to get used to making a post here in our Moodle space.
- Take the first IMARK lesson.

Podcast: Welcome to the Workshop

Learning Logs are a place for reflection, gathering workshop ideas, and smaller conversations between ourselves. They are a place to help us 'make sense' of what we are learning.

IMARK lesson: Online communities - new opportunities (15 min). You will need Flash Player 7 for viewing the lesson. In case you don't have it you can download it here.

The Weeks

- Pre-Course Week
- Week 1
- Week 2
- Week 3
- After the Course

Search Forums

Go

Advanced search

FAOTKN


- claraug
- Digital Juice DJTV Gallery
- Podcasting News
- neoluk
- Business | Don't bet against the internet | Economist.com
- Joomla! CMS - Templates





> Cycle of learning events (core)

The course consists of a series of learning activities that can be scheduled on a weekly or daily basis. Learning activities may include self-study as well as a range of individual and collaborative activities, such as:

- > Readings, 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-lessons.
- > Individual assignments and collaborative project work: The facilitator asks learners to conduct project work or an assignment, either in a group or individually. Learners also may be asked to comment on each other's assignments. An assignment should be well-structured and 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 SME.
- > Discussions initiated by the online facilitator: The facilitator can ask learners coming from different organizations or contexts to bring 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 track conversations so that online facilitators can review them afterwards and evaluate participants' involvement in the course.

EXAMPLE OF A DISCUSSION INITIATED BY THE FACILITATOR IN A E-LEARNING COURSE ON RURAL FINANCE

**Online Content & Discussions**
Please follow the order as indicated below. Read the text first. Then answer the related questions in the discussion forums.

 #1.1: Role of RAF in development and poverty reduction
 #1.2: Nature and causes of poverty in rural areas
 #1.3: History of agricultural lending programs
 Discussion #1.1 - #1.3



After reading documents on agricultural development and poverty reduction, learners are invited to answer some questions by considering their own country context and personal experiences.

Rural Finance (Philippines): History of directed agricultural loan programs - Windows Internet Explorer

http://www.collaborateandlearn.org/portal/mod/forum/discuss.php?id=549

Live Search

Rural Finance (Philippines): History of directed ag...

Search forums

Display replies flat, with oldest first

History of directed agricultural loan programs
by Rural Finance Facilitator - Tuesday, 22 January 2008, 12:02 AM

Are you aware of any directed rural agriculture loan programmes in your country? Please provide a historical analysis of these programmes and their impact on the rural people.

Reply

Re: History of directed agricultural loan programs
by Amachel Plaza - Tuesday, 11 March 2008, 01:41 AM

yes i am aware of the rural agriculture loan programmes, but i observe in our locality the government programs did not succeed why? its because of lack of monitoring or lack of manpower to supervise or even no strict credit discipline among beneficiary. the beneficiary thought that if the funds is coming from the government they think that it is ok if they cannot pay thier loans. as they obvee also that no one will be in prison if they did not pay thier loan.thats why the programmed of the government for the uplftment of the poor did not succeed.as an effect, the rural people still suffering from borrowing funds of higher interests.

Show parent | Reply

Re: History of directed agricultural loan programs
by Calvin Miller - Tuesday, 11 March 2008, 08:10 AM

Amachel,

Good response. From my limited experience in the Philippines, there were some good intentions of the government and then time to time politicalization in the rural loan programmes and that cuts all credit discipline as you have noted. It is better for the government to create the conditions for good governance, good infrastructure and good capacity building and let the banks, credit unions and MFIs do the savings and

Done

Internet | Protected Mode: On

100%

> Final assessment

Some e-learning courses include a final assessment of learners and some intersperse assessments throughout the course. Assessments can vary – they can consist of a set of questions (assessment tests) and/or be an evaluation of learners' final assignments made by the instructor.

> Feedback and conclusion

The last session of an online course usually includes the completion of an evaluation survey that will provide course designers and facilitators with feedback from participants. This is a very 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.

FEEDBACK AND CONCLUSION IN A FACILITATED E-LEARNING COURSE ON ONLINE COMMUNITIES

Once the course has finished, participants are asked complete an evaluation survey. They also have the opportunity to review course content, access additional resources and listen to the after action review, that is the analysis of what happened during the course and how things can be done better in the future.







8.2 PLANNING AND DOCUMENTING ACTIVITIES

Planning and documenting activities is essential in facilitated and instructor-led courses. Documentation will be used by facilitators as a guide to implement the activities and can be shared with learners at the beginning or throughout the course.

First, a course syllabus needs to be developed which describes session topics and learning objectives.





EXAMPLE OF A COURSE SYLLABUS FOR AN ONLINE FACILITATED COURSE

<div>Online Workshop</div> <div>Food Security: Information and Analysis for Decision-Making</div> <div> invent Capacity Building International Germany</div>	
Pre-Course Activities Wednesday - Monday, 22 - 27 April 2009 Before the course gets started on 28 April, please edit your profile and describe yourself and your work, take the first interactive lesson, and join the introduction forum.	
	Session 1 Dimensions of Food Security Tuesday 28 April 2009 In our first session we will look at the concept of Food Security and examine its multi-dimensional nature. Learning Objectives: <ul style="list-style-type: none">• understand the broad concept of food security;• understand the different dimensions of food security; and• identify the aspects of your job which relates to these dimensions
	Session 2 Food Security and Related Concepts Wednesday - Thursday, 29 - 30 April 2009 In this session we will look at the relationships between food security and other related concepts. Learning Objectives: <ul style="list-style-type: none">• understand the concept of vulnerability;• identify links between food security and hunger, malnutrition and poverty;• reflect on the situation in your country.
	Session 3 Key Data and Data Quality Monday - Tuesday, 4 - 5 May 2009 In this session, we look at the quality of data available for an analysis of the food security situation in your country, identify the weak points, and discuss the consequences of poor data quality. Following this analysis, you will have an opportunity to compare your situation with others in the workshop. Learning Objectives: <ul style="list-style-type: none">• undertake a critical reflection on the data quality of the FSIS in your country and identify weak areas;• compare this to the data situation in the different countries.

