



## **DELIVERABLE: D23 - D4.3**

### **Third Classroom Courses for Professionals**

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**Authors: University of Zagreb, Faculty of Civil Engineering**

**Network for Using BIM to Increase the Energy Performance**

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**Net-UBIEP H2020**

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A. Deliverable Details	
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<b>Format</b>	Report
<b>Dissemination Level:</b>	Public

## B. Short description

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The goal of this report is to provide an overview of the third classroom courses conducted for **professionals (Engineers and Architects)**. The target group of **engineers and architects** have a very important role while designing NZEB. They need to use the real data when performing the energy analysis to avoid that the declared values are not the same as built. Nowadays the discrepancy is over the 50% of the EPC provided by the designers and the one verified on the "as built". Besides, it is important to use class detection simulation before construction starts to avoid waste of money and time.

Validation of BIM Qualification Models and training materials was implemented in each partner country by the partners with more experience in training activities such as Universities and Training Centres. Mainly one partner per country organised and performed training, and these were as follows: ENEA (IT), FLC (ES), TUT (EE), FCE (HR), Dig.Con. (LT), ISSO (NL), ViaEU (SK).

Third Classroom Courses for Professionals were conducted in national languages Croatian, Dutch, Estonian, Italian, Latvian, Slovak, Spanish. Validation of training material and assessment for **professionals (Engineers and Architects)** on how to use BIM for the energy performance was conducted during these classroom courses using questionnaires.

Questionnaire tailored for **training participants** were prepared (*D27-D4.7 Survey and or interview among all different Targets*) in order to validate defined competence lists for **professionals** as well as trainee satisfaction with course and instructor (trainer) effectiveness. **Training participants** were asked to judge on their competences **before the training as well as after the training**.

Good quality practices of education are based on these three pillars:

- clear definitions of learning outcomes,
- design and structure of the programme course,
- evaluation and monitoring of the learning outcomes

**Two types of questionnaires** were used to cover these three pillars of good education and to simultaneously perform a self-assessment of competences gained by the participants during the course.

The purpose of the "**Pre training questionnaire**" was to assess initial level of knowledge, experience and current practices regarding BIM. "**Post training questionnaire**" contains the same or similar questions as a "Pre training questionnaire" which serve to determine in simple ways the progress training participants have made during the courses and efficiency of the courses. Questions about the completeness or redundancy of the foreseen schemes and training courses were also included in the "Post training questionnaires".

The main goal of this report is to provide information for future activities, based on the experience during the Net-UBIEP project. Therefore, this report will present the overview of the conducted classroom courses and will set guidelines for the learning outcomes (also project deliverable *D4.8 Review of the three dimensional matrix*), the evaluation of the courses, and finally will also enable experience exchange between the different training institutions.

The report does not contain sensitive information and the collected data is being treated confidentially following the rules of General Data Protection Regulation 2016/679.

## 1. Learning outcomes and training programme

Both learning outcomes and training programme were explored and defined in details in previous project activities. All the partners followed the learning outcomes defined in deliverables *D14 - D3.1 Three-dimensional Matrix* and *D15 - D3.2 Requirement for learning outcomes* as well as the training materials developed as deliverables *D18 - D3.5 Contents for Professionals (Engineers and Architects) on BIM competences* and *D19 - D3.6 Guideline for Professionals on BIM competences*.

Therefore, in this chapter a summary of the main information is presented, as detailed information can be found in the respective Deliverables.

The classroom courses followed somewhat different structure in every partner country but as mentioned before have always included all the learning outcomes and training content defined in respective deliverables. Additionally, each respective partner developed their own training aids (i.e. power point presentations, etc.) which then followed their course structure. I general partners analysed advantages and deficiencies of different approach of others and their own experiences gained through First and Second classroom courses for professionals. The result was slightly evolved approach of partners for the third classroom courses for professionals. In some countries, partners have reached the targeted number of training participants during the First classroom course and have thus decided not to perform second and third classroom course for professionals.

Partners used different systems for validation of training courses, but all using the questionnaires developed for this purpose in *D27-D4.7 Survey and or interview among all different Targets*. Some countries used GoogleForms, other partners used free web based voting solution (VoxVote) for interactive presentations and real time feedback from the course participants, BIMSyc (CDE) platform was also used to evaluate training, while the fourth option was to use hardcopy questionnaires. The participants filled questionnaires anonymously during classroom courses in order to get their honest opinion and validation.

Table 1 Overview of third classroom courses duration training methodology and number of participants

Partners country	Course date	Classroom course duration	Theoretical (T) / Practical (P)	No. of participants	Voting system
Croatia	8 - 9 March 2019	16 hours	T & P	37	VoxVote
Estonia	-	-	-	-	-
Italy	28 June 2019	4 hours	T	42	GoogleForms
Lithuania	10 April 2019	8 hours	T & P	17	BIMSyc
Slovakia	23-24 May 2019	8 hours	T & P	12	GoogleForms
Spain	-	-	-	-	-
The Netherlands	14 May 2019	4 hours	T	14	GoogleForms
			Total No. of participants	122	

## 2. Conducted courses

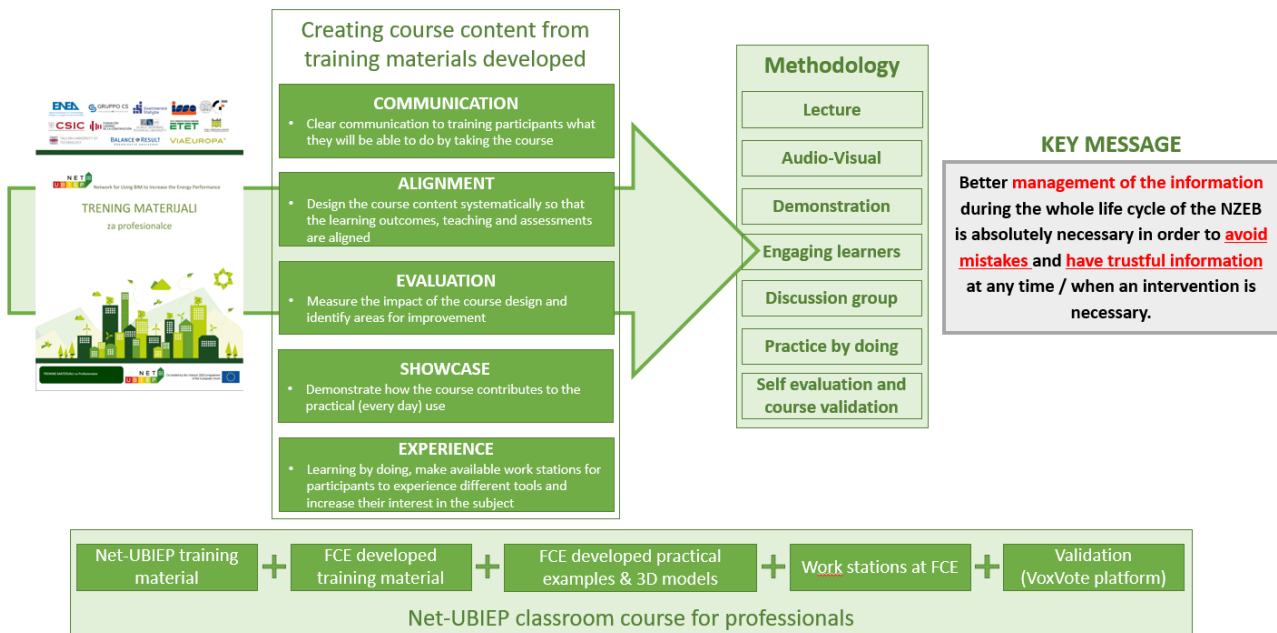
### 2.1 Croatia

#### 2.1.1 Course description and results

Third classroom course for professionals was organized on **March 8<sup>th</sup> and 9<sup>th</sup> 2019** in Zagreb, Croatia. The course programme consisted of 16 academic hours of theoretical lectures with application examples (case studies) and with practical tasks.

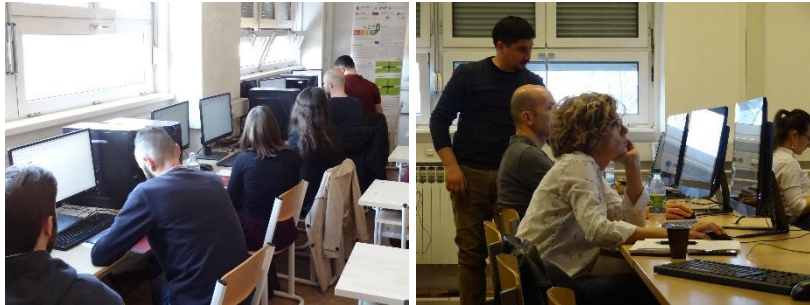
A group of **37 participants** specialising in architecture and engineering had undertaken the classroom course in Croatia within the framework of the Net-UBIEP project.

The overview of the content development and methodological basis of the classroom courses is shown in the figure below.



Several images from the third classroom course for professionals conducted by the FCE can be found below.





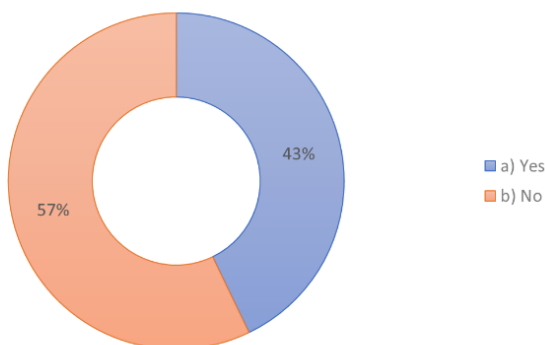
Pre- and Post-training questionnaires were translated to Croatian language and filled by training participants using interactive voting system VoxVote. Pre-training questionnaire is available at this link: <https://docs.google.com/forms/d/e/1FAIpQLSfQYVDL0b-Uic830VloYTrRaET2YvaGRmp3XeiNnZgwxfe42Q/viewform>

On the other hand, Post-training questionnaire is available at this link: <https://docs.google.com/forms/d/e/1FAIpQLSeDbMImztef6JkfdPQRccDasa0pexMC3RPi5foZyTad-UZ6gQ/viewform>

Few general conclusions of the classroom course validation from the participants in Croatia is given below, while the entire questionnaire analysis is performed in deliverable *D27-D4.7 Survey and or interview among all different Targets*. Due to the fact that validation was performed in partners' native language, the analysis below has both English questions and the same questions in native language.

1. Do You or Your company/organization currently use BIM, or is it intending to use BIM in the near future?
- a) Yes
  - b) No

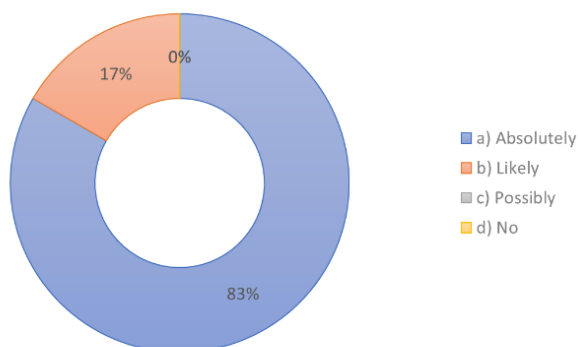
1. Do You or Your company/organization currently use BIM, or is it intending to use BIM in the near future?



15. Would BIM certification, support or training, benefit Your colleagues?

- a) Absolutely
- b) Likely
- c) Possibly
- d) No

15. Would BIM certification, support or training, benefit  
Your colleagues?

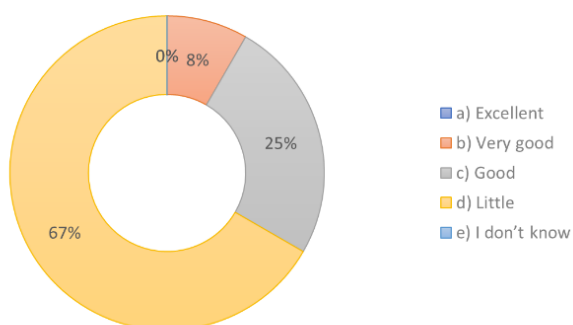


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18. In retrospective, how do You rate Your competences  
(knowledge, skills, responsibility and autonomy) before this  
BIM course?

- a) Excellent
- b) Very good
- c) Good
- d) Little
- e) I don't know

18. In retrospective, how do You rate Your competences  
(knowledge, skills, responsibility and autonomy) before  
this BIM course?

