

Train of Trainers Workshop Innsbruck

03.09.2018 – 07.09.2018

Author(s)	Prof. Wolfgang Streicher, Dr. Martin Hauer, M.Tech. Apeksha Shandilya		
Organisation name(s)	Innsbruck University, Faculty of Technical Sciences		
WP Number	WPx		
Task Number	Tx.x		
WP Leader			
Due date of delivery		Project month	
Submission date	Project month		
Total number of pages			

Project Coordinator

Prof. DI Dr. techn Wolfgang Streicher,

University of Innsbruck (UIBK)

Technikerstrasse 13 | 6020 Innsbruck, Austria

Tel: +43 (0) 512-507-63650 | Mob: +43 (0) 676-872-565 320 | Fax: +43 (0) 512-507 36902

Email: wolfgang.streicher@uibk.ac.at

Project website: HEBA website



Review Table

Version	Date of Submission	Quality check		Technical check	
		Reviewer	Date	Reviewer	Date
V01	dd.mm.yyy				

Contents

TRAIN OF TRAINERS WORKSHOP INNSBRUCK	1
REVIEW TABLE	2
1 OVERVIEW ABOUT PARTICIPANTS AND LECTURERS.....	4
2 SUMMARY OF THE WORKSHOP DAYS	6
2.1 Monday, 27th of August, 2018	6
2.2 Tuesday, 28th of August, 2018	8
2.3 Wednesday, 29th of August, 2018	9
2.4 Thursday, 30th of August, 2018	9
2.5 Friday, 31st of August, 2018	Error! Bookmark not defined.
3 TRAINING MATERIAL	12
4 PARTICIPANT LIST	13
5 EVALUATION RESULTS	14
5.1 Benefit and knowledge gain	14
5.2 Workshop Quality	16

1 Overview about Participants and Lecturers

In Table 1, the participants of all different Jordanian, Egyptian and Lebanon Partner Universities are listed.

Table 1: Participants from Jordanian, Egyptian and Lebanon Partner Universities

University	Participant Name
The University of Jordan (UJ), Jordan	Mr. Mohammad Hamdan
	Mr. Osama Ayadi
Lebanese University (LU), Lebanon	Mrs. Sorina Mortada
	Mr. Daoud Baalbaki
	Mrs. Rayan Slim
	Mr. Oussama Ibrahim
American University of Beirut (AUB), Lebanon	Mr. Kamel Ghali
	Mr. Mohamad Ahmad
	Dr. Marwan Darwish
Helwan University (HU), Egypt	Mr. Mohamed Mahmoud Abdelaziz Farid
	Mr. Karam Mohamed Abdellatif Mohamed
	Mr. Ahmed Ayman Ahmed Ali
	Mr. Iman Osama Mohamed Abdelgawad
Jordan University of Science and Technology, Jordan	Mr. Shouib Nouh Ali Ma'bdeh
	Mr. Jaser Khalaf Qasem Mahasneh
	Mr. Asma' Mahmoud Faleh Bataineh
	Mr. Hind Mohammad Hussain Almomani
Arab Academy for Science, Technology and Maritime Transport (AASTMT), Egypt	Dr. Hatem Diab

ERASMUS PLUS Programme–HEBA Project Number: 585740-EPP-1-2017-1-AT-EPPKA2-CBHE-JP

DISCLAIMER: This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

In Table 2 the agenda of the week including all lecturers, given by Innsbruck University, are listed with the topics of their contribution.