Based on the course syllabus, a storyboard specifies the activities that will be carried out and the materials that will be provided to learners in each session. In synchronous learning, such as e-conferences or virtual classrooms, special attention must be dedicated to the technology set-up requirements.

A Word document or an Excel spreadsheet can be used to develop the storyboard.

EXAMPLE OF A STORYBOARD FOR THE FIRST SESSION OF THE COURSE

Session 1	
Title:	Dimensions of Food Security
Time:	Tuesday 28 April 2009
	<p>In our first session we will look at the concept of Food Security and examine its multi-dimensional nature.</p> <p>Learning Objectives:</p> <ul style="list-style-type: none"> • understand the broad concept of food security; • understand the different dimensions of food security; and • identify the aspects of your job which relates to these dimensions <p>In case you didn't have time to go through Interactive Lesson #1 during the pre-course phase, please do this today as the lesson is fundamental to the course. Don't forget to introduce yourself in the introductions forum.</p> <p>Check the course bulletin for this session [link] sent to you by e-mail for more details.</p>
	<p>Start your Learning Log - Your Learning Log is a place for you to work on your daily assignments and allow for interaction with the class facilitator and your fellow students on your work in progress. Just click on the Learning Logs item in the left hand menu and then click the "Add a new discussion topic" button. Title it with your name. You can now make your first post for Assignment #1 (see below). To add to your log, return to your topic and reply to your last post. Feel free to change the subject line as you go!</p>
	<p>Assignment #1 – Reflection on your job</p> <p>Reflect on what you learned from Interactive Lesson #1 in the pre-course phase, and list the links you see between your professional experience and the multi-dimensional concept of food security in your Learning Log. In doing so, indicate how your job relates to one or more dimensions of food security.</p> <p>Take some time to visit the Learning Logs of at least two other students, and make some comparisons with your experience.</p> <p>Please upload your comments as soon as possible and before the start of the next session in order to allow other participants the opportunity to react to your Learning Log post.</p>
	<p>Discussion 1: Food Security Dimensions</p> <p>Join the discussion on Food Security Dimensions and tell us what new insights you gained by reflecting on your job. Let us know if you have questions or comments on the materials you have read, as well as any comments you have on other people's contributions.</p>

8.3 FACILITATING LEARNERS' ACTIVITIES

In collaborative online-learning, a group of participants creates synergy around common learning goals. The online facilitator is responsible for ensuring that this process is organized, stimulating and efficient. The online facilitator performs the following tasks:

- > provides information on tasks, deadlines and places to upload or download files;
- > accompanies participants during their work by checking workflow and individual or group results, composing working groups and interfering if necessary into group dynamics in case of conflicts or production blockades;
- > provides summaries at the end of units or phases;
- > answers questions concerning tasks, deadlines or use of learning tools;
- > motivates participants to produce, reflect, animatedly exchange ideas and initiate discussions;
- > assures links to other partners in the process (e.g. administrator, subject matter expert, technician); and
- > organizes the final evaluation of the e-learning event.

THE FACILITATOR'S CONTINUOUS PRESENCE

The online facilitator personalizes the online course, giving pace and rhythm to the learning event. The facilitator is the one who participants approach with any questions; therefore, he or she has to be available throughout the course and respond to questions as quickly as possible so that participants can proceed with their work and remain motivated.

The facilitator's continuous presence throughout the process is crucial to assure participants' motivation and reduce abandon rates considerably.

8.4 USING COMMUNICATION TOOLS FOR E-LEARNING

E-learning activities can be realized by using a range of communication tools – both synchronous and asynchronous. Some of these tools, such as wikis, blogs and chats, are called “social media” or “Web2” tools, because they have a strong social component and allow people to work together to create products, such as a project document.

The most common tools are:

- > e-mail based tools
- > discussion forums
- > wikis and other shared writing/editing tools
- > blogs
- > webcasting
- > chat and instant messaging (IM)
- > polling
- > whiteboard and screen-sharing tools
- > application sharing
- > audio and video conferences

These tools and their applications in e-learning courses are described below.

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, like chats or audio conferences, provide higher social presence. For example, in virtual classrooms, learners can use chats to offer comments and answer questions during the presentation.

Synchronous	Asynchronous
<ul style="list-style-type: none">> Chat and IM> Video and audio conference> Live webcasting> Application sharing> Whiteboard> Polling	<ul style="list-style-type: none">> E-mail> Discussion forum> Wiki> Blog> Webcasting

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. E-mail 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 can contain one or more discussions, which are comprised of one or more posts and replies.

How discussion forums can be used for e-learning

- > Forums are used for topic-specific discussions, case study collaborative work, post-class commentaries, etc.
- > Both learners and facilitators/instructors can leave messages, read and reply.
- > 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.

Wikis and other shared writing/editing tools

A wiki is a Web site which can be edited online. Unlike common Web pages, which are created offline and then uploaded to a Web server, wikis are edited "live". Users do not need any special technical knowledge to modify existing wiki pages or to add new pages.

The administrator of a wiki can specify who may view and edit the site or subsections of the site. The administrator can make the wiki open for anyone to use and edit, or restrict editing permissions to registered users.

How wikis can be used for e-learning

Wikis can be used by learners for collaborative work on the same document or to share ideas and resources on a topic.

Blogs

A blog (shortened from Web log), is a tool that allows people to share, access and easily update information, without having any knowledge of computer programming. Blogs were created to present content as a simple list of entries, just like a diary.

A blog allows users to easily post content onto a Web site 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.

What is the difference between a blog and a wiki?

Both blogs and wikis allow users to publish Web content "live" via a Web browser, without any knowledge of programming languages.

The difference between them is that:

- > blogs allow only a simple "diary-like" format; while
- > wikis do not impose any particular page structure, and allow users to create new pages and edit existing ones.

How blogs can be used for e-learning

- > Blogs allow sharing, accessing and easily updating information. Learners can use them for submitting their own assignments and for commenting on those of the other participants.
- > Participants can also use blogs as learning logs – a place for reflecting, gathering ideas and having smaller conversations among themselves. Blogs are a place to help participants "make sense" of what they are learning.

Webcasting

The term "webcasting" refers to audios and videos sent from a single source to multiple passive 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 programs 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. Audio can bridge literacy gaps, and the relatively small file sizes are easier to transmit in low bandwidth situations than video files.