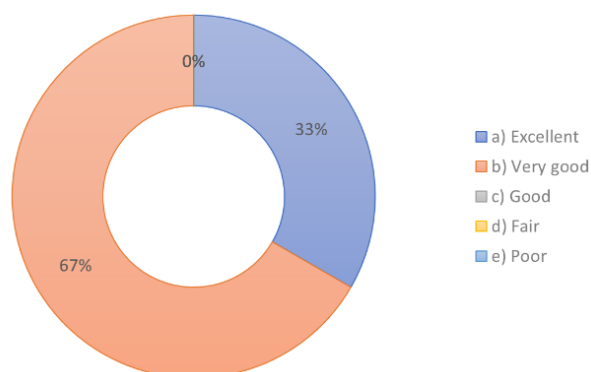


19. What overall rating would You give the course?

- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor



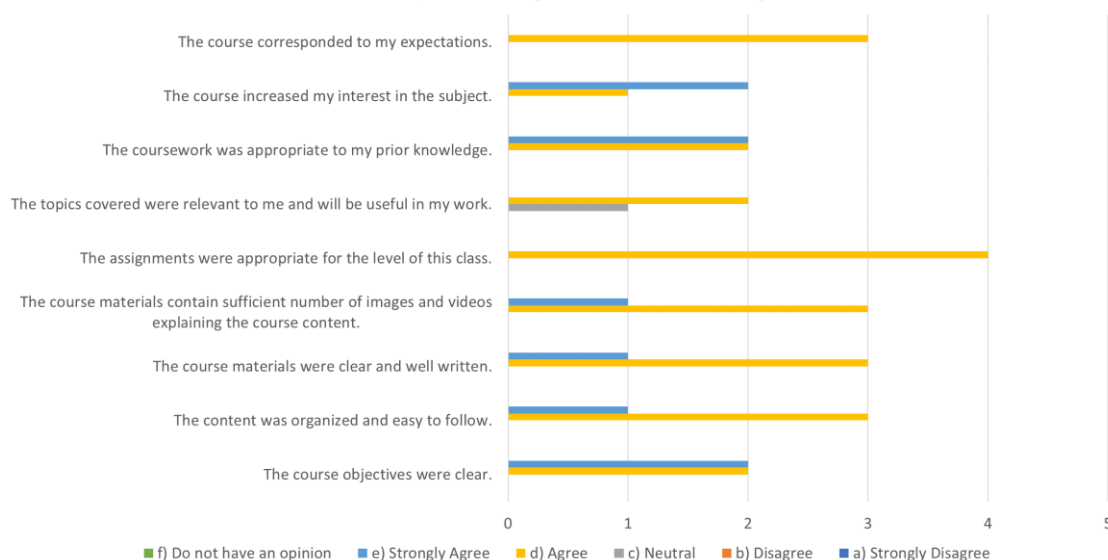
19. What overall rating would You give the course?



20. Please indicate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	do not have opinion
The course objectives were clear.						
The content was organized and easy to follow.						
The course materials were clear and well written.						
The course materials contain sufficient number of images and videos explaining the course content.						
The assignments were appropriate for the level of this class.						
The topics covered were relevant to me and will be useful in my work.						
The coursework was appropriate to my prior knowledge.						
The course increased my interest in the subject.						
The course corresponded to my expectations.						

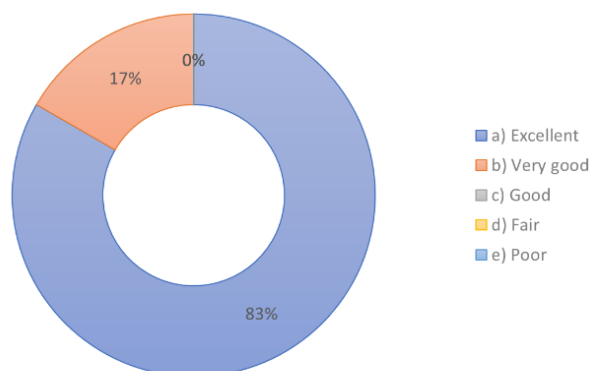
20. Please indicate your level of agreement with the following statements.



21. What overall rating would you give the trainer(s)?

- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor

21. What overall rating would you give the trainer(s)?



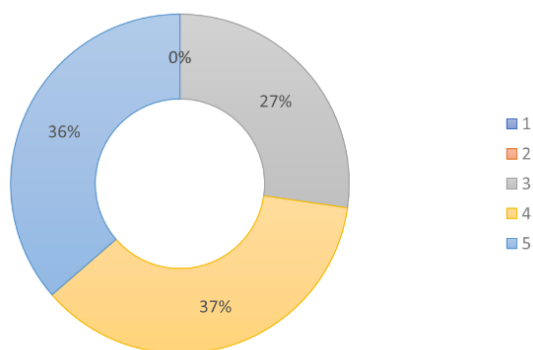
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23. How much new information did you receive in the training course?

Rate on the scale from: 1 (none) to 5 (a lot of new information)

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

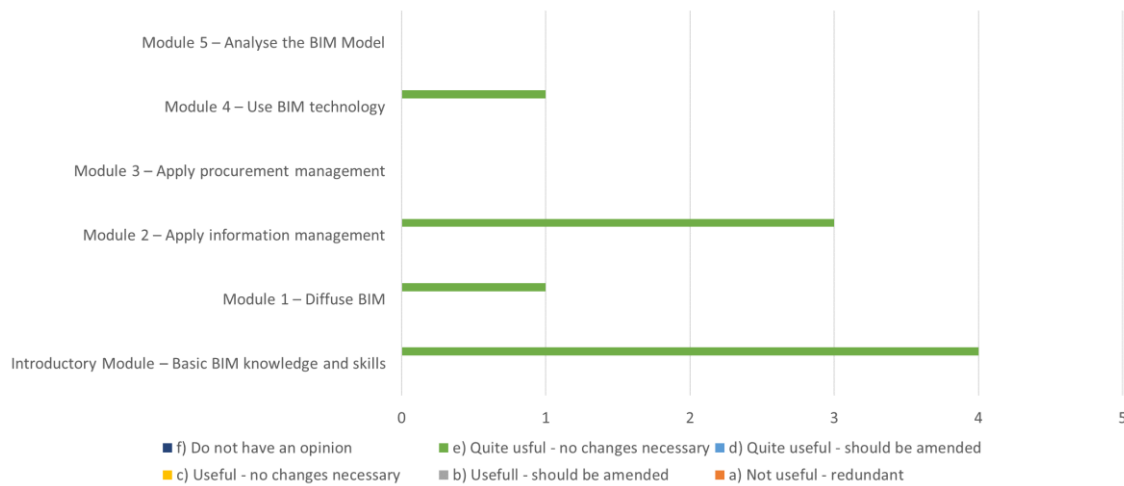
23. How much new information did you receive in the training course?



25. Please rate the following BIM course modules based on how they are useful and interesting to You.

	Not useful - redundant	Useful – should be amended	Useful – no changes necessary	Quite useful – should be amended	Quite useful – no changes necessary	Do not have opinion
Introductory Module – Basic BIM knowledge and skills						
Module 1 – Diffuse BIM						
Module 2 – Apply information management						
Module 3 – Apply procurement management						
Module 4 – Use BIM technology						
Module 5 – Analyse the BIM Model						

25. Please rate the following BIM course modules based on how they are useful and interesting to you.

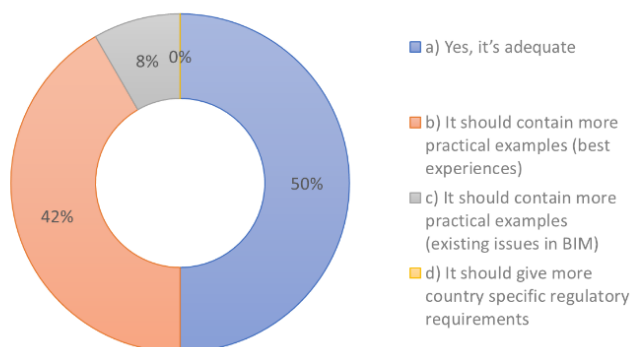


26. What do You feel, is the training material comprehensive enough?

(Please mark all that apply)

- a) Yes, it's adequate
- b) It should contain more practical examples (best experiences)
- c) It should contain more practical examples (existing issues in BIM)
- d) It should give more country specific regulatory requirements

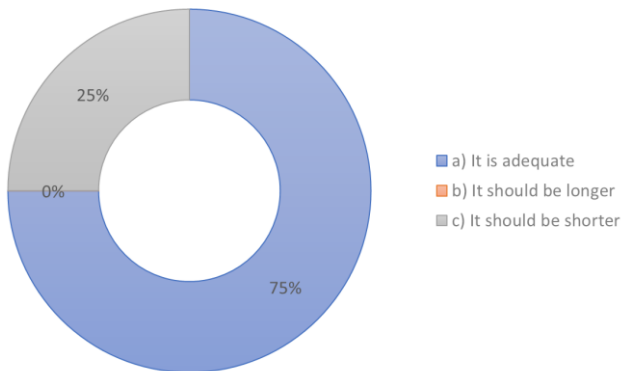
26. What do You feel, is the training material comprehensive enough?



27. What do You feel about the duration of the training?

- a) It is adequate
- b) It should be longer
- c) It should be shorter

27. What do You feel about the duration of the training?



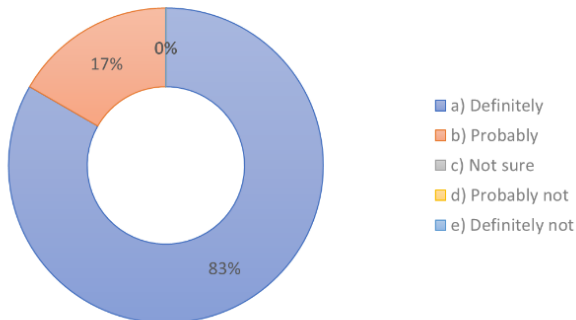
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28. Would You be willing to disseminate the BIM training courses among Your contacts and associates?

Without any obligation to do so!

- a) Definitely
- b) Probably
- c) Not sure
- d) Probably not
- e) Definitely not

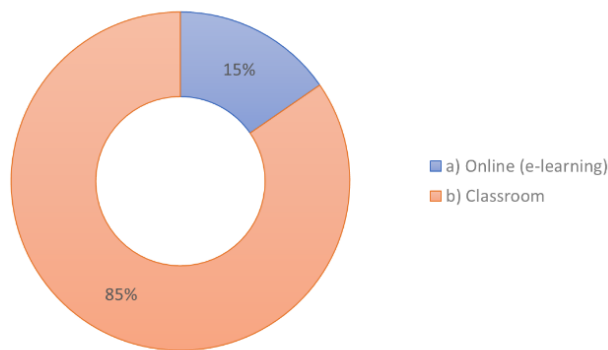
28. Would You be willing to disseminate the BIM training courses among Your contacts and associates? Without any obligation to do so!



29. Would you prefer to take this course online or in the classroom?

- a) Online (e-learning)
- b) Classroom

29. Would you prefer to take this course online or in the classroom?



It is evident from the training validation results that all (100 %) of participants feel BIM certification, support or training would absolutely (87 %) or likely (13 %) be beneficial to their colleagues which is a good indication of their view about the necessity of certification courses. Additionally, after the course, training participants were asked to evaluate their competences prior to the classroom course on BIM. The intention was to get the information what is their initial knowledge on BIM as well as to see whether the course was an “eye opener” and comprehensive enough. The participants replied that they feel they had little (67 %) or good (25 %) competences. Since 43 % of course participants are already using BIM (or intends to use it in near future) the overall rating of the course as very good (67 %) and excellent (33 %) is very encouraging and positive for the developed training materials and courses held in Croatia. Trainers received positive overall rating of very good (17 %) and excellent (83 %).

The majority of course participants who responded to these questions agree with the statements that the course objectives were clear with organized and easy to follow content. They mainly agree that course materials were clear and well written and contain sufficient number of images and videos explaining the course content. The positive validation of the Croatian course is also evident from the fact the majority of participants agree that assignments were appropriate for the level of this class (appropriate to their prior knowledge) and the topics covered are relevant and will be useful in their future work as they received new information (73 % of participants feel they got significant amount of new information). The course also increased their interest in the subject and corresponded to their expectations.

It is difficult to appraise participants’ opinion on each of the training modules since only several participants answered this question during third classroom course for professionals. Specifically, 50 % of course participants feel the training material is adequate and comprehensive enough, while remaining participants think that training materials should contain more practical examples (best experiences and existing issues in BIM), 42 % and 8 % respectively which is a significant number and should be respected. Regarding the duration of training, 75 % of training participants said that 16-hour training course is adequate, while 25 % think it should be shorter. It has to be enhanced that 85 % of course participants prefer to take this course in the classroom while only 15 % of people would prefer to take it on-line.

The quality of the course is best rated if training participants disseminated and recommend the course to their colleagues, friends and associates, and in the case of Croatian 3<sup>rd</sup> classroom course for professionals, 83 % of participants declared they would definitely and 17 % they would probably be willing to disseminate the BIM training courses among their contacts.

Analysis of the training results, problems and solutions together with lessons learned during the courses are as follows:

- A model of trainings for BIM has been developed, combining theoretical part with application examples (case studies) and practical session using BIM tools of their preference (Allplan and Archicad).
- The duration of trainings – 16 hours. Participants of the trainings have confirmed that duration is appropriate but significant number of participants asked for shorter training duration.
- The practical work is deemed by the trainers as necessary and a positive improvement compared to the first classroom course for professionals.

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Comments and suggestions of the training participants could be summarised in the following few lines:

- The classroom course participants seek for more practical lessons and tasks, more examples of good practice.

## 2.1.2 Agenda

NET-UBIEP | Network for Use BIM to  
Increase Energy Performance



### BIM za profesionalce (inženjere i arhitekte)

#### Besplatna radionica

Održavanje: 08. i 09. Ožujka 2019.

Mjesto održavanja: Sveučilište u Zagrebu, Građevinski fakultet, Kačićeva 26,  
10000 Zagreb, [Vijećnica](#)

#### Kontakt osoba:

- Mergim Gaši, Građevinski fakultet Zagreb,
- Tel: +385 1 4639 121
- [mgasi@grad.hr](mailto:mgasi@grad.hr)

Prijavni obrazac: <https://goo.gl/forms/uwAIP5s22dtUvyFY2>

Petak 8.3.2019.

