TASK O2/A4.

Technical test and implementation of IT improvements of BIMclay Multimedia Cards

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Consortium members: Associação Portuguesa da Indústria de Cerâmica (APICER), Centro Tecnologico da Cerâmica e do Vidro (CTCV), Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM), Asociación Española de Fabricantes (Hispalyt), Institute of Entrepreneurship Development (iED).

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1. DESCRIPTION OF THE TASK

This report is included in the IO2 “BIMclay Multimedia Materials. New interactive BIM-learning methods” which is based on the implementation in technical courses and trainings on specialisation focused on the BIMclay project. Partners of the Project have implemented pilot courses and used current courses based on the products of the project, which was also served as evaluating products for possible improvement before the end of the project.

The feedback obtained from technical experts during these courses and events was very useful to the improvement of the products of the project, mainly the Production of the ORC, BIMclay Multimedia Cards and the Interactive BIM Tool, both quality assessment of technical content and pedagogical approach and IT quality assessment of ICT Based.

The beta versions of those products were shown to experts and teachers, to be checked and used in during or after the courses. It was necessary because beta versions to correct them, as well as sometimes the trainings are carrying out in facilities where there is not online connection.

Finally, the consortium has also scheduled courses, trainings and other events (workshops, meetings, seminars, etc.) beyond the end of the project in order to guarantee the sustainability of the project.

2. EXPERTS AND ENTITIES CONSULTED ON BIMclay PROJECT

2.1. TECHNICAL EXPERTS CONSULTED

Table 2.1.1. Technical experts consulted

CTM

Name	Surname	Contact (email or phone)	Profession	Name of Organisation where he/she works or freelance, if applicable
Asociatia Romania Green Building Council (RoGBC)		*Private e-mail*	Architect	Asociatia Romania Green Building Council (RoGBC)
Universidad de Sevilla (USE)		*Private e-mail*	Architect	Universidad de Sevilla (USE)
Universidad de Sevilla (USE)		*Private e-mail*	Architect	Universidad de Sevilla (USE)
Universidad de Sevilla (USE)		*Private e-mail*	Architect	Universidad de Sevilla (USE)
University Transilvania din Brasov (UTBv)		*Private e-mail*	Civil Engineer	University Transilvania din Brasov (UTBv)
CertiMaC soc.cons. a r.l.		*Private e-mail*	Engineer	CertiMaC soc.cons. a r.l.
Cype Soft SL		*Private e-mail*	Architect	Cype Soft SL
Cype Soft SL		*Private e-mail*	Architect	Cype Soft SL
Cype Soft SL		*Private e-mail*	Architect	Cype Soft SL
Deutscher Naturwerkstein-Verband E.V (DNV)		*Private e-mail*	Civil Engineer	Deutscher Naturwerkstein-Verband E.V (DNV)
Klesarska skola (KSK)		*Private e-mail*	Engineer	Klesarska skola (KSK)
Centro Provinciale Di Istruzione Professionale Edile (C.P.I.P.E.)		*Private e-mail*	Engineer	Centro Provinciale Di Istruzione Professionale Edile (C.P.I.P.E.)
Centro Provinciale Di Istruzione Professionale Edile (C.P.I.P.E.)		*Private e-mail*	Engineer	Centro Provinciale Di Istruzione Professionale Edile (C.P.I.P.E.)
Colegio Oficial de Arquitectos de la Región de Murcia (COAMU)		*Private e-mail*	Architect	Colegio Oficial de Arquitectos de la Región de Murcia (COAMU)

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Name	Surname	Contact (email or phone)	Profession	Name of Organisation where he/she works or freelance, if applicable
ARMOS SA		info@armosprokat.gr	Conversion & Trade of Paper Products	ARMOS SA
DOMOTECHNIKI SA		info@domotechniki.gr	Public & Private Technical Projects	DOMOTECHNIKI SA

Association of Civil Engineers in Larisa (TEE)		tee_lar@tee.gr.	Technical counseling	Association of Civil Engineers in Larisa (TEE)
University of Thessaly-Department of Civil Engineers		g-civ@uth.gr	University	University of Thessaly-Department of Civil Engineers
University of Thessaly-Department of Architecture		g-arch@uth.gr	University	University of Thessaly-Department of Architecture
Department of Computer Engineering, Technological Educational Institute of Thessaly		pr@teilar.gr	University	Department of Computer Engineering, Technological Educational Institute of Thessaly

CTCV and APICER

Name	Surname	Contact (email or phone)	Profession	Name of Organisation where he/she works or freelance, if applicable
Centro Habitat Universidade de Aveiro		*Private e-mail*	Professor	Centro Habitat Universidade de Aveiro
LNEG		*Private e-mail*	Engineer	LNEG
ESAD-IPL		*Private e-mail*	Professor	ESAD-IPL

