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Augmented Reality applied to training on key competences

WP3. Identification of Key Competences Needs

R4. Key Competences Map

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The following organizations were Partners in the AR-key Project:

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- Centro de FormaÇao Professional de Industria da ConstruÇao Civil e Obras Públicas do Sul (Portugal),
- Fundación Laboral de la Construcción (Spain),
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1. Introduction

1.1. Description

The aim of this Work Package is to establish the essential key competences that unskilled workers of construction sector should have to make basic calculus to carry out properly refurbishment activities. Hence the WP3 includes the following objectives:

- ✓ Identification of basic math skills to make calculations and measurements related to refurbishment activities.

- ✓ Identification of basic science and technology skills necessary to understand the physical and chemical characteristics of the materials applied in a building site.

For the achievement of related objectives, several steps have been accomplished as part of the analysis:

1. **Documentary analysis.** A consultation of documentary sources carried out to establish a first comprehensive set of key competences:
   - Partners' didactical materials on this issue.
   - On-line applications.
   - Math and science books.

2. **Field work with VET experts and target groups.** Survey in order to identify key competences needs of unskilled workers from building industry and Focus Group to associate key competences with refurbishment processes.

3. **Analysis of results.** Data from survey and focus group have been analyzed and compiled in a report, which shows each country results (see *R3. Field Study on Key Competences*).

4. **Rating skills matrix.** The information of global report on field study produces as a main outcome the Key Competences Map. During partners meeting held in Lisbon, the final perimeter of the skills map was set up by partners –all experts in VET in construction sector– as well as the learning outcomes to be developed for the ARKEY App training system.

2. Key Competencies

2.1. Global results

As previously explained, the aim of this phase is to settle the key competences on:

- ✓ Basic mathematics knowledge for measuring and calculating tasks related to refurbishment activities.
- ✓ Basic science and technology competencies needed for understanding the physic and chemic features of materials frequently applied at construction work.

The final perimeter of the competencies map has been decided taking into account two core sources of information:

1. Integrated data coming from field study.
2. Rating skills matrix where the theoretical decision was to include in the final map those competencies which final average score was equal to or less than **7.5**.

Competencies	N	Average	Standard deviation
Use of new building materials.	297	5,33	3,070
Using of new technologies applied to building maintenance and renovation (External Thermal Isolation System; fastening to the supporting surface)	376	5,87	2,600
Using of technological progresses regarding the energy rehabilitation of buildings (thermographic camera)	374	5,89	2,640
Knowledge of geology (types of soils).	383	6,07	2,360
Knowledge of thermal bridges.	386	6,20	2,550
Knowledge of building ventilation.	386	6,30	2,460
Knowledge of thermal properties of materials.	385	6,34	2,350

Competencies	N	Average	Standard deviation
Using of new construction elevation and transportation machinery.	374	6,34	2,820
Use of new cutting machinery of construction sector.	376	6,36	2,670
Knowledge of acoustic properties of materials.	372	6,36	2,860
Knowledge of geography (physical geography: how the hot appear, the processes of the natural environment...?).	382	6,46	2,300
Knowledge of climatology (coldest to the north, greater humidity at the coast...)	387	6,59	2,340
Identification within the building site of materials behaviour against cold, fire, dilatation, etc.	384	6,73	2,210
Weight (Newton).	387	7,10	2,200
Rule of three.	386	7,10	2,380
Using of new construction small machinery.	388	7,18	2,720
Use of installation and assembly systems provided by manufacturers (e.g. lifts).	376	7,20	2,440
Use of New equipment for earthwork.	373	7,28	2,410
Using of Computer.	392	7,34	2,400
Using of Smartphone and tablets or other devices alike.	394	7,35	2,510
Triangles operations.	389	7,41	2,200
Angles operations.	386	7,41	2,220
Fractions (1/3, 1/5 ...).	387	7,43	2,320

Competencies	N	Average	Standard deviation
Equivalences between several measures (cubic metres - litres).	384	7,43	2,340

The training content is then developed based on these competencies in order to provide content to the AR.KEY App.