Sat	Tema	Predavač
15.00 – 15.15	Uvodno o projektu Net-UBIEP	Bojan Milovanović
15.15 – 15.30	Zašto korištenje BIM-a može poboljšati energetske učinkovitosti u zgradarstvu	Bojan Milovanović
15.30 – 16.00	Diskusija – pre-training upitnici	Bojan Milovanović
16.00 – 16.15	Uvodni modul - osnovna BIM znanja i vještine	Bojan Milovanović
16.15 – 16.45	<ul style="list-style-type: none"> <li>• Uvod: što je BIM?</li> <li>• BIM Rječnik – osnovni pojmovi</li> <li>• Prednosti i cijena korištenja BIM-a u različite svrhe</li> <li>• Povrat na investiciju (ROI)</li> <li>• Standardi koji podupiru BIM proces</li> <li>• Diskusija</li> </ul>	Ivana Burcar Dunović
16.45 – 17.15	Pauza	
17.15 – 17.45	Modul 1 – Difuzija BIM-a	Ivana Burcar Dunović
17.45 – 18.15	<ul style="list-style-type: none"> <li>• Otvoreni BIM alati i standardni format</li> <li>• BIM uloge i odgovornosti</li> <li>• Dimenzije BIM-a <ul style="list-style-type: none"> <li>◦ 4D, 5D, 6D, 7D</li> </ul> </li> </ul>	Ivana Burcar Dunović

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under grant agreement No.754016



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16.45 – 17.15	<ul style="list-style-type: none"> <li>• Diskusija</li> <li>Modul 2 – Primjena BIM-a za upravljanje podacima <ul style="list-style-type: none"> <li>• Načela upravljanja podacima u zajedničkom okruženju podataka - CDE (Okolina za razmjenu podataka)</li> <li>• Negrafičke informacije u BIM modelu zgrade</li> <li>• Plan održavanja zgrade i ugovaranje energetske usluge</li> <li>• BIM Model izvedenog stanja (eng. "as built") za poboljšanje energetske učinkovitosti zgrada</li> </ul> </li> <li>• Diskusija</li> </ul>	Mergim Gaši
17.15 – 17.45	<ul style="list-style-type: none"> <li>Modul 3 – Primjena BIM-a za upravljanje nabavom</li> <li>• BIM i ugovaranje</li> <li>• BIM u javnoj nabavi</li> <li>• BEP (BIM Plan izvršenja)</li> <li>• Indeks zrelosti informacija</li> <li>• Suradnja među sudionicima u gradnji</li> <li>• Diskusija</li> </ul>	Ivana Burcar Dunović
17.45 – 18.15	<ul style="list-style-type: none"> <li>Modul 4 – Korištenje BIM tehnologije</li> <li>Modul 5 – Analiza BIM modela</li> <li>• Održivi građevinski sektor <ul style="list-style-type: none"> <li>◦ Energetska učinkovitost</li> <li>◦ Zelena gradnja</li> </ul> </li> <li>• Automatizirana kontrola modela <ul style="list-style-type: none"> <li>◦ Procjena sukladnosti s propisima</li> <li>◦ Otkrivanje kolizija</li> </ul> </li> <li>• BIM za upravljanje kvalitetom</li> <li>• BIM za primopredaju i održavanje (as built model)</li> <li>• Diskusija</li> </ul>	Marina Bagarić
18.15 – 18.30	Pauza	
18.30 – 19.00	<ul style="list-style-type: none"> <li>Demonstracija rada s OpenBIM alatima: <ul style="list-style-type: none"> <li>• Rad na BIM modelima, kontrola preklapanja;</li> <li>• BIM model tijekom korištenja zgrade (energetska učinkovitost, održavanje zgrade)</li> <li>• Pregled i odobrenje izmjena modela od strane različitih suradnika</li> </ul> </li> <li>• Diskusija</li> </ul>	Sanjin Gumbarević
19.00 – 19.15	<ul style="list-style-type: none"> <li>Diskusija – post-training upitnici</li> <li>- Validacija razvijenih trening materijala</li> </ul>	Bojan Milovanović

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This project has received funding from  
the European Union's Horizon 2020  
research and innovation programme  
under grant agreement No.754016



Subota 9.3.2019.

Sat	Tema	Predavač
10.00 – 13.00	Praktični rad u BIM-alatima (Archicad / Allplan) • Kako postaviti projekt u BIM-u • Početak rada na kreiranju 3D modela i nacрта zgrade • Kako napraviti eksport/import IFC formata	Bojan Milovanović / Ivana Burcar Dunović / Marin Rajčić / Gianmarco Čurčić Baldini
13.00 – 14.00	Ručak	
14.00 – 16.00	Energetska učinkovitost • provođenje analiza energetske učinkovitosti u idejnim fazama projekata • usporedba različitih varijantnih rješenja arhitekture • usporedba različitih scenarija potrošnje i ušteda energije	Bojan Milovanović / Ivana Burcar Dunović / Marin Rajčić / Gianmarco Čurčić Baldini

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under grant agreement No.754016



## 2.2 Estonia

### 2.2.1 Course description and results

As shown in deliverable *D21 – D4.1. First classroom courses for professionals* it was shown that Estonian partners organized a classroom course on **January 9<sup>th</sup>** (8 hours), **January 10<sup>th</sup>** (8 hours) **2019** and **January 24<sup>th</sup>** (8 hours) **and 25<sup>th</sup> 2019** (8 hours) in Tallinn, Estonia.

The course programme consisted of 32 academic hours of theoretical lectures with application examples (case studies) and practical work.

A group of **50 participants**, architects, energy efficiency specialists and construction engineers had undertaken the First classroom course for professionals in Estonia within the framework of the Net-UBIEP project.

Estonian partners have reached the targeted number of training participants during the first classroom course and have thus decided not to perform the second and third classroom course for professionals.

Based on the validation questionnaire responses (First classroom course for professionals) Estonian partners have also concluded that satisfactory training methodology and training content was developed which are in line with the learning outcomes.

## 2.3 Italy

### 2.3.1 Course description and results

Third classroom course for professionals was organized on **June 28<sup>th</sup> 2019** in Pescara, Italy

The course programme consisted of 4 academic hours of theoretical lectures.

A group of **42 participants** in Pescara which work in public and private sector like professional, architects, surveyors and engineers, had undertaken the classroom course in Italy within the framework of the Net-UBIEP project.

The overview of lectures held at the 3<sup>rd</sup> classroom course is shown below.

- Introduction: building information modelling as a tool for the sustainability of our cities





- The Data Sharing Environment (ACDat) for managing the information flow of the BIM process
- Application of BIM in energy performance and property management contracts to reduce consumption and produce energy from renewable sources integrated into the building.
- Designing plants for improving energy performance using BIM: An application to ENEA's energy school.
- BIM applied to cultural heritage: HBIM
- BIM objects and vouchers for the construction of "regional catalogues"
- Final Debate

Photos from the third classroom course for professionals conducted by **ENEA** can be found bellow.



Pre- and Post-training questionnaires were translated to Italian language and filled by training participants, using the google form app in order to facilitate the filling.

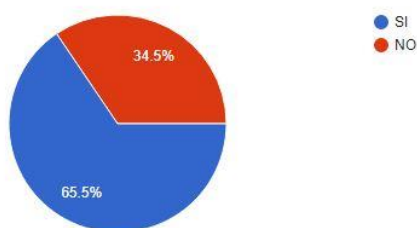
Few general conclusions of the classroom course validation from the participants in Italy is given below, while the entire questionnaire analysis is performed in deliverable *D27-D4.7 Survey and or interview among all different Targets*. Due to the fact that validation was performed in partners' native language, the analysis below has both English questions and the same questions in native language.

1. Do You or Your company/organization currently use BIM, or is it intending to use BIM in the near future?

- a) Yes
- b) No

1. La sua società già lavora in ambiente BIM o intende farlo nel futuro prossimo?

29 responses



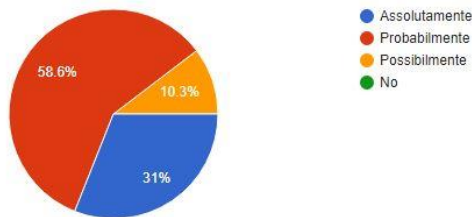


15. Would BIM certification, support or training, benefit Your colleagues?

- a) Absolutely
- b) Likely
- c) Possibly
- d) No

15. La certificazione BIM, il supporto o la formazione sarebbero utili a lei o ai suoi colleghi?

29 responses



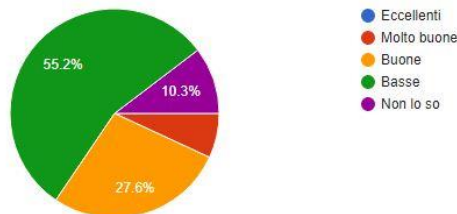
17

18. In retrospective, how do You rate Your competences (knowledge, skills, responsibility and autonomy) before this BIM course?

- a) Excellent
- b) Very good
- c) Good
- d) Little
- e) I don't know

18. Come valuti le tue competenze (conoscenze, abilità, responsabilità e autonomia) prima di questo corso BIM?

29 responses

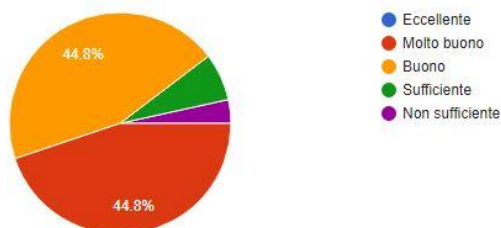


19. What overall rating would You give the course?

- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor

19. Quale valutazione generale daresti al corso?

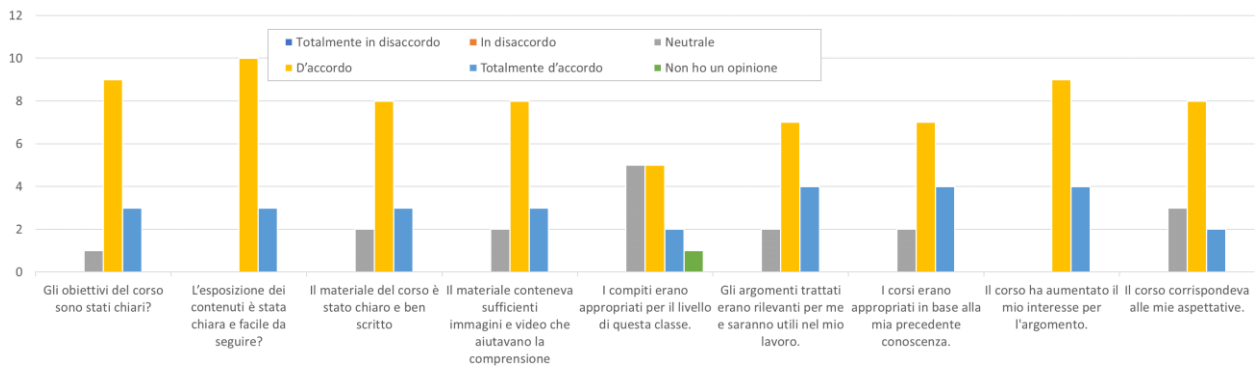
29 responses



20. Please indicate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	do not have opinion
The course objectives were clear.						
The content was organized and easy to follow.						
The course materials were clear and well written.						
The course materials contain sufficient number of images and videos explaining the course content.						
The assignments were appropriate for the level of this class.						
The topics covered were relevant to me and will be useful in my work.						
The coursework was appropriate to my prior knowledge.						
The course increased my interest in the subject.						
The course corresponded to my expectations.						

18

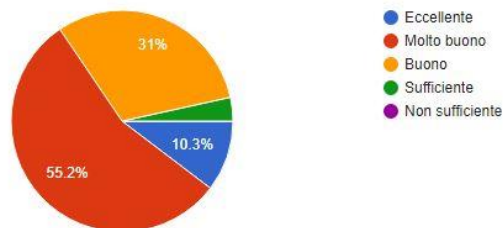


21. What overall rating would you give the trainer(s)?

- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor

21. Quale valutazione generale daresti al / ai formatore / i?

29 responses



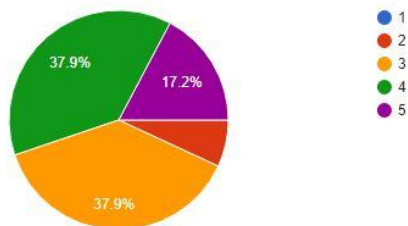
23. How much new information did you receive in the training course?

Rate on the scale from: 1 (none) to 5 (a lot of new information)

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

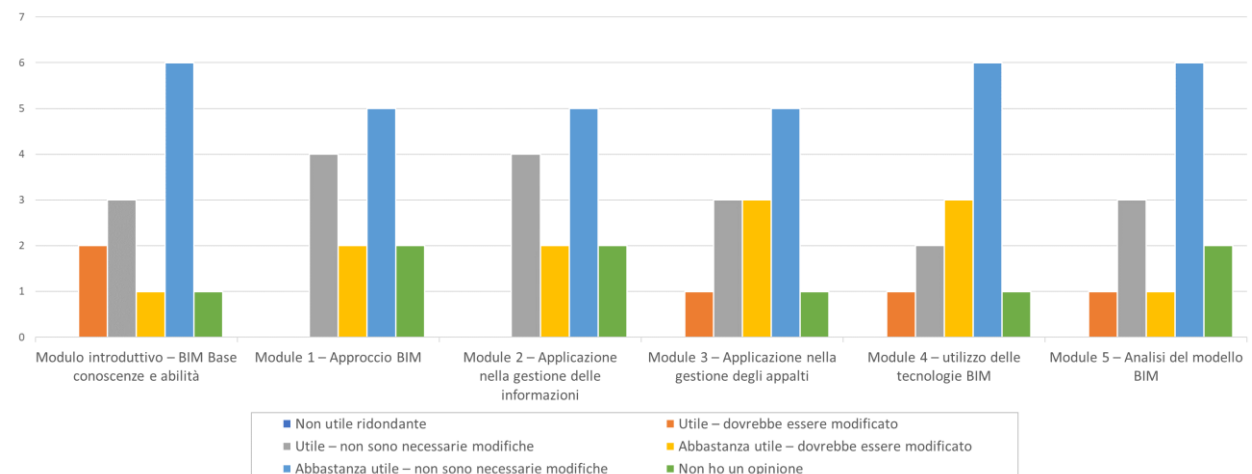
23. Quante nuove informazioni hai ricevuto nel corso di formazione ?  
Valuta sulla scala da: 1 (nessuna) a 5 (molte nuove informazioni)

29 responses



25. Please rate the following BIM course modules based on how they are useful and interesting to You.

	Not useful - redundant	Useful – should be amended	Useful – no changes necessary	Quite useful – should be amended	Quite useful – no changes necessary	Do not have opinion
Introductory Module – Basic BIM knowledge and skills						
Module 1 – Diffuse BIM						
Module 2 – Apply information management						
Module 3 – Apply procurement management						
Module 4 – Use BIM technology						
Module 5 – Analyse the BIM Model						



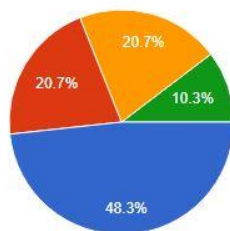
26. What do You feel, is the training material comprehensive enough?

