

REPORT OF PILOT TRAINING PERFORMED ON 24 SEPTEMBER 2015

Timisoara - Romania

The pilot training proposed to validate the theoretical contents for key competences in construction sector and the AR application, was held on 29th September 2015 in Timisoara, at FRG facilities and CTV (West Technical College and included the participation of 11 trainers and 29 students attending. The training was in charge of Dan Ionel Lazar; Gheza Kelemen; D. Marius Neagoe.

There were two different profiles: Workers involved in qualification courses (level 1 and level 2) and trainers.

During the first part of this Pilot Training, people in charge, presented the ARKEY application to the teachers and trainers. A deep knowledge of the technical concepts related to construction was very useful to a better reformation and rehabilitation tasks approach and to the learning outcomes derived therefrom.

The second part of the training was dedicated to the most practical activities related to the application of augmented reality, that is, to show how this tool works, to show how it has been applied to the acquisition of basic skills and the proposed exercises.

First of all it was the time to explain the framework in which this pilot training was held. The trainee's sincerity needed to obtain a real utility and applied usability of the theoretical training contents and the applied usability for the final output. The tool to do that is the following survey to apply it as self-assessment before start using the augmented reality application.

The survey was divided in three different areas. The first one related usability and innovation of the contents, technics and the tool to develop it.

| ITEM | Average |
|--|---------|
| Do you think the use of augmented reality in construction is something new and innovative? | 4,15 |
| Do you think that safety in building works in particular on renovation and energy rehabilitation is a major issue? | 4,75 |
| Do you think that similar procedures should be developed for other types of works, i.e. civil work activities? | 4,46 |
| <i>NOTE: The average is estimated over a maximum of 5 (the maximum score is 5)</i> | |

The average is over 4 and it seems a good average in this range of items. The possible applications of augmented reality to training has been highly valued

The possibility of application to other areas of construction or other productive sectors has also been highly valued.

Only some competences are valued negatively as a result of the difficulty in solving the exercises in the app. (i.e. small machinery).

| ITEM: Course are innovative and useful to improve or to understand key competencies | Average |
|---|---------|
| 01 Tutorial for the use of tablets – smartphones. | 3,71 |
| 02 Triangles and angles operations. | 4,21 |
| 03 Rule of three. | 3,36 |
| 04 Geometric shapes. | 4,38 |
| 05 Measures equivalences. | 4,32 |
| 06 Materials behaviour. | 4,60 |

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|---|------|
| 07 Knowledge of geography. | 3,99 |
| 08 Geology knowledge. | 4,14 |
| 09 Behaviour of the climatology and effects on the edification. | 4,26 |
| 10 Acoustic properties of the materials. | 4,24 |
| 11 Thermal properties of the materials. | 4,57 |
| 12 Ventilation concept and characteristics. | 4,43 |
| 13 Thermal bridges, how and why avoid them. | 4,11 |
| 14 New construction machinery. | 4,43 |
| 15 Small machinery. | 4,04 |
| 16 Application of the technology to the construction (insulation). | 4,85 |
| 17 Application of the technological progress to new needs to the renovation and energy rehabilitation of buildings. | 4,72 |

NOTE: The average is estimated over a maximum of 5 (the maximum score is 5)

The most negatively valued points in relation to innovation and usefulness: “Rule of three” (mathematics); and “knowledge of geography” (science), received low valorisation mainly due to the difficulties in the exercise resolution. Between 20 and 30% of the trainees that answered about that items remarked the need for improvement. But the general answers in this regard were positive, and it is possible to check in the second part of this report.

On the opposite the better valued items are directly related to the application of the construction tasks related the renovation and energy rehabilitation of the houses. For example the small machinery do not received a good average due to the difficulty for the trainees to set a relation with the specific tasks in this context.

| ITEM: Course are innovative and useful to improve or to understand key competencies | Average |
|--|----------------|
| Information regarding technology of insulation and/or installation. | 4,66 |
| Theoretical maths concepts (geometric shapes). | 4,25 |
| Theoretical science concepts (geographic orientation). | 4,17 |
| Theoretical technological concepts (thermographic camera). | 3,94 |

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|--|------|
| Practical maths exercises (rule of three). | 4,43 |
| Practical exercises of science (noise and environmental conditions). | 4,39 |
| Practical exercises of technology (new machinery). | 4,61 |
| Key competencies procedures consider health and safety good practices. | 4,83 |
| <i>NOTE: The average is estimated over a maximum of 5 (the maximum score is 5)</i> | |

CONCLUSIONS (after pilot test and discussion with participants):

Trainers / lecturer

- Although the concept presented are at a basic level approach, the type of teaching exercises presented are very attractive.
- Augmented reality in the training process is a new training tool for all participants and likely in the near future will be widely used.
- The ArKey products (courses) can be and will be used in the training process

Trainees (workers participants to the qualification courses):

- For some of them some exercises were simple but others did not know how to proceed to solve the proposed exercises.
- The use of new training tools is very attractive, specially for youngest workers.
- Using your phone / tablet for learning, very interesting (to study, testing or to dispose of documentation at anytime).
- Would attend such courses in future. It is interesting in special due to the practical connotation that the theoretical learning outcomes have.

ANNEX. SURVEY

APPLICATION ASSESMENT SURVEY AFTER PILOT TRAINING

The following survey is to assess the relevance and utility of this product related to the project. The assessment of this tool (augmented reality application) consist in the valorisation of each of the proposed items from 1 to 5: Being 1 the worst score and 5 the better or most positive.

| Mark your level of agreement (5 is the higher agreement score) or disagreement (1 is the lower agreement score) | | | | | | |
|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Item | Question | 1 | 2 | 3 | 4 | 5 |
| 1 | Do you think the use of augmented reality in construction is something new and innovative) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | Do you think the safety issue in the trade tasks works in a transversal way for reformation or energy rehabilitation is a major issue? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | Do you think that similar procedure should be developed for other work , i.e. civil work activities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Please asses if the contents of this course are innovative and useful to improve or to understand the key competencies and the application in construction sector. | | | | | | |
| 4 | 01 Tutorial for the use of tablets – smartphones. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | 02 Triangles and angles operations. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | 03 Rule of three. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | 04 Geometric shapes. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 | 05 Measures equivalences. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9 | 06 Materials behaviour. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 | 07 Knowledge of geography. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11 | 08 Geology knowledge. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 | 09 Behaviour of the climatology and effects on the edification. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 | 10 Acoustic properties of the materials. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14 | 11 Thermal properties of the materials. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15 | 12 Ventilation concept and characteristics. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16 | 13 Thermal bridges, how and why avoid them. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17 | 14 New construction machinery. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18 | 15 Small machinery. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19 | 16 Application of the technology to the construction (isolation). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20 | 17 Application of the technological progress to the new needs of the reformation and rehabilitation of buildings. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Please asses the innovation and utility of the learning outcomes derivative of the contents (lessons and exercises). | | | | | | |
| 21 | Report on the technology of isolation or installation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22 | Theoretical maths concepts (geometric shapes) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23 | Theoretical science concepts (geographic orientation) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24 | Theoretical technological concepts (thermographic camera) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25 | Practical maths exercises (rule of three) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26 | Practical exercises of science (noise and environmental conditions) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27 | Practical exercises of technology (new machinery) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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|----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 28 | Manual of reformation and energy rehabilitation key competencies procedures are based on health and safety good practice (is included the H&S in the manual)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

¿Do you have any additional comments on the procedures developed?

If you are interested in receive further information about the Project, please give us your contact details below:

