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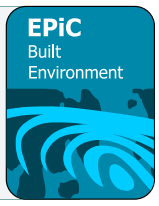

Soft Skills for Hard Hats; a Development Program for an On-Line, Multi-Lingual, Training Program for Construction Supervisors

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This collaborative paper highlights the Soft Skills for Hard Hats project that is a result of a successful bid to the 2016 Call for Erasmus+KA2 – Cooperation for Innovation and Exchange of Good Practices - Strategic Partnerships for Vocational Education and Training funding grant. This project consists of partners from Germany, Spain, Netherlands, Slovenia, Italy, United State of America, and the United Kingdom. Soft skills in construction supervisors has been a growing concern in the European Union. Soft Skills for Hard Hats (SSHH) was in response to that void by creating online, semi-immersive interactive scenarios aimed at first level construction supervisors to help develop soft skills. The focus is on four different soft skills: teamwork, communication, leadership and problem solving. The units are web based vignettes of difficult situations site supervisors are tasked to solve. As the situations evolve, there are pauses for the participants to make management choices. There are multiple paths to solve each situation. Upon completion, participants are provided feedback on how they handled each scenario with short and long term affects. Each unit enables participants to undertake an individualized learning experience based on the choices they make. This paper highlights the concept, framework, scenario outcome maps, examples, assessment, lessons learned and links to the on-line program.

Key words: competencies, soft skills, simulations, experiential learning, scenarios

Introduction and Background

Various reports, including the Charted Institute of Building (CIOB) 2011 report on skill requirements in construction, indicate there is a lack of soft skills in construction supervisors. These specifically include leadership, communication, problem-solving and teamwork. There is also inadequate soft skills teaching in vocational training and higher education. This has driven soft skills curriculum for construction management. As a result, soft skills have been successfully implemented as a part of the Coventry University experience for construction students and industry training sessions. Recognizing the need for further applications, Coventry University lead a Soft Skills for Hard Hats (SSHH) project after a successful 2016 Erasmus+KA2 funding grant included partners from Germany, Spain,

Netherlands, Slovenia, Italy, United States of America, and England. These partners are either Vocational Education Training (VET) providers closely connected to construction, or have close links to the industry. By developing the project tool, they will be able to complement their training programs by expanding soft skills. This paper highlights the case study and progress.

The main Learning Objectives proposed by this project are:

- Provide learning tools to complement and aid teaching and assessment of soft skills such as communication, leadership, problem solving and team work, for the construction sector within VET systems in order to improve individual's employability and mobility.
- Enhance VET provisions by complementing hard/technical skills they provide with soft skills and delivery of key competences employers require.
- Define a blueprint for development of scenarios relevant for multiple construction sectors.

The project created training material that can be used both in a formal learning setting and by individuals on their own time. Each unit enables participants to undertake an individual journey based on their choices. At the end of each scenario the individual receives feedback depending on the decisions taken throughout the process. The feedback focuses on efficacy of their choices. Each scenario is based on a real life scenario the individual is likely to encounter on a building site. The training material is not only useful for new apprentices, but also skilled construction workers that are in management and may lack soft skills. Audiences are apprentices in vocational training, workers targeting management promotion, trainers involved in VET, and within companies as a tool to reinforce soft skills.

Literature Review and Current Practices

The necessity for an appropriate understanding and application of Soft Skills in the modern construction professional is acknowledged in the structure of undergraduate education in the USA and the UK. Both the American Council for Construction Education Student Learning Outcomes (ACCE, 2014) in the USA, and the Chartered Institute of Building Educational Framework (CIOB, 2018) in the UK, make explicit reference to the need for construction graduates to possess wider communication and teamwork skills in addition to the hard technical skills. The CIOB report indicates the construction industry highlights "*a deficit in leadership and management skills within the industry*" (CIOB, 2013). The work of Andrews and Higson, supports this conclusion, when considering a cross European review of graduate employability skills across a range of sectors (Andrews and Higson, 2010). They review an extensive range of studies into the topic of soft skills including those by Weil, (1999), Sleezer et al., (2004), Possa, (2006) and conclude that there is the need for graduates to be responsive to the ever changing focus of an increasingly globalised and diverse workplace. The methodology of teaching soft skills is addressed by the work of Henry et al (2005) and Pursley al (2005). Whilst the former proposes that certain soft skills can be taught through traditional didactic processes the latter, in a report for the US Department of Labor, concludes that a hands on practical scenario based approach is more effective. This view is supported by UNESCO (2013) which argues that the European Vocational Education and Training (VET) systems are facing the "*challenge of accommodating a broader range of vocationally relevant adult learning, merging general with vocational education and formal with non-formal and informal learning modalities"*

Methodology for an International Partnership

The project partnership was composed of several institutions that had collaborated with one another on other projects. The effective cooperation and communication of the partnership was in accordance

with a precise and detailed working plan that defined precise timings for all the necessary activities. It was equally important to have a clear set of principles governing the cooperation as well as an early warning system in order to identify delays/problems with regard to the implementation of the work steps at an early stage. A core element of this early warning system was regular progress reporting obligations from the partners on the state of implementation of milestones.

