

D7.1 TRAINING PROGRAMME GUIDELINES

WP7 - TRAIN: TRANSFER OF SKILLS AND KNOWLEDGE
FOR THE CONSTRUCTION WORKFORCE



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List of abbreviations

ABE	Association of Balkan Eco-Innovations
ACC	Acciona Construcción SA
BIM	Building Information Modeling
CAP	Cap Digital
CDE	Control Demeter S.L.
CSTB	Centre Scientifique et Technique du Batiment
CVUT	Ceske Vysoke Uceni Technicke v Praze
DRX	Draxis Environmental S.A.
EBR	Evrobrod D.O.O.
EC	European Commission
EIGD	Eiffage Infrastructures Gestion et Developpement
ENoLL	European Network of Living Labs
EU	European Union
FCE	Faculty of Civil Engineering, University of Belgrade
GA	Grant Agreement
HCU	Hafencity Universität Hamburg
ILT	Instructor-led training
LL	Living Lab
LMS	Learning Management system
LND	Lofotr næringsdrift
LUA	Lund Hagem Arkitekter AS
MGP	Metropole du Grand Paris
MNORD	Stiftelsen Museum Nord
MOOC	Massive Open Online Courses
NGEB	NGE Batiment
PCO	Plaine Commune
PENTA	Penta Ge.Co. Construction d.o.o.
RENO	Reno-Vest IKS
SEN	Smart Engineering S.L.
SGBC	Serbia Green Building Council
SIT	Sitowie
SKA	Skanska AS

TESIS	Tesis srl
UGE	Université Gustave Eiffel
UIT	Universiteit i Tromsoe – Norges Arktiske Universiteit
UPC	Universitat Politècnica de Catalunya
WP	Work package

RESPONSES TO REVIEWER'S COMMENTS

	Comments*	Section**	Summary of responses***
1	The connection with the intended training methods of the CIRCBOOST pilots remains rather loose, because the methods are described in quite generic ways with the help of terms like webinars, seminars, site visits, etc. The overall document does not quite correspond to its original target, because the given guidelines for pilots are not adequately specific. The later tasks T7.2 and T7.3 need to compensate for the lacks of D7.1.	<u>4</u>	<p>This document has been created as a reference guide for the learning methodologies and techniques available, so that each pilot can choose the most suitable option according to the content of the trainings they wish and are able to prepare, based on the work carried out in the pilots and WP4, as well as the time, personal, and financial resources available. In Task 7.2, each pilot developed a training plan outlining the sessions they intend to deliver in Task 7.3, including the content to be taught, the techniques to be used, and the resources required.</p> <p>To clarify the concepts and identify the most appropriate methodologies and techniques for each pilot based on the work carried out, the wording of the section has been improved, along with Table 8. Additionally, an example is provided for Pilot 1. Tables in pages 26-31 are been updated to a more specific content for each pilot.</p>
2	<p>The tables on pages 25-30 are a good way to present the main ideas of the project. However, the visual quality of the text on pages 25-30 is poor. As the document is a public report, the text should be well readable. Please improve the visual quality of pages 25-30.</p> <p>The meaning of the text is also partly unclear. Please make the text unambiguous and easily understandable for external readers. Please ensure that the reader is able to understand what is the overall object and what is the object of comparison when something is presented with the help of percentages.</p>	<u>4</u>	<p>Quality of tables on pages 26-31 (previous 25-30) are improved so the text is readable now.</p> <p>According to the recommendation of the expert, the full description of the text was written out the first time the acronyms appeared, and comparisons were introduced to clarify the content, also for percentages.</p>
3	Please, also ensure that the reader is able to understand the relationship of the intended CIRCBOOST BIM model idea with the models to be worked out for the real (LaMercedes) project. Please clarify	<u>4</u>	As this deliverable is related to TRAIN activities, this comment is addressed in WP3 deliverables, in accordance with the

	<p>what valorisation means in this context; please clarify the differences between reuse and recycling and building conversion.</p>		<p>discussions held with the coordinator and the leader of Pilot 1.</p>
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*Expert's comments addressed in the General Project Review Individual Report (HE) (14/03/2025)

** Section designation (e.g. 2.3.1) in which the comment is addressed

***Short answer on comment or suggestion

Executive summary

The aim of the present document is to provide a step by step, experience-based guideline that describes how best to address trainings and workshop for industry workforce and other key stakeholders.

This guideline will provide information and recommendations to pilots on developing and delivering training to industry actors based on their needs and interests.

This guideline is the result of the 6-months duration task 7.1 that started on M1 and is part of the WP7 TRAIN. This work package is focused on solving the identified needs to enhance knowledge transfer between technologies developed in EU project and its use on the benefit of EU society. Special attention should be paid to spreading the knowledge developed in CIRC-BOOST to the EU companies and workforce that could be interested. For this purpose, project partners involved in the pilots provided their contribution regarding stakeholders involved in their country and the most suitable training methodology to be implemented for the training session of each used/developed technology/process in pursuit of improving the competitiveness, resource independence and sustainability of the European construction industry.

1 Introduction

One of the goals of the CIRC-BOOST project is the production and delivery of training material to endow workers with the right skillset to deploy validated new technologies and processes developed by each pilot, by setting up a thorough offer of training material for different training methodologies that will systematically provide them with practical knowledge and guidance.

To ensure that the solutions demonstrated in pilots will be integrated and used by EU industry, the project will support construction and design companies in educating and training their workforce to optimally use the new technologies as part of the WP7 TRAIN.

CIRC-BOOST training programme is developed to directly transfer knowledge to the construction industry to catalyse immediate market uptake of the developed integrated solutions. Additionally, workshops and physical trainings will be leveraged to gather stakeholder's feedback on the solutions under development.

This guideline will serve to lead the preparation of concrete guidelines on how to deliver training to industry actors based on their needs and interests. The guideline will be shared with all project pilots, which will be able to adapt the training practices to their local industries. The project will develop at least two types of training materials:

- i) Theoretical and practical knowledge on how to integrate circular solutions economies in construction value chains and the related economic benefits in the form of presentations, webinars and e-learning formats (i.e. an online MOOC on selective deconstruction of existing buildings to facilitate reuse and recycling of C&DW and resources will be developed).
- ii) Step-by-step instructions on how to adopt the integrated solutions developed during the project, which will also include in person demonstrations that show how to actually adopt the technologies, directly instructing construction work force, such as engineers, machinery workers, designers, etc. All the material developed will be either produced or translated in the local language of the five regions.

The recommendation present in this document will help pilot partners to develop a suitable training plan and material to achieve project's results, settled in >1000 construction workers participation.

2 Training

Training differs from education. Training is concerned with increasing knowledge, skills and abilities of the employees in doing a particular job, it is vocational in orientation and is given at the factory or at workplace. Education, on the other hand, is aimed at enhancing general knowledge and motivating the recipient to understand the total environment. The difference between training and education becomes difficult to identify when, in certain cases, training and education are imparted at the same time. Employee development programs conducted by certain organizations fall in the same category and are very wide in scope.

In this particular case, CIRC-BOOST WP7 training actions are focused on sharing the knowledge generated on the techniques used in the pilots among construction employees. Even if different Universities are part of the consortium and they will also introduce students to those last edge technologies, the target audience for which this guideline and training actions should focus on, are **construction workforce and other industrial professionals.**

The best types of employee's and professional training methods may include:



Figure 1 - Best types of professionals training techniques and methodologies. Image taken from <https://www.edgepointlearning.com/blog/top-10-types-of-employee-training/>

2.1 Training methodologies

2.1.1 Instructor-led training (ILT)












Instructor-led training is the traditional type of employee training that occurs in a classroom, with a teacher presenting the material.

This can be a highly effective method of employee training, especially for complex topics. Instructors can answer specific employee questions or direct them to further resources. They also allow for highly skilled instructors to match the training level and style to the employees in the room.

However, instructor-led training does have some drawbacks, including cost and time to implement. It can also be unnecessary for concise topics.

In the following table, some of the advantages and disadvantages of face-to-face training are presented:

Table 1 - Face-to-face training advantages and disadvantages.

Advantages	Disadvantages
 <p>Employees can ask questions.</p>	 <p>High cost of implementation in terms of time and money</p>
 <p>Highly trained instructors can adapt their presentations to the skill level and personality of the class.</p>	 <p>Inconsistent messaging and teaching style of instructors</p>
 <p>Possibility for brainstorming or role-playing groups.</p>	 <p>Time away from work</p>
 <p>Employees get a chance to learn from each other.</p>	 <p>Interruption to employee's daily task.</p>
 <p>Better use of time for highly complex information</p>	
 <p>Employees' attention is more engaged with the material.</p>	
 <p>Can help students feel more valued</p>	

2.1.2 eLearning









eLearning, on the other hand, refers to any training that takes place online, anywhere and anytime. Online learning relies on online videos, tests, activities, and images in training. Employees can do their training right in any available device, such as smartphone or on their company computers.

It's one of the easiest types of employee training to roll out to larger populations, especially for employees who are remote or have high-turnover rates. With interactive games, tests, videos, activities, or even gamified components, it can also go a long way towards keeping employees engaged with the training. eLearning provides different advantages for companies gathered in Table 2.

Upcoming eLearning technologies promise even more immersion for your employees, including:

- ✓ Augmented reality
- ✓ Virtual reality simulations
- ✓ Interactive videos
- ✓ Mobile learning
- ✓ Gamification
- ✓ Geofenced training areas
- ✓ Personalized learning paths

Table 2 - eLearning training advantages and disadvantages.

Advantages	Disadvantages
 Saving money, in terms of development hours, travel costs and employee time away from work.	 Students can be distracted from the objectives of the course due to flashy graphics or animations.
 Taking less time away from an employee's workday (40-60% less time than ILT training).	 Become outdated unless active revisions are part of the training design process.
 Flexibility to access training when and where possible. Suited for employees who are remote, traveling or have high turnover rates.	
 It allows learner to pause training, reread information or test out of information they already know.	
 Creating personalized custom eLearning solutions that can be tailored to better match the specific learner.	
 Better for specific and concise topics.	

Advantages presented in the previous table are best accessed when the online course is:

- ✓ Focused on a single, accessible topic, such as software demo that could be one of the possible trainings arise in this project.
- ✓ Concise, to-the-point and organized in small chunks to enhance learner attention and discourage skimming.
- ✓ Enhanced, but not distracted, by visuals, animations and activities.






Both face-to-face and eLearning training methodologies must focus on the core principles of instructional design and concisely communicate information to learners

2.1.2.1 Learning Management system (LMS)

For an online learning management, there are available virtual systems that allows the administration, distribution, and evaluation of scheduled training activities, known as Learning Management systems (LMS). Their objective is to make it easier to manage the activities or content of an e-learning process, anywhere and anytime.

There are different types of LMS platforms. Generally, two main groups can be distinguished according to their license of use: **licensed LMS platforms** and **Open Source LMS platforms**.

Table 3 – Learning management system characteristics and examples

	Description	Available Platforms
Licensed LMS platforms	<ul style="list-style-type: none"> ✓ A subscription is required for their use. ✓ It is not necessary to install any platform or program on the devices, but rather all the resources are available on the company's servers. ✓ Depending on the characteristics of the contracted plan, it can be adapted to the relevant needs. ✓ These are usually platforms that provide great flexibility and adaptability 	 Blackboard
		 SumTotal Systems
Open Source LMS platforms	<ul style="list-style-type: none"> ✓ Those platforms that do not require a license for their use. ✓ Anyone can install, modify, and use them free of charge. ✓ They have fewer restrictions than licensed LMS platforms. ✓ Are used as an open educational resource 	 Moodle
		 Chamilo E-Learning & Collaboration Software
		 Sakai

There are numbers of [LMS platforms available](#) worldwide. When choosing an LMS, there are some considerations that one should have in mind. In general, all of them should have:

- a registration system,
- a course or training catalogue,
- a reference library where to find the points to be studied,
- a follow-up of the work of the people being trained,
- evaluations (both external and self-evaluations),
- statistics, to get an overview of how teaching is working with this method,
- learning support.

