



INTELLECTUAL OUTPUT 2

New interactive BIM-learning methods for Circular Economy

TASK O2/A3-A4

Pedagogical and Technical test and IT improvements



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ROMANIA
GREEN
BUILDING
COUNCIL





INTRODUCTION

This report is included in the task “O2/A3-A4. *Pedagogical and Technical test and implementation of IT improvements.*”, corresponding to Intellectual Output 2 “*New interactive BIM-learning methods for Circular Economy*” of the CircularBIM project.

During the online project meetings, it was decided to merge the results obtained by both pedagogical and technical experts into one report, to identify more clearly all the work done in both tasks O2-A3 and O2-A4.

External Technical and Pedagogical Expert Groups were evaluating all CircularBIM multimedia and learning materials, from a technical and pedagogical point of view. A report was developed with the recommendations of the Pedagogical and Technical Groups and all the results and recommendations were implemented in the project results.

The feedback obtained from experts during the courses and events was very useful to the improvement of the products of the project, mainly the Open Educational Resource and the Interactive CircularBIM 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.

All the information about the project and more technical documentation is available in the following url:

- CircularBIM project web: www.circularbim.eu



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1. TECHNICAL EXPERTS AND ENTITIES CONSULTED ON CircularBIM PROJECT

1.1 TECHNICAL EXPERTS CONSULTED

Profession	Name of Organisation where he/she works or freelance, if applicable
Engineer	CertiMaC soc.cons. a r.l.
Architect	Colegio Oficial de Arquitectos de la Región de Murcia (COAMU)
Architect	Colegio Oficial de Arquitectos de la Región de Murcia (COAMU)
Architect	Colegio Oficial de Arquitectos de la Región de Murcia (COAMU)
Civil Engineer	Deutscher Naturwerkstein-Verband E.V (DNV)
Civil Engineer	National Technical University of Athens (NTUA)
General manager	Nhood Romania (a real estate services and consulting company) - https://nhood.ro/en/home-english/
BIM expert	Technyx Euro Services Romania, part of Canam Group Canada - https://www.groupecanam.com/en/
Solutions Promotion Area Manager	Holcim Romania - https://www.holcim.ro/ro
Civil Engineer	Kasper Development Romania
Architect	"Ion Mincu" University of Architecture and Urban Planning

1.2 ORGANISATIONS/ENTITIES CONSULTED

Name	Contact (email or phone)	Type of organisation (SME, LE, VET, University, etc.)	Field (industry, construction, research, etc.)
CertiMaC soc.cons. a r.l.	Private e-mail	Research Centre	Research
Deutscher Naturwerkstein-Verband e.V.	Private e-mail	Natural Stone Association	Research
School of Mining Engineering & Metallurgy Laboratory of Mining and Environmental Technology of National Technical University of Athens (NTUA)	Private e-mail	University	Mining engineering
BZB1	Private e-mail	VET Center	Construction
Nhood Romania - https://nhood.ro/en/home-english/	Private e-mail	SME	Real estate services and consulting company)



Technyx Euro Services Romania, part of Canam Group Canada - https://www.groupecanam.com/en/	Private e-mail	SME	Constructions
Holcim Romania - https://www.holcim.ro/ro	Private e-mail	LE	Building materials
Kasper Development Romania	Private e-mail	SME	Constructions
“Ion Mincu” University of Architecture and Urban Planning	Private e-mail	University	Architecture