EXAMPLE OF PODCASTING FROM THE FACILITATED COURSE "KNOWLEDGE SHARING FOR YOUR WORK"

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.

- [Click here to listen to podcast](#)

EXAMPLE OF A VIDEO LESSON FROM THE FACILITATED COURSE "KNOWLEDGE SHARING FOR YOUR WORK"

In the same course, a short video is used to introduce course topics.



Mini Lesson #1: Knowledge

In this video Patrick Lambe of Straits Knowledge talks about the different types of knowledge. Although he talks about them in the context of a Knowledge Audit, don't worry about what a Knowledge Audit is for the moment. Pay attention to the six types of knowledge that he describes.

Please click on play to watch the video (*right mouse click on the video for full zoom*). If you are using Mozilla Firefox as your browser, you will need to save the video onto your computer first before you can view it. [Save this video](#)



Alternatively, go to this website to view the video - <http://plambe.blip.tv/file/2045199/>

Chat and instant messaging

Instant messaging (IM) 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.

A group of people can start a text conversation online in a space commonly called a “chat room”. In a typical chat session, everybody sees all the messages. However, some chats allow private messaging between two session members.

How chat can be used for e-learning

- > 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 “break out” sessions where small groups of learners conduct their own meetings. This approach can be used, for example, for competitive problem solving, brainstorming, preparing debates with pro and con groups or developing alternative scenario resolutions.
- > Chat sessions have the advantage of keeping track of the textual dialogue in a discussion.

Polling

Instructors can ask learners to respond to a displayed poll, usually consisting of a question and two or more possible answers.

How polling can be used for e-learning

- > Polls can be used by the facilitator to collect learners’ opinions by asking them to vote on issues and make choices concerning course activities.

Whiteboard and screen-sharing tools

Whiteboards allow instant visual communication. They allow instructors to display content and learners to interact with that content.

How whiteboards can be used for e-learning

- > Instructors can use whiteboards for synchronous presentations, when content is changing right up the last minute and when the visual component is important (e.g. to brief about activities). The presentation can also be recorded.
- > Whiteboards allow two-way interaction. Learners 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 in a map, etc.

Application sharing

Application sharing lets the presenter share programs, windows or screens with learners. Learners can watch the presenter's actions and can take control of the display with permission from the presenter.

How application sharing can be used for e-learning

- > Instructors can use application sharing to teach a software procedure.
- > Application sharing should be used only for demonstrations which require simple movements, so as to not lose fluidity in the presentation.

Audio and video conferences

Audio and video conferences are audio and video sessions between two or more users at different locations, in real time. They are primarily used for meetings and project updates.

Some Instant Messaging applications incorporate video and voice conversations. Voice over Internet Protocol (VoIP) applications and services allow users to make high-quality, low-cost calls over the Internet. One of the most popular programs using VoIP is Skype. Skype allows free calls to other Skype members connected by their computers, and charges a small fee for calls to regular phones.

Telephones ensure better audio quality and are more reliable; VoIP is cheaper and easier when there are more than a few people talking.

How audio and video conferences can be used for e-learning

- > Audio conferences can have great application in mobile learning (i.e. through cell phones).
- > Audio conferences are well-suited for training topics where speaking and listening are crucial (e.g. language skills courses).
- > Recorded audio conferences can be made available as podcasts.
- > Video conferences emulate face-to-face experience and human presence.
- > Video conferences are particularly appropriate for training topics where visual clarity is crucial (e.g. medicine).
- > Video conferences require very fast network connections.

Virtual classroom

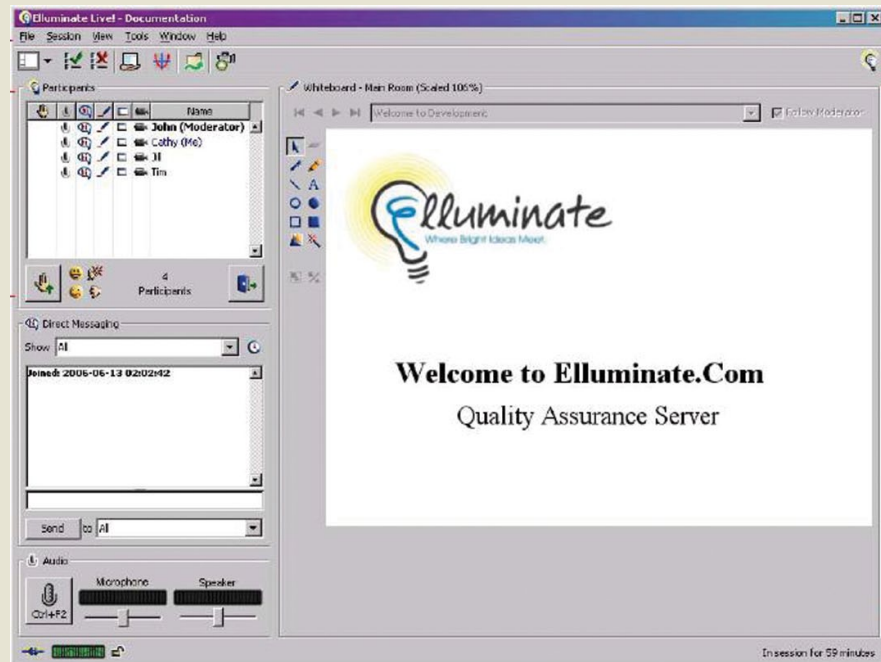
A virtual classroom mimics a traditional instructor-led classroom by integrating different types of synchronous tools, such as whiteboard, chat, audio conference or application sharing.

Most virtual classroom tools incorporate similar functions, although the screen interface may be different.

EXAMPLE OF VIRTUAL CLASSROOM FUNCTIONS

The largest portion of the screen is devoted to the whiteboard, on which the instructor can project slides and learners can write and draw using text and drawing tools.

On the left side of the screen, there is a participant window that shows the name of everyone attending the session, a set of tools to use for interaction (comparable to a traditional classroom, such as for raising hands), the instant messaging window to send messages to other learners and the instructor and the audio control for the microphone and speaker.