LMSs are a valuable tool for in-company training. Below, some advantages and disadvantages of their application are presented:

Advantages of an LMS

- ✓ **Organization:** the larger the company and the more employees/professionals involved in training, the easier it is to organize with an online system that centralizes everything we need.
- ✓ **Control:** LMS administrators have full control of the system at their disposal, so they are aware of everything that happens in the system.
- ✓ **Monitoring:** with different mechanisms, it makes the evaluation of individual learners much easier and more effective.
- ✓ **Flexible:** being online, we can involve students working at other sites in the same system, or we can let them do the learning tasks when they have a gap in their daily work rather than imposing a timetable on them.

Disadvantages of LMS

- ✓ Requires technological and computer skills. Not having these skills can reduce the effectiveness of LMS systems.
- ✓ Depending on the subject or content to be covered, it may not be the best learning system.
- ✓ Requires access to technological resources.
- ✓ Flexibility is two-fold, as it also requires discipline and dedication to get the most out of the platform.

2.1.2.2 Massive Open Online Courses (MOOCs)

One of the possibilities to afford an eLearning training are these free online courses for anyone to enroll. MOOCs provide a flexible and economical way to learn new skills (for upskilling¹ or reskilling² workforce) and deliver quality educational experiences at scale. The main difference between an online course and these MOOCs models, is that the latter is designed to run with no trainer involvement, to tend to cover basic concepts and use mainly videos and quizzes.

According to Kennedy, J. (2014)³, there are two distinct MOOC models, and they attract different audiences, use different learning approaches and employ different teaching methods:

- ✓ Connectivist (cMOOC): where the pedagogical structure of the MOOC model incorporates a social, distributed, networked approach and significant learner autonomy that is geared towards adult lifelong learners interested in personal or professional development.
- ✓ Stanford Artificial Intelligence model (xMOOC): uses a more conventional directed instruction for specializations based on university courses that are transmitted through an open online space. Their purpose is to obtain a certificate at the end of the course.

Usually, these courses consist of traditional class material made accessible online, which may include recorded video lectures; readings; problem sets; online quizzes and examinations; interactive learning modules; and interaction with other students via forums.

Typically, each MOOC will include a course provider and a course platform. A course provider is often a university, which supplies the course materials and instructors. Platforms such as: [EdX](#), [Canvas](#), [Coursera](#), [Udacity](#) or [FUN \(France Université Numérique\)](#), provides the technological infrastructure for course modules, user access and other learning resources.















The followings are some of the best platforms for MOOC online courses:

¹ Upskilling: employees learning new skills and relevant competencies needed for today's work environment as well as for the near future. Focuses on improving employees' skill sets, usually through continuous training programs (classroom-based instruction, online learning, mentoring, coaching, and workshops), to help them advance in their jobs.

² Reskilling: employees learn new skills to move into a different job role within the organization or to meet the new demands of a current role. It typically occurs when an employee's previous tasks or responsibilities become irrelevant, often due to advances in technology or skill gaps.

³ Kennedy, J. (2014). Characteristics of Massive Open Online Courses (MOOCs): A Research Review, 2009-2012. Journal of Interactive Online Learning, Volume 13 (1), pages 1-16.

Table 4 – Examples of MOOCplatforms available

 edX	 Coursera	 Udemy
 Udacity	 FutureLearn	 Skillshare
 LinkedIn Learning	 Khan Academy	 Iversity
 Kadenze	 The Open University	 Pluralsight
 France Université Numéri...	 DataCamp	 Open Yale Courses
 BitDegree		

2.1.3 Blended learning

Another training methodology used is the blended learning. The most attractive facet of blended learning is that combines ILT and eLearning and boost the benefit of both options, to save time and money, while increasing overall employee engagement. Trainer would decide how to proceed between the online and face-to-face sessions, regarding the course content, objectives to be achieve and trainees' skills and situation.

Table 5 – Advantages of blended learning.

ADVANTAGES	<ul style="list-style-type: none"> ✓ Flexibility for students and instructors. Mainly in heavily online modes. ✓ Personalized pace of learning ✓ Availability of information: Material shared on an online platform is always available anytime and anywhere. ✓ Improvement of communication skills: the versatility of the method helps in the development of communication and social skills. Trainers can host zoom meetings, chat-room sessions, online discussions, and even organize traditional meetings for this purpose. ✓ Cost-effective: for learners as well as organizations. It will involve the cost of commuting, accommodation as well as classrooms. ✓ Boosts engagement: Since learning is operating on two fronts, students and employees engage in more productive work on various levels. The organizations can make use of webinars, zoom-calls, and group discussions and boost interaction and engagement. ✓ Easy management and supervision: as it is in online mode, it is easier to store, track it and monitoring each student progress. ✓ Dynamic learning experience: it could be a very dynamic experience as is real-time interaction. There are brain-stimulating online exercises. Trainees engage in collaborative activities and learn team-work, they also learn how to work collectively and to pursue success as a team.
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Table 6 – Disadvantages of blended learning.

DISADVANTAGES	<ul style="list-style-type: none">✓ Misjudgment in choosing the right model: The model should be determined by the kind of trainees (and their skills) that are going to take up the course. There should be a balance between the online as well as offline stations to ensure a smooth flow of learning experience.✓ Poor tech skills: before enrolling the course, it should be ensured that learners are well versed in basic computer skills and have an internet connection and all-time accessibility to the study-material.✓ Poor time-management: Since students have more control in blended eLearning, time-management is a crucial quality. Assignments, tests, and quizzes should be scheduled and conducted in such a manner that students do not get a chance to neglect their work. Student monitoring is important to check their progress.✓ Disinterest: If the course relies heavily on the online mode, students can easily get distracted and eventually lose interest. Thus, interactive sessions should be made a crucial part of the course. Students should be kept motivated and frequent teacher-students discussions are a great way of doing that.
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For a successful implementation of blended model of learning, there are some tips that should keep in mind:

- ✓ Devise a plan considering learners and instructors' preferences.
- ✓ Define the course funding. Although eLearning is comparatively cheaper, it still requires a proper financial source to survive.
- ✓ Create the online content offered in the course: More interactive and interesting the lessons are, easier it would become for students to learn, and more learners would be attracted.
- ✓ Choose the perfect [LMS](#) for course management.

2.1.4 Simulation employee training

Simulation training is most often provided through a computer, augmented, or virtual reality device. Despite the initial costs for producing that software or technology, however, simulation training can be a necessary option for employees/professionals in riskier or high-stakes fields. Usually, this kind of training is focused for pilots or doctors, but it can be useful for other employees too.

This type of employee training is also highly effective and reliable, allowing employees to progress consistently and at their own pace.

Table 7 – Advantages and disadvantages of simulation trainings.

ADVANTAGES	DISADVANTAGES
Computer-based training programs are easy to use.	These programs require trainees to be computer literate.
They can often be customized.	They require trainees to have computer access.
Suitable for helping employees develop and practice new skills.	There is little or no interaction with a trainer; if trainees have questions, there's no one to ask.
Useful for refresher training. They apply to self-directed learning.	These programs are not effective at teaching "soft skills," such as customer service, sales, or sensitivity training.
Cost-effective for large numbers of employees, as they can use the same equipment and program.	They are not the best choice for new or one-time training. Trainers need to live interaction to ensure new skills or concepts are being communicated. Trainees need to be able to ask questions and receive feedback.
Flexible: trainees can learn at any time anywhere.	Some poorly designed programs are "boring" and result in trainees having a low retention rate of the material and a low finish rate.
Some programs are interactive resulting in greater comprehension and retention	
They are measurable. Trainees progress monitoring is possible. Most programs have post-tests to evaluate the understanding. Test scores give trainers statistics for training evaluations	

Some examples of platform that deal with this kind of learning technique are [LUMINOUS](#), [PIXO](#) or [FUTURE VISUAL](#), among others.

2.1.5 Experiential learning

This kind of learning methodology is focused on employees' and professionals' individual needs. Experiential learning is a **hand-on type of training** that helps employees understand key information by directly performing the task or skill at hand. It is directly applicable to the employees' jobs. Hands-on training can help employees fit perfectly into their upcoming or current role, while enhancing their current skills.

Experimental learning focus on learning by DOING instead of PASSIVE LEARNING models.

This is a time-intensive method of employee training, however, that is best used when there are enough resources available to support employees during the program.

There are four identified components of experiential learning:

1. Concrete experience: Active involvement in the experience
2. Reflective observations: Analyzing the experience.
3. Abstract conceptualization: Drawing conclusions and evaluating what students have learned.
4. Active experimentation: Implementing what has been learned.

Also known as learning in the flow of work, experiential learning is an opportunity to revolutionize how companies train their employees and develop leaders from within.

Studies show that offering repeated opportunities for practice of new information and skills vastly improves learning, both in the quantity of what is learned and the quality of the application. The information retention by practice after two weeks doubles the retention by just studying written material (68% for the former vs 29% for latter).

Coaching or mentoring can share similarities to hand-on training, but in this case, the training is focus on the relationship between a trainee and a more experienced professional, such as their supervisor, a coach, or a veteran employee.

The one-on-one mentoring style creates a relationship between employees that carries far beyond training. This training method can be done in person or virtually, through online coaching sessions.

For all its benefits, mentoring is costly in terms of employee hours and should be used appropriately to reduce those associated costs. Coaching—bringing in a trained professional—can sometimes provide a more time-efficient alternative, but without the relationship building that's so valuable in mentoring.

2.2 Training Techniques and Means

When designing a course, there are too many tools that can be implemented in order to prepare a more interactive sessions, both online and in-person trainings. According to the content to be presented, the trainees' skills, characteristics and the available resources, the following techniques can be distinguished:

- ✓ **Blackboard or whiteboard:** even if it could be the most “old-fashioned” method, it can still be useful, especially if you invite trainees to write on the board or ask for feedback that you register on the board.
- ✓ **Video portion:** lectures can be broken up with [video](#) portions that explain sections of the training topic or present case studies for discussion.
- ✓ **PowerPoint® presentation:** this [presentation software](#) is used to create customized group training sessions that are led by an instructor. This method is one of the most popular lecture methods and can be combined with handouts and other interactive techniques. It replaced the **overhead projector** method.
- ✓ **Storytelling:** [Stories](#) can be used as examples of right and wrong ways to perform skills with the outcome of each way described. This method is most effective with debriefing questions, such as:
 - How does this story relate to training?
 - How did the main character's choices make you feel?
 - What assumptions did you make throughout the story? Were they correct?
 - What would you have done differently?

This technique makes communication easier since it is non-threatening with no one right answer. It is cost-effective, especially if trainers have their own stories to tell. Stories can also make sessions more personal if they involve people trainee's know-how. There can be also find many training stories online.

- ✓ **Lectures:** are perfect for getting big chunks of information to a large employee population, lecture-style training can be an invaluable resource for communicating required information quickly. The main problem is that in many cases, lectures contain no form of interaction from the trainer to the trainee and can be quite boring. Studies show that people only retain 20 percent of what they are taught in a lecture. Here are several ways to ensure as a trainer, that the audience is engaged throughout the session:
 - Train yourself in the art and science of public speaking.
 - Prepare sessions using interactive methods.