2. PEDAGOGICAL EXPERTS AND ENTITIES CONSULTED ON CircularBIM PROJECT

2.1 PEDAGOGICAL EXPERTS CONSULTED

Profession	Name of Organisation where he/she works or freelance, if applicable
Professor	Klesarska skola (KSK)
Professor	Universidad Politécnica de Cartagena
Construction teacher	University of Thessaly-Department of Civil Engineers
Civil Engineer	Technical University of Cluj-Napoca, Faculty of Civil Engineering, Cluj-Napoca, Romania - https://www.utcluj.ro/en/
Construction teacher	University of the West of England (UWE)
Construction teacher	Warsaw University of Technology (WUT)
Professor	Universidade do Coimbra
Professor	Lycee Des Metiers Leonard De Vinci
Professor	Technical University of Cluj-Napoca, Faculty of Civil Engineering, Cluj-Napoca, Romania - https://www.utcluj.ro/en/
Professor	Stefan cel Mare University of Suceava, Faculty of Electrical Engineering and Computer Science, Suceava, Romania - https://usv.ro/en/homepage-2021/
Professor	Gheorghe Asachi Technical University of Iași, Faculty of Civil Engineering & Building Services, Iasi, Romania - https://www.tuiasi.ro/?lang=en



2.2 ORGANISATIONS/ENTITIES CONSULTED

Name	Contact (email or phone)	Type of organisation (SME, LE, VET, University, etc.)	Field (industry, construction, research, etc.)
Technical University of Cluj-Napoca, Faculty of Civil Engineering, Cluj-Napoca, Romania - https://www.utcluj.ro/en/	Private e-mail	University	Civil Engineering
Stefan cel Mare University of Suceava, Faculty of Electrical Engineering and Computer Science, Suceava, Romania - https://usv.ro/en/homepage-2021/	Private e-mail	University	Civil Engineering
Gheorghe Asachi Technical University of Iași, Faculty of Civil Engineering & Building Services, Iasi, Romania - https://www.tuiasi.ro/?lang=en	Private e-mail	University	Civil Engineering
Technical University of Cluj-Napoca, Faculty of Civil Engineering, Cluj-Napoca, Romania - https://www.utcluj.ro/en/	Private e-mail	University	Civil Engineering
University of the West of England (UWE)	Private e-mail	BIM Professor	BIM Professor
Warsaw University of Technology (WUT)	Private e-mail	BIM Professor	BIM Professor
Universidade do Coimbra	Private e-mail	Civil Engineer	Construction

5. QUESTIONNAIRE

For the technical evaluation of the products of the CircularBIM project, a survey was distributed to obtain the opinion of the educational and technical experts about training materials. This form contains questions about:

- Training materials.
- Online Educational Resource
- Interactive CircularBIM tool.

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

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



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Feedback questionnaire of CircularBIM training materials. Technical and Pedagogical Test

Project code: 2019-1-ES01-KA203-065962

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***Obligatorio**

Profile: *

- Technical
- Pedagogical



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
Training materials' contents were of my interest.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel now better informed on various aspects related to the circular economy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I now better understand the benefits of the CircularBIM tool.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that it has helped me to reinforce my knowledge, competences and skills about ecological challenges and BIM technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



3. To what extent do the Open Educational Resource (OER) show the following attributes? *

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
The contents of the OER are clearly understandable and motivating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The OER is well-organised and well-structured.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The OER is user-friendly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall, the OER is adequate for the self-learning of circular economy, life cycle assessment and BIM technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



4. Do you have any further comments and recommendations on the CircularBIM * Course? What could have been done better?

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
The course relates to the circular economy and BIM technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The design of the curriculum environment is detailed enough to understand the topics.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The curriculum is enough to be able to carry out the works described in it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The development of the content is correct for attract and paying attention.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The contents are useful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The duration of the course is adequate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



O2-A2. INTERACTIVE CircularBIM TOOL

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
The position of the elements (buttons, menus, images, etc.) follow a logical order in the BIM Tool.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The operating speed of the BIM Tool is correct, considering the type of task required.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The message system helps the user to develop his tasks and orientate himself within the BIM Tool.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The colours used facilitate the user's understanding of the contents and structural elements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The BIM Tool is suitable for users and their degree of experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Circular economy data are easy to find in the BIM Tool.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





