INTELLECTUAL OUTPUT 2
TASK O2-A1
IT production of RecoverIND Interactive Flashcards for HE and VET

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Consortium members: Universitatea Transilvania Din Brasov (UNITBv), Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM), Universidad de Sevilla (USE), Asociatia Romania Green Building Council, Politechnika Poznanska, Fundatia pentru Formare Profesionala si Invatamant Preuniversitar Viitor (FPIP), Zespol Szkol Budownictwa Nr 1 (ZSB1)

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ECOLOGICAL AND INNOVATIVE TECHNOLOGIES FOR RECOVERING INDUSTRIAL AREAS FROM LCA AND ENERGY EFFICIENCY POINT OF VIEW

2020-1-RO01-KA203-080223

O2-A1. IT PRODUCTION OF RECOVERIND INTERACTIVE FLASHCARDS FOR HE AND VET

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1. INTRODUCTION

One of the pillars on which the project is based is the use of new technologies as well as the use of BIM methodologies as a technical design and planning tool in the restoration of buildings and industrial parks. The versatility of BIM as a space for collective intelligence allows professionals in the construction sector to access all the information and knowledge produced in the project, providing a design tool that contains the necessary guidelines for designing in the context of energy efficiency and making exhaustive use of materials.

To do so, it is necessary to make available to the educational community all the necessary training materials, as well as to take advantage of the different possibilities that new technologies offer us as a means to disseminate and visualize the interactive multimedia materials that will be developed in IO2.

Nowadays, the great availability of information that exists has meant a revolution in the way society selects the content it accesses. Numerous studies show that nowadays animated digital content is the most used option by users to access any kind of information. An example of this is the great impact generated by audio-visual content platforms such as YouTube.

Taking advantage of this trend, the RecoverIND Interactive Flashcards clearly explain using multimedia material (video, drawings, animations, pictures, guides), how to benefit and manage the new technologies used in construction and rehabilitation of the buildings, it contains general sketches and detailed one. The Interactive Flashcards are free available on the website of the project and can be used also for the companies when sending their workers on site to do the data acquisition of the building areas.

The Interactive Flashcards have been permanently updated and improved thanks to recommendations in testing, seminars and pilot courses during the project, and also can be used online, directly in several kind of devices.

Regarding to the content of the RecoverIND Interactive Flashcards, it was developed by the teachers and professional from the consortium organisation. All the partners contributed with their experience in this task, to ensure that the Flashcards are adapted as appropriate to the fields of action of students and professionals of HE and VET institutions.

The development of interactive multimedia materials for the dissemination of knowledge on the use of new technologies in the restoration of industrial buildings with the inclusion of Energy Efficiency parameters and life cycle assessment criteria is one of the main objectives of the project. The aim is to generate an innovative educational precedent that can be transferred to other sectors and that can also benefit from it.

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2. FLASHCARDS

In this task has finally produced 11 training units that includes 13 Interactive Flashcards based on new technologies (BIM, drones, scanners, data measurement devices, etc.), all of them available for free on the project's website and on the YouTube channel to be created in the project, which can be used as support material for courses in architecture, construction, restoration and industrial heritage distributed in the new technologies sector.

These RecoverIND Interactive Flashcards have been designed and produced based on all the previous information developed in the project, to support the implementation of the curriculums applicable to training courses and the OER.

All these units are translated into all project languages and the videos are also subtitled in all project languages (**English, Romanian, Spanish and Polish**).

According to the curricula, these are the stablished training units.

THEMATIC AREA I: LIFE CYCLE ASSESSMENT FOR MATERIALS

UNIT 1. Life Cycle Assessment (LCA).

1.1 Introduction. Basic concepts.

1.2 LCA in constructions sector.

1.3 Methodology.

1.4 Normative frame of reference for LCA.

1.5 LCA examples.

1.6 LCA conclusions.

UNIT 2. Building Energy Efficiency.

2.1 Introduction. Basic concepts.

2.2 Building energy assessment in BIM.

2.3 Estimating energy efficiency.

UNIT 3. Energy Certification of buildings.

3.1 Definition and scope.

3.2 Energy Performance of Existing Buildings.

3.3 Examples of Energy Certification.

THEMATIC AREA II: INFORMATION MODELING METHODS FOR INDUSTRIAL BUILDINGS.

UNIT 4. BIM technologies.

4.1 BIM definitions.

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4.2 BIM basics applied to LCA.

4.3 Levels of development (LOD).

4.4 Environmental impact categories.

4.5 LOD600.

UNIT 5. Use of 2D documentation for the 3D inventory of building.

5.1 Scanning of drawing documentation.

5.2 Photographs.

5.3 Graphic correction.

5.4 Import of scans as trace reference.

5.5 Using the trace reference.

UNIT 6. Structural modelling of buildings.

6.1 General characteristics.

6.2 Models and tools.

6.3 Structural modelling in the building restoration.

6.4 Application examples.

THEMATIC AREA III: USE OF ICT TOOLS IN CONSTRUCTION

UNIT 7. Drones.

7.1 Introduction.

7.2 Drone legislation.

7.3 Use of drones.

7.4 Drone flight applications.

7.5 Practical application.

UNIT 8. Thermography.

8.1 Thermal imaging cameras.

8.2 Faults and precautions in use.

8.3 Areas of use.

8.4 Practical applications of the thermal imaging camera.

8.5 Thermography applied to electric power lines.

UNIT 9. 3D laser scanner.

9.1 Laser scanning of building.

9.2 Outputs of scanning.

9.3 Point cloud editing.

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9.4 Import point cloud to BIM software.

9.5 Use the point cloud for 3D modelling.

9.6 IFC export.

UNIT 10. Photogrammetry.