There are many ways that you can break up training sessions and keep trainees attentive and involved, including:

- ✓ **Quizzes:** for extended, complicated training, stop periodically to administer brief quizzes on the information presented to that point. Trainees will stay engaged to improve their pre-quiz scores on the final quiz. Further, motivate participants by offering awards to the highest scorers or the most improved scores.
- ✓ **Small group discussions:** Break the participants down into small groups and give them case studies or work situations to discuss or solve. For the right group of employees, group discussions and activities can provide the perfect training option. It allows multiple employees to train at once, in an environment that better fits their current departments or groups. These discussions and activities can be instructor-led or facilitated by online prompts that are later reviewed by a supervisor. This type of employee training is best used for challenges that require a collaborative approach to complex issues, such as **problem-solving learning**, where trainees may solve a problem posed them. One of the basic characteristics of this method is that the student is not provided with all the relevant information, and that a fundamental part of his or her learning consists of finding that information and applying it to the problem posed.
- ✓ **Project-based learning** is a group work or individual learning method based on the development of a feasible project. The initial phase of a project is always its design, and it is this phase that is developed in this method. Project-based learning is frequently used in business and administration schools. Students are asked to design the implementation of an improvement project for the institution or company for which they work. Project-based learning requires the trainees to gather and assimilate information, analysis and planning, risk management, resource allocation and, in general, all the aspects of a project. The trainer's work is to guide students, supervision and revision of the work plan, and evaluation of what has been achieved.
- ✓ **Case studies:** case studies can provide a quick way for employees to learn about real workplace issues. Employees can read through these at their own pace, or while working in a team-building session with other employees. Case studies are a great option for focused topics, but more complex topics will likely require more advanced types of employee training. This is an excellent way to capitalize on this type of adult learning. By analyzing real job-related situations, employees can learn how to handle similar situations. They can also see how various elements of a job are working together to create problems and solutions (problem solving cases or decision-making proposals).

A training technique that can be considered as case study and group discussion and activity, and it is shown to be very useful to engage audience and keep them interested in the content are the **LIVING LAB** concept:

Living Labs (LLs) are open innovation ecosystems in real-life environments using iterative feedback processes throughout a lifecycle approach of an innovation to create sustainable impact. They focus on co-creation, rapid prototyping & testing, and scaling-up innovations & businesses, providing joint-value to the involved stakeholders. In this context, living labs operate as intermediaries/orchestrators among citizens, research organizations, companies, and government agencies/levels. Within a wide variety of living labs, they all have common characteristics, but multiple different implementations.

In this context, in the European Union, a community network ENoLL ([European Network of Living Labs](#)) was launched to promote the Living Labs concept in order to influence EU policies, enhance Living Labs and enable their implementation at a global level.

Other break up techniques to keep trainees attentive and involved, could be:

- ✓ **Active summaries:** create small groups and have them choose a leader. Ask them to summarize the lecture's major points and have each team leader present the reviews to the class. Read aloud a prewritten summary and compare this with participants' impressions.
- ✓ **Q & A sessions:** informal question-and-answer sessions are most effective with small groups and for updating skills rather than teaching new skills. For example, some departmental procedure changes might easily be handled by the supervisor's short explanation, followed by a question-and-answer period and a discussion period.
 - **Question cards:** during the lecture, ask participants to write questions on the subject matter. Collect them and conduct a quiz/review session.
 - **Role-playing:** by assuming roles and acting out situations that might occur in the workplace, employees learn how to handle various conditions before they face them on the job. Role-playing is an excellent training technique for many interpersonal skills, such as customer service, interviewing, and supervising. Like other group activities, role-playing is highly effective but may be unnecessary for simple, straightforward topics. It also requires more employee time, potentially taking time away from an entire department while they're going through the training.
 - **Participant control:** create a subject menu of what will be covered. Ask participants to review it and pick items they want to know more about. Call on a participant to identify his or her choice. Cover that topic and move on to the next participant. This method can be less structured, and trainers will need to ensure that all necessary information is covered.
 - **Demonstrations:** whenever possible, bring tools or equipment that are part of the training topic and demonstrate the steps being taught or the adopted processes.
 - **Other activities:**
 - Create a personal action plan.
 - Raise arguments to issues in the lecture.
 - Paraphrase important or complex points in the talk.

It is important to prepare and think on an interactive session, as they keep trainees engaged in the training, which makes them more receptive to the new information. They make training more fun and enjoyable. They provide ways for veteran employees to pass on knowledge and experience to newer employees and they can provide in-session feedback to trainers on how well trainees are learning. The chosen techniques have to facilitate the achievement course objectives and ensure that the students assimilate the corresponding contents.

On the contrary, it is true that these interactive sessions can take longer because activities, such as taking quizzes or breaking into small groups, are time-consuming.

2.3 Creating employee training programs for your workplace

When designing training programs for internal employees or external professionals, there are two possibilities to afford this task: sub-contract training design to local /online experts or select internally a training responsible that would have the challenge to prepare and design the training concepts and material for the company.

For the latter cases, here there are some tips for creating employee/professional training programs for a company effectively:

- ✓ **Create interactive training content:** To overcome the traditional culture of monotonous PowerPoint slides and conventional learning methods, create an interactive training using the techniques already presented in [section 2.2](#). Interactive learning focuses on learner engagement which leads to higher productivity and performance. To make courses more interactive, take into account to:
 - Create visually appealing training videos by including rich graphics and high-quality images with new, simple-to-use [video training software platforms](#).
 - Incorporate an interactive element on each slide.
 - Add digital storytelling to your courses.
 - Include interactive 360° images and videos.
 - Create simulated environments where training mimics real-world situations for learners to practice freely.
 - Use training gamification techniques by incorporating certain gaming elements into your learning programs.
 - Ask questions and encourage discussions.

- ✓ **Leverage Workplace Training Software:** employee training software and corporate learning management systems are leveraged to deliver online employee training experiences. The adoption of a training software is recommended. These tools allow, as previously mentioned, to create training modules efficiently and securely deliver them to the employees, track employee engagement with the training materials, analyze performance, and give feedback. It is an all-in-one tool to deliver effective training to your workforce.

A [digital adoption platform](#) (DAP) is a training software that integrates with your enterprise applications in order to help the user learn while working on the application itself. DAP uses interactive walkthroughs, videos, and self-help menus to guide users through every aspect of the application. This allows new hires to be onboarded and trained on all software tools crucial to their job, as well as continuously having their skills developed with contextual and just-in-time learning features.

- ✓ **Set employee training goals:** identify the purpose of a training program: what do you want to accomplish with a particular training program – Improve employee performance? Address a knowledge gap? Teach a new skill?

It is important to identify the purpose of your training for creating and setting realistic employee training goals and objectives. Your organization's training goals are measurable outcomes that learners are expected to achieve by the end of a training program. Setting goals is a key responsibility of managers to offer their employees some guidance and motivate them to attend the next training program. To define clear and measurable goals, consider using the SMART goals framework (specific, measurable, achievable, relevant, and time-based).

- ✓ **Segment training programs:** for more effective employee training, it is critical for organizations to turn their training platform into a scalable, collaborative network that provides individualized learning tied to every employee's performance. Segmenting training programs based on business units helps in scaling and facilitating employees' learning and business activities. Here are a few ways to segment your training programs:
 - By language: people understand and retain information better when studied in their native language.
 - By age: different generations prefer different learning styles. For instance, Gen X might prefer traditional instructor-led training programs and written manuals, while millennials prefer interactive video training accessible.

- By skills: specific skills training is grouped based on what skills employees need to improve or develop.
- By role: role-based training segmentation groups employees according to their position, their department, and their responsibilities within an organization.

Invest in personalized online learning tools (DAP) with algorithms that gather information on your employees and suggest learning activities based on that information.

- ✓ Measure training effectiveness with employee surveys: training effectiveness measures the impact of a training program on the employee's knowledge, skills, and performance. In addition, measuring training effectiveness is also an important tool to boost employee engagement and retention as it demonstrates a positive impact of training. Measuring training effectiveness via anonymous employee surveys and feedback forms would be helpful for evaluating your training success.

For a more detail information about **How to design a training course**, please check [ANNEX A](#).

3 ACCIONA training platform

[ACCIONA](#), as an international company with an historic presence in more than 60 countries all over the world and with more than 40000 employees, is aware of the importance of a constant upskilling and reskilling of its workforce to keep in the [top 5 of the construction companies](#), so, it creates different learning concepts for its workforce and also for future young talent such as:

- ✓ [ACCIONA Academy](#): Last July 14th (2023) finalized the 6th Acciona Academy edition (Spanish editions). This program, implemented also in other countries, gathered 40 university students in a 2weeks-duration online training. During the program, students were able to learn more about ACCIONA and its businesses thanks to the *Learning by Doing methodology*, a learning process based on the professional experience of the Company's leaders. In addition, this edition had additional dynamics that complemented the learning process such as:
 - Workshops on soft skills for a professional success.
 - Professional orientation sessions, holding individual interviews with them to identify their professional interests and facilitate their career.
 - Smart Cities Challenge: a project and learning sessions based on innovation, creation, creativity and solutions for sustainability and innovation.
- ✓ **Training Catalog**: for company's workforce, different online training sessions are gathered split in different knowledge areas:

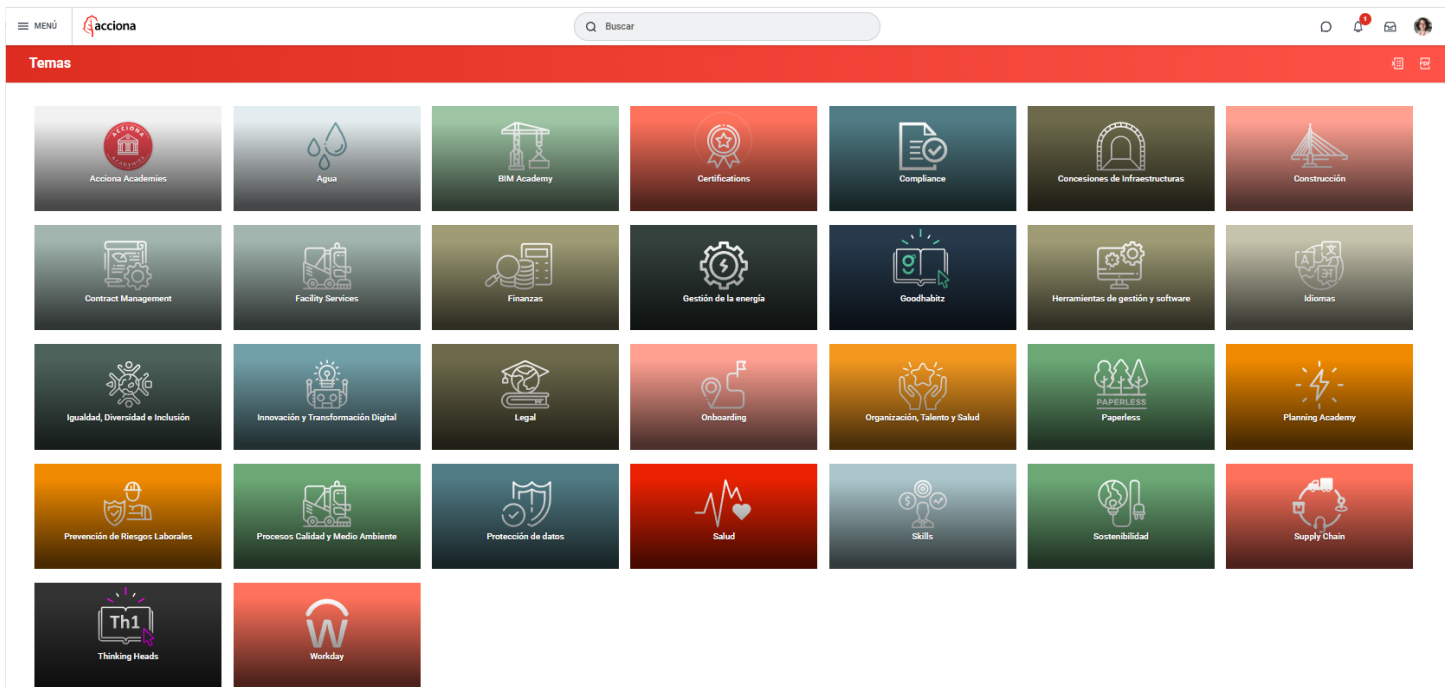


Figure 2 – Example of ACCIONA’s training catalog for its workforce

The company counts with more than 1400 courses combining online and blended training methodologies. The sessions are prepared in different languages (Spanish and English, but also Polish and Portuguese).