(Please mark all that apply)

- a) Yes, it's adequate
- b) It should contain more practical examples (best experiences)
- c) It should contain more practical examples (existing issues in BIM)
- d) It should give more country specific regulatory requirements

26. Il materiale didattico è abbastanza completo?

29 responses



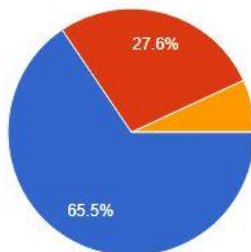
- Si è adeguato
- Dovrebbe contenere più esempi pratici (best experiences)
- Dovrebbe contenere più esempi pratici (problemi esistenti nel BIM)
- Dovrebbe fornire maggiori specifiche riguardo i requisiti richiesti dalla normativa

27. What do You feel about the duration of the training?

- a) It is adequate
- b) It should be longer
- c) It should be shorter

27. Che cosa ne pensi della durata del corso?

29 responses



- adeguata
- dovrebbe durare di più
- dovrebbe durare di meno

28. Would You be willing to disseminate the BIM training courses among Your contacts and associates?

Without any obligation to do so!

- a) Definitely
- b) Probably
- c) Not sure
- d) Probably not
- e) Definitely not

28. Saresti disposto a divulgare i corsi di formazione BIM tra i tuoi contatti e collaboratori? Senza obbligo di farlo!

29 responses



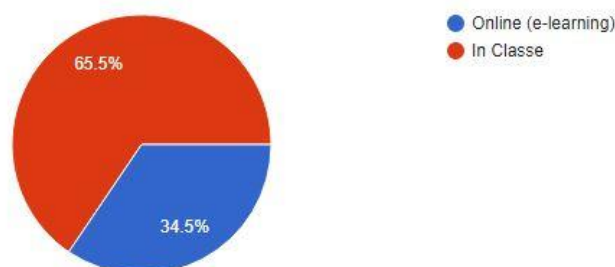
21

29. Would you prefer to take this course online or in the classroom?

a) Online (e-learning)  
b) Classroom

29. Preferiresti fare il corso on-line o frontale in classe?

29 responses



It is evident from the training validation results that 90 % of participants feel BIM certification, support or training would absolutely (31 %) or likely (59 %) be beneficial to their colleagues which is a good indication of their view about the necessity of certification courses. Additionally, after the course, training participants were asked to evaluate their competences prior to the classroom course on BIM. The intention was to get the information what is their initial knowledge on BIM as well as to see whether the course was an “eye opener” and comprehensive enough. The participants replied that they feel they had little (55 %) or good (28 %) and very good (7 %) competences. Since 65 % of course participants are already using BIM (or intends to use it in near future) the overall rating of the course as good (45 %), very good (45 %) is very encouraging and positive for the developed training materials and courses held in Italy.

The majority of course participants agree and strongly agree to the statements that the course objectives were clear with organized and easy to follow content. They are neutral and mainly agree that course materials were clear and well written and contain sufficient number of images and videos explaining the course content. There were no practical assignments so there is a significant number of participants who disagree with the claim that assignments were appropriate for the level of this class while the coursework was appropriate to their prior knowledge and the topics covered were relevant and will be useful in their future work as they received new information (52 % of participants feel they got significant amount of new information). The course also increased their interest in the subject and corresponded to their expectations.

When getting more in depth and looking for their opinion on each of the training modules, participants feel that Introductory module and modules 1, 2, 4 and 5 are useful and requires no changes, while module 3 is useful but significant number of course participants feel that this module should be amended with additional content to make it better. Specifically, the general opinion is that training materials are adequate, but significant number of participants (21 %) said it should contain more practical examples (best experiences). Regarding the length of training, 66 % of training participants said that 4-hour training course is adequate, while 28 % think it should be longer and 7 % think the course should be shorter. It has to be enhanced that 65 % of course participants prefer to take this course in the classroom while only 35 % of people would prefer to take it on-line.

The quality of the course is best rated if training participants disseminated and recommend the course to their colleagues, friends and associates, and in the case of Italian classroom course for professionals, participants declared they would definitely (51 %) and probably (38 %) be willing to disseminate the BIM training courses among their contacts.

Comments and suggestions of the training participants could be summarised in the following few lines:

- Training participants would like to have more insights about specific software
- Some participants declared they would like to have more practical case studies

### 2.3.2 Agenda

Il seminario ha l'obiettivo di presentare la metodologia del Building Information Modelling (BIM) fornendo ai partecipanti una conoscenza di base.


A seguito del nuovo DM 560/17 (Decreto BIM) e della pubblicazione delle norme UNI 11337 (2017) risulta importante conoscere il BIM e la sua applicazione e diffusione a livello nazionale ed internazionale.

Verrà presentato il progetto NET-UBIEP che ha l'obiettivo di aumentare le prestazioni energetiche degli edifici stimolando e promuovendo l'uso del BIM durante il ciclo di vita di un edificio: dalla fase di progettazione alla costruzione, gestione, manutenzione, ristrutturazione, per arrivare, infine, alla demolizione. Per trarre tutti i benefici introdotti dal BIM occorre che tutti i tecnici della filiera delle costruzioni siano pronti ad acquisire nuove competenze che siano integrate anche con l'obbligatorietà dell'introduzione dei criteri di performance energetica degli edifici per una migliore qualità del progetto e per un costo di manutenzione e gestione inferiore.


L'uso del BIM è già un obbligo di legge così come è obbligo, per la pubblica amministrazione, fare formazione e dotarsi di hardware e software adeguati. Al di là dell'obbligo è bene sapere che il BIM si sta diffondendo sempre più in tutti i paesi del mondo, proprio per i vantaggi che ne derivano per la sostenibilità del nostro ambiente costruito e la pubblica amministrazione ha un ruolo fondamentale nel dotarsi di strumenti per gestire un progetto digitale che può essere realizzato e condiviso con piattaforme informatiche.

NET-UBIEP promuove anche la collaborazione in tutta la filiera perché è importante che tutti i professionisti e i tecnici, che partecipano alle diverse fasi della progettazione e della realizzazione, abbiano uno specifico ruolo di raccolta, gestione e memorizzazione di tutte le informazioni necessarie, durante l'intero ciclo di vita dell'edificio. Ogni tecnico, dipendente pubblico, progettista, costruttore, gestore di strutture o fornitore, deve dunque conoscere quali informazioni possano essere utilizzate potenzialmente da qualsiasi altro attore. Tutte le informazioni dovranno essere disponibili per tutta la vita dell'edificio anche quando il processo che l'ha generato è terminato. È quindi essenziale che tutti i diversi attori utilizzino lo stesso linguaggio, gli stessi dizionari e la stessa struttura dei dati... ecco perché la formazione è così importante!!

A cura di:




Agencia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile



REGIONE ABRUZZO

Anna Moreno  
Coordinatore Net-UBIEP  
Tel. +39 06 3048 6474  
[anna.moreno@enea.it](mailto:anna.moreno@enea.it)

Segreteria Organizzativa  
Regione Abruzzo (Servizio politica energetica, qualità dell'aria, SINA e Risorse estrattive del territorio) – ENEA Ufficio Territoriale di Pescara



Network for Using BIM  
to Increase the Energy Performance

[www.net-ubiep.eu](http://www.net-ubiep.eu)

Building Information Modeling

Innovazione e nuove frontiere  
per infrastrutture e città sostenibili

Progetto NET UBIEP

28 Giugno 2019  
Pescara – Polo Universitario di Viale  
Pindaro (Aula 31)

L'ENEA, in collaborazione con la Regione Abruzzo, propone un seminario tecnico sul tema: l'importanza della formazione sul Building Information Modeling per costruire città sostenibili

Somministrazione questionario iniziale da compilare on line [www.net-ubiep.eu/it/self-assessment](http://www.net-ubiep.eu/it/self-assessment)

#### Programma della Giornata

Ore 9:00 registrazione partecipanti

Ore 9:30

##### Saluti istituzionali

**Arch. Nicola Campitelli**

Assessore della Regione Abruzzo con delega a Urbanistica e Territorio, Demanio marittimo, Paesaggi, Energia e Rifiuti

**Prof. Marcello Buccolini**

Direttore del Dipartimento INGEO (Ingegneria e Geologia), Università "G. D'Annunzio" di Chieti-Pescara

##### Introduzione al Workshop

**Ing. Anna Moreno** – ENEA, Coordinatore del Progetto

**Dott.ssa Iris Flacco** – Servizio politica energetica, qualità dell'aria, SINA e Risorse estrattive del territorio della Regione Abruzzo

**Dott. Carlo Amoroso** – Servizio Formazione ed Orientamento professionale della Regione Abruzzo

**Dott. Giovanni Addamo** – ENEA, Responsabile Laboratorio Regioni Centrali della Divisione Servizi Integrati per lo Sviluppo Territoriale (Dipartimento Unità per l'Efficienza Energetica)

#### 1. Il Building Information Modeling come strumento per la sostenibilità delle nostre città

*Il BIM non è più uno strumento per la sola progettazione di edifici, ma è il nuovo strumento per progettare, realizzare, gestire e mantenere meglio edifici e infrastrutture di superficie e del sottosuolo. In tale contesto l'uso dell'openBIM, che favorisce l'interoperabilità digitale, diventa essenziale per assicurare la gestione delle informazioni in qualsiasi ambito settoriale, geografico e temporale.*

**Ing. Anna Moreno, ENEA**

#### 2. L'Ambiente della Condivisione dei Dati (ACDat) per la gestione del flusso informativo del processo BIM

*Il clima collaborativo, alla base del BIM, deve avere un Ambiente di Condivisione dei Dati per favorire il dialogo tra tutti gli attori senza perdita d'informazioni ma anche senza ridondanze e evitando incomprensioni*

**Dr. Giovanni Esposito, Acca software**

#### 3. Applicazione del BIM nei contratti di rendimento energetico e gestione degli immobili per ridurre i consumi e produrre energia da fonti rinnovabili integrate nell'edificio.

*La modellazione BIM permette di avere uno strumento utile per valutare l'opportunità di una riqualificazione più o meno profonda di un edificio riuscendo a calcolare i tempi di ritorno con certezza dei risultati utilizzando gli incentivi fiscali oggi disponibili: Eco bonus e Sisma bonus.*

**Prof. Gianmichele Panarelli, Università degli Studi "G. D'Annunzio" di Chieti-Pescara**

#### 4. BIM e certificazione LEED V4 applicato al Nuovo Edificio a Servizi nel nucleo ind. Di Sassa Scalo Caso studio GBC Italia con Statica Aggregato Edilizio Via Antinori (AQ)

**Arch. Andrea Valentini, COAF e GBC**

#### 5. Esperienze BIM sul territorio Abruzzese

**Prof. Stefano Brusaporci, Università degli Studi dell'Aquila**

#### 6. Efficientamento energetico e riparazione edile: Scuola Ponticelli di Napoli

**Ing. Isabella Gargale, COAF**

#### 7. Gli oggetti BIM e i voucher per la costruzione di "cataloghi regionali"

*Per una progettazione con criteri ambientali minimi è opportuno avere cataloghi BIM dei prodotti locali in modo che progettisti e costruttori possano progettare e realizzare edifici con prodotti a Km zero e i proprietari possano più facilmente provvedere alla gestione e alla manutenzione degli impianti degli edifici.*

**Ing. Anna Moreno, ENEA**

Ore 12:30

Somministrazione questionario finale da compilare on line [www.net-ubiep.eu/it/assessments-5](http://www.net-ubiep.eu/it/assessments-5)

Dibattito Finale

#### Nota bene

Per poter usufruire del corso net-UBIEP bisogna partecipare al sondaggio che si trova al seguente link:

[www.net-ubiep.eu/it/users-classes](http://www.net-ubiep.eu/it/users-classes)

e iscriversi al sito [www.net-ubiep.eu](http://www.net-ubiep.eu)

Nello stesso sito è possibile scaricare gratuitamente il materiale informativo per le pubbliche amministrazioni ed altri target.

## 2.4 Lithuania

### 2.4.1 Course description and results

Third classroom course for professionals was organized on **April 10<sup>th</sup> 2019** in Vilnius, Lithuania.

The course programme consisted of 8 academic hours combining theoretical part with application examples (case studies) and practical tasks.

A group of **17 participants** specialising in architecture and engineering had undertaken the classroom course in Lithuania within the framework of the Net-UBIEP project.

