

R3-A5, A6, A7.

VR-Adaptative Training Content and Evaluation



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Content

INTRODUCTION	3
1. RECOGNITION AND VALIDATION OF KNOWLEDGE, SKILLS AND COMPETENCES	4
1.1. Handling of blocks/slabs and overhead cranes.	4
1.2. Cleaning in a natural stone factory.....	5
1.3. Waste management and storage.	6
1.4. Forklift Truck Operation.....	7
2. PILOT COURSES	9
2.1. Pilot course in Split	9
2.1.1. Course details.....	9
2.1.2. Presentation of content	9
2.1.3. InclusiveStone VR training	10
2.2. Pilot course in Murcia	12
2.2.1. Course details.....	12
2.2.2. Presentation of content	13
2.2.3. InclusiveStone VR training	14
2.3. Pilot course in Würzburg	16
2.3.1. Course details.....	16
2.3.2. Presentation of content	16
2.3.3. InclusiveStone VR training	18
3. QUALITY ASSESSMENT	18
3.1. Evaluation questionnaire	18
3.2. Results of the questionnaire. Conclusions.....	20

INTRODUCTION

The purpose of this document is to report on a series of training courses and their validation that have been carried out for this purpose. The courses have been designed to be practical and accessible, ensuring that people of diverse backgrounds and abilities can participate and benefit from them.

During these training sessions, 3D Virtual Reality animations played a key role, serving as an effective tool to enhance understanding and learning. Participants had the opportunity to experience first-hand the use of this technology, allowing them to gain a deeper and more detailed perspective of the heritage we are working to preserve.

In this report, we will detail how the courses were structured, who attended and what methods were used to deliver the content effectively. We will also provide an assessment of how these courses have influenced the participants and the overall perception of the InclusiveStone project. Our approach is to present the facts in a clear and straightforward manner, reflecting the practical and tangible impact these courses have had in advancing the project's objectives.

This report and all information about the project are available on the InclusiveStone website: <https://inclusivestone.eu/>



1. RECOGNITION AND VALIDATION OF KNOWLEDGE, SKILLS AND COMPETENCES.

It should be noted that the knowledge to be acquired by students is the same whether they have a disability or not. As has been repeated on several occasions, the aim of InclusiveStone is, while maintaining the same content, to make a series of reasonable adjustments to both the curriculum and the workplaces.

The didactic materials already existing in the training courses, as well as those made with the support of Virtual Reality tools, are a great support to achieve the objectives of the project.

As is well known, the workstations finally developed in the Virtual Reality tool and at curriculum level were the following:

1. Operation of the bridge crane. In this workstation, 2 Virtual Reality scenarios have been developed. Curriculum: HANDLING BLOCKS, BALLS AND RACHONS OF NATURAL STONE and HANDLING LOADS WITH BRIDGE CRANES AND POLYPASTES.
2. Cleaning. In this workstation 1 Virtual Reality scenario has been developed. Curriculum named: CLEANING IN NATURAL STONE FACTORIES AND MINERALS AND ROCKS BENEFICIATION PLANTS.
3. Waste management and storage. In this workplace 1 Virtual Reality scenario has been developed. Curriculum named: WAREHOUSING OF CONSUMABLES AND PRODUCTS IN NATURAL STONE AND MINERALS AND ROCKS PROCESSING AND BENEFIT PLANTS.
4. Handling forklift trucks. Two Virtual Reality scenarios have been developed for this workplace. Curriculum entitled: LOAD HANDLING WITH FORKLIFTS

To develop these jobs, as mentioned in the curriculum in more detail (R2-A3. InclusiveSTONE Course Curriculum), the required knowledge, skills and competences will be the following:

1.1. Handling of blocks/slabs and overhead cranes.

COMPETENCIES



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RP1: Assisting in the reception, distribution and storage of blocks, blocks and blocks of stone, according to the work instructions and in safe conditions, to ensure the supply of raw materials for the natural stone production process.

RP2: Collect and provide tools and consumables for the correct and safe positioning of blocks, blocks and blocks in the cutting or sawing machines, according to the work instructions and in safe conditions.

RP3: Preparing and applying pastes and mortars, following the established instructions and complying with safety and environmental regulations, to settle and immobilise the material on the cutting and sawing machines.

EVALUATION CRITERIA

C1: Describe in general terms the organisation and operation of a block workshop, relating the main work processes and activities, with the trades and facilities, as well as with the equipment and machinery used, in order to collaborate in the reception, distribution and storage of natural stone blocks.

C2: Describe the industrial process used for the handling of blocks, blocks and slabs, indicating those actions that guarantee the stability of the load, as well as the safety of the means, machines and people involved in the processes.

C3: Select the necessary tools and equipment to position the stone in the cutting machines, ensuring its stability and safety, following the established procedures.

C4: Prepare pastes and mortars with the established dosages and following the manufacturer's specifications in order to apply them directly on the block and guarantee their perfect stability, minimising vibrations.

1.2. Cleaning in a natural stone factory.

COMPETENCIES



RP1: Transport and stockpile consumables and products, in a safe way, manually or using auxiliary elements, to ensure the supply of the machines in the process and/or their storage.