8.5 COURSE EVALUATION

As already stated in chapter 4, the evaluation strategy should be defined at the design phase of your e-learning project.

What is the purpose of the evaluation?

Evaluation can be done to accomplish specific evaluation purposes. First, you should decide if you 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
- > some time after the course has been implemented, to understand if it is still valid or needs to be updated or modified (confirmative evaluation).

Case study

A formative evaluation of the first IMARK module entitled “Management of Electronic Documents” was undertaken by FAO during the later stages of the development phase of the module. The evaluation focused on usability, media, content, and instructional design. Questionnaires with open- and closed-ended questions were submitted to learners, SMEs and IDs. The results of the formative evaluation were used to improve the module prior to the release of version 1.0.

After the first IMARK module had been available at least for two years, FAO and the Technical Centre for Agricultural and Rural Cooperation (CTA) undertook a confirmative evaluation. The evaluation focused on the uptake and use of the first IMARK module and used questionnaire-based surveys of learners, with additional inputs from distribution partners. The results of the confirmative evaluation were used to update the content for developing a new version of the module.

What can be evaluated?

According to the Kirkpatrick⁴³ model, evaluation can encompass four levels:⁴⁴

- > learners’ reactions
- > learning
- > behaviour
- > results

Evaluating **learners’ reactions** means understanding how those who participate in the program 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.

⁴³Kirkpatrick D.L. and Kirkpatrick J.D. (2006). *Evaluating Training Programs. The Four Levels*. San Francisco: Berrett-Koehler Publishers.

⁴⁴A 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: $ROI = \frac{\text{Net Programme Benefits}}{\text{Programme Costs}}$. See J.J. Phillips (1997). *Return on Investment in Training and Performance Improvement Programs*, Gulf Pub Co.

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

ASSESSING LEARNING

According to the type of learning objectives, 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 inside 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 options⁴⁵. 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 assignments 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.

Evaluating **behaviour** means understanding the extent to which participants' behaviour has changed because of the training program: 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 because the participants attended the programme. The final results can include increased production, improved quality, decreased costs, and fewer accidents.

⁴⁵See chapter 6 for guidance on how to develop practice and assessment tests for self-paced e-learning.

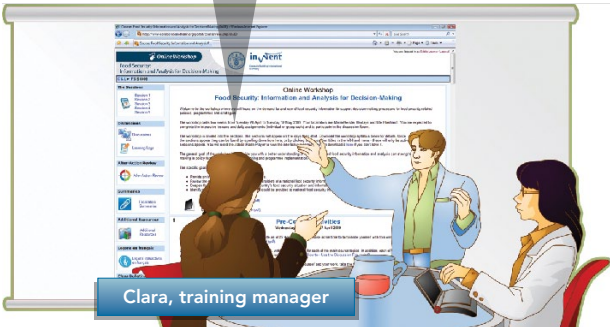
8.6 IN SUMMARY

KEY POINTS FOR THIS CHAPTER

- > Online facilitated and instructor-led courses can include the following components: a kickoff event, core learning activities (e.g. self-study, online discussions, group work, virtual classroom), final assessment, conclusion and feedback.
- > A course syllabus needs to be developed which reports sessions and learning objectives. A set of storyboards should detail the activities that will be carried out in each session.
- > Activities can be realized by using a range of tools, both synchronous and asynchronous, which are selected according to learners' preferences and technical requirements. Some of them, such as wikis, blogs and chats, are called "social" or "Web2" tools.
- > Evaluating learning activities is crucial for both self-paced and facilitated online courses. Evaluation allows you to assess learners' progress, the quality and effectiveness of the course, and improve future learning activities and content

9. LEARNING PLATFORMS

How will we make the courses accessible to learners?



Clara, training manager

Clara has to choose the platform for delivering the course.

She 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 to her organization to support the delivery of e-learning courses.

This chapter illustrates the different types of learning platforms which 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.

9.1 WHAT ARE LEARNING PLATFORMS?

A number of organizations and educational institutions use learning platforms to deliver and manage their learning processes.

A learning platform is a set of interactive online services that provide learners with access to information, tools and resources to support educational delivery and management through the Internet.

There are a variety of learning platforms with different levels of complexity, but their most important features include:

- > learning content management – creation, storage, access to resources
- > curriculum mapping and planning – lesson planning, personalized learning experience, assessment
- > learner engagement and management – learner information, progress tracking
- > tools and services – forums, messaging system, blogs, group discussions

Learning platforms are usually referred to as virtual learning environments (VLEs), learning management systems (LMSs) or learning content management systems (LCMSs). These terms are often used interchangeably, and despite differences between these platforms, they have many features in common.

Virtual learning environments, or VLEs, are used to simulate traditional face-to-face classroom activities and facilitate teaching and learning with a strong collaborative component. Examples of VLEs are Moodle⁴⁶ and Blackboard.⁴⁷

A learning management system, or LMS, solution facilitates delivery and management of all learning offerings, including online, virtual classroom and instructor-led courses. It automates the learning course and easily delivers training, manages learners and keeps track of their progress and performance across training activities, which reduces administrative overhead.

⁴⁶<http://moodle.org/>

⁴⁷<http://www.blackboard.com/>

HOW DO VLEs DIFFER FROM LMSs?

Basically, there are no functional differences between LMSs and VLEs, but the distinction comes more from the setting in which they operate. LMSs are primarily for training while VLEs are primarily for education.

For example, Moodle is considered to be an LMS within corporate e-learning, but it is referred to as a VLE in the education sector where it promotes a communicative and collaborative approach.

An LMS is used by training administrators to manage all aspects of learning and development, such as skill/competency, personal development plans, learning content management, reporting and workflow.

A VLE, instead, supports facilitated online learning within education institutions and allows tutors and students to share content. This means that VLEs do not necessarily contain all the content within them – they may only provide links to content outside.

VLEs are increasingly being adopted as LMS replacements; products like Moodle or Blackboard originally adopted for the education institutions are now widely used by the corporate market for online and blended solutions delivery.

