

# *TASK 01/A1. Definition of the learning objectives and learning outcomes of the curriculum*

ADAPTED SENIOR TRAINING PROGRAM ON BIM METHODOLOGIES FOR THE INTEGRATION OF EPD IN SUSTAINABLE CONSTRUCTION STRATEGIES

2020-1-ES01-KA204-083128



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# INTRODUCTION

This first report which is part of the task "O1/A1. Definition of the learning objectives and learning outcomes of the curriculum" has consisted in defining the main objectives and learning outcomes of the curriculum as well as the goals to be achieved in adapting the materials to adult learning.

This task yields the main objectives of the curriculum as a result of the needs analysis and the review of studies of adult learning systems, presenting the specific needs of the target groups and beneficiaries.

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## A. Learning objectives

1. Adequate knowledge of new technologies and their link to the construction industry.
2. Training of professionals in the construction sector in order to increase the quality of the final work, ensuring environmental sustainability.
3. Knowledge of the mechanisms that favour the recovery, reuse and recycling of construction materials.
4. Knowledge and ability to design solutions that minimises the waste generated in the placing processes.
5. Train the student over 45 years old (senior) to acquire a critical and scientific way of thinking, to be able to apply the offered technologies to their constructive solution, to respond to the demands of citizens regarding sustainability and to protect the environment during the placing process.

## A. Learning objectives

6. Teach the basic operation of the BIMEPD Application, as a professional instrument to evaluate the environmental impacts of products, processes and services.
7. Acquire the necessary basic knowledge of LCA and analyse the databases and impact assessment methodologies available to perform an LCA.
8. Make practical cases that support learning.
9. Present the foundations and the environmental regulations that pertain to construction sector development.
10. Teach the operation of the OER platform, as an open educational resource for self-learning in placing methodologies for sustainable development in construction industry.

## A. Learning objectives

### 1. Adequate knowledge of new technologies and their link to the construction industry.

In the last 30 years, sectors such as the automobile and textile industries, based on industrial manufacturing, have carried out a spectacular technological transformation in their processes that has led them to practically double their productivity. However, the construction sector has been slow to join this reality. In an environment where skilled labour is scarce and the price of materials such as steel, cement and wood are constantly rising, technology has become an ally in the construction sector.

## A. Learning objectives

2. Training of professionals in the construction sector in order to increase the quality of the final work, ensuring environmental sustainability.

The building sector has a huge untapped potential for cost-effective energy savings. Nearly Zero Energy Consumption Buildings (NCEB) standards have been mandatory in Europe since 2020. The biggest challenge to reducing energy consumption in the building sector lies in increasing the rate, quality and efficiency of building renovations, especially considering that the current renovation rate is only 1.2% per year.

A major obstacle holding back the development of NDEs and effective renovations is the lack of adequate building capacities. It is therefore essential to improve the skills of construction professionals, and of the various professionals in the field of sustainable and energy efficient construction.

## A. Learning objectives

### 3. Knowledge of the mechanisms that favour the recovery, reuse and recycling of construction materials.

The main cause of the environmental impact caused by the construction sector is the mismanagement of the large amount of waste it generates. If these materials are not recycled or reused, they end up in landfill sites, resulting in the contamination of soils and aquifers.

Knowing the different mechanisms to facilitate the recovery, reuse and recycling of construction materials is essential for the sector's contribution to the environment.



## A. Learning objectives

### 4. Knowledge and ability to design solutions that minimises the waste generated in the placing processes.

The development of any construction project has many aspects to take into account and one of them is to prevent the generation of waste generated in the installation process. The main objective is not to affect the environment, to show solidarity with this commitment and to contribute what each of us can, both in our personal and professional activities, to minimise the production of waste.

In order to prevent high volumes of waste from being produced during the execution of works, we must implement appropriate solutions that minimise the generation of waste generated in the tile installation process.

## A. Learning objectives

5. Train the student over 45 years old to acquire a critical and scientific way of thinking, to be able to apply the offered technologies to their constructive solution, to respond to the demands of citizens regarding sustainability and to protect the environment during the placing process.

Critical thinking aims to develop thinking skills, based on analysis, reflection, reasoning and decision-making.

In this way, the student is able to provide a solution that responds to needs in the most sustainable and environmentally friendly way possible.

Adaptive learning for professionals over 45 (or senior) will be taken into account.

## A. Learning objectives

6. Teach the basic operation of the BIMEPD Application, as a professional instrument to evaluate the environmental impacts of products, processes and services.

The BIMEPD application to be developed as one of the main results of this project will be of great help to assess environmental impacts.

It is therefore necessary that the trainees understand the functioning of this tool and its correct use.

## A. Learning objectives

7. Acquire the necessary basic knowledge of LCA and analyse the databases and impact assessment methodologies available to perform an LCA.

Life Cycle Assessment (LCA) is a tool used to study the environmental impacts throughout the entire life cycle of a product, process or activity. Life Cycle Assessment (LCA) considers the entire history of the product or activity to be studied, starting from its origin until it ends up as waste.