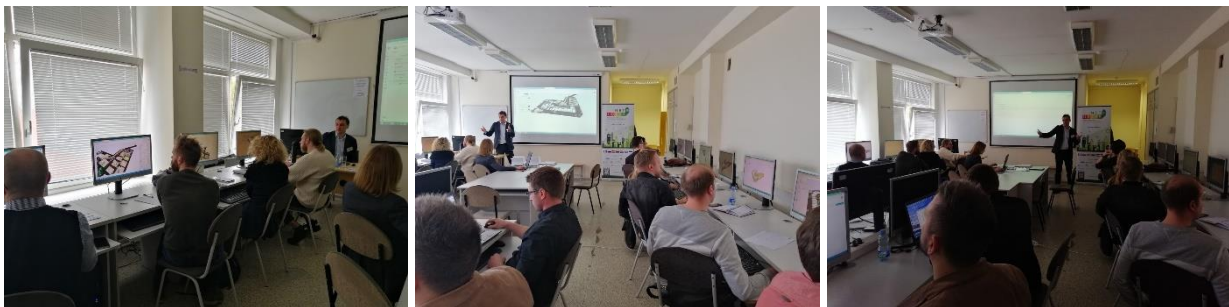
The overview of the partners and methodological basis of the classroom courses is shown in the figure below.





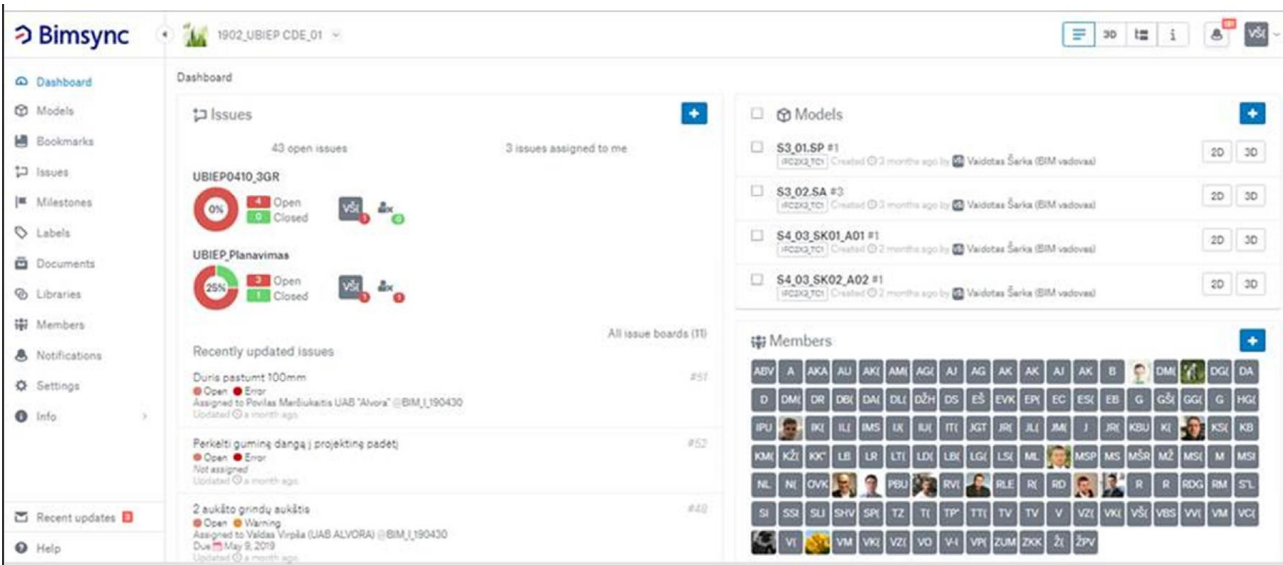
Prepared by: Doc. Dr. Vaidotas Šarka (VŠĮ „Skaitmeninė statyba“); Doc. Dr. Tatjana Vilutienė (Vilnius Gediminas Technical University)

Several images from the third classroom course for professionals conducted by the **Dig.Con.** can be found below.

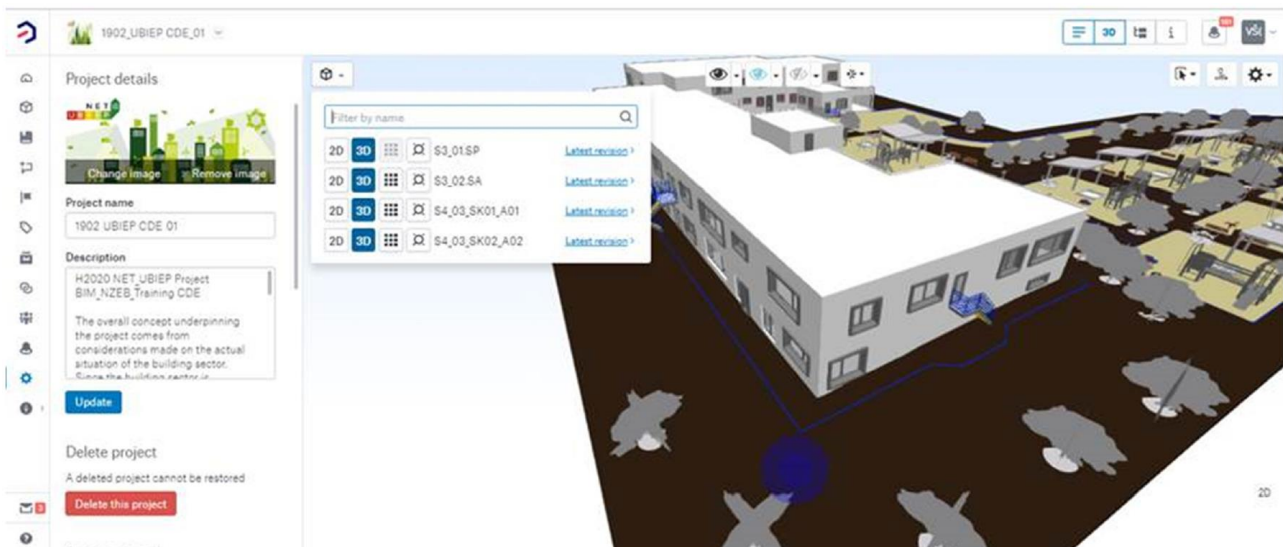


BIMSync platform for Common Data Environment (CDE) provided by Catena (Norway) was used during classroom courses in Lithuania. Project Dashboard (summary) within the BIMSync platform is shown in the figure below.

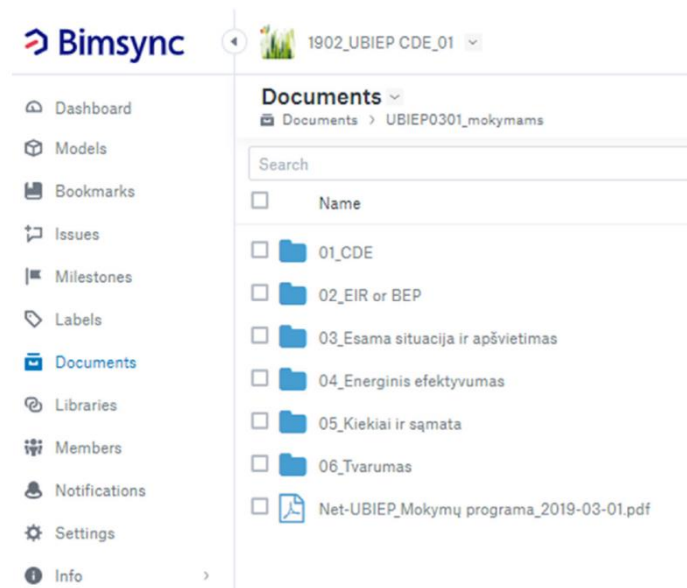




Real BIM Model (Presented by Vilnius Municipality Company “Vilniaus vystymo kompanija” – figure below) was shared with the classroom course participants as an application example and BimSync platform was used to conduct specific tasks given to participants during the course.



Training documents developed for the purpose of classroom course within the Net-UBIEP project was shared among participants using BimSync platform, as shown in figure below.



Pre- and Post-training questionnaires were translated to Lithuanian language and filled by training participants.

Pre-training questionnaire is available at this link:

[https://docs.google.com/forms/d/e/1FAIpQLSfK\\_ZgufjP2RxbOV-ZcZnvNuPrWwS7v7ETfPY57Hzzg6cXN7g/viewform](https://docs.google.com/forms/d/e/1FAIpQLSfK_ZgufjP2RxbOV-ZcZnvNuPrWwS7v7ETfPY57Hzzg6cXN7g/viewform),

while the responses to the Pre-training questionnaire are available at this link:

<https://docs.google.com/forms/d/15uY64BIGHQjq33KWMdtBasG6lotuPdP1h45yINCswl/edit#responses>

On the other hand, Post-training questionnaire is available at this link:

[https://docs.google.com/forms/d/e/1FAIpQLSdGyTyIhqzf7DoEsl-y0YghAbpA1ZmKrqr7RBXyaZm\\_RdsQ/viewform](https://docs.google.com/forms/d/e/1FAIpQLSdGyTyIhqzf7DoEsl-y0YghAbpA1ZmKrqr7RBXyaZm_RdsQ/viewform) , while the responses to the Post-training questionnaire

are available at this link:

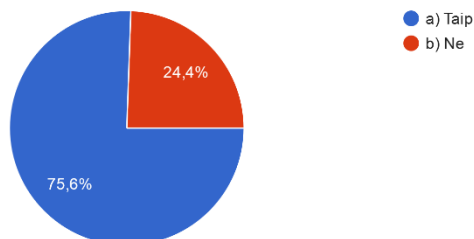
[https://docs.google.com/forms/d/1limow7zJEoEQkZfhQaqxP0vQ\\_OdyfoeKR4aNsDbJ8pg/edit#responses](https://docs.google.com/forms/d/1limow7zJEoEQkZfhQaqxP0vQ_OdyfoeKR4aNsDbJ8pg/edit#responses)

Few general conclusions from the classroom course validation from the participants in Lithuania is given below, while the entire questionnaire analysis is performed in deliverable *D27-D4.7 Survey and or interview among all different Targets*. Due to the fact that validation was performed in partners' native language, the analysis below has both English questions and the same questions in native language.

- |   |                 |
|---|-----------------|
| 1. Do You or Your company/organization currently use BIM, or is it intending to use BIM in the near future? | a) Yes<br>b) No |
|---|-----------------|

1. Ar jūsų įmonė/organizacija šiuo metu taiko BIM (bet koku lygmeniu), ar ketina artimiausiu metu taikyti?

45 odgovora



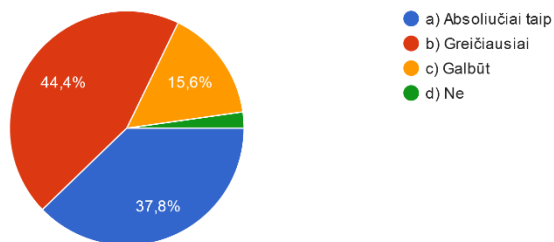
27

15. Would BIM certification, support or training, benefit Your colleagues?

- a) Absolutely
- b) Likely
- c) Possibly
- d) No

15. Ar BIM kompetencijų sertifikavimas ar mokymas bus naudingas jūsų kolegoms?

45 odgovora

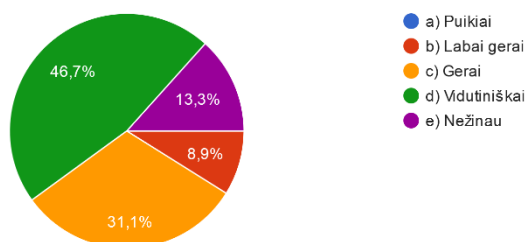


18. In retrospective, how do You rate Your competences (knowledge, skills, responsibility and autonomy) before this BIM course?

- a) Excellent
- b) Very good
- c) Good
- d) Little
- e) I don't know

18. Retrospektyviai, kaip vertinate savo kompetencijas (žinias, įgūdžius, atsakomybę ir autonomiją) prieš šį BIM kursą?

45 odgovora

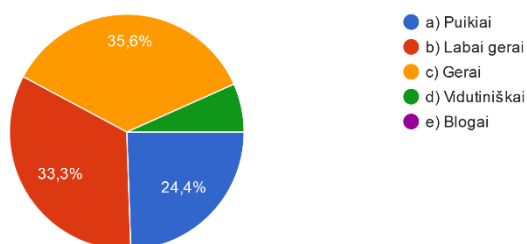


19. What overall rating would You give the course?

- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor

19. Kaip vertinate mokymus?

45 odgovora

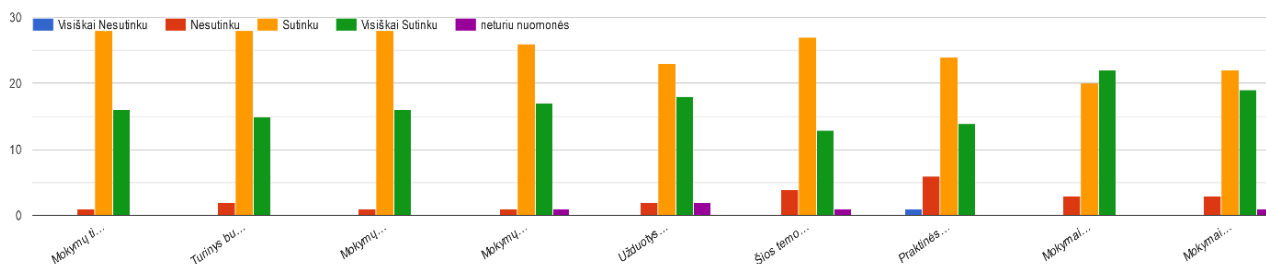


28

20. Please indicate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	do not have opinion
The course objectives were clear.						
The content was organized and easy to follow.						
The course materials were clear and well written.						
The course materials contain sufficient number of images and videos explaining the course content.						
The assignments were appropriate for the level of this class.						
The topics covered were relevant to me and will be useful in my work.						
The coursework was appropriate to my prior knowledge.						
The course increased my interest in the subject.						
The course corresponded to my expectations.						