Another type of platform – learning content management systems, or LCMSs – focuses mainly on creating e-learning content. In other words, developers and administrators create content material, such as articles, tests, games, video and small units of digital content (content chunks), which then are rapidly assembled, reused and tailored into different courses according to learners' needs. LCMSs reduce development efforts and allow digital content to be easily repurposed.

Both LMSs and LCMSs are designed to manage course content and track learner performance and learning objects, but they differ in their purposes. While LMSs manage and track online activities, classrooms and all sources and events, LCMSs do not manage blended learning, but only the digital content, even at its lowest levels.

These differences are summarized in the table below.

	LMS	LCMS
Benefits who?	All learners; organization	Content developers; learners who need personalized content
Primarily manages	Learner performance; learning requirements; learning programs and planning	Learning content
Manages e-learning	Yes	Yes
Manages traditional forms of training, such as instructor-led	Yes	No
Tracks results	Yes	Yes
Supports learner collaboration	Yes	Yes
Includes learner profile management	Yes	No
Allows human resource and enterprise resource planning (ERP) systems to share learner data	Yes	No
Schedules events	Yes	No
Offers competency mapping/skill gap analysis	Yes	No
Includes registration, prerequisite screening and cancellation notification	Yes	No
Creates test questions and test administration	Yes	Yes

	LMS	LCMS
Supports dynamic pre-testing and adaptive learning	No	Yes
Supports content creation	No	Yes
Organizes reusable content	Yes	Yes
Includes tools to manage content creation process (workflow)	No	Yes
Develops content navigation controls and user interface	No	Yes

Source: <http://www.brandon-hall.com/>

It is difficult to draw a fine line between these platforms. New generations of platforms are modular – they consist of “plug-ins” and “add-ons”, software components that extend platforms’ basic functionalities. For example, some LMS applications integrate plug-ins that extend performance management capabilities and support job competency databases, while others include content management capabilities for central storage of all forms of content (e.g. media assets, learning objects). Web 2.0 add-ons add social networking functionalities.

Finally, enterprise resource planning software companies (such as Oracle or SAP) tend to extend their human resource offerings with LMS components.

Hosted vs. internally handled LMS

LMS platforms, both proprietary and open-source platforms, can be hosted externally by a vendor or handled internally within the organization’s IT structure.

The table below shows some characteristics of both service models to consider when choosing a deployment modality option. More often than not, the chosen modality depends on whether an organization’s policy is flexible or strict.

	INTERNALLY HANDLED LMS	HOSTED LMS
LMS licence cost	per user	per user
LMS configuration and deployment	internally on-premises	off-shore hosted on the vendor’s server
Web site for LMS installation	required	not required, installed on the vendor’s site
Dedicated internal IT team	required	not required, the vendor’s IT team handles all IT activities
Technical knowledge required	requires substantive technical/programming knowledge	limited
IT support cost	high	low
Hardware & software cost (cost of scalability, reliability, fail over)	high, especially in case of stand-alone setup	low, costs are shared across customers
Maintenance & upgrade cost	high	much lower
LMS customization time	long	short
LMS implementation policy	strict	flexible

9.2 PROPRIETARY VS. OPEN-SOURCE LMS

Learning platforms exist as proprietary software or open source:

- > Proprietary LMSs are licensed under exclusive legal right, restricted from modification, further distribution, reverse engineering and other uses. They are closed-source with licence costs per user.
- > Open-source LMSs instead work under the terms of the GNU General Public License. The licence is intended to guarantee freedom to share and change the program and ensures that it is free for all users.

Open-source software packages in e-learning include LMS and LCMS platforms, as well as course and media elements authoring tools. 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.

LMS open-source initiatives are usually backed by non-profit associations and consortiums, such as: .LRN consortium,⁴⁸ Claroline Consortium,⁴⁹ and the Sakai Foundation.⁵⁰ The 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. 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 instance, Moodle offers themes that enable users to personalize the look and feel of the Moodle platform.

On the other hand, some code extensions are suitable only for clients with specific needs. As such, they are commercial and not covered under a free licence. For instance, a core community edition of the “eFront” platform has been significantly extended with various administrative and report tools. The newly extended version led to the creation of two commercial editions, Education and Enterprise.

Besides numerous advantages related to code modification and customization, open source packages have a few drawbacks. Although there is no licence fee, certain cost elements are usually ignored. First of all, open-source programs require a dedicated IT team with advanced technical and programming skills to handle set up, installation and customization (e.g. installation of database and operating system). In some cases, the total running cost of open-source LMS, including administration, support and maintenance costs, can even exceed the initial licence cost of proprietary LMS software.

	PROPRIETARY LMS	OPEN-SOURCE LMS
Licence fee	cost-based	no cost
Source code	encrypted, 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	owned by community
Ease of LMS implementation and deployment	fairly easy	can be very difficult and requires advanced technical skills
Client support/maintenance services	dedicated support services provided by vendor	relies on community forums, online documentation, development community
Support/maintenance cost	included in licence	paid support
Risk of product discontinuation	yes	no
Ease of customization	performed only by a vendor’s developers	assured, performed by freelance skilled developers according to specific needs. Strong link with end-user groups/communities who suggest changes and modifications
Release process	slow	rapid

⁴⁸<http://dotlrn.org/about/index>

⁴⁹<http://www.claroline.net/consortium/consortium.html>

⁵⁰<http://sakaiproject.org/sakai-foundation>

Based on their underlying instructional approaches, open-source LMS packages may be more suitable for education/academia, governments or business/corporate. In addition, some of them integrate social learning features that include chats, forums, RSS feeders and wikis (e.g. Sakai).⁵¹

Every year, leading experts in technology and market research (e.g. Brandon Hall Research,⁵² Bersin and Associates⁵³ or Forrester Research⁵⁴) issue the LMS knowledge base, with in-depth profiles of the whole e-learning industry. Such resources offer structured and proven methodologies and advisory tools that help organizations/institutions identify their own requirements when selecting an appropriate LMS.

9.3 MOODLE AND OTHER OPEN-SOURCE LMS SOLUTIONS

Moodle⁵⁵ is a widely used, free of charge, open-source learning platform.

Moodle promotes a collaborative approach. It was originally made for education, training and development environments to help educators create online courses with a focus on interaction and collaboration, although lately it has been extended to business settings as well.