Table 2: Agenda of the week

Date	Time	Content	Lecturer
Mon. 27/08/2018	09:00 – 12:00	Introduction to Energy Efficient Building Design Basics and Theory in Building Energy Modelling, Introduction to the software tools: SketchUp- EnergyPlus-OpenStudio	Dr. Martin Hauer Apeksha Shandilya, M.Tech.
	13.30 – 17.00	Modelling of a Single Office Space, Definition of Boundaries, Schedules, Constructions and Loads. Variant studies: Overhangs and Orientation Defining dynamic shading controls, configure Daylighting sensors	Dr. Martin Hauer / Apeksha Shandilya, M.Tech.
Tue. 28/08/2018	09:00 – 12:00	Creating a Multi-Zone Building example Establishing a common construction database for local standards	Dr. Martin Hauer Apeksha Shandilya, M.Tech.
	13.30 – 17.00	HVAC and DHW modelling – Overview what is possible in OS/E+	Dr. Martin Hauer Apeksha Shandilya, M.Tech.
Wed. 28/08/2018	09:00 – 12:00	Modelling of a local non-residential house in SketchUp	Dr. Martin Hauer
	13.30 – 17.00	Continuation of assisted Self-Study work on the Demo building, Optional additions: Special topics of participants interests	Dr. Martin Hauer
Thu. 30/08/2018	09:00 – 10:00	Building certificates and benchmarking	Prof. Wolfgang Streicher
	13.30 – 17.00	Legal European Situation (EPBD)	Prof. Wolfgang Streicher
Fr. 31/08/2018	09:00 – 16:00	Excursion	Prof. Wolfgang Streicher
		NHT, IIG, UIBK Technical Faculty Building at Innsbruck University	Prof. Wolfgang Streicher

ERASMUS PLUS Programme–HEBA Project Number: 585740-EPP-1-2017-1-AT-EPPKA2-CBHE-JP

DISCLAIMER: This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

2 Summary of the Workshop Days

2.1 DAY 1: Monday, 3rd September, 2018

On Monday, 3rd September, 2018 the Train-of-Trainers Workshop started at University of Innsbruck at 9.00 am. Prof. Wolfgang Streicher addressed all the participants and participants introduced themselves.

Workshop was started with an introduction to energy efficient building design. The lecture was delivered by Dr. Martin Hauer. This lecture included introduction of energy efficient building design, definitions and understanding of heat transfer, translucence, solar energy utilization, building physics, solar energy gains, shading devices, thermal mass, concepts of night/ passive cooling, advantages and disadvantages of passive cooling, influence of overhangs and building orientation, window gains, heating and cooling loads etc.

The following picture was taken at the beginning of the session.



Afterwards Dr. Martin Hauer gave the presentation on “Introduction to SketchUp-EnergyPlus-OpenStudio”. Fundamentals involved in building performance simulations were discussed in the lecture. It was discussed how the behaviour of a real building can be described in a simulation model and how the building dynamics are interacting to each other. This session was focused on the potentials of simulation tools in order to achieve human comfort and reduce the energy demands in buildings.

ERASMUS PLUS Programme–HEBA Project Number: 585740-EPP-1-2017-1-AT-EPPKA2-CBHE-JP

DISCLAIMER: *This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.*

Dr. Martin Hauer focused and described following content to the participants:

1. Development of building simulation.
2. Benefits of using building simulation.
3. Building performance simulation in practice.
4. Modelling and simulation.
5. Need of simulation.
6. Modelling- Classification of models.
7. Model identification, validation and optimization.
8. Data evaluation, modelling and calibration.
9. Different types of simulations for buildings.
10. Different room gains.
11. Building model inputs, Thermal zones, Zoning method etc.

It was very interactive and informative session for most of the participants.

Despite of the fact that the requirement of software installation and agenda of training was informed to the respective universities and participants via E-Mail in weeks before, many participants had not installed the software or their computers were not compatible with the software. The participants were helped and guided to install the software on their computers.

In the afternoon after lunch all the participants gathered in the lecture hall at 13.30 sharp. Where Mrs. Apeksha Shandilya (B.Eng., M.Tech.) presented and explained a ready model done by using the OpenStudio SketchUp plugin and the OpenStudio Application. She presented the typical OpenStudio workflow to the participants. It was discussed in the presentation how to choose a new template, create and customise the envelope, fenestration, define conditions for heat transfer through surfaces, site shading etc. The brief introduction of OpenStudio modelling tools, space types, thermal zones, site, constructions, schedules, internal loads, facility and the run mode were given in this session.