RP2: Cleaning natural stone elements, removing possible adhered elements, for their appropriate transformation, storage or dispatch.

RP3: Cleaning and conditioning machinery, equipment and installations, tools and work area, in the established conditions and in compliance with safety and environmental protection regulations, for the correct and safe performance of the work.

RP4: Carrying out complementary tasks to assist in the storage and dispatch of goods, following instructions.

EVALUATION CRITERIA

C1: Describe, in general terms, the organisation and operation of mineral and rock processing and beneficiation plants, relating the main work processes and activities with the trades and facilities, as well as with the equipment and machinery used.

C2: Describe, in general terms, the organisation and operation of natural stone processing plants, relating the main work processes and activities with the trades and facilities, as well as with the equipment and machinery used, in order to collaborate in the reception, distribution and storage of natural stone products.

C3: Identify the main types of intermediate and final products of natural stone processing plants, recognising the main characteristics and basic quality requirements.

C4: Apply the necessary washing processes for each type of material according to its real state and the process to which it is going to be submitted.

C5: Apply the most appropriate method to carry out the cleaning of machinery, equipment, installations and work area, taking into account the established safety measures and environmental criteria.

1.3. Waste management and storage.

COMPETENCIES



RP1: Transport and stockpile consumables and products, in a safe way, manually or using auxiliary elements, to ensure the supply of the machines in the process and/or their storage.

RP2: Cleaning natural stone elements, removing possible adhered elements, for their appropriate transformation, storage or dispatch.

RP3: Cleaning and conditioning machinery, equipment and installations, tools and work area, in the established conditions and in compliance with safety and environmental protection regulations, for the correct and safe performance of the work.

RP4: Carrying out complementary tasks to assist in the storage and dispatch of goods, following instructions.

EVALUATION CRITERIA

C1: Describe the processes of transport and stocking of consumables and intermediate and final products, in order to assist in their reception, distribution and storage, by mechanical and manual means, depending on the different machines existing in a plant for the treatment and processing of minerals and rocks and the working of natural stone.

C2: Apply storage systems according to the different materials and products received, intermediate and final products.

1.4. Forklift Truck Operation.

COMPETENCIES

RP1: Correctly interpret orders for the movement of materials and products for their loading or unloading, in order to proceed with their storage, supply, dispatch or any other movement in the logistics flow.

RP2: Correctly handle products and loading units for their subsequent handling, following the procedural instructions or orders received.

RP3: Handling automated or manual forklift trucks, following the established procedures, observing the rules for the prevention of environmental occupational hazards.

RP4: Performing the first level maintenance of self-propelled forklift trucks or manual traction forklifts, ensuring compliance with the minimum health and safety provisions established for their use.

RP5: Carrying out the loading or unloading of materials and products according to the instructions received and, where appropriate, under the supervision of a person in charge.

RP6: Transporting and supplying raw materials and materials to the production lines, as well as removing waste generated in the production processes to the areas provided for that purpose.

RP7: Adopting the safety measures established for the prevention of occupational hazards and workers' health.

RP8: Collaborating in stock control by transmitting information on the movement of loads carried out by the worker.

EVALUATION CRITERIA

C1: Identify the basic conditions for handling materials and products for their loading or unloading in relation to their nature, state, quantities, protection and means of transport used.

C2: Classify and describe the different types of palletisation, relating them to the form of constitution of the load to be transported.

C3: Interpret and apply the regulations on labour risk prevention and workers' health.

C4: Interpret the symbols used in the signposting of the environment and means of transport.

C5: Identify the elements of the machines foreseen for safe driving, as well as the first level maintenance operations.

C6: Handle loads and/or drive forklift trucks, carrying out conventional loading, transport and unloading operations of materials or products, taking into account safety measures, risk prevention and signposting of the working environment.

C7: List the basic conditions for transporting and supplying raw materials and materials to production lines.

C8: Filling in the support established by the company, the documentation generated by the movement of cargo.

2. PILOT COURSES

Three pilot courses were held for the InclusiveStone project. In Split (Croatia), in Murcia (Spain) and in Würzburg (Germany).

These pilot courses were very well attended, with over 80 participants in total (87 participants in Split, 39 in Split, 36 in Murcia and 12 in Würzburg). In these courses, adapted training based on reasonable accommodations was provided and the participants were informed about the different offers that the world of natural stone could offer them through the curricular adaptations developed in the InclusiveStone project.

The trainees were also able to carry out a practical training with the Virtual Reality tool, where the participants were able to observe virtual working environments.

2.1. Pilot course in Split

2.1.1. Course details

The first of the courses took place in Split on 3 November 2023, on the premises of one of the participating schools in Split. It was attended by 39 people, including teachers, natural stone professionals and above all students with different disabilities (23 of them under the age of 18).

2.1.2. Presentation of content

Karmela Šegvić, as a representative of the Klesarska Skola (KSK), welcomed the participants. She made a presentation about the objectives of the project in general and then specified about the course in question by conducting a training that would serve as an introduction to better understand the virtual environment.