Moodle has more than one million users and almost 50 000 registered sites around the world. Numerous modules extend its functionalities (e.g. graphical themes, authentication and enrolment methods, games and activities and resources). Moodle runs without modification on Unix, Windows, MacOS and many other systems that support PHP scripting language and a database compliant with SCORM and AICC standards. However, its installation requires certain technical proficiency of PHP technology.

MOODLE PLATFORM FOR "COLLABORATE AND LEARN AT FAO – VIRTUAL WORKSHOP: INTRODUCTION TO ONLINE COMMUNITIES"

Prior to the start of this course, participants are given access to the course space.



In the central area, where the course is actually taking place, participants find a list of tasks and activities to do. In this case, they are invited to introduce themselves or make their first postings to get used to the whole area. On the left, they are given access to the tools, such as Discussion Forum, Cybrary, Case studies Wiki and Learning logs, and can listen to the podcasts or take self-paced courses. Those listed in the section "People" are all workshop participants.

"The Weeks" (top right) shows a course structure divided by weeks. Each week has its own agenda and activities.

⁵¹<http://sakaiproject.org/>

⁵⁴<http://www.forrester.com/rb/research>

⁵²<http://www.brandon-hall.com/>

⁵⁵<http://moodle.org/>

⁵³<http://www.bersin.com/>

In addition to Moodle, there are other open-source LMS solutions:

Docebo (<http://www.docebo.org/doceboCms/>) - Three versions: Community (basic), Reseller, Enterprise. Customizable according to clients' specific didactic needs (i.e. cognitivism, constructivism and blended learning). Used in large companies and across the sectors: finance and insurance, health, government, universities and schools.

eFront (<http://www.efrontlearning.net/>) – Three versions: Community (basic), Educational, Enterprise. Visually attractive and highly expandable with various modules. Educational and enterprise extensions are enriched with more powerful administration, performance management and reporting features.

Dokeos (<http://www.dokeos.com/>) – Contains all features necessary for e-learning and blended learning. Available as: Free, Education, Pro and Medical editions. Dokeos E-learning Studio offers free resources, templates for rapid content authoring and a test builder, image gallery. Live collaboration through video conferencing, tracks learner progress, time and collaborative interaction. Language tool (DLTT) provides a workable language management tool.

Claroline (<http://www.claroline.net/>) – More for educational than corporate environments, this system allows teachers to build online courses and to manage learning and collaborative activities on the Web. Translated into 35 languages, it has a large worldwide users' and developers' community.

ATutor (<http://www.atutor.ca/>) - The "A" stands for Accessible and it has excellent support for key accessibility standards (Atutor, Acontent, ATutor social). ATutor social is a social networking module that allows ATutor users to connect with each other. They can gather contacts, create a public profile, track network activity, create and join groups and customize the environment with any of the thousands of OpenSocial gadgets available all over the Web. ATutor Social can be used as a stand-alone social networking application.

ILIAS (<http://www.ilias.de/>) - Provides testing and assessment tools as well as collaboration tools (e.g. chat and forums) and distribution technologies (e.g. RSS and podcasts). Learners can personalize their desktops and collect all resources needed to fulfil the daily learning tasks. The personal desktop features News, Personal Messages, Learning Resources, Personal Notes, Bookmarks, External Web Feeds and other information. A learner can rearrange these blocks of information according to his or her needs. Content management and authoring is limited to xml modules, glossaries and wikis.

OLAT (<http://www.olat.org/website/en/html/index.html>) – While it was developed by the University of Zurich, especially for public institutions such as universities, academies or colleges, it is also suitable for other businesses. It is Java based, Web 2.0 enabled, user-friendly and flexible; however, it is not easy to set up because of quite complex server requirements. It can handle more than 700 students simultaneously on one standard Linux server. If higher performance requirements for up to 30 000 users are needed, OLAT's fully scalable system allows it to be deployed on multiple servers. Users are able to set their own personal home portal, course structure and navigation. It contains an editor for simple OLAT courses with OLAT course elements. Won the "Leadership Award 2009" in the category "Best Open-source Learning Platform".

Sakai CLE (Collaboration & Learning Environment) (<http://www.sakaiproject.org/>) – This is a robust system for education based on collaboration and open sharing of knowledge. It includes features of LMSs and VLEs and contains a full set of "core" capabilities (e.g. blogs, calendar, forums, glossary news, wiki, RSS reader). Users can easily create rich and collaborative documents and share them with others using integrated Google-powered tools (Docs and Google Apps). Used by Yale, Stanford, Boston, Oxford, Berkeley and Cambridge universities and more than 350 small private and public colleges and universities.

.LRN (<http://www.dotlrn.org/>) – This is one of the world's widely adopted, open-source, full-featured applications for rapidly developing Web-based learning communities. It supports a variety of learning styles, ranging from traditional structured learning to group collaboration. Its customizable layout allows users to personalize learning space. It is built as a platform for "learning communities" rather than a narrow system for "course management" or online learning.

open Elms (<http://www.openelms.org/>) – This is flexible and robust, designed for corporate business. It is a complete e-learning solution which contains Jackdraw, a free e-learning creator. Courses created with this tool can be published onto any SCORM compliant Learning Management System.

Functionality matrix of open-source LMS (core packages)

FUNCTIONAL AREA	DOCEBO	EFRONT	DOKEOS	CLAROLINE	ATUTOR
Multilanguage support⁵⁶	✓	✓	partly	✓	
Easy to setup	✓	✓	✓	✓	✓
Programming language	PHP	PHP	PHP	PHP	PHP
Course management⁵⁷	✓	✓	✓	✓	✓
Reporting tools		✓	✓		
Content management⁵⁸	✓	✓	✓	✓	✓
Authentication	✓	✓	✓	✓	✓
SCORM 1.2 compliance	✓	✓	✓	✓	✓
Group setup and management	✓		✓	✓	✓
Course authoring			✓		✓
Communication tools⁵⁹	✓		✓	✓	
Modular	✓	✓	✓	✓	✓
Online assessment tools		✓			
Enterprise or Pro edition⁶⁰	✓	✓	✓		

⁵⁶Interface is available in many languages

⁵⁷Create, delete, modify course, assign it to learner, groups, create course category

⁵⁸Manage/import/upload content

⁵⁹Blogs, wikis, instant messaging, podcasting, etc.