2.2. ORGANISATIONS/ENTITIES CONSULTED

Table 2.2.1. Organisations/entities consulted

CTM

Name	Contact (email or phone)	Type of organisation (SME, LE, VET, University, etc.)	Field (industry, mining, research, etc.)
Centro Provinciale Di Istruzione Professionale Edile (C.P.I.P.E.)	*Private e-mail*	VET Center	Construction
Lycee Des Metiers Leonard De Vinci	*Private e-mail*	VET Center	Construction
Deutscher Naturwerkstein-Verband E.V (DNV)	*Private e-mail*	Technical counselling	Construction
University Transilvania din Brasov (UTBv)	*Private e-mail*	University	Faculty of Civil Engineering
Asociatia Romania Green Building Council (RoGBC)	*Private e-mail*	Technical counselling	Construction

Asesoramiento, Tecnología e Investigación (ATIN)	*Private e-mail*	Technical counselling	Technology
Colegio Oficial de Arquitectos de la Región de Murcia (COAMU)	*Private e-mail*	Architects Association	Architecture
Department of Technical Sciences, University of Bucharest	*Private e-mail*	University	Architecture
Klesarska skola (KSK)	*Private e-mail*	VET Center	Construction
Department of Sustainable Construction of Universidad de Sevilla (USE)	*Private e-mail*	University	Architecture

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Name	Contact (email or phone)	Type of organisation (SME, LE, VET, University, etc.)	Field (industry, mining, research, etc.)
University of Thessaly-Department of Civil Engineers	g-civ@uth.gr	University	Education
University of Thessaly-Department of Architecture	g-arch@uth.gr	University	Education
Department of Computer Engineering, Technological Educational Institute of Thessaly	pr@teilar.gr	University	Education
Center for life-long learning	learning-city@larissa-dimos.gr	VET	Life-long learning
Dinamiki VET Center	kek@dynamiki.gr	VET CENTER	VET
Association of Civil Engineers in Larisa (TEE)	tee_lar@tee.gr.	Association	Technical counseling
ARMOS	info@armosprokat.gr	Company	Construction/Manufacturing
DOMOTECHNIKI A.E	info@domotechniki.gr	Company	Construction
Association of Thessalian Enterprises & Industries (STHEV)	info@sthev.gr	Association	Business and Industry
GSEVEE VET Center	larisa@kekgsevee.gr	VET CENTER	VET
GSEE VET Center	info@gsee.gr	VET CENTER	VET

CTCV and APICER

Name	Contact (email or phone)	Type of organisation (SME, LE, University, etc.)	Field (industry, mining, research, etc.)
Gres Panaria	*Private e-mail*	LE	Ceramic Industry
Gres Panaria	*Private e-mail*	LE	Ceramic Industry
Aleluia Ceramicas	*Private e-mail*	LE	Ceramic Industry
Revigrés	*Private e-mail*	LE	Ceramic Industry
Recer	*Private e-mail*	LE	Ceramic Industry
Certeca	*Private e-mail*	SME	Ceramic Industry
Vidrala	*Private e-mail*	LE	Glass Industry
Vidrala	*Private e-mail*	LE	Glass Industry
Vidrala	*Private e-mail*	LE	Glass Industry
Costa Verde	*Private e-mail*	SME	Ceramic Industry
Sanitana	*Private e-mail*	LE	Ceramic Industry

3. QUESTIONNAIRE

For the technical evaluation of the products of the BIMclay project, a survey was distributed to obtain the opinion of the technical experts. This form is divided into four large blocks into which the project is divided:

- Training materials.
- Online Resource Centre.
- BIMclay Multimedia Cards.
- Interactive BIM Tool.

It also includes a generic question for experts to propose the comments they consider necessary to improve the quality of all BIMclay project products.

Below is the questionnaire carried out for the technical evaluation of this project and its products.

IMPROVE TECHNIFICATION AND LCA QUALIFICATION OF WORKERS IN CERAMIC SECTOR WITH THE SUPPORT OF BIM APPLICATIONS

Co-funded by the Erasmus+ Programme of the European Union

Feedback questionnaire of BIMclay Multimedia Cards

1. Overall, how satisfied were you with the training materials?

Please tick a box in the respective line.

Very satisfied	Rather satisfied	Neither satisfied nor unsatisfied	Rather unsatisfied	Not satisfied at all

2. To what extent do you agree or disagree with the following statements?

Please, tick a box in each line.

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
Training materials' contents were of my interest.					
I feel now better informed on various aspects related to the clay sector.					
I now better understand the benefits of the BIMclay Multi-media Cards approach.					
I feel that it has helped me to reinforce my knowledge, competences and skills about methods of placing clay and ceramic products.					

3. To what extent do the Online Resource Centre (ORC) show the following attributes?

Please, tick a box in each line.