- ✓ **MASTERCLASSES:** ACCIONA prepared different masterclasses sessions for specific concepts and interests’ areas, as per example, healthy and mindfulness sessions to improve workers health.
- ✓ **Knowledge Navigator:** ACCIONA promote this tool that make it easier for employees to share our knowledge based on real experiences on real site projects.

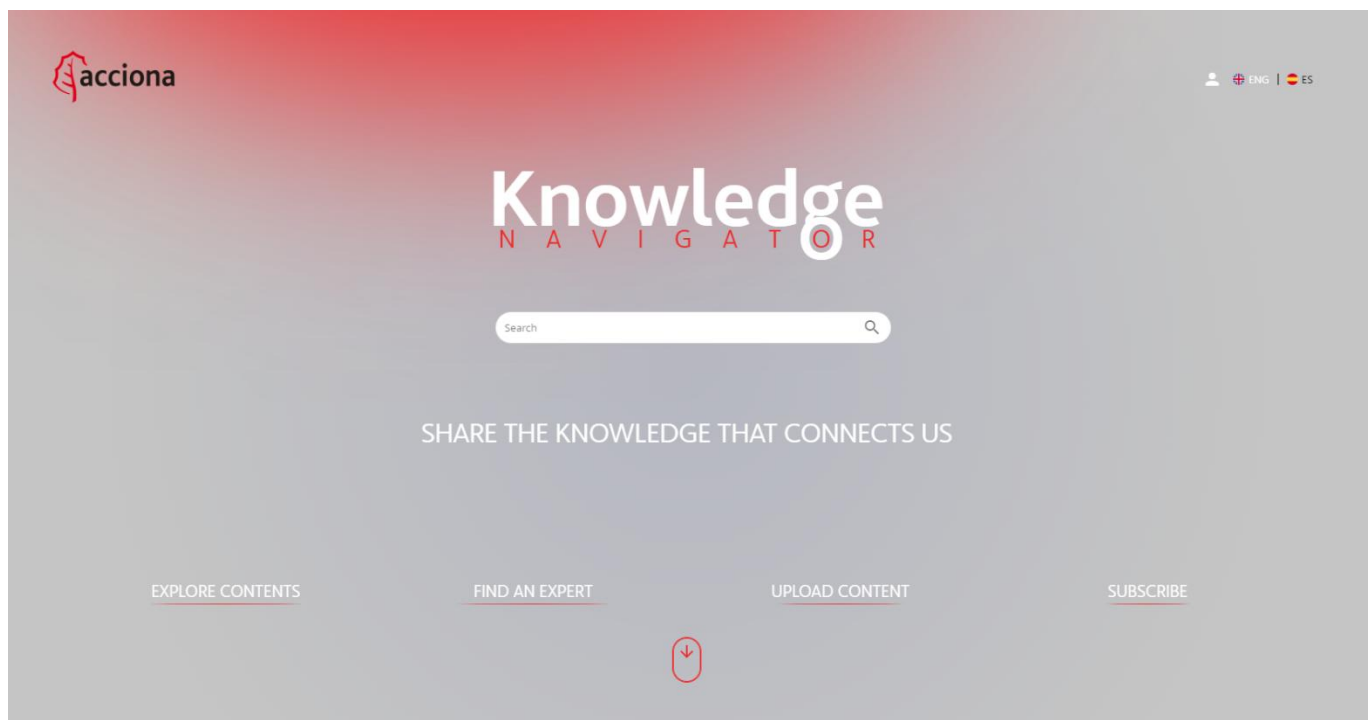


Figure 3 – Example of ACCIONA’s Knowledge NAVIGATOR tool interface.

This tool contains different contents regarding all the business that compose ACCIONA company: water, construction, concessions and management areas. Inside each content, more detailed knowledge areas can be distinguished.

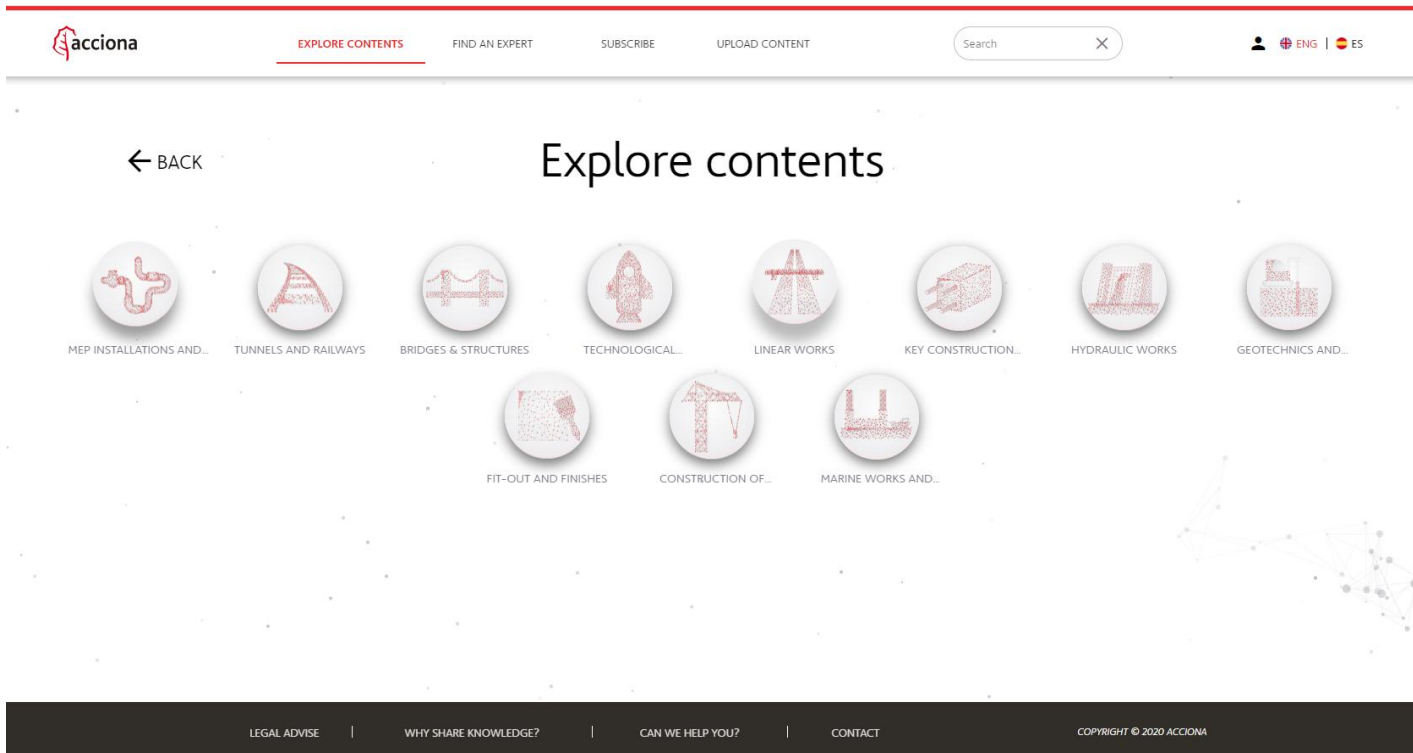


Figure 4 – Example of ACCIONA’s Knowledge NAVIGATOR Construction area content.

4 CIRC-BOOST Pilot’s training models

WP7 Kick-off meeting was held on July 26th. In that meeting, general concepts regarding work package objective, tasks, timing, and deliverables to be submitted were presented. In the meeting, an Excel file where all the relevant information (recovered from the GA and the KoM presentations) and stakeholders for each project pilot that are susceptible to be in a training course (as a content or trainee) was gathered as a baseline to have homogeneous information from all the pilots.

The updated version of this common database is upload to WP7 folder in [RDlab document management platform](#), with all the involved partners’ comments and suggestions.

Each pilot has its particular characteristics, technologies developed, and constructions techniques used. The following table compiles an overview of the local target audience, stakeholders and the most suitable techniques according to the works developed within each kind of activities expected within the pilots, such as: soil contamination, digital platforms and construction stage.

Table 8 – General summary of target audience, local stakeholders and suitable training methods of CIRC-BOOST project pilots.

	TARGET AUDIENCE	LOCAL KEY STAKEHOLDERS	SUITABLE TRAINING METHOD
New techniques and processes such as, soil contamination or recycling processes, for example	Construction companies, Civil engineers, Urban planners, Excavation and waste managers, Workers	Municipalities, building owners and operators, demolition and construction companies, and architects and designers associations	Workshops, coupled with visits of sites (when possible), face-to-face trainings. Site visit. Guidances.
Digital platforms (BIM or 3D web map)	Construction companies, Platforms managers, Civil engineers, Urban planners, Waste managers, Workers, Architectural firms, Universities		Guidance, workshops, MOOCs
Construction stage: pilot's particular characteristics	Construction companies, Civil engineers, Universities, precast concrete manufacturing companies, workers, Architectural firms. Material suppliers, tire factory and recycled tire factories.	Construction companies, Universities, concrete suppliers, logistic companies	Guidances, workshop, Living-Labs, real site demonstrations, webinars, seminars, face-to-face training, online sessions
General public (Sustainability and circularity process related in each pilot)	Residents, universities	Environment-focused NGOs, student associations	Webinars, workshops, site visits

The target audience of the aforementioned training courses are mostly employees and professionals of the construction sector. Regarding the most feasible training techniques to be used, both face-to face and eLearning trainings are the most appropriate ones for the pilots. According to each one's activities, partners would select the most suitable methodologies to train in their activities, according to the recommendations shown on the previous table and each particular facilities and resources available to carry out training action. For example, Pilot 1 combines soil decontamination activities, different construction processes with the possibility to site-visit, but also digital platforms. According to these actions, the most appropriate methodologies to implement by Pilot 1 partners would be:

- Face-to-face training
- Workshops, summer schools or seminars
- Site visit

Due to the growing importance of sustainability and circular-economy concepts, it is considered important to include a “General” audience for residents, universities, and authorities in each pilot country to present the work done in each case and the benefits for the society that the work carried out by each pilot will bring. Due to the variety of audience knowledge, a general divulgated content will be the most appropriate.

In the next task 7.2 that started on M7, training contents, techniques and methodologies will be decided in each pilot. Also, each pilot will define who is responsible for training material development and training sessions performance. For this reason, individual pilots’ meetings will be scheduled once this guidance is submitted and shared with all involved partners, to define the most appropriate training sessions in each pilot, sharing knowledge and resources for similar technologies used (such as BIM technology). There could be an opportunity to prepare training sessions in common between CIRC-BOOST and other Sister Projects, to boost the used/developed technologies in different EU countries.

For the boosting of the training sessions and events related, we will count on ABE partner support as leader of WP8, WP dealing with Communication & dissemination of the project. They will help WP7 to achieve the Key Exploitable Result (KER) planned for this work package, that is: *Training and capacity building deck used for training >1000 construction professionals and universities in 5 EU countries*, by promoting different sessions in the project’s social media.

In the following sections (4.1-4.6), each pilot’s particular information is presented:

- Technologies developed or used within CIRC-BOOST.
- Innovative techniques (when applicable) are used within CIRC-BOOST.
- Target audience for a training program.
- Suitable training method to carry out the training program regarding the developed technology and the possible audience.

4.1 PILOT 1: Spanish pilot – la Mercedes Barcelona

Spanish pilot – la Mercedes Barcelona					
Project partners	UPC	CDE	ACC	SEN	TESIS
Stakeholders involved	Conren Tramway	Spanish investor, developer and manager backed by a group of committed private and institutional investors			
	Battleiroig (BIR)	Planning, Landscaping and Architecture office			
	ELISAVA	Barcelona School of Design and Engineering			

PILOT OBJECTIVE	Design of a 100% car-free urban space of 185,000 m ² with a rich industrial heritage, designed for the well-being of people and to respect the environment.
CIRC-BOOST PROJECT OBJECTIVE	Development and deployment of novel BIM-Based selective demolition and decontamination techniques for: 1) Full traceability and 2) Valorization (decontamination for its use again) of > 90% of the recovered demolished material.