⁶⁰Commercial versions of LMS

ILIAS	MOODLE	OLAT	SAKAI	LRN	OPEN ELMS
✓	✓	✓		✓	
✓	✓		✓	✓	✓
PHP	PHP	Java	Java	OpenACS	ASP/Java Script
✓	✓	✓	✓	✓	
	✓				
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	
limited		limited			✓
✓	✓	✓	✓	✓	
✓	✓	✓	✓	✓	
✓		✓	✓	✓	

9.4 SOLUTIONS FOR LIMITED OR NO CONNECTIVITY

Faced with technical constraints, such as very limited or no online access and an unreliable supply of electricity, organizations and institutions need to evaluate those solutions that will allow users to work with a lack of connectivity and limited information and communication technology (ICT) infrastructure.

Local-area network-based LMS

In cases with limited or no connectivity, a potential solution is to run an LMS on a local-area network (LAN) in the client-server architecture. In this model, a server provides resources or services, while client PCs request and retrieve content from the server via a computer network. In some rural secondary schools in Tanzania,⁶¹ students used a LAN configuration without Internet to access e-learning resources from their client PCs where the LMS application was installed. The local server would receive content updates from removable storage devices, like CD-ROMs, DVDs or memory sticks.

A constraint of using this approach is that it requires knowledge of client-server architecture.

Offline player possibilities for LMS

Offline players are another potential solution in cases with limited or no connectivity. These applications can download and play offline course content and track learners' progress and preferences. Learners can take the course without having to access the Internet. Once an Internet connection is established, it automatically synchronizes with the LMS and updates data. The offline players that have been tested are: Meridian,⁶² blackboard Agilix backpack⁶³ and Harbinger.⁶⁴

M-learning technologies

E-learning facilitated by hand-held devices, such as mobile phones, Palms, pocket PCs and personal digital assistants (PDAs), is called "m-learning". These technologies offer communication channels via e-mail, access to the Internet and voice and text messaging. Learning and teaching via mobile devices also is growing rapidly because they offer certain advantages (e.g. they are cheaper and easier to carry and handle than desktops and provide instant access to educational material). Learners can share lessons plans, exchange advice, opinions and tips or immediately apply their knowledge, such as in on-the-job and just-in-time training.

Interest in "anytime" and "anywhere" learning via mobile devices is growing rapidly in developing countries:

- > In West Africa mobile learning solutions are being spread to schools, corporations and government by a mobile dealer, Ad-Connect⁶⁵. The Ad-Connect platform that supports voice, pictures, text and audios was used in schools and pilot projects with Central University College in Ghana and University Nsukka in Nigeria. The system enables teachers to publish lecture notes, examinations and other material and to get feedback from learners directly.
- > Health workers in remote areas of Kenya⁶⁶ use mobile devices to obtain information about difficult cases of HIV/AIDS. They download tests and reference materials and go to the forum to make postings and exchange experiences with their colleagues.

⁶¹<http://www.waset.org/journals/waset/v54/v54-139.pdf>

⁶²http://www.meridianksi.com/products/mobile_lms/

⁶³<http://backpack.blackboard.com/Default.aspx>

⁶⁴<http://www.harbinger-systems.com/offlineplayer.htm>

⁶⁵<http://www.mobileafrica.net/2787.htm>

⁶⁶<http://www.infodev.org/en/Article.551.html>

- > In three districts in Punjab⁶⁷ province in Pakistan, participants, mostly women, engaged in a very interesting mobile-enabled post-literacy pilot project to reinforce their newly acquired literacy skills. After completing a basic literacy course, they were given mobile handsets and received nearly 600 SMS messages. They had to read messages, copy them into their workbooks and read them repeatedly. Finally, they would reply to the messages and answer questions. The whole programme was very motivating and their skills were significantly improved.
- > The Commonwealth of Learning launched the LIVES (Learning through Interactive Voice Educational System)⁶⁸ education system to deliver learning components via voice to multiple users over the existing telephony/mobile infrastructure. The system is able to assess user performance via stored numeric feedback from the users. It has full working LMS and LCMS features able to deliver and manage education materials and manage student profiles and progress.
- > Initially launched in Nigeria and Tanzania, Vodacom's mobile social network, The Grid,⁶⁹ has expanded globally, offering mobile chat and content-sharing features to their users and learners.

Despite the potential and capabilities of mobile devices, m-learning experiences are currently limited and fragmented because of some technological and pedagogical issues:

- > Their small size makes them easy to lose and damage.
- > It is difficult to input or scroll because of the small user interface. There is a lack of technical standards across platforms and mobile devices; e-learning is easier to deliver when mobile devices are more standardized.
- > There is a lack of appropriate instruction strategies.
- > No tools exist to evaluate the learning process.
- > Telecom infrastructure is undeveloped.
- > The cost of mobile devices can be a barrier to widespread use.

Approaches to working around these constraints include the following:

- > Optimize and downsize applications and Web sites for portable devices; eliminate multicolumn design with simple navigation and no graphics.
- > Adopt adequate instructional approaches and make m-learning more collaborative and learner-centred. Because e-learning content created for desktop devices cannot be delivered via mobile devices, m-learning is suitable for accessing knowledge, reminders, reviews and support; learning through play; or inquiring or constructing knowledge. Learners should be allowed to access and create content and communities of practitioners to exchange tips and best-practice solutions.
- > Elaborate evaluation and assessment tools in order to understand the learning process.
- > Bridge the Internet divide and lack of telecom infrastructure by using the initiative and efforts of mobile operators in the region. For example, the leading mobile operator in Angola offers quicker Internet access through Opera Mini software, and in Nigeria, Nokia's Ovi Life Tools give access to a wide range of healthcare, agriculture and education services and information, such as Learn English, in which learners acquire general knowledge or access exam results.