Partnership communication – The Partnership used English as a working language. Partnership communication was conducted with a variety of communication tools:

- Sharepoint - the partnership used a password protected collaborative work space where necessary files were exchanged and saved.
- Day to day contacts with the partners (via e-mail, phone, skype) - regular communication amongst partners was conducted via email and by telephone calls with email being the preferred method as it allowed an audit trail of the activities.
- Transnational project meetings (4) - There were 4 transnational project meetings planned on 6 monthly intervals to coincide with key project milestones. It was expected that each partner is represented by 2 people for a 2-day duration of the project meeting

The languages within the project partners included: English, German, Spanish, Italian, Slovenian and Dutch. Even though the videos were formally produced in the Netherlands, it was decided that the final outputs would not be produced in Dutch. The base languages used were English, German, Spanish, Italian and Slovenian. The outputs were contextualized to the native location in terms of construction process and procedure, but the overall structure of each output was the same.

The multiple languages meant that the project, though EU funded, has a worldwide application. Any country has the ability to use the learning materials on an open source process. There is no cost. The dissemination of the project has shown expanded testing in Peru, using the Spanish version. In addition, the materials are planned for use in Hong Kong using the English version.

Due to the nature of the production, videos overlaid with voices of the five native languages, the opportunity to offer additional languages in the future is fully possible. The voices would need to be recorded, using the scripts produced, and overlaid onto the video. The feedback section and instructions would be altered into the new language. There is a clear possibility and opportunity to add further languages to the product, e.g. French or Chinese.

Outline for Planning Structure

Creating an outline for the program that could be easily understood was critical with the high number of stakeholders. This resulted in Table 1: Learning Outcomes.

Table 1

Learning Outcomes

Intellectual outputs	**IO 1 Teamwork**	**IO2 Leadership**	**IO3 Communication**	**IO4 Problem Solving**
Scenario 1	Dealing with difficult people	Planning/organizing/time management	Active listening	Defining the problem

Scenario 2	Communication	Decision making and prioritizing	Non-verbal communication	Creating possible solutions
Scenario 3	Effective delegation	Role model/integrity	Choosing an appropriate mode of communication	Making decision or not making decision
Scenario 4	Influencing	Responsibility	Job site cooperation	Implementation
Scenario 5	Supporting	Motivation	Communication with different stakeholder	Lessons learned

The learning outcome table allowed the team to delegate planning to partners. All total, there were twenty separate videos to create. Upon agreement of Table 1, the team further split the four transversal skills into more detailed explanations of the intellectual output.

Once defined, each skill was delegated to a partner for detailed scenario mapping. See Figure 1 below.