PILOT STAGES	DEVELOPED TECHNOLOGIES	ACTORS INVOLVED	LOCAL KEY STAKEHOLDERS	SUITABLE TRAINING METHOD
Demolition stage	BIM ¹ -based Digital Twin	Construction companies, Civil engineers, Universities, Architectural firms.	Architectural and designer associations, concrete associations, local authorities	Workshop, summer school, seminars, online sessions, site visits
	Phytoremediation and electrokinetic techniques for soil decontamination and reuse	Workers, skilled technicians, construction companies, Universities, excavation and demolition companies, waste treatment companies.		
Design stage	BIM model + Life Cycle Assessment +MIVES ² for selective deconstruction and demolition	Construction companies, Civil engineers, Universities, precast concrete manufacturing companies, workers, Architectural firms.		
Construction stage	Wireless sensor and NFC ³ tags for material traceability			
General	Sustainability and circular economy. Benefits of the project for the society	Residents, Universities	Environment-focused NGOs, student associations	Webinars, Workshops, Living labs

¹ BIM (Building Information Modeling) is a working methodology that allows the creation and management of digital models of construction projects.

² Acronym for 'Integrated Value Model for Sustainable Assessment'.

³ Near Field Communication, a variant of RFID technology, which allows communication between two devices with an exchange of data.

Reuse: use again the construction element taken from the site in a new site. Recycling: The process of converting waste into a material that can be use again. Building conversion: Building conversion is the process of changing the use of an existing building for a new purpose.

4.2 PILOT 2: French pilot – Plaine Commune Paris region

French pilot – Plaine Commune Paris region								
Project partners	CAP	EIGD	NGEB	SIT	CSTB	PCO	MGP	UGE
Stakeholders involved	Not specified							

PILOT OBJECTIVE	Digital and physical platforms to facilitate matching supply and demand for materials and waste for 9 towns of Plaine Commune.
CIRC-BOOST PROJECT OBJECTIVE	<p>The overall aim of the pilot is to:</p> <ol style="list-style-type: none"> 1) Develop a platform facilitating the matching between supply and demand for materials and waste, allowing for a better identification of construction waste deposits and regional needs. 2) Explore innovative construction processes that enhance the value of materials obtained from deconstruction 3) Structure the materials and waste upcycling sectors resulting from the deconstruction of buildings.

PILOT STAGES	DEVELOPED TECHNOLOGIES	PARTNERS INVOLVED	TARGET AUDIENCE	SUITABLE TRAINING METHOD
Demolition stage		CSTB, PCO	Construction companies, Civil engineers, Urban planners, Waste managers, Workers	Guidances, MOOC
Platforms circular innovations	Experimentation of new transformation and recycling processes - new ways of material reuse from urban quarry	UGE, NGEB, SIT	Construction companies, Platforms managers, Civil engineers, Urban planners, Waste managers, Workers	
Platforms usage	Physical platform to facilitate storage, reconditioning, recycling and recovery of waste from deconstruction and rehabilitation sites. Digital platform that enables to localize construction waste and offer a marketplace to exchange those materials	EIGD, PCO, CSTB, SIT	Construction companies, Platforms managers, Civil engineers, Urban planners, Waste managers, Workers	
General	Sustainability and circular economy. Benefits of the pilot project for the society	UGE, MGP, EIGD, PCO	Residents, local authorities, Universities, Public procurers	

4.3 PILOT 3: Serbian pilot – 3R Pilot House

Serbian pilot – 3R Pilot House				
Project partners	FCE	EBR	PENTA	SDA
Stakeholders involved	Several companies that offer prefabricated, ready-made houses to the market			
	ASES	Association of Structural Engineers of Serbia		
	FACULTY OF ARCHITECTURE	University of Belgrade, FACULTY OF ARCHITECTURE		

PILOT OBJECTIVE	Demonstrate possible application of different structural elements and solutions developed by FCE and industrial partners, by upscaling them "horizontally" from laboratory to the real environment and "vertically", from individual parts to the functional system, a house.
CIRC-BOOST PROJECT OBJECTIVE	To increase deployment and market uptake of innovative climate-neutral circular solutions for the Serbian construction industry by demonstrating: 1) Reduce of natural sources, Recycling of waste materials and Reuse of structural elements. 2) Implementation of material efficiency, optimization methods and disassembly concept.

PILOT STAGES	DEVELOPED TECHNOLOGIES	ACTORS INVOLVED	LOCAL KEY STAKEHOLDERS	SUITABLE TRAINING METHOD
Design stage	Connection between structural elements suitable for fast assembling and disassembling	Construction, demolition, design and precast companies, Universities, Architectural firms. Material suppliers, tire factory and recycled tire factories.	Precast house manufacturers, local authorities, schools of architecture and engineering, associations of engineers, end users (large hotel corporations, fast food companies, different attendant facilities in the industry)	Workshop/seminars, Living-Labs, webinars, face-to-face and online sessions
Construction stage	Recycled aggregate concrete precast walls, old masonry brick panels, recycled tire rubber as seismic isolation, eco composite steel-concrete deck, Modularity-based moment-resisting frame system made of reused steel			
Operational environment testing	On-site testing, monitoring and durability performance of the 3R ¹ house			
Demonstration	Assembling and disassembling in 3 days to demonstrate ease circularity.			
General	Sustainability and circular economy. Benefits of the project for the society	Residents, Universities	Environment-focused NGOs, student associations	Webinars, Workshops, Living labs

¹ 3R house because they use: reduce, recycle and reuse concept for its design and manufacturing.

4.4 PILOT 4: Norwegian pilot – Gaia Vesterålen museum

Norwegian pilot – Gaia Vesterålen museum				
Project partners	Museum Nord	UIT	LUA	RENO
Stakeholders involved	Sortland municipality			
	Demolition company			
	Structural designers (through LUA)			

PILOT OBJECTIVE	Demonstrate an entire circular process “from demolition to construction” in the Arctic region of Norway deploying leading construction technologies and solutions for the region.
CIRC-BOOST PROJECT OBJECTIVE	1) make accessible methods for deployment and market uptake of innovative solutions to design and manufacture for disassembly, waste prevention and management, reuse and recycling in the construction sector. 2) Increase recovery and recycling rate of construction and demolition waste by 40% compared to the current situation. 3) Increase the upcycling of reused and recycled material in construction materials, products and buildings. 4) Increase knowledge of the environmental footprint of buildings and construction materials, including integrated materials and energy efficiency and trade-offs and synergies. 5) Emphasize the use of local resources for raw and recycled and reused materials.

PILOT STAGES	EMPLOYED TECHNOLOGIES	ACTORS INVOLVED	LOCAL KEY STAKEHOLDERS	SUITABLE TRAINING METHOD
Demolition stage	Use of innovative methods to precisely evaluate and minimize the quantity of concrete labelled as contaminated	Construction companies, Civil engineers, workers, on-site skilled technicians.	Municipalities, building owners and operators, demolition and construction companies, and architects and designers associations	Workshop/seminars, webinars, seminars, online sessions
	Selective demolition and sorting of recyclable (non-contaminated concrete) and contaminated concrete.	Workers, on-site skilled technicians, construction and concrete companies. Waste management companies.		
Production of quality RCA stage	Modern machinery and crushing and sorting techniques, certification and properties evaluation.			
Construction stage	Logistics connected to RCA ¹ transportation and concrete mix adjustment	Construction companies, Universities, concrete suppliers, logistic companies		
General	Sustainability and circular economy. Benefits of the pilot project for the society	Residents, local bussiness, Universities	Webinars, Workshops, Site visits	

¹ Recycled concrete aggregate.

4.5 PILOT 5: Czech pilot – Modřanský Cukrovar (MOCU)

Czech pilot – Modřanský Cukrovar (MOCU)		
Project partners	SKA	CVUT
Stakeholders involved	Skanska Residential	Developer

PILOT OBJECTIVE	Modřanský cukrovar is one of the first residential districts in the Czech Republic that takes care of water, greenery and living culture. The project consists of several residential buildings as well as infrastructure, services, green zones and a small square. Sustainability is carried throughout the campus - from its location on a brownfield to the use of recycled materials during construction to energy-saving operation.
CIRC-BOOST PROJECT OBJECTIVE	The overall aim of the pilot is the implementation and demonstration of sustainable and circular solutions in a residential project with the specific objective of deploying: 1) Structural building elements made of recycled aggregate concrete (RAC); 2) Facade panels made of recycled aggregate concrete; 3) Accessory elements made of recycled concrete 4) Low carbon concrete with a use of secondary raw materials for structural elements 5) Use of recycled materials for roads and parking areas (asphalt and sub-base layers) 6) 3D concrete printing in combination with RAC.

PILOT STAGES	DEVELOPMENT TECHNOLOGIES	ACTORS INVOLVED	LOCAL KEY STAKEHOLDERS	SUITABLE TRAINING METHOD
Demolition stage	Already demolished, production of recycled aggregate (RA), testing and certification	Demolition companies, Recycled aggregate producers, Construction companies, Universities, Testing laboratories, Certification bodies, Developers, Concrete producers, On-site technicians/Civil engineers, Professional societies.	Construction, designers and architectural associations, public authorities, municipalities, concrete additives producers, cement producers, demolition companies, certification companies (leed, breem, well, etc.)	Guidelines, Workshops/Seminars, Webinars, face-to-face and online sessions.
Design and pre-con stage	Design of structural elements made of RAC, design of 3D printed structures, concrete mix design and testing, BIM model	Architects, Design companies, Developers, Universities, Concrete producers, Testing laboratories, On-site technicians/Civil engineers, Construction companies, Cement producers, Admixture producers, professional societies		
Construction stage	Material testing. Technology standards and practical use of materials and products. Selected structural elements sensoring. Monitoring system for continuous and remote tracking and control	Construction companies, On-site technicians/Civil engineers, On-site workers, Universities, Concrete producers, Asphalt producers, Cement producers, Admixture producers, Testing laboratories, Design companies, Architects, Professional societies.		
General	Sustainability and circular economy. Benefits of the pilot project for the society	Municipalities, Developers, Residents, Universities, Professional societies, Certification bodies (LEED, BREEAM,...).		Webinars, Workshops, Site visits

4.6 WP4 3D-BASED WEB MAP

CROSS PILOT – 3D web CE map											
Project partners	FCE	UPC	ACC	SKA	DRX	UGE	HCU	UIT	SIT	CVUT	CDE
Stakeholders involved	City of Hamburg Authority	Senate of the Free and Hanseatic City of Hamburg Senate Chancellery									

PILOT OBJECTIVE	Create an interactive 3D web-based map of a minimum of 500 existing buildings, integrating spatial data and building information models enriched with circular economy data, across at least three pilot countries. Technologies for circular economy data availability, accuracy, and data traceability for existing building stocks.
CIRC-BOOST PROJECT OBJECTIVE	Increase knowledge data availability, and data accuracy about existing building material composition by developing a digital solution that will integrate the spatial data and information models of existing buildings within, this further enabling a generation of Building Information Modelling (BIM)-based CE passports with all relevant CDW and CE indicators in line with the second Digital Agenda for Europe.

PILOT STAGES	DEVELOPED TECHNOLOGIES	ACTORS INVOLVED	LOCAL KEY STAKEHOLDERS	SUITABLE TRAINING METHOD
3D Building Stock Development	Semi-automated CityGML LOD3 ¹ cities' models geometry reconstruction technology.	Researchers and Academia GIS service providers BIM, GIS, CE Professionals Software Developers City Authorities/Government Agencies City Planning Departments Building Owners and Managers CDW Operators Construction Companies Civil Society Organisations	Waste Management Companies CDW Operators Construction Companies Logistic Companies Building Owners and Managers City Authorities/Government Agencies Civil Society Organisations City Planning Departments Environmental Agencies Researchers and Academia BIM, GIS, CE Professionals	Online Tutorials Online Courses Hands-on Workshops Seminars
Building Stock Material Flow Assessments	Advanced and more accurate building stock material and RW&CDW ² flow assesment models.			
3D Models Enrichment	Technological solution for structuring CE data into the CityGML format and generating CE passports.			
Map Development & Launch	CE map data model and web application based on 3D mapping techniques such as 3D visualization, GIS and CityGML viewers.			