20. Pažymėkite savo nuomonę dėl šių teiginių:

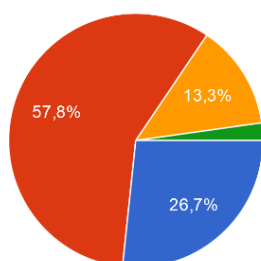


21. What overall rating would you give the trainer(s)?

- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor

21. Kaip vertinate mokytojus?

45 odgovora



- a) Puikiai
- b) Labai gerai
- c) Gerai
- d) Vidutiniškai
- e) Blogai

29

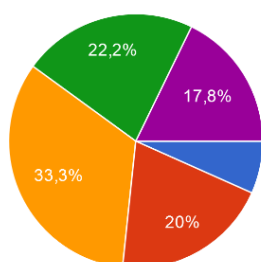
23. How much new information did you receive in the training course?

Rate on the scale from: 1 (none) to 5 (a lot of new information)

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

23. Kiek naujos informacijos gavote mokymu metu ? Įvertinkite skalėje nuo 1 (nėra) iki 5 (daug naujos informacijos)

45 odgovora



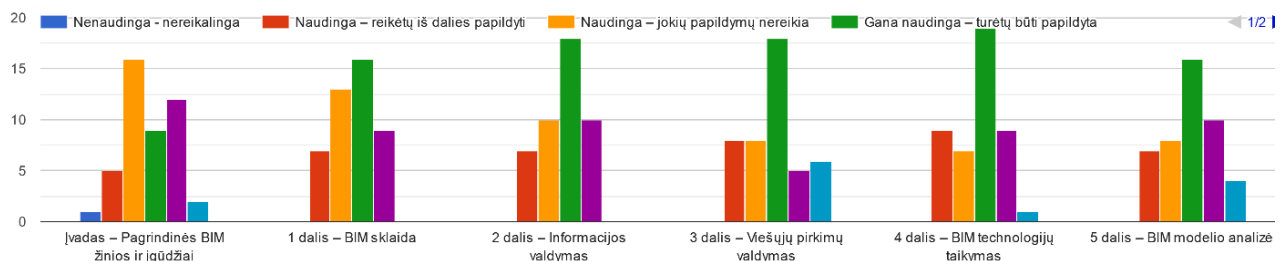
- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

25. Please rate the following BIM course modules based on how they are useful and interesting to You.

	Not useful - redundant	Useful – should be amended	Useful – no changes necessary	Quite useful – should be amended	Quite useful – no changes necessary	Do not have opinion
Introductory Module – Basic BIM knowledge and skills						
Module 1 – Diffuse BIM						
Module 2 – Apply information management						
Module 3 – Apply procurement management						
Module 4 – Use BIM technology						
Module 5 – Analyse the BIM Model						

30

25. Įvertinkite šią BIM mokymų atskiras temas pagal tai, ar jos buvo naudingos ir įdomios.



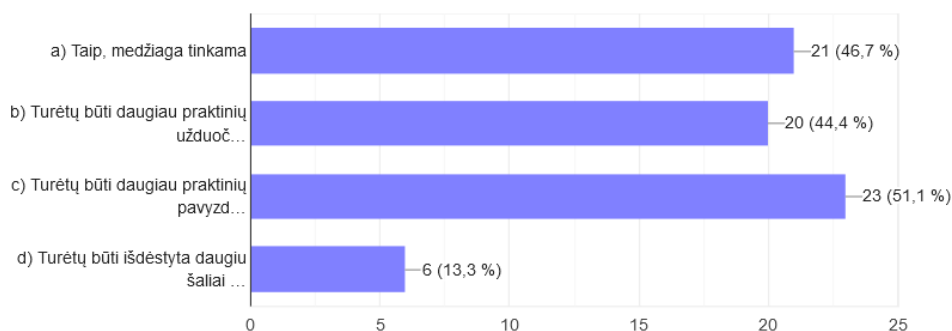
26. What do You feel, is the training material comprehensive enough?

(Please mark all that apply)

- a) Yes, it's adequate
- b) It should contain more practical examples (best experiences)
- c) It should contain more practical examples (existing issues in BIM)
- d) It should give more country specific regulatory requirements

26. Ką manote, ar mokymo medžiaga yra pakankamai išsami?  
(Pažymėkite visus tinkamus atsakymus)

45 odgovora

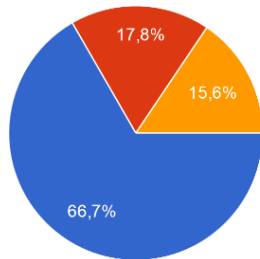


27. What do You feel about the duration of the training?

- a) It is adequate
- b) It should be longer
- c) It should be shorter

27. Kaip jus vertinate mokymų trukmę?

45 odgovora



- a) Tinkama
- b) Mokymai turėtų būti ilgesni
- c) Mokymai turėtų būti trumpesni

31

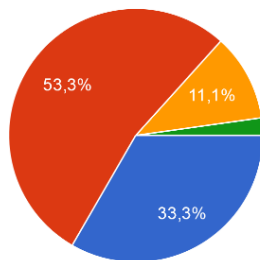
28. Would You be willing to disseminate the BIM training courses among Your contacts and associates?

Without any obligation to do so!

- a) Definitely
- b) Probably
- c) Not sure
- d) Probably not
- e) Definitely not

28. Ar sutiktumėte platinti informaciją apie BIM mokymus savo partneriams? (Be įsipareigojimo tai daryti!)

45 odgovora



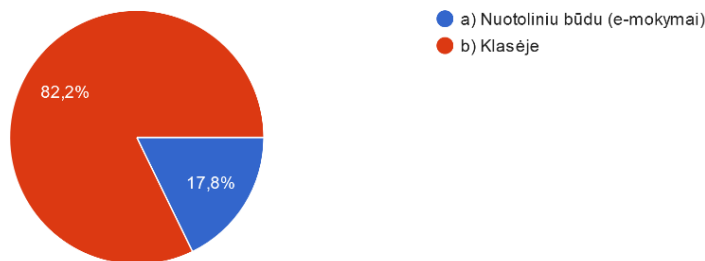
- a) Tikrai taip
- b) Tikėtina taip
- c) Nesu tikras
- d) Tikriausiai ne
- e) Tikrai ne

29. Would you prefer to take this course online or in the classroom?

- a) Online (e-learning)
- b) Classroom

## 29. Ar šiuos mokymus jums būtų patogiau išklaudyti klasėje ar nuotoliniu būdu ?

45 odgovora



32

It is evident from the training validation results that 82.2 % of participants feel BIM certification, support or training would absolutely (37.8 %) or likely (44.4 %) be beneficial to their colleagues which is a good indication of their view about the necessity of certification courses. Additionally, after the course, training participants were asked to evaluate their competences prior to the classroom course on BIM. The intention was to get the information what is their initial knowledge on BIM as well as to see whether the course was an “eye opener” and comprehensive enough. The participants replied that they feel they had little (46.7 %) or good (31.1 %) and very good (8.9 %) competences. Since 75.6 % of course participants is already using BIM (or intends to use it in near future) the overall rating of the course as good (35.6 %), very good (33.3 %) and excellent (24.4 %) is very encouraging and positive for the developed training materials and courses held in Lithuania. Trainers received positive overall rating of very good (57.8 %) and excellent (26.7 %).

The majority of course participants agree or are neutral to the statements that the course objectives were clear with organized and easy to follow content. They mainly agree that course materials were clear and well written and contain sufficient number of images and videos explaining the course content. The positive validation of the Lithuanian course is also evident from the fact the majority of participants agree that assignments were appropriate for the level of this class (appropriate to their prior knowledge) and the topics covered are relevant and will be useful in their future work as they received new information (73.3% of participants feel they got significant amount of new information). The course also increased their interest in the subject and corresponded to their expectations.

When getting more in depth and looking for their opinion on each of the training modules, participants feel that Introductory module is useful and requires no changes, while 5 modules developed are useful but majority of course participants feel that these modules should be amended with additional content to make it better. Specifically, the general opinion is that training materials contain more practical examples (best experiences and existing issues in BIM), 44.4 % and 51.1 % respectively. Regarding the length of training, 66.7 % of training participants said that 8-hour training course is adequate, while 17.8 % think it should be longer and 15.6 % think the course should be shorter. It has to be enhanced that 82.2 % of course participants prefer to take this course in the classroom while only 17.8 % of people would prefer to take it on-line.

The quality of the course is best rated if training participants disseminated and recommend the course to their colleagues, friends and associates, and in the case of Lithuanian classroom course for professionals, participants declared they would definitely (33.3 %) and probably (53.3 %) be willing to disseminate the BIM training courses among their contacts.



Analysis of the training results, problems and solutions together with lessons learned during the courses are as follows:

- A new model of practical trainings for BIM has been developed, combining theoretical part with application examples (case studies) and practical tasks.
- The system of documents and methodology developed by DigCon and partners was used for the trainings: system of documents, i.e. templates of EIR, BEP, LOD, BIM Use cases, etc.
- The duration of trainings – 8 hours. Participants of the trainings have confirmed that duration is appropriate.
- After the training, the majority expressed a desire to continue with the trainings.
- Real BIM project management web platform BIMSync (CDE) has been used as a platform for communication between trainers and training participants
- Training platform BIMSync used real BIM model files and related information.
- To complete the questionnaires, tasks were created through the CDE environment in BIMSync platform. This resulted in a high percentage of responses (Pre- 95%, Post -75%).

Comments and suggestions of the training participants could be summarised in the following few lines:

- The classroom course participants seek for more practical lessons and tasks, more examples of good foreign practice, and more practical project reviews.
- Training is useful for all market participants, but it needs to be clarified that training is intended for beginners
- It would be possible to invite the building contractor to describe the implementation of the construction and to evaluate it equally in the BIM modeling process. Additionally, it would be more useful to hear about practical problems in our market.
- Some course participants would like to have a more specific and deeper analysis rather than the amount of information but poorly analyzed. It would be useful to introduce more detailed application of the BIM model 4D (timing control for construction companies) and 5D (model-match mapping capabilities through classification to automate the creation of a booklet), as well as more detail on BIM usage in 6D and 7D.
- Several participants suggest that the course could be divided into a series of courses on individual topics, that more time is needed (maybe two days) since topics are taught too fast and have little time for discussions. On the other hand, a few participants said everything is fine, but they would prefer a little shorter course.
- Some participants feel they would like more links (problems) to the management of the BIM project and the legal basis for interference / assistance in building a construction document. In the course materials, provide a comparative relationship with the innovations to be implemented and the current situation according to the applicable standards. Some participants would require analysis of various BIM apps.
- Testimonial: *The courses were useful for me to get to know the system and get interested. Now I would like to learn more and deepen my practical knowledge because I still feel that there is a lack of practical application of theoretical knowledge.*

## 2.4.2 Agenda



**Mokymai „Kaip efektyviai projektuoti ir statyti bei naudoti energijos beveik nenaudojančius (angl. NZEB) tvarius pastatus, taikant statinių informacinio modeliavimo (BIM) metodiką“.**

**Net-UBIEP 3-iejį mokymų statybos profesionalams (WP4)**

**Data:** 2019-04-10, 8:30-17:00 val.

**Vieta:** Vilniaus Gedimino technikos universitetas (Saulėtekio al. 11, Vilnius), SRL-I 520

MOKYMŲ PROGRAMA		
Laikas	Tema	Pranešėjas
8:30-9:00	Registracija / Sutikimo kava	
9:00-9:10	Sveikinimo žodis, mokymų tikslai.	Dalius Gedvilas (VšĮ „Skaitmeninė statyba“)
9:10-9:30	Skaitmeninė statyba Lietuvoje. Kiek esame pažengę?	Dalius Gedvilas (VšĮ „Skaitmeninė statyba“)
9:30-9:50	Apie Net-UBIEP projektą. Mokymų planas.	Tatjana Vilutienė (Vilniaus Gedimino technikos universitetas)
<b>Praktinė dalis</b>		
9:50-10:20	Susipažinimas su mokymų dalyviais. <i>Praktinė užduotis:</i> Statybos projektų problematikos identifikavimas	Vaidotas Šarka (VšĮ „Skaitmeninė statyba“)
10:20-10:50	<i>Praktinė užduotis:</i> CDE - projekto komandos bendradarbiavimo aplinka WEB platformoje ir integruotos komandos formavimas (IPD).	Vaidotas Šarka (VšĮ „Skaitmeninė statyba“) Tatjana Vilutienė, Edita Šarkienė (Vilniaus Gedimino technikos universitetas)
10:50-11:10	Kavos pertraukėlė / Komunikavimas	
11:10-11:30	Kas yra EIR ir BEP? Kodėl svarbu parengti racionalų EIR?	Vaidotas Šarka (VšĮ „Skaitmeninė statyba“)
11:30-12:00	<i>Praktinė užduotis:</i> Projekto BIM tikslų nustatymas	Tatjana Vilutienė, Edita Šarkienė (Vilniaus Gedimino technikos universitetas)
12:00-12:30	<i>Praktinė užduotis:</i> Kokius BIM taikymo būdus naudosime projekte?	Tatjana Vilutienė, Edita Šarkienė (Vilniaus Gedimino technikos universitetas)
12:30-13:15	Pietūs	
13:15-14:00	<i>Demonstravimas:</i> Tvarumo analizė <i>Praktinė užduotis:</i> Užduočių pasirinktam BIM taikymo būdai formulavimas. Informacijos pateikimo plano (IPP) rengimas. Rezultatų aptarimas.	Rita Mikušonienė (Vilniaus Gedimino technikos universitetas)
14:00-14:45	<i>Demonstravimas:</i> Energinio naudingumo modeliavimas <i>Praktinė užduotis:</i> Užduočių pasirinktam BIM taikymo būdai formulavimas. Informacijos pateikimo plano (IPP) rengimas. Rezultatų aptarimas.	Rasa Džiugaitė-Tumėnienė (Vilniaus Gedimino technikos universitetas)

Net-UBIEP: D21-D4.1 Third classroom courses for Professionals (Lithuania).