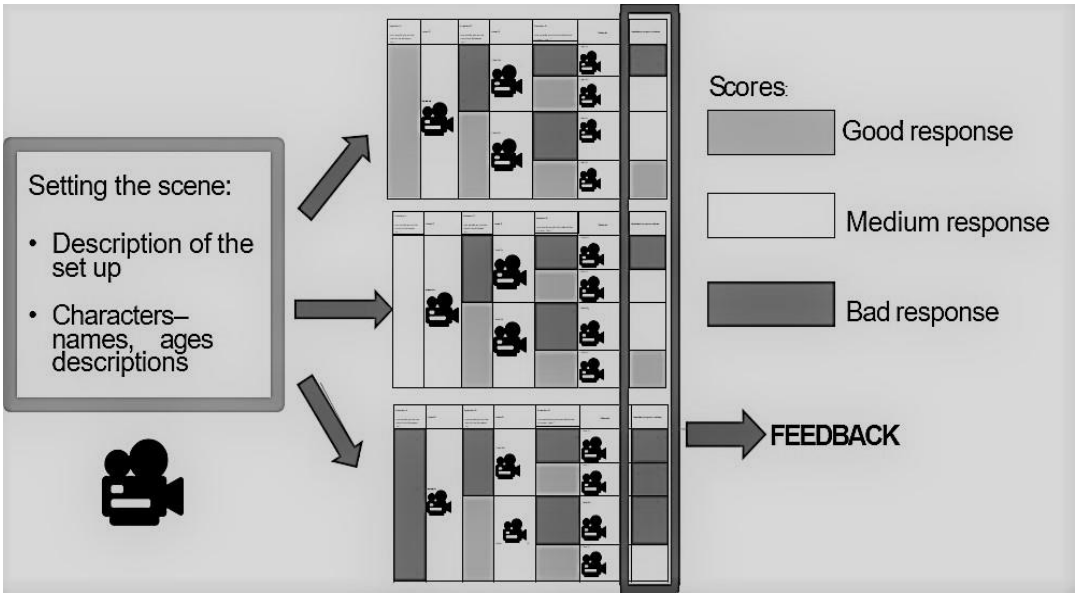

Figure 1: Detailed Scenario Mapping

The scenario maps were the documents that led many team meetings. The team would debate and define a scenario. An example might be a distracted employee playing on their smart phone during a meeting. One team member would then draft several scenario maps. These would then be the basis for a team meeting to further detail and define. All in, each one of the scenario maps would take eight hours of time to create. They were more time consuming that originally planned.

Creating the Videos

The graphics were created by the Dutch Partner, the Open Universiteit of the Netherlands. The program can been utilized at https://softskillshardhats.eu/ Initially, the plan was to create video clips for each of the decision-making stages in the scenarios. However, this proved to be expensive and difficult to achieve due to the multi-lingual aspect of the project, i.e. lip synching would detract from the learning experience. Therefore, it was decided that the best solution was to create static visuals including commentary. Additional visual guidance, moving photos, would highlight specific points. An example would be a distracted person on their phone in a meeting. The image of this worker moves across the screen to highlight the distraction they are creating. Several screenshots are shown below in Figures 2, and 3.

Figure 2. Introduction Pages

Figure 3: Communication and Leadership Introductions

As the participants progress through the scenarios they are presented with decisions to make after each step. Following the video with voice overlay, the narrator asks them to consider the choices they could make. After selection, the next video starts with the appropriate situational response. The path through one scenario will require each participant to watch four videos even thought there are twenty one potential options after the initial situational start up. Figure 5: Motivation highlights a situational start up. Figure 6: Motivational Choices highlights an example of three choices the participant could select.

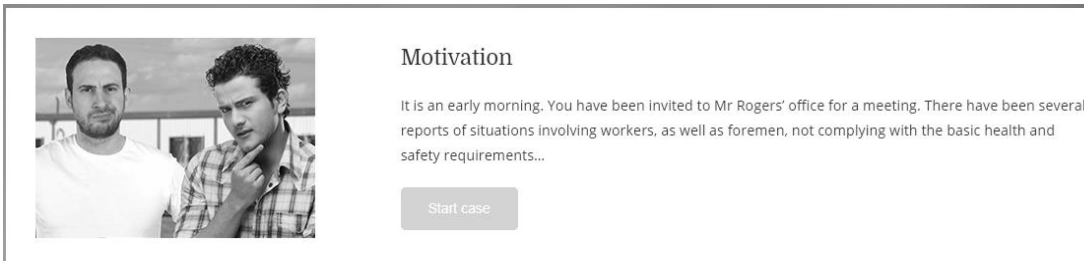

Figure 5: Motivation Situation

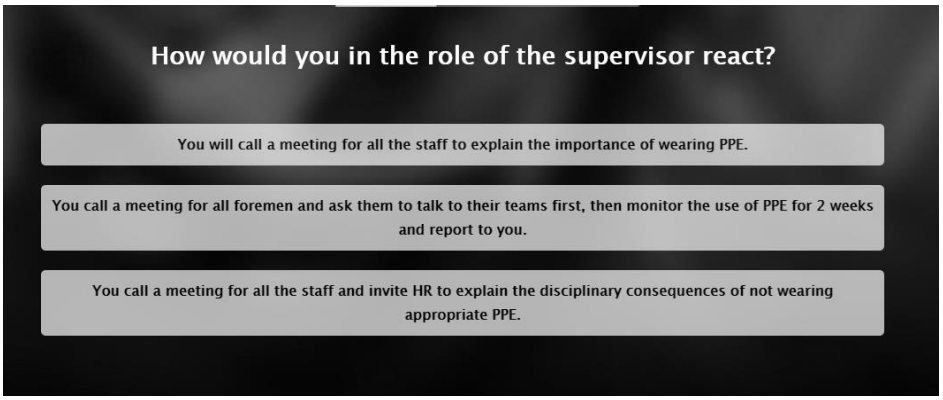

Figure 6: Motivation Choices

Upon completion of the scenarios participants are provided a basic score via three faces as highlighted in Figure 7 below. They also receive further feedback in why their choices warranted the situational reactions.

