CONSTRUCTION INHERITANCE. TRANSFER OF KNOW-HOW FROM OLDER CONSTRUCTION WORKERS TO YOUNG ONES

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Abstract

“CONSTRUCTION INHERITANCE” European project addresses the preservation of work processes, materials and traditional tools for building restoration, through compilation of key knowledge which will be the basis for the development of training contents and its subsequent m-learning products.

The partnership consists of six partners: Bildungszentren des Baugewerbes eV -BZB- (Germany); Ente per la Formazione e l’addestramento professionale nell’edilizia -Formedil Puglia- (Italy); Institut wallon de Formation en Alternance et des indépendants et Petites et Moyennes Entreprises -IFAPME- (Belgium); Comité de Concertation et de Coordination de l’Apprentissage du Bâtiment et des Travaux Publics -CCCA-BTP- (France); Centro de Formação Profissional da Indústria da Construção Civil e Obras Públicas do Sul -Cenfic- (Portugal); all led by Fundación Laboral de la Construcción –FLC- (Spain).

For many years, only major monuments were protected and restored. Today it is recognized that entire groups of buildings, even if they do not include any example of outstanding merit, may have an atmosphere that gives them the quality of works of art, welding different periods and styles into a harmonious whole. It is the so called “integrated conservation” wherein such buildings should also be preserved.

Integrated conservation is achieved by the application of sensitive restoration techniques and the correct choice of appropriate functions of buildings. Thanks to many years of experience, senior workers in the construction sector have a precious knowledge about restoration and integrated conservation of old buildings and about methods and tools for artisanal work. However, with the impending retirement of those professionals, this knowledge risks of being lost for good.

To avoid that, project will take into account knowledge transfer relating to processes, materials and techniques applied in six real refurbishment works, a European architectural heritage which will be the basis for the development of training contents and its subsequent m-learning products.

One of these products will be an application for mobile devices (APP), which shall be used as a complement for the existent training in the national systems of VET, and which will help to improve trainees’ skills in restoration activities in EU countries.

Keywords: Open Education Resources, Vocational Education and Training, Mobile learning (m-learning), Traditional architecture in Europe, Restoration works.

1 INTRODUCTION

Several studies show that the loss of knowledge is a fact when experienced employees leave the company for retirement. According to Dr. Peña (2013)[1] when employees retire, employers lose the institutional knowledge or history that they take with them and many organizations lack sufficient transfer programs to stem the loss. This situation is particularly significant in the construction industry as the building sector became a specialized and industrialized activity, in particular due to the spectacular booming occurred during last decade. This industrial approach is causing the loss of traditional crafts and what is even more critical, the loss of these workers’ know-how. In this respect, the SmartMarket Report carried out by McGraw Hill Construction (2012)[2] reports that nearly half (49%) of general contractors were concerned about finding experienced craftworkers by 2014. As a result, the recommendation made in this report is to encourage experienced employees to keep on somehow in the industry by creating strategies to foster their priceless input.

In addition to this and according to 77th Euroconstruct Conference (2014)[3], the renovation and maintenance sector is actually higher in monetary terms to the residential sector. Thus, the renewal
sector is an activity of great singularity in the building industry that requires qualified workers with specific know-how regarding traditional methods to undertake building renovations such as façade lining (with stone, brick, rendering, etc.), staircases made by traditional materials, restoration of vaults and roofs, carpentry, etc., especially due to the noticeable ageing of the European real estate and the relevance of the urban planning, the logical economic impact and the new requirements set up by Europe to meet the energy objectives by 2020.

There are two other important factors necessary to take into account in this proposal: According to the DG of Health and Food Safety from the European Commission by 2025 more than 20% of Europeans will be 65 or over. As a result, a great majority of jobs positions being created in the EU will be not new ones, but a replacement of those that held the job and retire. Accordingly, it seems necessary to orchestrate strategies to drive a non-traumatic generational change, because as highlighted in the LDV project InPhaseOut (“Training Course with intergenerational mentoring system regarding old building rehabilitation”, 2012-1-NL1-LEO05-08715) “the earlier generations of workers in the construction sector must show their knowledge to new generations ones”

And here the big problem comes up. The middle-skilled workers who were in charge of transmitting their know-how to low-skilled newcomers to the sector, who have a lack of skills to address properly restorations activities especially those applied to old buildings, are starting to become scarce due to their retirement.

By contrast, it is a fact that conservation and recovery of traditional techniques and materials that are part of the unique and specific cultural heritage of each European community is a responsibility that must be assumed by its inhabitants and therefore should be studied and protected. But, what about whether there is not enough skilled manpower available to undertake the renovation of buildings under basic quality parameters? Even more, what does it happen with the know-how that leaves along with these workers when retire that the companies are not able to retain?