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 754016. This deliverable reflects only the author's view. The Agency is not responsible for any use that may be made of the information it contains.



MOKYMŲ PROGRAMA		
Laikas	Tema	Pranešėjas
14:45-15:00	Kavos pertraukėlė / Komunikavimas	
15:00-15:45	<i>Demonstravimas:</i> Apšvietimo analizė <i>Praktinė užduotis:</i> Užduočių pasirinktam BIM taikymo būdai formulavimas. Informacijos pateikimo plano (IPP) rengimas. Rezultatų aptarimas.	Violeta Motuzienė (Vilniaus Gedimino technikos universitetas)
15:45-16:30	<i>Demonstravimas:</i> Kiekių analizė ir sąmatų rengimas. <i>Praktinė užduotis:</i> Užduočių pasirinktam BIM taikymo būdai formulavimas. Informacijos pateikimo plano (IPP) rengimas. Rezultatų aptarimas.	Albinas Vaitkevičius (UAB „SISTELA“) Vaidotas Šarka (VšĮ „Skaitmeninė statyba“)
16:30-17:00	Klausimai / Diskusija / Mokymų refleksija / Klausimynas	
17:00	Renginio pabaiga	

Daugiau informacijos:

1. Apie net-UBIEP projektą: <http://www.net-ubiep.eu/it/home-it/>
2. Apie BIM metodikos taikymą: [www.skaitmeninesstatyba.lt](http://www.skaitmeninesstatyba.lt)
3. Apie statybų sektoriaus e-kompetencijų registrą: [www.statres.lt](http://www.statres.lt)
4. Apie A, A+, A++ ir NZEB pastatų statybos technologijas: [www.statybostaisykles.lt](http://www.statybostaisykles.lt) statybos taisyklių ir ENERGOTRAIN skiltis

**Renginio organizatoriai:**



**Renginio partneriai**



Net-UBIEP: D21-D4.1 Third classroom courses for Professionals (Lithuania).

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## 2.5 Slovakia

### 2.5.1 Course description and results

On **23-24 May 2019** (16 hours), the third Net-UBIEP Training courses for Professionals was organised in Bratislava, Slovakia.

Slovak partners have set up the Net-UBIEP School of BIM in Slovakia. The training provided by the school is modular and open to further new modules. At present they have established 7 modules:

- MU1 - Basic module for public authorities;
- MU2 - basic module for owners of buildings;
- MU3 - basic module for facility managers;
- MP1 - basic module for professionals;
- MP2 - working with the software for BIM (for professionals);
- MP3 - planning fire protection in BIM (for professionals);
- MT1 - module for technicians and craftsmen;
- Certification module – under development - will be clarified as we have more details of using bSI platform.

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During the classroom courses, Slovak partners were testing these modules:

- 1st seminar for PA, owners and facility managers (25 October 2018) and in second seminar for PA, owners and facility managers (25 April 2019);
- 1<sup>st</sup> and 2<sup>nd</sup> training sessions for professionals (1 - 2 April 2019);
- third training session for professionals (23-24 May 2019);
- in-class training for technicians (28 March 2019) - they had to organise the training for technicians in-class, as reading the information material using e-learning would be not enough for them and Slovak partners were delivering through this session practical demonstrations for augmented reality using phones, tablets and 3D-glasses; and they could personally test working with 3D-glasses (this exercise was prepared by a company affiliated to the school).

The Net-UBIEP School of BIM is supported by affiliates that include: construction association, Chamber of Architects, training institute, providers of software (for the moment only Revit, but others are interested to come), many technical companies that are providing BIM related services (mostly SMEs) for integrated planning, construction and facility management (still we have to cover liquidation and recycling), architect studios.

These affiliates provide input to the training, provide speakers, equipment for practical demonstrations and exercises (Slovak partners have established a rule that they are neutral in respect of brand - so no company presentations allowed) etc. The network is growing.

Certainly, this school will continue to work beyond expiry of the project and they already have many plans with their affiliates.

Additionally, Slovak partners have an ambition to include also the Czech Republic and organise joint "Summer BIM Schools" (they have contacted the representatives of czBIM).

After they are done with the validation classroom courses, they would like to organise additional routine training in the second half of the year (2019).

The course programme for professionals consisted of 32 academic hours (all three training sessions together) combining theoretical part with application examples (case studies) and practical tasks.

A group of **12 participants** specialising in architecture and engineering had undertaken the classroom course in Slovakia within the framework of the Net-UBIEP project.

The key objectives of the seminar were:

- Present key elements of BIM and train architects/planners using the relevant software (Autodesk family);
- Explain how to use the available tools for BIM-based energy efficiency assessment of buildings;
- Discuss the barriers in efficient and effective use of BIM in integrated design and planning;
- Discuss the barriers to the digitalization of spatial planning and delivery of e-permits.

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Particular objectives of the seminar were set as follows:

- Test the content of the training for modules MP1, MP2 and MP3;
- Receiving feed-back from the participating professionals on how to improve and further develop the offer of the Net-Ubiep Academy in Slovakia (fine-tuning existing modules, development of new modules);
- Discuss the tentative projects for supporting market uptake of skills and knowledge on BIM and its support to energy optimisation of buildings;
- Discuss specific issues, such as planning fire protection (specific legislative requirements in Slovakia and the Czech Republic that needs to be addressed).

The following main topics were discussed in detail:

- How BIM helps the target group in achieving the targeted energy performance of the building during the relevant (to the target group) phases of the building's life cycle;
- What tools the target groups need to master in order to reap the benefits of BIM;
- Digitalised building model and how to work with it in performing the target groups' duties and responsibilities;
- Infrastructure and training needed for the target groups to perform their duties and responsibilities.

Several images from the third classroom course for professionals conducted by the **ViaEU** can be found below.



Pre- and Post-training questionnaires were translated to Slovak language and filled by training participants.

**VIAEUROPA®**

**Dotazník pre účastníkov školenia pre profesionálov - pred školením**

1. Ktorý typ z nasledujúcich najviac charakterizuje Vašu organizáciu?

- ☐ a) vlastné budovy
- ☐ b) architekti
- ☐ c) inžinierska organizácia
- ☐ d) stavebná spoločnosť
- ☐ e) dodávateľská spoločnosť
- ☐ f) správcovská organizácia
- ☐ g) organizácia riadiaca výstavbu
- ☐ h) organizácia verejnej správy
- ☐ i) iné

2. Aká je Vaša pozícia v organizácii?

- ☐ a) vlastník
- ☐ b) riaditeľ
- ☐ c) prezident
- ☐ d) viceprezident
- ☐ e) dizajnér
- ☐ f) hlavný dizajnér
- ☐ g) projektový manažér
- ☐ h) projektový inžinier
- ☐ i) verejný inžinier (vedúci oddelenia, úradník...)
- ☐ j) montážny technik
- ☐ k) inštalatér (izolácia, technické systémy, iné...)
- ☐ l) vlastník budovy alebo jej časti

**VIAEUROPA®**

**Dotazník pre účastníkov školenia pre profesionálov - po školení**

1. Používa Vaša firma/organizácia v súčasnosti BIM alebo ho plánuje použiť do budúcnosti?

- ☐ a) áno
- ☐ b) nie

2. Čo považujete za prekážky pre implementáciu BIM?

Tržiny v zmluvách o výhodách BIM

Cena implementácie

3. Nedostatok profesionálov so znalosťami BIM

4. Nedostatok času na učenie sa

5. Nevýhoda zmeny už zabehnutých postupov

6. Vlastníci alebo iné firmy zapojené do projektu BIM nevyžadujú, a tak nie je potrebný v procese stavby

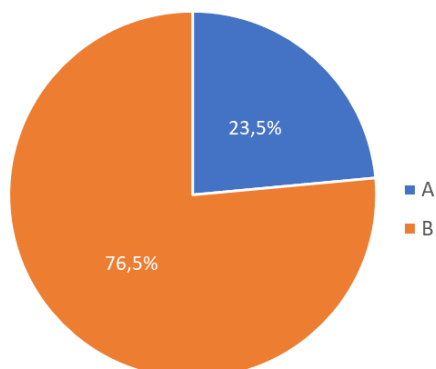
7. Klienti si nie sú vedomí výhod BIM

8. Rozpočet projektu a ziskovosť

Few general conclusions from the classroom course validation from the participants in Slovakia is given below, while the entire questionnaire analysis is performed in deliverable *D27-D4.7 Survey and or interview among all different Targets*. Due to the fact that validation was performed in partners' native language, the analysis below has both English questions and the same questions in native language.

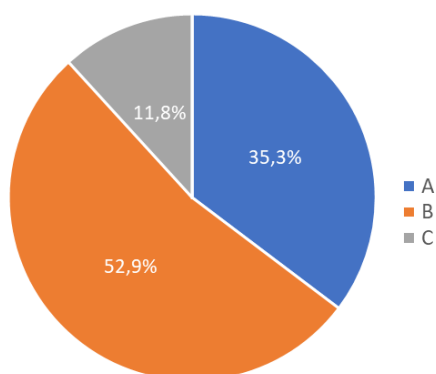
1. Do You or Your company/organization currently use BIM, or is it intending to use BIM in the near future?

- a) Yes
- b) No



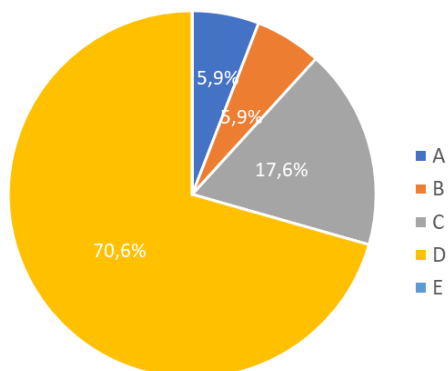
15. Would BIM certification, support or training, benefit Your colleagues?

- a) Absolutely
- b) Likely
- c) Possibly
- d) No



18. In retrospective, how do You rate Your competences (knowledge, skills, responsibility and autonomy) before this BIM course?

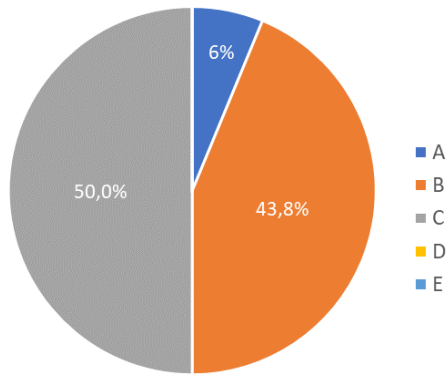
- a) Excellent
- b) Very good
- c) Good
- d) Little
- e) I don't know





19. What overall rating would You give the course?

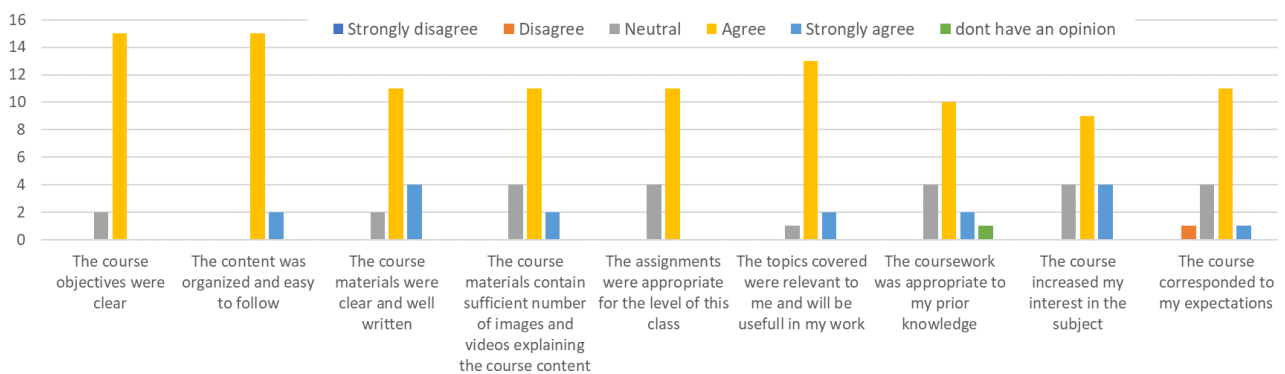
- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor



39

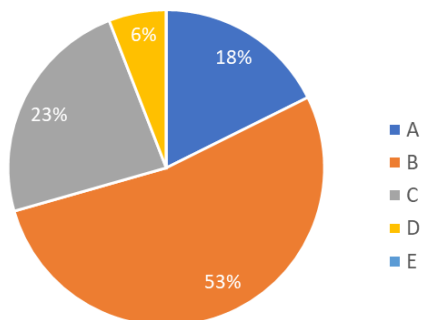
20. Please indicate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	do not have opinion
The course objectives were clear.						
The content was organized and easy to follow.						
The course materials were clear and well written.						
The course materials contain sufficient number of images and videos explaining the course content.						
The assignments were appropriate for the level of this class.						
The topics covered were relevant to me and will be useful in my work.						
The coursework was appropriate to my prior knowledge.						
The course increased my interest in the subject.						
The course corresponded to my expectations.						