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
The contents of the ORC are clearly understandable and motivating.					
The ORC is well-organised and well-structured.					
The ORC is user-friendly.					
Overall, the ORC is adequate for the self-learning of LCA, clay products and described placement methods.					

IMPROVE TECHNIFICATION AND LCA QUALIFICATION OF WORKERS IN CERAMIC SECTOR WITH THE SUPPORT OF BIM APPLICATIONS

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4. Do you have any further comments and recommendations on the BIMclay Multimedia Cards? What could have been done better?

Please tick a box in each line.

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
The stage relates to the product and its method of placement.					
The design of the working environment is detailed enough to understand the situation.					
The animation is enough to be able to carry out the works described in it.					
The development of the content is correct for attract and paying attention.					
The contents of the animations are useful.					
The duration of the animations is adequate.					

5. Do you have any further comments and recommendations on the Interactive BIM Tool? What could have been done better?

Please tick a box in each line.

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
The position of the elements (buttons, menus, images, etc.) follow a logical order in the BIM Tool.					
The operating speed of the BIM Tool is correct, considering the type of task required.					
The message system helps the user to develop his tasks and orientate himself within the BIM Tool.					
The colours used facilitate the user's understanding of the contents and structural elements.					
The BIM Tool is suitable for users and their degree of experience.					
LCA data are easy to find in the BIM Tool.					

Please, tell us what kind of improvement you can suggest:

_____

_____

_____

Thank you for your feedback!

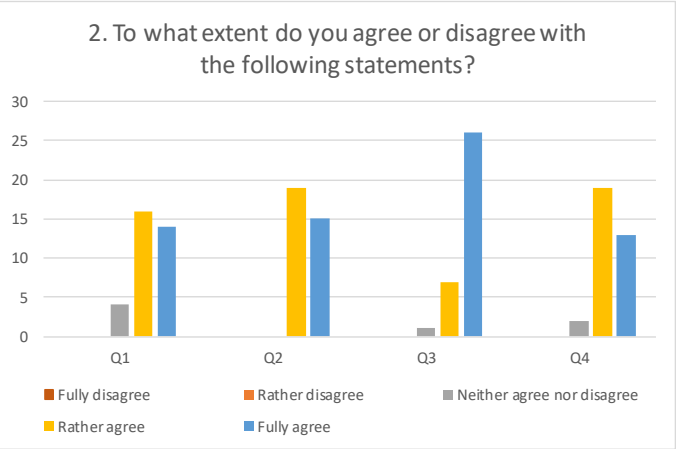
3.1. QUESTIONNAIRE RESULTS

1. Overall, how satisfied were you with the training materials?

Very satisfied	Rather satisfied	Neither satisfied nor unsatisfied	Rather unsatisfied	Not satisfied at all
28	6	0	0	0

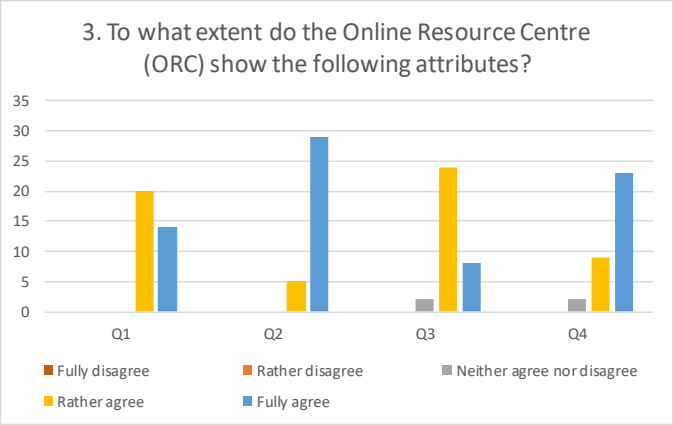
2. To what extent do you agree or disagree with the following statements?

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
Q1: Training materials' contents were of my interest.	0	0	4	16	14
Q2: I feel now better informed on various aspects related to the clay sector.	0	0	0	19	15
Q3: I now better understand the benefits of the BIMclay Multimedia Cards approach.	0	0	1	7	26
Q4: I feel that it has helped me to reinforce my knowledge, competences and skills about methods of placing clay and ceramic products.	0	0	2	19	13



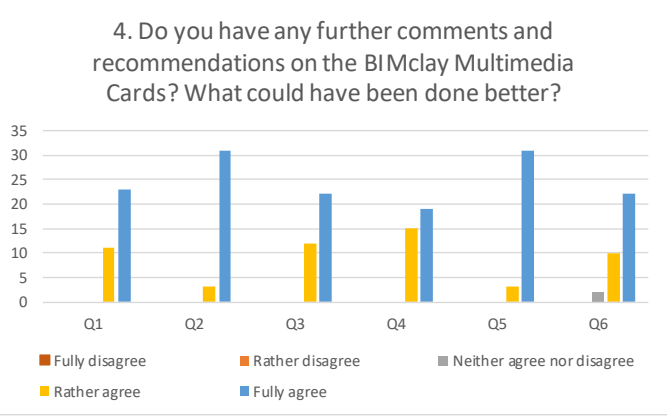
3. To what extent do the Online Resource Centre (ORC) show the following attributes?