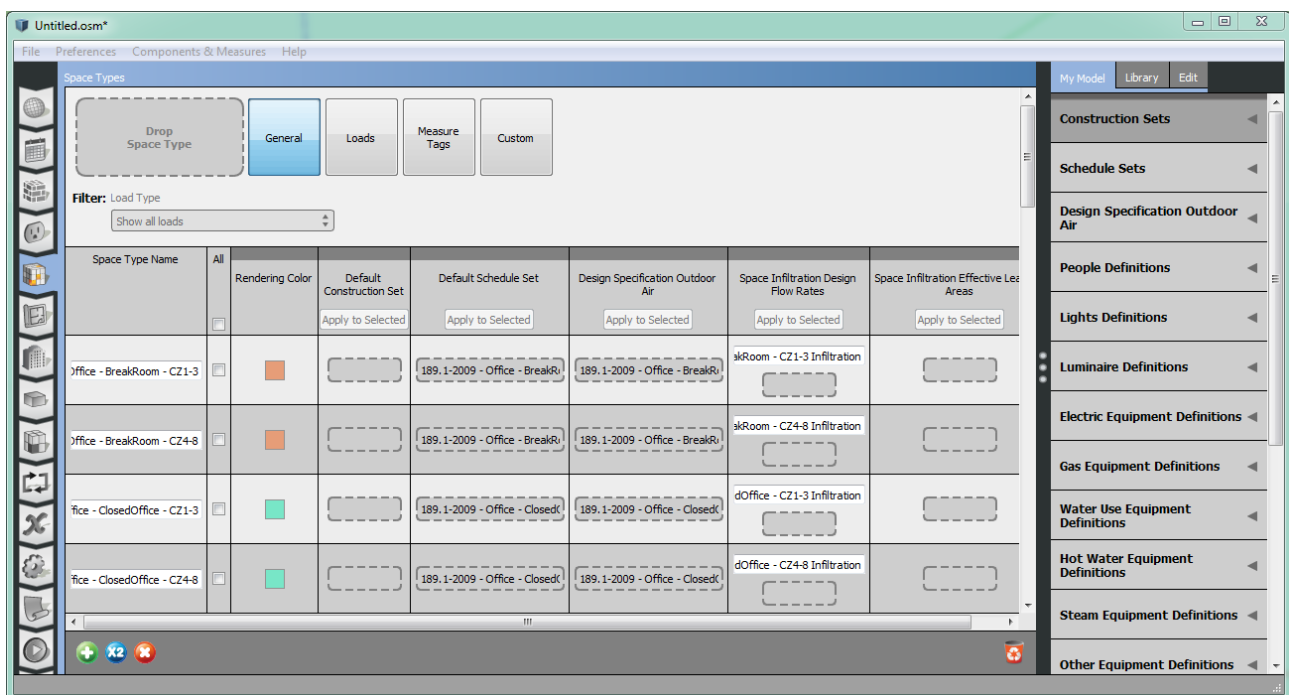
Afterwards, participants modelled a simple single zone box model assisted by the lecturers and learnt the application of OpenStudio modelling tools and the way to define, create and edit new and existing space types, thermal zones, site, constructions, schedules, internal loads and facilities. It was introduced to the participants how to run the model and evaluating the simulation result in the OpenStudio application.

2.2 DAY 2: Tuesday, 4th of September, 2018

On Tuesday, 4th of September, 2018, M.Tech. Apeksha Shandilya started at 9:00 with the modelling of simple single zone box model in SketchUp-OpenStudio. Participants explored the options of optimization a building design and how to modify construction layers, schedules and internal loads, in order to reduce the cooling and heating energy demand in the building. Radiation based shading controls and the effect of fixed shadings (obstructions) on the energy demand was also discussed in the session.

In the afternoon, Dr. Martin Hauer modelled and simulated a new simple building model to define, discuss and show the effect of optimization of building resources i.e. scheduling, construction, thermal envelope, shading, internal loads, shading control, direction of façade etc. based on a single room model with a south oriented glazing surface (office situation). Apeksha Shandilya assisted in this session and helped participants to keep themselves on track.

In the following screen shot of OpenStudio application is showing the potentials of editing, creating and using of new space types or the standard space types from the library.