10.1 Basic concepts.

10.2 Use of photographs and videos.

10.3. 3D model generation.

10.4 Import the model to BIM.

10.5 Practical application of stereophotogrammetry.

UNIT 11. 3D-printed construction technologies.

11.1 Introduction.

11.2 Advantages of 3D printed.

11.5 Technologies and equipment.

11.4 Programming and optimization.

11.5 On-site applications of 3D-printed construction technologies.

11.6 Factory applications of 3D-printed construction technologies

In order to make better use of these didactic contents, 13 Flashcards directly related to these contents were made, which are shown in the following table:
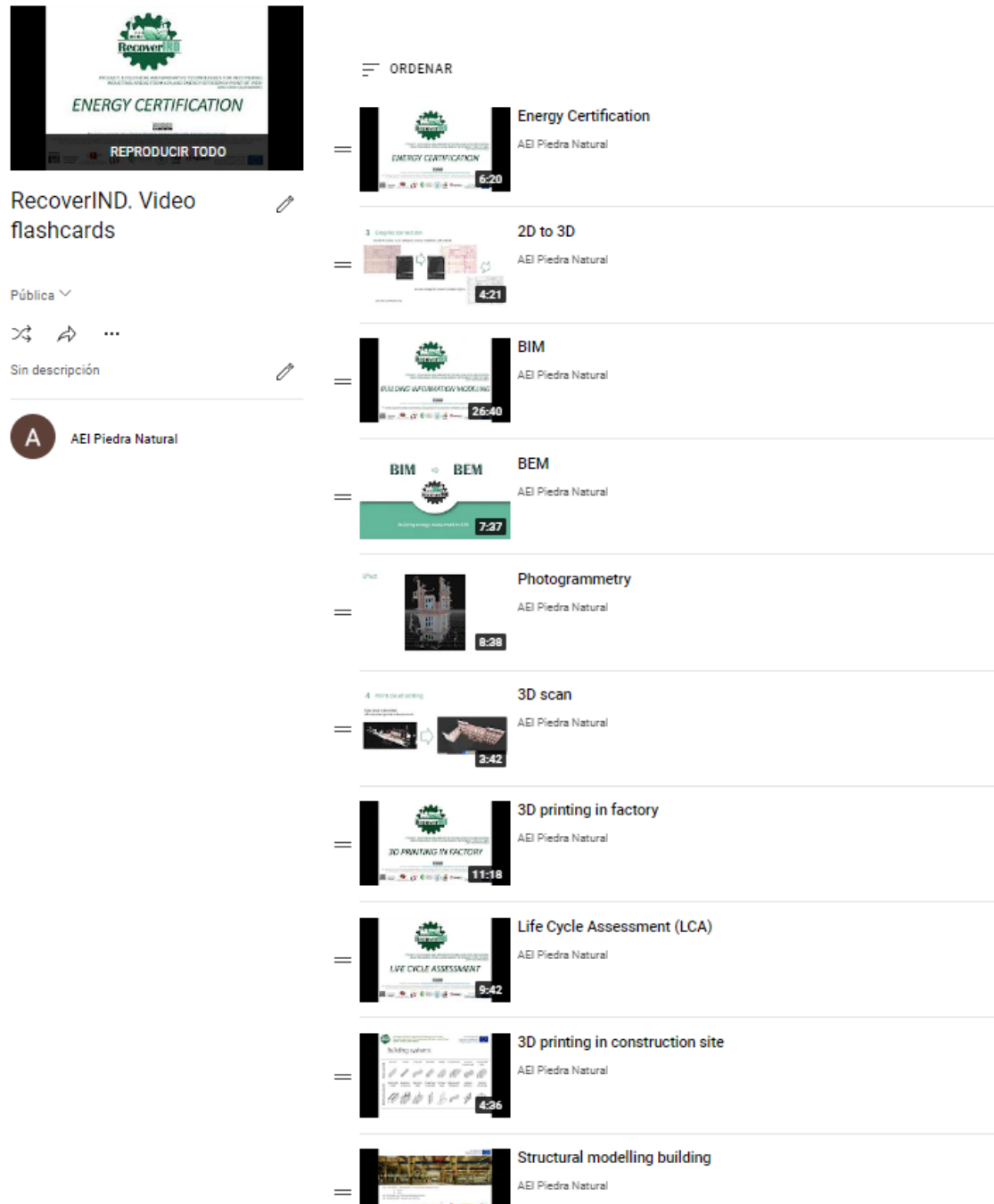
LIST OF INTERACTIVE RecoverIND FLASHCARDS

UNITS	FLASHCARDS
1. LCA	1. Life Cycle Assessment Flashcard.
2. Energy Efficiency	2. Energy Efficiency Flashcard.
3. Energy Certification	3. Energy Certification Flashcard.
4. BIM	4. BIM Flashcard.
5. Use of 2D documentation for the 3D inventory of building	5. 2D to 3D Flashcard.
6. Structural modelling of buildings	6. Structural modelling building Flashcard.
7. Drones	7. Drones Flashcard.
8. Termography	8. Termography for industrial electrical installations Flashcard.
9. 3D laser scanner	9. 3D laser scanner Flashcard.
10. Photogrammetry	10. Photogrammetry Flashcard. 11. Stereophotogrammetry Flashcard.
11. 3D-printed construction technologies.	12. 3D printing in factory Flashcard. 13. 3D printing in construction site Flashcard.

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All of this contents, are available in the platform of the project as well as in Youtube, specifically in the following links:

RecoverIND project web: https://recoverind.eu

RecoverIND OER: https://recoverind.eu/en/oer/

Youtube Playlist: https://www.youtube.com/playlist?list=PLsofEA09jEWz47ghf-UtfK3Byn1SXAYVN

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