¹ CityGML standard defines a conceptual model and exchange format for the representation, storage and exchange of virtual 3D city model. Level of Detail (LOD) refers to the depth of detail in a model, describing both geometric complexity and attribute richness.

² Raw and construction demolition waste

5 Conclusions

This guideline presents different training methodologies, techniques, and recommendations to prepare and design an effective training strategy to boost CIRC-BOOST technologies throughout European workforce. For this purpose, each project pilot has identified the technologies implemented in the project. Until M23, pilot partners would decide the training concepts to prepare the required training material that better fits their resources and expectations. To avoid any extra effort within partners, common technologies will share training sessions (when possible). For more interactive sessions and to collaborate with dissemination activities, when possible, the preparation of workshops and Living-labs (also collaborating with sister projects) will be encouraged. To achieve this goal, ACCIONA, as WP leader, will be in constant update on interesting events for both project and to the sector.

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ANNEX A: Training content design

There are different training methodologies with diverse characteristics that could be selected according to the audience, topic, location, etc.

The design of training actions or Instructional System Design (ISD in advance) is a systematic procedure for developing coherent and reliable training programs. The design of training actions is a complex, creative, active and iterative process.

Although there are several versions of ISD, the ADDIE model is perhaps the most popular in business and organizational environments, with the Dick and Carey model being the most popular model in schools and educational environments.

- ✓ **ADDIE** model: Is defined as the systematic and iterative method for creating learning experience to develop and enhance skills and knowledge. Is an acronym of the five phases of the Instructional Design: Analysis, Design, Development, Implement and Evaluate.

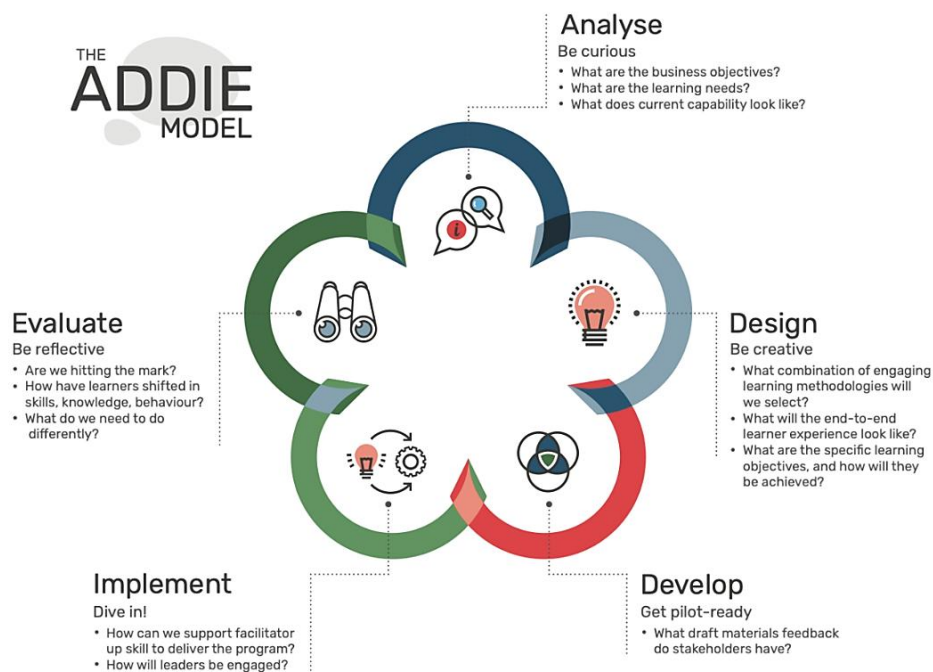


Figure A 1 - ADDIE model process scheme. Image taken from <https://instructionaldesign.com.au/what-is-the-addie-model-of-instructional-design-anyway/>

- ✓ **Dick, Carey and Carey** model. It consists in 9 steps:

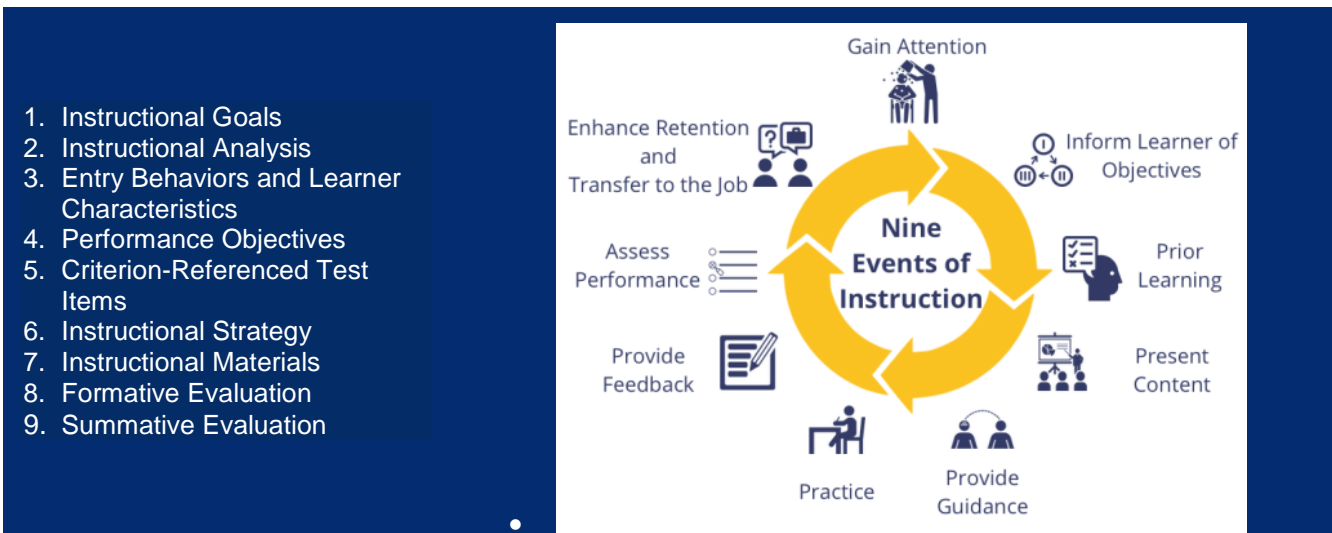


Figure A 2 - Dick, Carey and Carey learning process list and scheme. Image taken from <https://www.coursearc.com/gagnes-nine-events-of-instruction/>

While ISD can handle a variety of performance and learning needs, some problems might require a different approach based in other models that may fit the problem better. These models can be found at Design Methodologies: Design Thinking, Agile Design or System Design, among others.

This guideline is focused on the ISD or ADDIE methodology, as it is based on obtaining an overall view of the learning process. It is characterized by an orderly process for gathering and analyzing collective and individual performance requirements, and the ability to respond to identified learning and training needs. The application of a systems approach insures that learning programs and the required support materials are continually developed in an effective and efficient manner to match the variety of needs in a rapidly changing environment.

The model selected consists of 5 stages in each of which one design element is developed:

- A1. Goal and learning objectives.
- A2. Evaluation.
- A3. Practical activities.
- A4. Contents, training strategy and programming of a training action.
- A5. Students support and tutoring.

This Guide presents a proven method for designing training actions. As such, it can be used to good advantage in any environment and for any training purpose: setting the right learning objectives, practices to achieve them, appropriate assessment tests to measure their achievement, developing relevant and effective content and good programming are always positive elements in a training action, whatever it may be.

When designing a training action, one of the main questions to think about is the training model we will follow in our lessons: face-to face, online or a hybrid format. It should be considered that face-to-face lessons and online learning have differences but also similarities as seen in [2.1 section](#).

A1. Goal and learning objectives.

To define the goal of a training action we should think on:

- ✓ WHO is the training focused on.

- ✓ WHAT / WHICH skills/concepts will acquire the student to achieve course goal.
- ✓ WHEN and WHERE has the student to demonstrate the learned concepts.

For a proper definition of the goals and objectives of the training action, it is important to define the objectives, based on the skills that the student may applied later in the jobsite. Learning Objectives, in short, guide the effort and activity of the training designer, the teacher and the student. Well-described objectives allow the learner to know whether a course interests him or not, the organizer to know whether this is what it is really aiming for with the training action programmed, and the expert who is going to teach it to guarantee its success, which can only be that the student will be able, when he finishes it, to do something he did not know how to do before. Well-described objectives are the basis for effective training.

A2. Evaluation

The students' evaluation tests will allow us to know if a student has achieved the established learning objectives for our training action: the students know the objectives, assimilate the contents, practice the objectives and, at the end, we evaluate if they have achieved them or not.

Following the recommendation of Dick, Carey and Carey, (2011), we will design the learner's evaluation tests immediately after setting the Goal and Objectives of the training action. Even if it is not the most intuitive way, it will make the design process easier. The evaluation method will guide us in the development of content and learning strategies, including practical activities. The evaluation could consist of practical or evaluation test practices. In any case, both possibilities must deal with observable and measurable skills and be aligned with the objectives.

Our courses are aimed primarily at adults in a professional environment and, although we want to ensure that they achieve the objectives of the course, it is not necessary to an exam or test at the end to ensure the achievement of objectives. Our proposal is to use the practical activities throughout the course as evaluation tests. We would then distinguish between:

- **Non-evaluative practices**, which are those in which the student simply practices what he is learning and receives feedback and guidance from the tutor on the steps he is taking in the application of what he is learning. This type of practice should never be missing from a course and should be prior to any type of evaluation.
- **Evaluative practices**, in which the student must be ready to demonstrate his achievement of the partial learning objectives, and which the students would carry out at the end of the training action of that partial objective (or of a set of several partial objectives). These are also essential, either in the form of "evaluative practice" or in the form of an "evaluation test".

A2.1 Different tests for different learning domains

There are three learning domains: The cognitive is related to thinking processes or skills, the affective domain, with feelings development and attitudes, whereas psychomotor domain, with automated movements that are integrated to cognitive processes.

Most of the courses designed for professional adults will belong to the intellectual domain, i.e., they will aim at having the learners assimilate or memorize information and/or develop intellectual skills. Generally, some information must be memorized before an intellectual skill can be developed.

For this purpose, the easiest way is to check the verbs related to learning objectives. For this purpose, Bloom identified different verbs list related to each domain. In the case under study, [here](#) we can find Bloom's taxonomy verb list for cognitive domain.

According to the training session objective(s), different tests could be applied on the evaluation stage of a training. Those tests can be selected from a multiple-choice test, text writing questions, short-answer test or practical activities, for example. The trainer should decide which of them are more appropriate to demonstrate concept understanding.

A2.2 Criteria for evaluation test development

There are two things to keep in mind when designing evaluation tests: how fast is expected that trainees achieve objectives, and the aspects that ensure the quality of the assessment tests.

The quality of the evaluation tests depends on a series of criteria that can be summarized in the closeness of the tests to the real conditions of the use of the skills in the professional environment. Thus, the tests must:

- ✓ respond strictly to the learning objectives and their exercise conditions.
- ✓ allow learners to demonstrate their mastery of the objectives they have achieved.
- ✓ tailored to trainees' characteristics.
- ✓ be designed as a support for the learning process, and never to "hunt" the learner.

Only by trying to achieve learning objectives can the learner have a chance of achieving them. Insofar as the objectives respond to the skills, practicing them is the way to master them. For this reason, the practices or activities of the training action are one of its most important components. Those practices also must be aligned with the objectives and skills to be achieved in the workplace.

A3. Information acquisition and processing practices.

Practical problem-solving exercises allow students to face situations that simulate the reality of the work environment and to rehearse the behaviors that are the object of the training action. Rehearsal in a "safe environment", in which our mistakes will have no personal or professional consequences, is the learning tool per excellence in courses aimed at professionals.