21. What overall rating would you give the trainer(s)?

- a) Excellent
- b) Very good
- c) Good
- d) Fair
- e) Poor

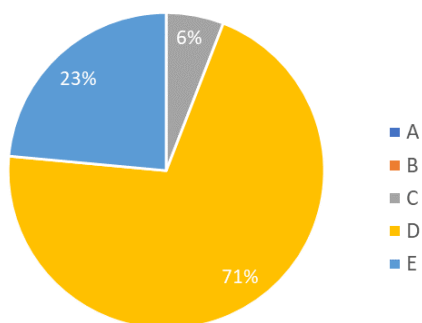


40

23. How much new information did you receive in the training course?

Rate on the scale from: 1 (none) to 5 (a lot of new information)

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

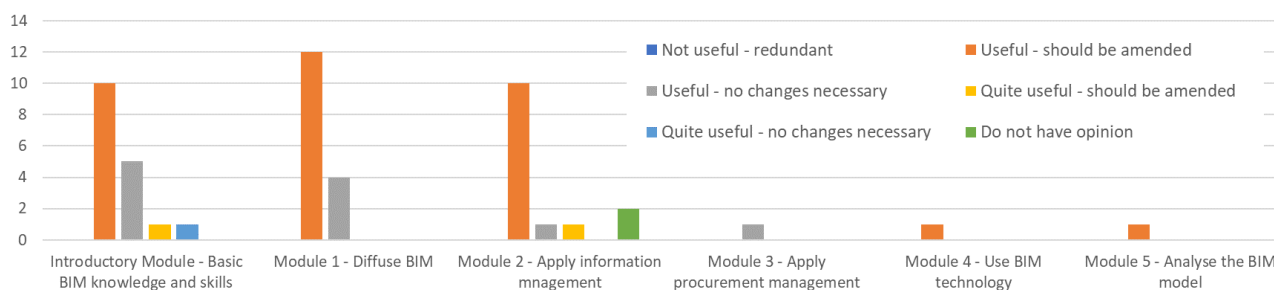




25. Please rate the following BIM course modules based on how they are useful and interesting to You.

	Not useful - redundant	Useful – should be amended	Useful – no changes necessary	Quite useful – should be amended	Quite useful – no changes necessary	Do not have opinion
Introductory Module – Basic BIM knowledge and skills						
Module 1 – Diffuse BIM						
Module 2 – Apply information management						
Module 3 – Apply procurement management						
Module 4 – Use BIM technology						
Module 5 – Analyse the BIM Model						

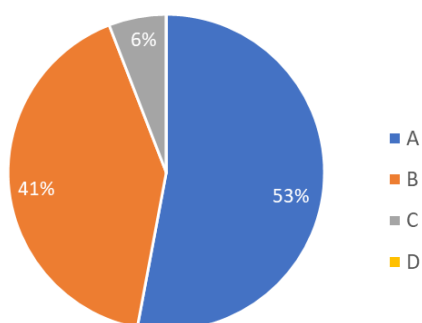
41



26. What do You feel, is the training material comprehensive enough?

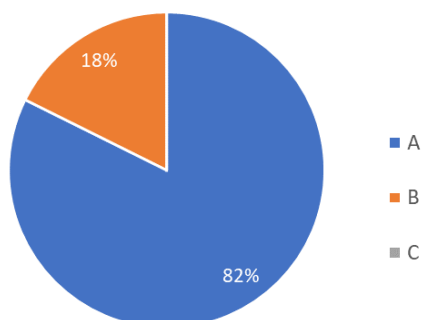
(Please mark all that apply)

- a) Yes, it's adequate
- b) It should contain more practical examples (best experiences)
- c) It should contain more practical examples (existing issues in BIM)
- d) It should give more country specific regulatory requirements



27. What do You feel about the duration of the training?

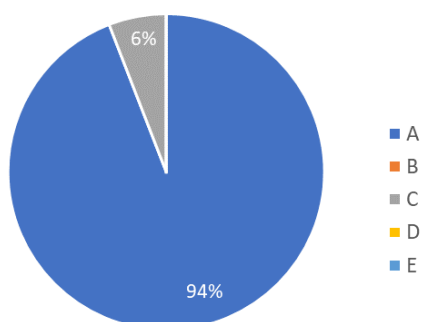
- a) It is adequate
- b) It should be longer
- c) It should be shorter



28. Would You be willing to disseminate the BIM training courses among Your contacts and associates?

Without any obligation to do so!

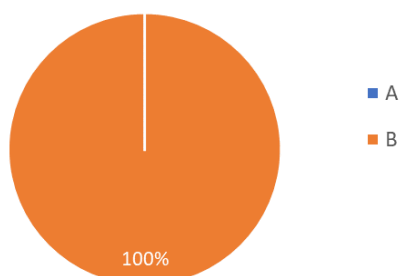
- a) Definitely
- b) Probably
- c) Not sure
- d) Probably not
- e) Definitely not



29. Would you prefer to take this course online or in the classroom?

- a) Online (e-learning)
- b) Classroom

29



It is evident from the training validation results that 88.2 % of participants feel BIM certification, support or training would absolutely (35.3 %) or likely (52.9 %) be beneficial to their colleagues which is a good indication of their view about the necessity of certification courses. Additionally, after the course, training participants were asked to evaluate their competences prior to the classroom course on BIM. The intention was to get the information what is their initial knowledge on BIM as well as to see whether the course was an “eye opener” and comprehensive enough. The participants replied that they feel they had little (70.6 %) or good (17.6 %) and very good (5.9 %) competences. Since 76.5 % of course participants is not using BIM this was to be expected for the case of Slovakia. The overall rating of the course as good (50.0 %), very good (43.8 %) and excellent (6.0 %) is very encouraging and positive for the developed training materials and courses held in Slovakia. Trainers received positive overall rating of very good (53 %) and excellent (18 %).

The majority of course participants agree to the statements that the course objectives were clear, with organized and easy to follow content. They mainly agree that course materials were clear and well written and contain sufficient number of images and videos explaining the course content. The positive validation of the Slovak course is also evident from the fact that the majority of participants agree that assignments were appropriate for the level of this class (appropriate to their prior knowledge) and the topics covered are relevant and will be useful in their future work as they received new information (94 % of participants feel they got significant amount of new information). The course also increased their interest in the subject and corresponded to their expectations.

When getting more in depth and looking for their opinion on each of the training modules, participants feel that Introductory module, Module 1 and Module 2 are useful but should be amended with additional content. For other three modules (module 3 – 5) it seems course participants did not have the need to fill the questionnaire and thus made it difficult to draw any conclusions. Specifically, the general opinion is that training materials are adequate, but significant number of course participants declared more practical examples are needed (best experiences), 53 % and 41 % respectively. Regarding the length of training, 82 % of training participants said that 32-hour training course is adequate, while 18 % think it should be longer. It has to be enhanced that all of the course participants (100 %) prefer to take this course in the classroom while nobody would prefer to take it on-line.

The quality of the course is best rated if training participants disseminated and recommend the course to their colleagues, friends and associates, and in the case of Slovak classroom course for professionals, 94 % of participants declared they would be definitely willing to disseminate the BIM training courses among their contacts.

## 2.5.2 Agenda

### 4.3 Module MP2: Working with the software (Autodesk family)

23 – 24 May 2019, Hotel Saffron, Radlinského 17, Bratislava, Slovakia

Trainers: Ivor Mečiar (ViaEuropa), Jakub Pecúšiak (ViaEuropa)

Time	Agenda Item		
1.	Informačný model budovy (BIM)	0,5	4hod.
	• princíp informačného modelu budovy		
2.	Základy práce s Revit-om		
	• vytvorenie nového projektu		
	• oboznámenie sa s užívateľským prostredím programu Revit (panel s nástrojmi ribbon, properties - vlastnosti, project browser – prehľad projektu)		
	• definovanie prvkov Revit-u, úvod do práce s rodinami		
3.	Základy vytvárania výkresu	0,5	
	• vytvorenie jednoduchého pôdorysu		
	• vytvorenie a úprava výškových úrovní		
	• práca s modulovou mriežkou		
4.	Základy vytvárania modelu budovy	2	
	• vytvorenie stien		
	• vkladanie dverí a okien		
	• vytvorenie podláh		
	• úprava vlastností		
	• nástroje pre úpravy prvkov (zarovnanie, posúvanie, kopírovanie, otočenie,...)		
5.	Pridanie a úprava ďalších komponentov	1	
	• pridávanie a úprava rodín a komponent		
6.	Vytvorenie pohľadov na model budovy	1	4hod.
	• vytvorenie nového plánu		
	• vlastnosti plánov, rozsah pohľadov		
	• nastavenie zobrazovania objektov		
	• práca s rezmí a pohľadmi		
	• vytvorenie a úprava 3D pohľadov		
7.	Kótovanie a väzby	1	
	• umiestnenie kót		
	• použitie a úprava vzájomných väzieb		
8.	Dokončení modelu objektu	2	
	• úprava podláh, vytvorenie podhľadov		
	• vytvorenie a úprava striech		
	• vytvorenie a úprava obvodových plášťov, fasád		
	• vloženie schodiska, rampy a zábradlia		
9.	Konštrukčné prvky	2	4hod.
	• vytvorenie stĺpov		
	• vytvorenie nosníkov, priehradových trámov		
	• vytvorenie rozpiet		
	• vytvorenie základov		
10.	Práca s terénom	1	
	• vytvorenie a úprava terénu a podoblastí		
	• vytvorenie podlaží		
11.	Príprava výkresov, popisovanie a detaily	1	
	• vytvorenie pomenovaných pohľadov		
	• práca s detailmi		
	• rysovacie nástroje, text, položkovanie rodín		
12.	Legendy, rozpisky a výkazy	2	4hod.
	• vytváranie popisov miestností a ich plôch		
	• farebné schémy		
	• vytváranie legend		
	• vytváranie a úprava tabuliek a výkazov		
13.	Práca s výkresovými listami	1	
	• príprava a tlač výkresových listov		
14.	Zopakovanie	1	

## 2.6 Spain

### 2.6.1 Course description and results

As shown in deliverable D21 – D4.1. *First classroom courses for professionals* it was shown that Estonian partners organized a classroom course on **April 25<sup>th</sup>** in Madrid, Spain. The course programme consisted of 4 academic hours of theoretical lectures.

A group of **54 participants** specialising in architecture and engineering had undertaken the classroom course in Spain within the framework of the Net-UBIEP project, therefore the FLC think that there is no need to organise more trainings because the target number was reached.

Since there was no post-training validation performed using the designed questionnaires during the First classroom course for professionals, it was not possible to draw any on training methodology and training content developed by Spanish partners and their coherence with the developed learning outcomes.

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## 2.7 The Netherlands

### 2.7.1 Course description and results

Third classroom course for professionals was organized on **May 14<sup>th</sup> 2019** in Houten, The Netherlands. The course programme consisted of 4 academic hours of theoretical lectures.

A group of **14 participants** specialising in architecture and engineering had undertaken the classroom course in The Netherlands within the framework of the Net-UBIEP project.

The Dutch partners provided an explanation why there were only several participants for the professional trainings. Dutch partners are trying to get more people interested in the professional training via the professional networks of ISSO, B&R, TVVL, the NetUBIEP website, LinkedIn and BIMloket, but so far, we had little success.

The reasons for this are:

- A large part of the Dutch construction sector has already some professional education or knowledge on BIM. Also, professionals are already trained in some degree on nZEB in the last years. Added value of Net-UBIEP project is to create a link between these subjects. However, it is very difficult to convey possible participants of this added value.
- Lack of time: the Dutch construction sector is at its peak. Moreover, employees are scarce at the moment. Therefore, the existing workforce is very busy with their construction projects instead of educating themselves. To solve this, we are building an e-learning module for professionals so people can follow the course at their convenience.
- Legislation (NTA8800/BENG) in The Netherlands about nZEB is changing in 2018 and 2019 and is not yet final. A lot of the workforce is waiting with training until there is more clarity about the legislation. After this we expect things will go faster.

In other words, things are going slower than expected. However, Dutch partners are trying to disseminate the results and the education material with professional educators who expressed interest. So, they think the results and materials will be used by these professional educators, but this is a slow process.

Several images from the third classroom course for professionals conducted by **ISSO** can be found bellow.



Pre- and Post-training questionnaires were translated to Dutch language and filled by training participants. Dutch partners used Googleforms version of questionnaires for the course validation.

For the reason of lacking post-training questionnaire results validation of third classroom course held in The Netherlands cannot be completed.

## 2.7.2 Agenda

**UITNODIGING**

**AGENDA VAN** Kennissessie met BIM opleiders

**DATUM** 14 mei 2019

**AANVANGSTIJD** 09:30 uur

**EINDTIJD** 12:30 uur

**LOCATIE** Van der Valk Houten, Hoofdveste 25 in Houten


1. Opening	09:30 – 09:45 uur
<ul style="list-style-type: none"> <li>- Voorstelronde</li> <li>- Doel van de kennissessie: Delen wat we geleerd hebben</li> </ul>	
2. Ontwikkelde kwalificatiestructuur BIM	09:45 – 10:30 uur
<ul style="list-style-type: none"> <li>- Betrokken partijen</li> <li>- Kwalificatiestructuur als middel voor coaching</li> </ul>	
3. Ontwikkelde materiaal	10:30 – 11:30 uur
<ul style="list-style-type: none"> <li>- In netUBIEP (BIM irt BENG)</li> <li>- In BIMplement (BIM irt kwaliteitsborging)</li> </ul>	
4. BUILD UP Skills 12:00 uur	11:30 –
5. Samen optrekken	12:00 – 12:15 uur
<p>Projectgroep:</p> <ul style="list-style-type: none"> <li>- Hoe kunnen we gezamenlijk als BIM opleiders ontwikkelde kennis over BIM delen en verder brengen ?</li> </ul>	
6. Rondvraag & Sluiting 12:30 uur	12:15 –

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This deliverable reflects only the author's view. The Agency is not responsible for any use that may be made of the information it contains.

The present deliverable will be update during the project in order to align the outcome to the market needs as well as to other BIM related projects realized within Horizon 2020 program.

The updated version of the deliverable will be only available in the website of the project [www.net-ubiep.eu](http://www.net-ubiep.eu).

Some deliverables could also be translated in partners national languages and could be find in the respective national web pages. Click on the flags to open the correspondence pages:



International web page



Italian web page



Croatian web page



Slovak web page



Spanish web page



Dutch web page



Estonian web page



Lithuanian web page