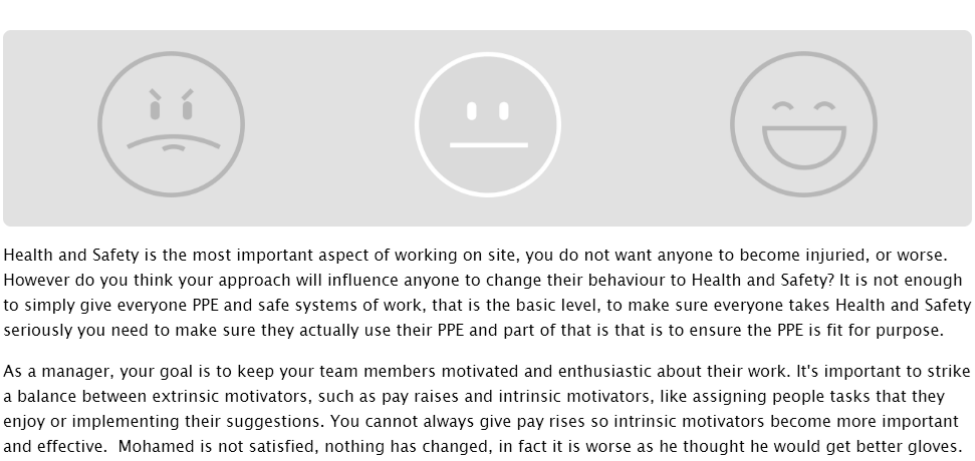

Figure 7: Feedback

Assessment

As a part of the project activities, each intellectual output had to be reviewed by the external partner in each country. This was done with on line testing with a sample of targeted users after each completed output. Multiplier events (large testing and feedback sessions) have been organized in Slovenia, Italy, Spain, Germany and the UK. Having undergone that roll out, the response and feedback is positive. During the UK multiplier event the questionnaires were distributed to participants, teacher and students alike. See table 2 below for participant age groups.

Table 2

Distribution by country and age

Answer/Country	**Slovenia**	**Italy**	**Germany**	**Spain**	**UK**	**TOTAL:**
under 20 years	1	0	62	0	2	65 – 13.1 %
21 - 30 years	23	23	79	54	58	237 – 47.78 %
31 - 40 years	24	8	13	9	8	62 – 12.50 %
41 - 50 years	5	2	15	43	8	73 – 14.72 %
51 - 60 years	1	8	15	16	8	48 – 9.68 %
61+ years	0	2	6	3	0	11 – 2.22 %

Respondents included 495 across all five countries. There were 300 males and 195 females. All were asked to complete the following questionnaire. For paper space these are summarized for all countries. See the table 3 and table 4 below for feedback from participants and instructors. Figure 8 highlights pictures of both participants during testing and instructor roundtables.

Table 3

Participant Feedback – Consolidated for all 5 Countries

Likert 5 point scale - 1 = strongly disagree to 5 = strongly agree

Participant Feedback 478 respondents	**Average**
The On-line tool is easy to navigate	4.68
The flow of the scenarios is logical	4.58
The visual format of the scenarios is acceptable	4.62
The scenarios are realistic	4.50
The images of the people are realistic	4.50
The quality of the voice and audio is easy to understand	4.58
I believe that the module content improves managerial soft skills.	4.41
The individual feedback after each scenario helped me understand how I performed.	4.32
General feedback gives useful guidance for further development of my soft skills.	4.29
I am satisfied with overall of this on-line tool.	4.47

Table 4

Instructor Feedback – Consolidated for all 5 Countries

Likert 5 point scale - 1 = strongly disagree to 5 = strongly agree

Instructor Only Feedback 141 Respondents	**Average**
The module will enrich your training/teaching.	4.17
I am likely to use this on-line tool regularly.	3.66
I would recommend this on-line tool to my colleagues.	4.28
The on-line tool raises awareness of importance of soft skills in managerial roles.	4.26
I am satisfied overall with this on-line tool.	4.25

Figure 8: Student and Instructor Testing/Feedback Sessions

The feedback received exceeded expected results put forward in the proposal. Overall satisfaction by users is 77%. This is 7% points higher than targeted. 100% of teachers will use this tool in their teaching which compares to 60% for the respective parameters put forward in the project application. Testing data and open feedback is going to be used to continue to refine the program for further distribution.

Conclusions and Future Research

The construction industry recognizes the need to enhance leadership and management skills to improve productivity, health and safety. The ability to use this tool individually, or in a group teaching session, gives the industry the flexibility to encourage operatives to continuously learn and develop. The use of visualization, understanding consequences of decisions, and instant feedback are recognized as an effective pedagogy for the construction industry. This "blue print" could be used for other forms of individualized construction training.

This project has been a success in terms of an international team working together to create a useful tool that satisfies a gap in the construction industry. The ability to cross multiple languages and cultures highlights the international collaboration. There is also a proposal under discussion for further translation of the work into Arabic, Mandarin and Cantonese for work with overseas partners. The team looks forward to a follow up paper with further research of the program efficacy.

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