⁶⁷http://www.unesco.org.pk/education/documents/Project%20Brief%20Paper_ICT.pdf

⁶⁸<http://lives.cs.ubc.ca/>

⁶⁹<http://www.thegrid.co.za/>

9.5 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 provide learners with access to information, tools and resources to support educational delivery and management.
- > Learning platforms are usually referred to as VLEs (virtual learning environments), LMSs (learning management systems) or LCMSs (learning content management systems). These terms are often used interchangeably, and despite differences between these platforms, they have many features in common.
- > Learning platforms exist as proprietary or open-source software. Proprietary LMSs are licensed under exclusive legal rights, restricted from modification, further distribution, reverse engineering and other uses. They are distributed as closed-source programs with LMS licence costs based on a per user fee. Open-source programs, work under the terms of the GNU General Public License, which is intended to guarantee freedom to share and change the program, and ensure that it remains free for all users.
- > Solutions for low Internet connectivity can be considered, such as LAN (local area network)-based LMS, offline players and mobile-learning technologies.

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GLOSSARY

*Source: American Society for Training & Development, www.astd.org

- > **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 (Mbps).
- > **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.
- > **CD-ROM* (compact disc read-only memory or compact disc read-only media)**: A computer storage medium similar to the audio CD that can hold more than 600 megabytes of read-only digital information.
- > **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.)
- > **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.
- > **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, audio- and videotape, CD-ROM, online learning, audio- and videoconferencing, interactive TV, and FAX. 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) *:** Term covering a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio- and videotape, satellite broadcast, interactive TV, CD-ROM, and more.
- > **E-learning 2.0:** Refer to new ways of thinking about e-learning inspired by the emergence of Web 2.0.
- > **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.
- > **Flash*:** Software by Macromedia that enables designers to use simple vector graphics to create computer animations, which can be viewed by any browser with the correct plug-in.
- > **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.
- > **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 show 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.

- > **PDA (Personal Digital Assistants):** Also known as palmtop computer, it is a mobile device functioning as a personal information manager; able to connect to Internet.
- > **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 RLOs, 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*:** (noun) An outline of a multimedia project in which each page represents a screen to be designed and developed; (verb) To create a storyboard.

- > **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.
- > **Web 2.0*:** The use of Internet technology and web design to enhance information sharing and, most notably, collaboration among users. These concepts have led to the development and evolution of web-based communities and hosted services, such as social-networking sites, wikis, blogs.
- > **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 Internet Explorer or Netscape Navigator. 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.
- > **Wiki*:** A collection of web pages designed to enable anyone who accesses it to contribute or modify content, using a simplified markup language. Wikis are often used to create collaborative Web sites and to power community Web sites.

The following section summarizes some taxonomies and design tools presented throughout the guide.

— 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/ 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 critical aspects/tasks that should be improved with the target audience, for the overall goal to be accomplished?

Write the critical aspects/tasks here:

- 1.
- 2.
- 3.
- 4.
- 5.

Step 2: task classification

How are these tasks going to be accomplished?

Do tasks imply the mechanical execution of steps? [Y/N]

Do tasks require judgment and decisions to be taken for which some guidelines are required? [Y/N]

Step 3: breaking up the tasks

Describe each task and list the type of judgment, decisions or the steps that are required for each of the tasks. These represent how each task is accomplished.

TASK:	GUIDELINES / STEPS
Task description:	

Step 4: identification of required knowledge

What does the target audience need to know to make those judgments, take decisions or undertake steps?

TASK:	GUIDELINES/STEPS	REQUIRED KNOWLEDGE

— 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, David R.; Bloom, Benjamin S.; and Masia, Bertram 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 behavior after someone else.
Manipulation	The learner is able to perform certain actions by following instructions and practicing.
Precision	The learner refines his/her behavior, becoming more exact.
Articulation	The learner is able to coordinate a series of actions, achieving harmony and internal consistency.
Naturalization	Having high level performance become natural.

Adapted from: Dave, R. H. (1975). Developing and Writing Behavioral Objectives. (R. J. Armstrong, ed.). Tucson, Arizona: 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, aiming to perform 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) describe 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., Kemp J.E., 2001

E-LEARNING METHODS AND DELIVERY FORMATS

The following table summarizes the main uses and delivery formats of the various e-learning methods.

	METHOD	USED TO	DELIVERY FORMATS
Expositive methods	Presentations, case studies, worked examples, demonstrations	Facilitate knowledge acquisition (mainly conceptual and factual knowledge), orientation, motivation, attitudinal change	Simple learning resources (documents and PPT presentations)
			Interactive e-learning lesson
			Webcasting (video lessons and podcasts)
			Webinars (video conference, audio conference, chat-based)
			Virtual classroom

	METHOD	USED TO	DELIVERY FORMATS
Application methods	Demonstration-practise method	Develop procedural skills	Combination of animation and operational simulation
			Virtual classroom (using application sharing)
	Job aids	Provide just-in-time information and guidance	Printed documents such as checklists, technical glossaries, templates, manuals
			Online help and expert systems
	Case-based exercises	Develop job-specific cognitive skills	Interactive e-learning lesson
			Electronic simulation based on branched scenarios
			Individual tutored activity
			Online group activity
	Role plays	Develop interpersonal skills Stimulate attitudinal change	Interactive e-learning lesson
			Electronic simulation based on branched scenarios
			Online group activity
	Simulations and serious games	Develop deep understanding of complex system	Symbolic simulations
			Learning games
Collaborative methods	Guided research	Active knowledge construction	Discussion forum, e-mail, chat, audio and video conference Wiki, blog, shared documents
	Project work	Active knowledge construction	Discussion forum, e-mail, chat, audio and video conference Wiki, blog, shared documents
	Online guided discussion	Stimulate critical thinking and reflection Facilitate communications among learners Develop interpersonal skills Stimulate attitudinal change	Discussion forum, e-mail, chat, audio and video conference
	Collaborative work	Stimulate critical thinking and reflection Develop problem solving skills Develop interpersonal skills Stimulate attitudinal change	Discussion forum, e-mail, wiki, blog, chat, audio and video conference, shared documents
	Peer tutoring	Stimulate critical thinking and reflection Develop interpersonal skills Stimulate attitudinal change	Discussion forum, e-mail, wiki, blog, chat, audio and video conference, shared documents

[illegible]

A guide for designing and developing e-learning courses