There are no specific recipes for the design of this type of activity, as they depend entirely on the learning objectives; the closer we get to the behaviors that the training aims to promote in the work environment, the better. Although they depend on the learning objectives, practices of this type must respect some rules or consider some factors in order to be effective:

- ✓ **be as realistic as possible:** based on real documentation used in real jobs. In many cases, however, the actual documentation is too complex or too rich to be useful for learning. In this case, it should be simplified and adapted to the learning objective.
- ✓ **posed as problems to be solved, with no single solution:** There are many ways of doing things, and the most important, is how the problem is approached, not how it is solved.
- ✓ **designed as stories or narratives:** whether the practices are broad cases or specific aspects of professional tasks, their approach is easier if they are personalized and allow the student to identify with the protagonist. The context of a narrative favors memorization, that is why [storytelling](#) is one of the tools increasingly used in online training. The narrative must have:
 - a number of elements: protagonists, a significant event that triggers the story.
 - a structure: actions and their consequences, a climax which is the lesson learned by the protagonist/student and an ending with a moral, namely that the application of what has been learned in the work context.

A4. Contents, training strategy and programming of a training action.

This chapter is focused on a training session contents, as what the student needs to know to achieve training objective, skills and to carry out the practices and pass the tests. For this purpose, several concepts need to be defined, such as course scheduling of the training action (ordering of contents, practices, and tests). To have a clear scheme of a training course design and execution, some concepts will be defined:

A4.1 Actors in a training process

Four basic functions/processes can be distinguished in a training process: designing, material development, training, and management. In any training action, these four functions are carried out by one or more people:

- ✓ The **designer's** responsibility is to find the best possible way to transfer the expert's knowledge to the learner. The designer helps to ensure that the course has a solid pedagogical foundation, and that all elements of the course are aligned with its objectives. The designer faces, among others, the limitations presented by the format of the course (face-to-face, online or blended learning), the time available, budgetary resources and the requirements of the organization sponsoring the course.
- ✓ **Material development:** material producer is called a Content Expert. This figure is someone who has in-depth knowledge of the subject of the course. They are the experts in the matter.
- ✓ The **tutor or trainer** is the one who materially teaches the course, who leads the face-to-face class or tutors the online course. His or her duty is to attract and maintain the attention of the participant in the course during its development and to ensure that the transfer of the skills and abilities that are the object of the training action takes place, following the guide for the tutor included in the design of the course.
- ✓ The **manager** oversees the administrative and material support of the course: he/she makes sure that the classroom is available and contains all the resources needs, is in charge of registering the participants on the course platform and is responsible for resolving connection problems in case of online courses, either by himself or through his dependents.

A4.2 Training content and its presentation

In this chapter materials and the criteria to choose/elaborate them will be described. We call material to the physical or virtual content that would help the student to learn the subject and achieve learning objectives / skills.

Content presentation is an essential training aspect. The content presentation is always an exchange of information between the trainer (or the online course if it is a fully automated course or tutorial) and the trainee. Content in an online course can be presented in several ways: oral or written exposition or videos elaborated for the course; pre-existing original material (book or article on the subject, fiction or documentary film, etc.); animations and simulations.

The selection of one or another depends mainly in the budget available. The production of professional quality videos for specific courses is expensive unless you plan to monetize the course by selling it; it can also be expensive to obtain the necessary permissions to use original materials, whether they are books, articles or films that illustrate the subject of the course but do not have an educational purpose, although in recent years the availability of free original materials on the Internet has increased exponentially. These materials, called **Open Educational Resources**, have been designed in many cases for training purposes, and in others are easily adaptable to our needs. Before buying a license to use a book or writing our own materials, it is worth looking: we may be able to save time and money.

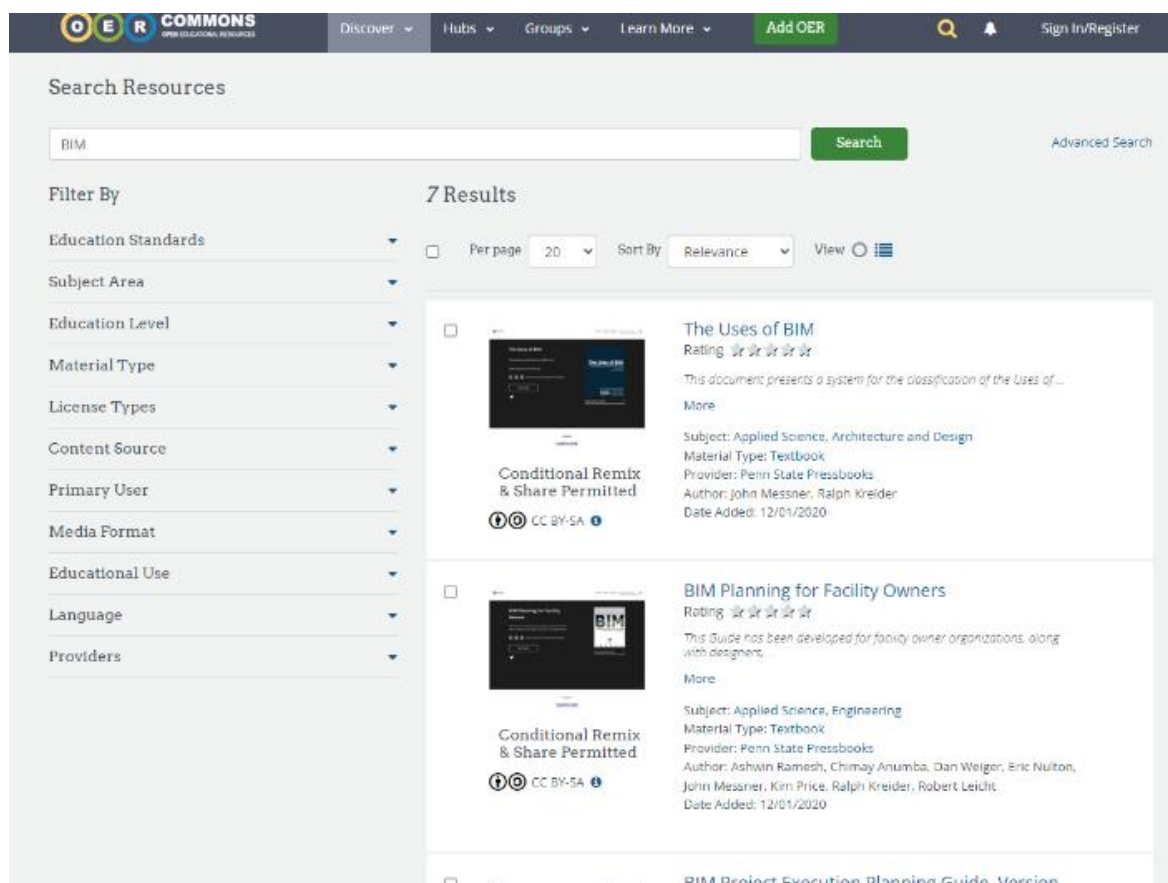


Figure A 3 - Examples of some BIM open sources trainings available at the Open Educational Resources

One of the essential factors for a training success, in addition to a good design, is the intensity and quality of the trainer's presence in it. For example, an online course in which the tutor's presence is constant through forums or chats and through feedback on the practical activities, does not really need to use more complex techniques than the oral or written presentation prepared for the course, the cheapest and one of the most effective forms of presentation. Thus, the materials chosen will also be determined by how the presence of the trainer is designed and planned throughout the course.

In any case, as mentioned previously in the deliverable, the use of multimedia resources is increasing in online learning, and they are very effective in engaging learners' attention and a good option for present the content if they are well design following pedagogical principles.

From the material development point of view, it is cheaper to design and develop the materials for a course that will be constantly supported by the presence of the tutor but increases the costs per student because a tutor can only attend to a limited number of participants.

When choosing materials, there should reach a compromise, adjusted for economic issues: number of target students, number of course sessions needed, number of tutors available in the period in which the courses must be given. There will be times when it is necessary to use more automated feedback because the period to give the courses is very short, a lot of people have to be trained and there is no possibility to train and have as many tutors as would be needed.

A4.3 Oral or written presentation

In previous sections of this deliverable, there are presented several training techniques and material to select depending on the training sessions looked for, but it is important to remark a few words about the most used and most effective form of presentation: the oral or written presentation.

For the oral or written presentation to be truly effective, it has to respect some rules: do not concentrate too much information on a single screen; make it interesting and attractive by incorporating a common thread (a personalized narrative, for example, called storytelling in e-learning); constantly include examples; highlight definitions and rules when they exist; incorporate analogies; etc.

A4.4 Content management

The expert who is designing and developing the course knows what content is necessary for the trainee to achieve the learning objectives. Choosing the order in which the content will be presented to the learners is very important when deciding the structure of the course.

The literature recommends starting with the most basic contents, on which the others are based. This means that we will start with the subordinate skills, where we will find the basic knowledge that will lay the foundation for the rest. **We will start from the most simple and basic to the most complex content.** Complexity and logical and temporal sequence are widely used criteria, but everything depends on the object of our course. There are other forms of content arrangement:

- ✓ **alphabetical:** used in glossaries, always useful in online courses; or by categories, when the contents of the course have no other relationship between them.
- ✓ **by cause-effect order:** when the object of the course is the resolution of problems in a specific field.
- ✓ **in order of importance:** a course designed to welcome a new employee to the company, for example, should start with health and safety issues and follow in order of importance.

Finally, we need to make the modules or training units of an appropriate size for our learners, the time available to them and the trainers, the complexity of the learning material, the limitations of the learning environment, the format of the chosen course, etc.

A4.5 Training strategy.

Training strategy is related to what we are going to do to present the course to the students, make sure that the student pays attention to the course, that he/she actively participates in it and that we do everything we can to help him/her achieve the objectives set in the course.

This aspect is always important, but even more when the learners are adults. **Adults are not taught, adults learn, if they want to.** If we consider an online course, in addition, the learner decides what to do and when to do it. It is easier to disengage in an online course than in a face-to-face class. So, in online training for adults, **sustained motivation** is an essential element for the course success. To achieve this purpose, we will follow some learning components described in a previous section:

1. Pre-training activities

These activities must focus on students' motivation, inform them of the objectives and stimulate the previous knowledge and skills they may have on the subject matter of the training action.

One of the motivation models most used, is the John Keller's **ARCS model**. To motivate, Keller explains, we have to awaken the student's Attention, convince him of the Relevance of what he is learning, give him Confidence that he is capable of learning it, and make sure he gets Satisfaction in the learning process.

Table A 1 – ARCS model for students' motivation. <https://k3hamilton.com/LTech/ARC.html>

Attention	Relevance	Confidence	Satisfaction
A1 Perceptual arousal	R1 Goal orientation	C1 Learning requirements	S1 Intrinsic reinforcement
A2 Inquiry arousal	R2 Motive matching	C2 Success opportunities	S2 Extrinsic rewards
A3 Variability	R3 Familiarity	C3 Personal control	S3 Equity

Students' attention must be maintained throughout the course, by means of the techniques expose in previous sections, such as videos, storytelling, presentations, etc. The relevance will be transmitted by linking the objectives of the course with something that interests the student (professional promotion, deepening in their tasks, correcting something that is done wrong, learning new ways, or simple curiosity).

The confidence that he/she can do the course is acquired by the student when he/she feels that the practices he/she is doing are understandable, graduated from less to more complex, and of course adapted to his/her characteristics.

And finally, the student must feel satisfied with his progress throughout the course; personal satisfaction is the best reinforcement. The most powerful and longest lasting compensation is the feeling of having achieved a goal that is relevant to the learner's internal value system. To obtain that satisfaction, we will have, for example, to propose to the student, who is learning to plan with us, activities that involve some difficulty, but that they can overcome with some work. And we will have to provide immediate, personalized and positive feedback.

2. Presentation of the content

As we mentioned when we talked about objectives, the presentation of objectives serves to communicate to the learner what he or she will learn in each training session, and in the course in general, what he or she will be able to do when the session or course is over. It is a statement of intent that focuses the learner on what to expect in the time ahead.