2 METHODOLOGY

Hence, this project is trying to answer the questions above throughout the execution of the following main aims:

- Gathering knowledge and techniques regarding the traditional processes in the construction sector related to the restoration of buildings in order to minimize the loss of know-how.
- Training young workers in these techniques to ensure a proper restoration of the traditional elements especially in old buildings, in order to secure a stable manpower supply from now on in these kind of activities.

It is noteworthy that this project is according to the “Strategy for the sustainable competitiveness of the construction sector and its enterprises” (2012)[4], which states that the sector is going to need skilled workers to face the renewal of building and zero energy building.

Also, it is based on the Agenda for “New skills and jobs”, launched in 2010 by the European Commission in which it is set up the necessity of boosting a smart, sustainable and inclusive growing for the following 10 years, particularly because the project aims at equipping people with the right skills for the jobs of today and tomorrow.

All in all and given the rationale above, the development of this project aiming at gathering know-how in order to train young workers, it would help to keep the building inheritance in Europe, mainly by the improvement of the execution of traditional procedures as well as a correct application of materials.

To do so, the project is developing, testing and implementing an online training course designed towards an APP for mobile devices, considering intergenerational knowledge transfer regarding processes, techniques and materials for restoration of antique buildings.

By gathering knowledge and best practices along the six European countries of this Strategic Partnership, it is expected to cover all countries’ needs with a common tool and approach and with common accreditations, in order to:

- Increase transparency and mutual trust between VET systems by cross-border cooperation, as the partnership is made up by VET entities from Spain, Portugal, Italy, France, Belgium and Germany.
• Provide a common training system for the restoration of Europe-wide, making working mobility between countries feasible, by job shadowing along countries to fully satisfy market needs and expectations.
• Ensure an easy access to VET by offering an Open Educational Resource through an APP for mobile devices: Construction Inheritance APP.
• Promote stronger coherence between worlds of work and training to better perform in terms of youth unemployment by addressing labour market mismatches (according to the “Strategy for the sustainable competitiveness of the construction sector and its enterprises”).
• Assure the process of recognition and validation of skills by common accreditations and coherent implementation at national level of ECVET.
• Strengthen synergies between VET institutions and key stakeholders by NAG endorsement to ensure a close alignment of VET provision to contribute for the achievement of regional, national and European policy goals.
• Preserve, safeguard and disseminate knowledge among the various generations of workers while giving value to senior’s experience by highlighting successful working practices.
• Contribute to dissemination of good practices in Europe.
• Guarantee a proper restoration of traditional elements of old buildings in Europe by encouraging a new generation of qualified workers.
• Support the preservation of our cultural heritage and the reuse of the built-up environment, by the promotion and dissemination of good practices.

3 RESULTS

3.1 Handy Guide: Traditional restoration being applied to antique buildings in Europe

In order to provide a useful and visual input concerning traditional restoration, the project has produced a practical guide for all groups of interest: trainees, VET institutions, enterprises, VET and employment authorities, workers, professional associations and society in general.

To do so, first step has been the analysis of the productive processes of traditional restoration being applied to refurbish antique buildings (materials, techniques, applications, tasks performed by workers...) in consortium countries. This identification has been carried out by two techniques:

- Job observation: 6 key restoration case in each country
- Semistructured Interviews: 5 interviews with key informants

Based on the information collected above, the partnership has worked out a document that contains commonest traditional techniques, materials and processes used by traditional trades and crafts at
risk of disappearing in refurbishment in several countries in Europe, including the six real rehabilitation works studied in depth:

<table>
<thead>
<tr>
<th>The palace Calò Carducci, Bari (Italy)</th>
<th>Farmbuilding, (France)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building at Mouraria, Lisbon (Portugal)</td>
<td>XVII century watermill, Amay (Belgium)</td>
</tr>
<tr>
<td>Grafschafter Castle, Moers (Germany)</td>
<td>Canalejas building, Madrid (Spain)</td>
</tr>
</tbody>
</table>

Table 1. Six cases of study

### 3.2 KSC Map (Knowledge, Skills and Competencies map)

Once ready the list of topics in terms of traditional techniques, materials and processes explained above, the partnership has described them in terms of Knowledge, Skills and Competencies (KSC) based on the European Qualification Framework (EQF) approach, in order to determine the key factors necessary to consider a person as a competent professional in a specific activity in this regard, meaning that is capable of: “Know”, “know-how” and “behave” in a specific context.