2.1.3. InclusiveStone VR training

Carlos Martínez (CTM) then showed some of the 3D scenarios developed in the InclusiveStone project. He showed the audience how to use the virtual reality equipment for the different situations, so that the users could use it afterwards.





There was a remarkable show of initiative on the part of the participants, who demonstrated a strong commitment to testing the tool, with almost unanimous participation in its evaluation and application.

2.2. Pilot course in Murcia

2.2.1. Course details

This course was held at the FAMDIF facilities on 14 December 2023 in Murcia (Spain). This course was given for two different groups and in total 36 people attended, including students and teachers of FAMDIF, divided into two groups, one of these groups with students with a disability and the other mostly made up of people over 45 years old, some of whom also had a physical disability. One of the participants was a minor at the time of the course.

2.2.2. Presentation of content

In this course, María José Fernández, as representative of FAMDIF, was in charge of welcoming the participants and explaining the objectives of the project, and David Caparrós (CTM), gave a lecture on the adapted jobs of the natural stone industry in the project and, in particular, making a broad introduction on the tasks that were going to be shown in the Virtual Reality demo in which they would participate.



Group 1.



Group 2.

2.2.3. InclusiveStone VR training

Carlos Martínez (CTM) was in charge of showing the VR tool developed. He explained the controls and the environment to the users, so that they had some prior information. After these indications, the participants had the opportunity to use the tool. A large number of participants were willing to use it in the two groups.





2.3. Pilot course in Würzburg

2.3.1. Course details

The last pilot course took place in the German city of Würzburg on 18 January 2024 at the Conference Center Burkadushaus, organised by DNV. This course was attended by around 12 students, as well as teachers from a school focusing on people with disabilities (IFD).

2.3.2. Presentation of content

First of all, Reiner Krug, as the German representative of the consortium, welcomed the participants and gave a brief explanation of the objectives of the project and the course.

Then, David Caparrós (CTM) gave an introduction to the different workstations that will be shown in the demonstration, to continue with a training on them with the help of the contents developed in the project..



2.3.3. InclusiveStone VR training

Carlos Martínez (CTM) was in charge of showing the scenarios developed for the VR tool, as well as the controls that the situations required, so that the attendees could later use it. There was great initiative from the participants to try out the tool.



3. QUALITY ASSESSMENT

3.1. Evaluation questionnaire

At the end of each of the pilot courses, each partner in charge of the courses provided an evaluation questionnaire to the participants (students) so that their feedback could be used for future improvements.

Screenshots of the questionnaire in question are shown below:

Example of the form in Germany:



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Pilot course activities in Würzburg. January 2024. Feedback questionnaire.
Adaptative Learning Paths for Employability of People with Different Skills in the Stone Sector.



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1. How would you rate the overall effectiveness of the pilot activities in achieving their intended goals?

Excellent	Very good	Good	Fair	Poor

2. How would you rate the clarity and organization of the pilot activities in terms of providing a structured learning experience?

Very clear and organized	Clear and organized	Neutral	Unclear	Very Unclear and Disorganized

3. How helpful were the training materials and resources provided during the pilot activities?

Very Helpful	Helpful	Neutral	Not helpful	Not at all helpful

4. How realistic and applicable do you find the proposed mechanisms for adapting in your workspace?

Very Realistic and Applicable	Realistic and Applicable	Neutral	Not Realistic and Applicable	Not at All Realistic and Applicable

5. How would you rate your overall experience with the pilot activities?

Excellent	Very good	Good	Fair	Poor

6. Would you recommend similar pilot activities to your colleagues or industry peers?

Definitely	Probably	Not sure	Probably not	Definitely not

7. What specific aspects of the pilot activities did you find most valuable, and are there any areas that you think could be improved? Do you have any additional comments, suggestions, or feedback regarding the pilot activities?

3.2. Results of the questionnaire. Conclusions.

The collected results are shown in the Quality report of the project, and, as mentioned above, were used as a support for the improvement of the project contents.

Students and teachers who responded to the pilot course surveys generally rated the course positively. The students were satisfied with the pilot course, and it has served to improve their knowledge in order to, with appropriate reasonable adjustments, be able to develop various jobs in the natural stone sector.

Generally, they consider the course to be well structured, with a good atmosphere, interesting and clear contents that help their training, together with the training team, which they also value positively. As suggestions, the users think that the course is good, one of them suggests the implementation of the 3D animation learning system for all subjects.

In addition to the evaluation of the pilot courses by the students, after the end of the pilot courses, teachers from KSK and Famdif also wanted to share their opinion on the course. In fact, these two entities have acquired Virtual Reality glasses (in this case the same ones used for this project, the Oculus Quest) to incorporate this tool in their day-to-day work for future training.



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Consortium members: Deutscher Naturwerkstein-Verband e.V. (DNV), Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM), Federación de Asociaciones Murcianas de Personas con Discapacidad Física o Orgánica (FAMDIF). Institute of Entrepreneurship Development (IED). Klesarska skola (KSK).