Objectives guide the learner's effort. With clear objectives, the learner will know which concepts are essential and which are not, which skills are the ones that must necessarily be mastered, and which are less important, etc.

3. Student participation

It has already been said that student participation is essential to obtain results in adult learning: participation ensures that the new contents are consolidated and that the course practices are carried out.

For this purpose, it is advisable that in the very beginning of the course, students introduce themselves to the group, saying who they are, what they do and what they are looking for in the course, what expectations they have. It is also important that they put a photo: the photo accompanies the interventions in the forum and allows identification. It is therefore advisable to start the course with an introductory forum, which you should start with a presentation that includes at least all these aspects.

The other fundamental form of participation is participation in the discussions, either face-to-face or by forums or chats, in the case of distance courses. The forum is asynchronous, everyone intervenes when he/she can or wants to, allowing time for reflection and intervene with care. On the contrary, chats reproduce (or try to) conversations in real time. In chats, students do not pay as much attention as in forums, neither to what they have written nor to what others write, which is why they are not as useful in the learning process. Chats can also lead to confusion if there are more than 8 or 10 participants. In general, forums are more recommendable, although chats can be useful for resolving doubts. More information about the techniques to promote participation, can be found in this [link](#).

4. Review and follow-up activities.

These activities help us to relate what the student is learning with what he/she is doing in the workplace, to ensure that what is learned does not remain in the air, theoretical or unreachable.

These activities deal not only with work aids, such as memory aids or lists of steps to follow in the tasks, as a recapitulation, but also with reflections by the students on how they are going to apply what they have learned in the workplace. Examples of these activities are reflections in the forums, in individual work, guided and/or guided by the tutors.

A4.6 Time allocation in the training actions

A training action is carried out in a given period of time. The components of the action are ordered sequentially, one after the other, with a pedagogical objective. It takes time to execute each of these components correctly. The sum of all the times of all the components is the duration of the training action.

The scheduling of face-to-face and online training actions have common aspects and different aspects:

- ✓ **Scheduling a face-to-face training action:** Once we have the components of the training action (learning objectives, practical activities and evaluation tests), ordered and developed its contents, we have to deploy them in a proper order, according to a pedagogical objective. The actual design process is characterized by constantly linking all relevant aspects. From the very beginning we will take into account the time we have, which will condition the definition and development of contents and activities.

A classroom schedule is a detailed script of what will happen in the classroom at each moment, including a description of the practical activities and evaluation tests.

- ✓ **Scheduling of an online training action:** Although there are totally synchronous online training actions, in which the teacher and students are connected simultaneously in real time by means of a specific application, such as Skype, Webinars, or the more traditional virtual classes, they are usually asynchronous, although they may have synchronous elements.

The scheduling process is not very different from that followed in face-to-face actions, but the **timings are longer**. What may take two or three hours in a classroom session may take several days in online training, partly because the trainees' daily tasks are combined with the course, something that does not happen in a classroom course in which the student is fully dedicated to the course.

Despite requiring more time than in face-to-face courses to achieve the same, student participation in the online action is more intense and reflective: forum participations are written, which requires a greater effort of synthesis and imagination than for spoken participations. The same can be said of the practical activities, which will be more complex and demanding in the online action and will be carried out individually. The student will also have the possibility to read more documentation on the same topic.

As a guideline for programming, we can consider a number of aspects:

- ✓ The week can be a good measure of the periodicity of the course.
- ✓ The student has his work, simultaneous to the course. Normally he cannot access the course every day. We must present the course in such a way that the student can organize the different activities (readings, forums, practical activities, etc.) throughout the week.
- ✓ Consistency in planning. It is convenient that each module lasts the same, and has a similar structure, because it helps the student to organize himself.
- ✓ Include the time that the learner will need to read the mandatory texts, watch videos, carry out the practical activities, participate in the obligatory and optional forums, take the evaluation tests, etc.

A5. Student support and tutoring of an online course

This chapter groups several topics that have to do with the support that should be given to the learner of an online course. Normally we are used to face-to-face courses, and we know techniques that we can use in this type of courses. However, online courses are more and more demanded, because they allow learners to follow them from home. It is important to be aware of a fundamental difference: the learner in an online course is autonomous and has some motivation that pushes him or her into the course.

On the other hand, the autonomy and motivation of the learner in an online course are important assets. It has been shown that online courses are as effective or more effective than face-to-face courses, i.e., they are as effective or more effective in getting the learner to acquire information and skills or competencies.

We are going to emphasize everything related to online courses, although many of the techniques we will see are also applicable to face-to-face courses, or blended courses.

A5.1 Didactic guide

It is always necessary for the student to know what the objectives of the course are, what practices he/she will have to do, when and how he/she can talk to his/her tutor or to whom, etc. The student must have a clear idea of what is going to happen and when it is going to happen before starting the course. This is key in an online training, the student is alone in front of a screen, and will be constantly presenting doubts. What in a face-to-face learning does not represent a problem, can be a very serious matter in an online course. The guide will consist on:

- **Title:** course title.
- ✓ **Navigation information:** All the information will be handled in an online platform.
- ✓ **Teacher's Information:** Trainer's summary of his/her professional career and contact information: email, phone, website, student office hours, etc.
- ✓ **Course Description:** Trainers should provide a brief description of the course.
- ✓ **Prerequisites:** Trainers should specify which background should have learners before taking the actual course.
- ✓ **Text Requirements:** It is important to highlight which, if any, books are recommended to be acquired to complement the learning of that subject.
- ✓ **Course Objectives:** Course learning objectives.
- ✓ **Teaching Method:** Trainer should describe which techniques will be used to help students. Comments about the activities and their characteristics, forums and chats, if any, collaborative work, if any, etc. When a specific methodology is going to be used (case method, learning by problem solving or project development, etc.), this will be stated and its general lines and what it will mean for the students will be anticipated.
- ✓ **Grading Scheme:** List of all the evaluations students will undergo to verify that they achieve the objectives. It is important to detail what percentage each of these evaluations will represent in the final evaluation and also clearly state the evaluation criteria.

- ✓ **General instructions for evaluations:** Teacher can detail the requirements for the presentation and preparation of homework, assignments, labs, etc.
- ✓ **Academic integrity:** Trainer should highlight his/her policies regarding deadlines for activities and tests, plagiarism, and any other offense against the honesty of each student's work. It is advisable to have a code of ethics that will be mentioned.
- ✓ **Course outline:** This is one of the most important parts of the guide. It includes the course program, the planned activities and the timetable.

A5.2 Tutoring an online course

There are many online course tutoring manuals on the market, and on the Internet, you can find plenty of resources on this topic. Next table present a summary of Adiego and González, (2014) recommendations on online training.

Insisting that the pedagogical advantage of online learning is the ability of learners to interact with teachers and other learners at spatial and temporal distances, they recommend:

Table A 2 – Online training recommendations.

Course design	Well-designed course: clear learning objectives, learning activities and evaluation methods, and sets clear expectations for learners and instructor.
Online class organization	Manage your time by setting <u>how and when</u> you can be contacted and your maximum response time. Create a well-organized and easy <u>virtual classroom</u> .
Focus on interaction	Invest your time more in learner interaction than in content dissemination. Trainer needs to be active and present as a guide, observer, and facilitator.
Introductory activity	Welcome each student individually at the beginning of the course and propose a task that will help them get to know the virtual classroom and other students.
Set the tone	Establish a culture of trust and openness that promotes participation. Elaborate critical but constructive feedback and exchange of ideas with respect. Encourages students to ask questions and take risks in sharing ideas and opinions and to support each other in the learning process. Promote a learner-driven virtual classroom (set clear expectations and boundaries).
Set concrete goals for discussions	Set explicit goals for online discussions so that the interaction is more than an exchange of opinions and leads to deeper learning (i.e., developing critical and analytical thinking skills, problem solving, knowledge construction, and application of experience to new situations).
Construction of knowledge and learning skills	Use virtual classroom, small group discussions, and collaborative projects to engage students and develop learning skills.
Learning Objectives	Relate the topics to be discussed to the learning objectives.
Asynchronous communication and critical thinking	Asynchronous discussions [in forums] are useful for developing critical thinking. Engage in reflective discussions and responses that lead to conversation to a greater level of depth; clarify without closing the discussion; encourage students to develop and contrast their own concepts. The posts in an asynchronous forum are more effective, insofar as they favor a greater reflection useful for the learning process.
Group activities	Use small group projects to promote learning collaborative and cooperative online skills that include sharing experiences, using complementary skills, and contrasting and developing ideas. As a tutor you can guide the process by assisting in setting up/or creating the groups, ensuring that learners are clear about the task at hand, leading discussions, providing frequent feedback and encouragement, and resolving bottlenecks in group work when they occur.
Individual participation	Encourage participation through a variety of means: launching meaningful discussions relevant to the learning objectives, assigning tasks for which others are responsible, and involving learners in evaluating each other's work. Use private mail to encourage those who do not participate to do so.
Feedback and evaluation	<ul style="list-style-type: none"> - Continuous feedback in different ways: forum discussions, individualized feedback when considered by private mail. - Learning objectives. Align the evaluation tests with the learning objectives. -Transparency with formal evaluation tests. Include grading rubrics for each assignment as part of the course information. - Choose the best technology that are most advantageous for the evaluation methods chosen: multiple-choice tests, short essays, collaborative projects, wikis, student-made videos, etc. - Detailed feedback to help trainees to identify where they fail and why and where they get it right and why. It takes time, but it is essential in online learning, where the learner and the tutor are not physically present. -Evaluate the quality of participation, not the quantity.

A5.3 Best practices in an online course

Here are some tips, that even seem like obvious, is important to consider them:

- ✓ Don't forget that there are other people on the other side, with their own ideas and feelings that may be offended. Always write as if both parties look each other in the eyes. Never write anything that you would not say face-to-face to another person. This is perhaps the main rule to always keep in mind.
- ✓ Try to empathize with the people on the other side. Everyone likes it when others put themselves in their place.
- ✓ Short statements are more readable than long paragraphs. Be clear and concise.
- ✓ Do not include all the text of the original message. Delete the part that is not necessary, especially if the text is long, and leave only what is necessary to be clear about the topic to be answered.
- ✓ In the forums, read the answers of the group, to see what and how the topics are developing. Participate and express your own opinions.
- ✓ Insults and personal attacks are not allowed. Use polite and respectful language with other participants.
- ✓ Write properly, take care of spelling and grammar. You are not writing a text message. You have all the space you need, so it is advisable to avoid cell phone jargon.
- ✓ Place in the message header or in the subject line a clear reflection of the content of the message, with accuracy and briefly, so that potential readers can decide whether they are interested in reading the message or not. Those who are interested in the topic or know about it will answer faster.
- ✓ Use threads and post replies to the original message. Traceability is important, so do not create a new thread to reply.
- ✓ Do not write in all capital letters, this is equivalent to SHOUTING. Write in all caps only when you want to emphasize something important or when you are angry.
- ✓ Limit the use of characters such as accented letters or strange keyboard symbols, as they can be mistranslated by another computer on the way through your message and become unreadable symbols.
- ✓ A troll is a message that seeks nothing more than to provoke. They are usually brief, categorical and polemical.
- ✓ The best way to react to trolls - and the only really effective way - is to ignore them.
- ✓ Forgive others' mistakes. Be tolerant. It's easy to make mistakes, it happens all the time to everyone, and it is very annoying to find people who correct any mistake made by others.
- ✓ Respect the time others may need to respond. Their bandwidth, greater or lesser responsiveness, eloquence or knowledge, the existence of other occupations, etc., may influence a person's need to take more time to give a response than others would require.
- ✓ Be careful when using sarcasm and humor, as they can often be misinterpreted.
- ✓ Do not send messages with religious, political or social content - unless it is the specific topic of the group - as certain topics may offend some members.
- ✓ Share your knowledge with others or with other members of the community.
- ✓ Respect other's privacy.
- ✓ Respect reproduced materials' copyright and the references to the authors.

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