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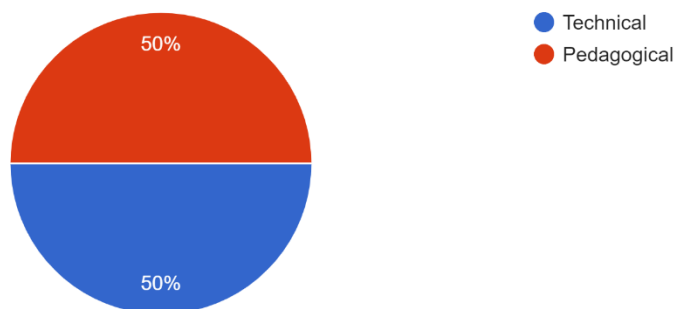
Google Formularios

3.1 QUESTIONNAIRE RESULTS

The results compiled are the following:

Profile:

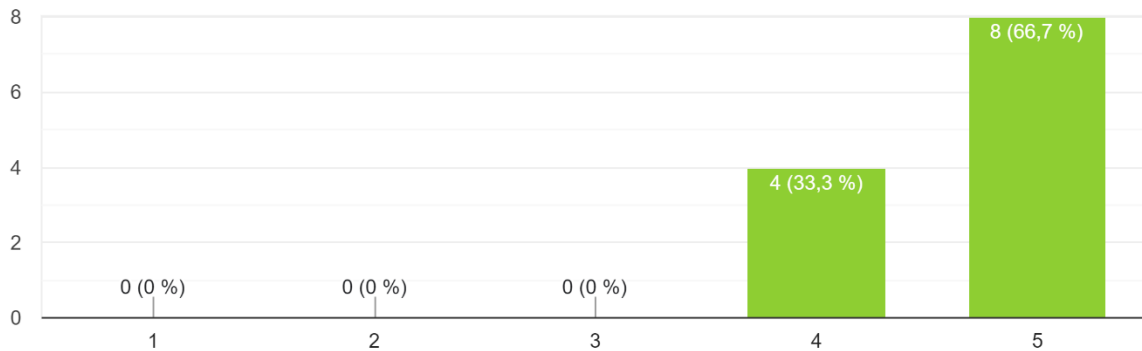
12 respuestas



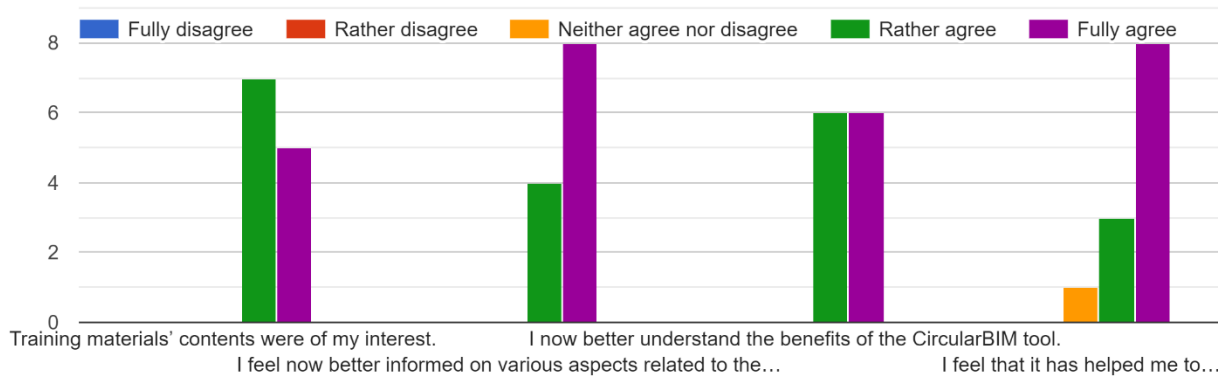


1. Overall, how satisfied were you with the training materials?

12 respuestas

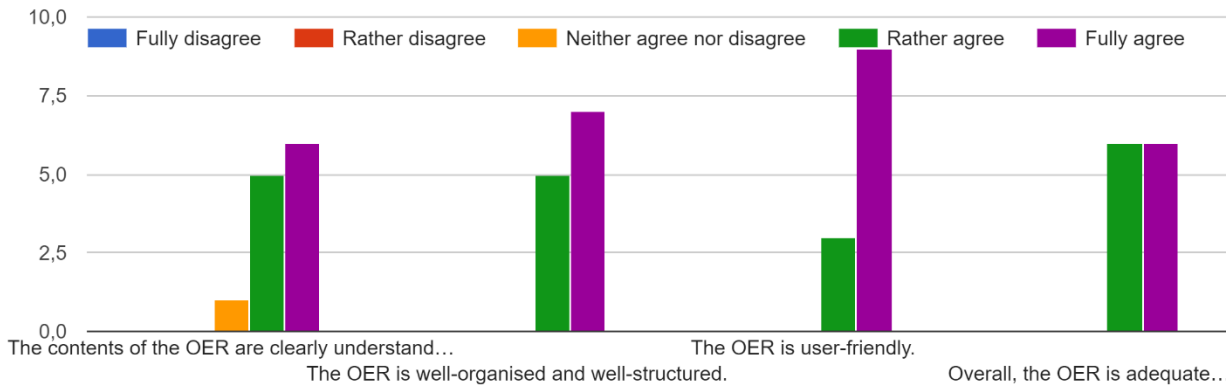


2. To what extent do you agree or disagree with the following statements?

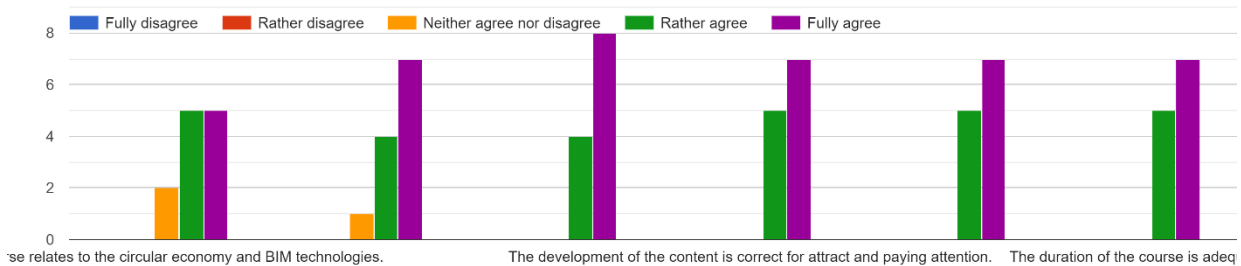




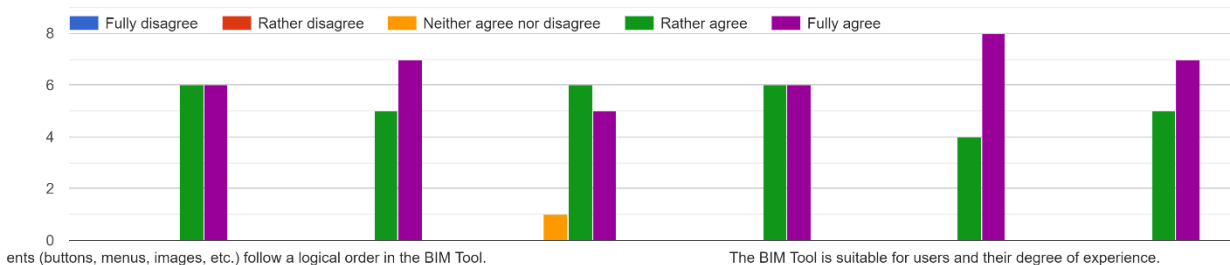
3. To what extent do the Open Educational Resource (OER) show the following attributes?



4. Do you have any further comments and recommendations on the CircularBIM Course? What could have been done better?



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



3.2 CONCLUSIONS

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



All the experts considered that the constructive processes included were correctly carried out and easy to understand and assimilate even by pupils or workers who have never seen such constructive methods or procedures before.

Teachers from universities and VET centres appreciated the production of these CircularBIM Tool and the didactic materials developed for this sector because, in some cases, it is very difficult to explain some constructive developments with sustainable criteria and using BIM technologies can help in this regard.

In addition, all the improvements made both in the courses and in the different events of the project have been implemented.