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
Q1: The contents of the ORC are clearly understandable and motivating.	0	0	0	20	14
Q2: The ORC is well-organised and well-structured.	0	0	0	5	29
Q3: The ORC is user-friendly.	0	0	2	24	8
Q4: Overall, the ORC is adequate for the self-learning of LCA, clay products and described placement methods.	0	0	2	9	23



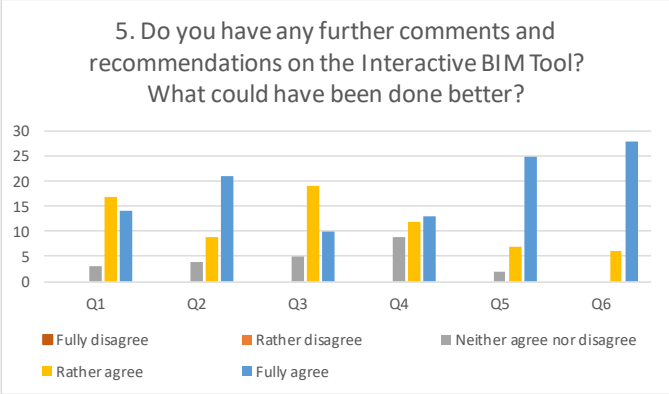
4. Do you have any further comments and recommendations on the BIMclay Multimedia Cards? What could have been done better?

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
Q1: The stage relates to the product and its method of placement.	0	0	0	11	23
Q2: The design of the working environment is detailed enough to understand the situation.	0	0	0	3	31
q3: The animation is enough to be able to carry out the works described in it.	0	0	0	12	22
Q4: The development of the content is correct for attract and paying attention.	0	0	0	15	19
Q5: The contents of the animations are useful.	0	0	0	3	31
Q6: The duration of the animations is adequate.	0	0	2	10	22



5. Do you have any further comments and recommendations on the Interactive BIM Tool? What could have been done better?

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
Q1: The position of the elements (buttons, menus, images, etc.) follow a logical order in the BIM Tool.	0	0	3	17	14
Q2: The operating speed of the BIM Tool is correct, considering the type of task required.	0	0	4	9	21
Q3: The message system helps the user to develop his tasks and orientate himself within the BIM Tool.	0	0	5	19	10
Q4: The colours used facilitate the user's understanding of the contents and structural elements.	0	0	9	12	13
Q5: The BIM Tool is suitable for users and their degree of experience.	0	0	2	7	25
Q6: LCA data are easy to find in the BIM Tool.	0	0	0	6	28



In relation to the free-answer questions included in the technical experts' questionnaire, the most outstanding answers are the following:

- In animation 01 "Roof dry tiling process", should be included the sealing of the hole of the nails that are used to fix the eave comb. The 5 cm that should protrude over the edge of the roof should also be appreciated.
  SOLUTION: The sealing of the hole was included, and the perspective was changed so that the 5 cm salient was appreciated and this measurement of the tile on the edge of the roof was limited.

- In animation 03 “Construction of large format hollow brick masonry walls” all large-format brick walls should be sealed with plaster-glue instead of mortar.
  SOLUTION: The colour and texture of the joints of the bricks were changed to white. Some explanatory texts of the procedures were also included in order to make clearer the steps to follow for the correct construction.

- Animation 05 "Ventilated façade construction process", in order to clarify the process of laying the armour, the technical experts advised to add more details indicating the recommended measures.
  SOLUTION: Zoomed in images with their respective dimensions were added, so that the placement position of the armour is clearly visible.

- Animation 10 “Mosaic tile installation process”, the technical experts considered the need to include a further step in the animation relating to the levelling of the surface on which the mosaic is placed. SOLUTION: This step was included in the animation to clarify the process.

- Animation 12 “Laying process of ceramic pavers on sand bed”, the technical experts pointed out the need to include a rubber lining on top of the pavers when compacting them and not damaging them. SOLUTION: The rubber lining was included.

3.2. CONCLUSIONS

In general, the evaluation of the project by technical experts was really positive.

Despite the comments mentioned in the previous section, all the experts considered that the constructive processes included in the animations were correctly carried out and were in line with reality, since they are construction methods or procedures that are currently used and are therefore very useful.

On the other hand, they appreciated the need for this type of didactic material in order to be able to explain and teach some of the construction procedures detailed in these animations. In this sense, they commented that they are very useful as formative material for some workers who do not know yet how these constructive details are executed.