Tangible results with valuable information have been achieved regarding the skills needs identification, including a general description, its scope, the trades involved and the knowledge, skills and competences description:
This structure has been applied to the 18 skills selected, which knowledge is at stake for future generations. This final list of skills is shown in the following table:

Table 2. List of selected skills

<table>
<thead>
<tr>
<th>Site Stage I: Wall, structure and foundations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone cutting / cutting of customized pieces</td>
</tr>
<tr>
<td>Construction of the rows (courses) of brick walling/Rigging and construction to required specifications</td>
</tr>
<tr>
<td>Construction of false work/shoring scaffolds</td>
</tr>
<tr>
<td>Carving and configuration of structural lintels</td>
</tr>
<tr>
<td>Setting of the arch/vault elements and anchors or encounters to other construction elements according to their required layout</td>
</tr>
<tr>
<td>Reconstruction of staircases and other special elements: configuration of its structural elements</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Stage II: Roofs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placement of straps and components of the gable structure</td>
</tr>
<tr>
<td>Placement of tiles and plate covering</td>
</tr>
<tr>
<td>Execution of finishes and roof aprons</td>
</tr>
<tr>
<td>Resolution of roof encounters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Stage III: Plumbing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation and repairs of guttering, downpipes and system components</td>
</tr>
<tr>
<td>Execution of joints, encounters and anchors to other construction elements in sanitation installations</td>
</tr>
<tr>
<td>Finishing of encounters of roof plumbing with other building elements</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Stage IV: Finishing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment of the seams and joints in facades and interior architecture</td>
</tr>
<tr>
<td>Configuration of finishes and decorative elements of masonry elements (stone, brick)</td>
</tr>
<tr>
<td>Restoration and placement of other finishes of decorative elements</td>
</tr>
<tr>
<td>Decorative painting: selection of pigments and application of colour, lacquers and varnishes</td>
</tr>
<tr>
<td>Elaboration and application of templates and molds for decorative fittings</td>
</tr>
</tbody>
</table>

3.3 Learning Outcomes description

Learning outcomes are the nourishment that will feed up the APP “Construction inheritance”. Project partners are currently working on the development of these contents, which contain these aspects:
There will be one learning outcome per skill that will be the basis for producing the training contents for the App.

### 3.4 Open Educational Resource: APP “Construction Inheritance”

The training product will be an application for mobile devices, such as Smartphone and tablet, downloadable for Android or IOS in order to facilitate in a very practical and visual way, students’ learning on traditional techniques of building restoration. Therefore, the final result will be a training program accessible at any time from any country and accredited in the participating countries, overcoming the barriers of time and space that usually hinder workers’ participation in training actions.

The App “Construction inheritance” is right now under construction, but some features have been already decided:

- The App will be an interactive virtual environment based on real photos (360°) from the Palazzo "Calò-Carducci" (Bari, Italy). Therefore, it will allow users to make a 360° virtual tour.
- During the virtual tour, the user will be able to interact with 18 training points. Each of them will address one of the defined skills.
- Each interaction point will display after users’ action a pop-up, which will contain further information about the skill concerned as well as multimedia support to facilitate learning.

### 3.5 Experimentation and External validation: Pilot Experience

The Beta version of the APP will be tested through a "Pilot experience" with 60 trainees who will use the training programme in the six European countries of consortium, in order to trial and validate the product from a pedagogical, technical and technological point of view. Those trainees who successfully complete the programme shall receive the recognition of the learning experience through ECVET accreditation.
Results coming from this experimental action and further evaluation will provide the information for making final adjustments to the training APP, ensuring its quality and suitability to target groups and countries (more information at: http://microsites.fundacionlaboral.org/construction-inheritance?idioma=1)

3.6 Standard recognition of the Learning Outcomes: Accreditation and impact in VET systems

The project faces as well the challenge to make the working and learning mobility between countries feasible; therefore, partners are aware concerning the need of achieving a standard recognition among countries. With that purpose, it is foreseen the development of an action plan to bring on the accreditation of the skills and competences set by the training programme. To do so, we will undertake these actions that will also ensure the sustainability and further impact of the project:

- Facilitate the insertion of learning outcomes in VET curricula.
- Set up accreditation routes throughout EQF as well as recognition procedures.
- Relate occupations with the European classification of skills, competencies, qualifications and occupations (ESCO)
- Propose actionable policy recommendations, if necessary.

4 CONCLUSIONS

The project is not finished yet, so it is difficult to anticipate any final conclusion. Nonetheless, we can identify some aspects that we have already conclude so far:

- The loss of knowledge is a fact in the construction industry and this problem may jeopardize the future renovation of old buildings
- The project is having a very good acceptance in participant countries, who understand the problem at stake and are willing to keep this valuable know-how.
- Its implantation is being really hard, particularly because of the difficulty that implies to consider all the potential elements that involves a renovation as such. Besides, contents and graphical material is hardly accessible.
- All partners agree that virtualized contents could be a good way of keeping know-how long-term.

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