The Life Cycle Assessment of a product allows the identification of the main environmental impacts (discharges, waste, atmospheric emissions, consumption of raw materials and energy) taking into account all the stages of its life cycle, from its origin, i.e. the extraction and processing of raw materials, through production, transport and distribution, to use, maintenance, reuse, recycling and disposal in landfill at the end of its useful life. Once the main impacts throughout their life cycle have been identified, it allows for the analysis of alternatives in production processes and the implementation of environmental criteria in strategies.

## A. Learning objectives

### 8. Make practical cases that support learning.

The analysis of case studies in which real problems are presented is a useful and flexible learning tool in various disciplines, such as the construction sector.

The main advantage of this practice is that it encourages autonomous work and learning on the part of the students, once they have the basic theoretical material.

## A. Learning objectives

### 9. Present the foundations and the environmental regulations that pertain to construction sector development.

Construction is incredibly labour intensive: the creation of the built environment is inherently disruptive to the natural environment. Governments balance the needs of both by requiring contractors, owners and others involved in construction to mitigate the effect of construction activity on the environment, including air, water, plant and animal life.

Environmental laws form the backbone of permitting and reporting requirements for construction projects, while a wide variety of state and municipal laws impose even stricter standards.

## A. Learning objectives

10. Teach the operation of the OER platform, as an open educational resource for self-learning in placing methodologies for sustainable development in construction industry.

Another of the main results of the BIMEPD project is the OER.

Open Educational Resources or "OER" are documents or multimedia material for education-related purposes such as teaching, learning, assessment and research whose main characteristic is that they are freely accessible and usually under an open licence.

## B. Learning outcomes

1. Know the different tools of management, differentiating those of a mandatory nature from those of a voluntary nature.
2. Identify and assess the best techniques in a constructive process.
3. Know the different concepts of the field of sustainability.
4. Know the sustainable construction and the life cycle assessment.
5. Understand sustainability as a new culture in the construction sector.



## B. Learning outcomes

6. Be able to develop an efficient project, taking into account the design, new technologies, and its functionality.

7. Develop the capacity for environmental evaluation of construction projects, and the capacity for self-criticism.

8. Know the different European environmental specific regulations in the field of construction.

9. Know the different available methodologies for construction to be able to develop an optimized project.

## B. Learning outcomes

1. Know the different tools of management, differentiating those of a mandatory nature from those of a voluntary nature.

Construction management is a professional service that provides project developers with effective management of a project's schedule, cost, quality, safety, scope and function.

Numerous tools are available for construction management.

## B. Learning outcomes

### 2. Identify and assess the best techniques in a constructive process.

Target group members must understand that process improvement is carried out through methodologies by which someone evaluates its current processes and adapts them with the intention of increasing productivity, reducing costs, simplifying workflows, adapting to changing market needs, reducing environmental impact or improving profitability.

To this end, students will learn and evaluate the best techniques.

## B. Learning outcomes

### 3. Know the different concepts of the field of sustainability.

Sustainable construction is based on a new building model that takes into account the environmental impacts related to the entire building construction process, from the design and project phase, through the construction phase, the use of the building and subsequent demolition and waste management. Sustainable construction aims to minimise all the environmental impacts generated throughout the life cycle of the building, covering factors such as the efficient use of energy and water, the use of construction materials and natural resources that are not harmful to the environment, the correct management of waste, the use of renewable energies, all with the sole objective of making the building as sustainable or "green" as possible and, therefore, with less environmental impact.

The student will be aware of the different concepts related to sustainability in the construction sector.

## B. Learning outcomes

### 4. Know the sustainable construction and the life cycle assessment.

The student will be able to design and construct buildings with the whole life cycle of the construction in mind, so that once the useful life of a building is over, instead of demolishing it, it can be dismantled and rebuilt. To this end, it is essential for the student to be able to carry out Life Cycle Analysis studies for projects that will allow them to know where the critical points are at an environmental level in order to tackle them and look for more sustainable alternatives, considering the construction from cradle to grave, that is, throughout its life cycle.

## B. Learning outcomes

### 5. Understand sustainability as a new culture in the construction sector.

It is of great importance that all the links that make up the construction sector, in one way or another, make a real commitment to the environment, making real efforts to reduce the impact of the activity. Combining construction and sustainability must be a reality for everyone and this will be instilled in the target groups.

## B. Learning outcomes

6. Be able to develop an efficient project, taking into account the design, new technologies, and its functionality.

This project will allow students to develop their own projects taking into account the new technologies existing in the construction sector as well as the functionalities of each of them.

## B. Learning outcomes

7. Develop the capacity for environmental evaluation of construction projects, and the capacity for self-criticism.

The knowledge and awareness of professionals in the construction sector of the environmental impacts of construction will be improved by helping decision-makers to identify the main negative impacts of construction on the environment and to formulate environmentally friendly construction plans during the early stages of construction.



## B. Learning outcomes

8. Know the different European environmental specific regulations in the field of construction.

BIMEPD will give users the opportunity to learn about the different European environmental regulations related to the construction sector.

## B. Learning outcomes

9. Know the different available methodologies for construction to be able to develop an optimized project.

The construction sector, despite being one of the most important industries in the world, is largely reluctant to move forward with current market technologies and methodologies that drive a comprehensive change in companies in order to improve the quality of works. For this reason, BIMEPD will show participants the main technologies and methodologies for optimising construction projects.