2.3 DAY 3: Wednesday, 5th of September, 2018

On Wednesday, 5th of September, 2018, Dr. Martin Hauer started the session at 09:00 and talked about the potentials of HVAC and DHW modelling in OpenStudio / EnergyPlus. He discussed the HVAC and DHW modelling in multizone-building model. He focused and described following content to the participants:

- Concept of the HVAC modelling part
- Implementing VRV cycle
- Implementation of DHW cycle

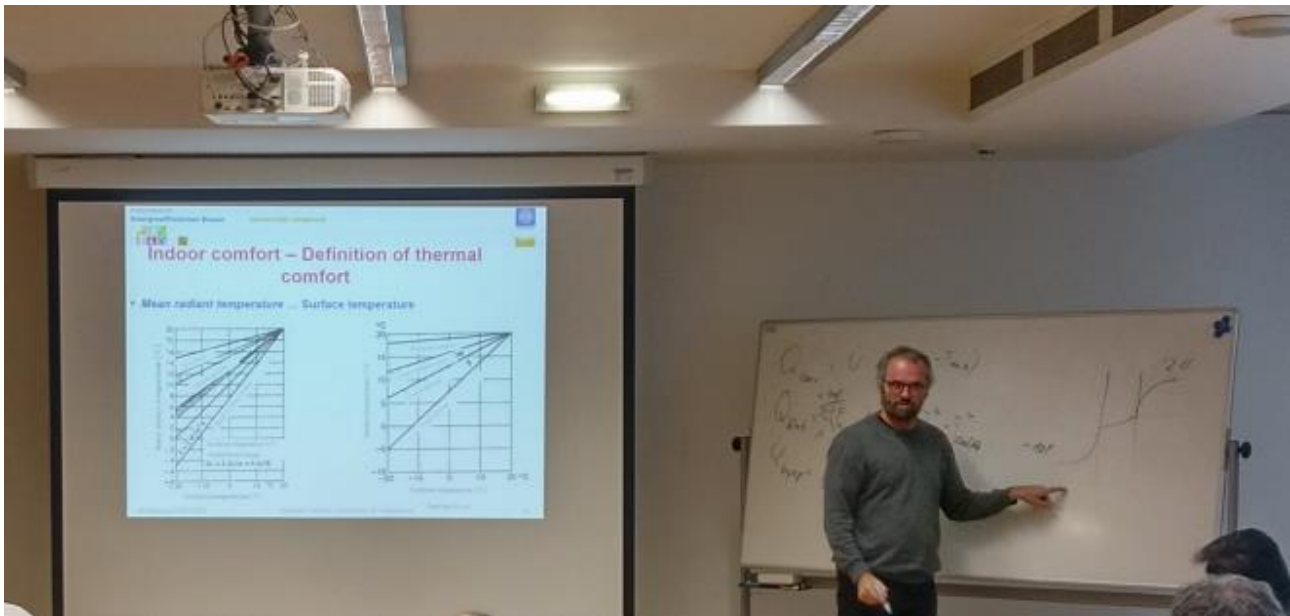
Under the above topics he thoroughly discussed air-conditioning, components in HVAC cycle, multi-zone implementation, setpoint and control definitions, definition of water use schedules, implementation different types of use equipment (tap water, shower, etc.) and how to design a simple solar assisted hot water system.

The session was closed with a final recap of the learnt aspects from the last three days. The last half hour was also open for questions asked by the participants.

2.4 DAY 4: Thursday, 6th of September, 2018

On 6th of September 2018, Prof. Wolfgang Streicher delivered a lecture on Building certificates and benchmarking.

In the following picture Prof. Wolfgang Streicher during the discussion.



After lunch Prof. Wolfgang Streicher discussed legal European situation and Energy Performance of Building Directive (EPBD) with the participants. He shared and discussed the idea, how EU countries are aiming at decarbonizing the national building stocks by 2050.

2.5 DAY 5: Friday, 7th of September, 2018

On 7th of September Prof. Wolfgang Streicher offered a tour to the laboratories of Unit of Energy Efficient Buildings under the department of Civil Engineering. The group visited the refurbished building of the Technical Faculty of Innsbruck University.

Afterwards group visited several low/cost social housings in passive houses located in the city of Innsbruck. Where Mr. Harald Malzer from Neue Heimat Tirol (NHT) gave some guidance through the building. This tour to passive houses was very helpful for all participants to gain improved knowledge about passive houses and their functionality and technical specifications.

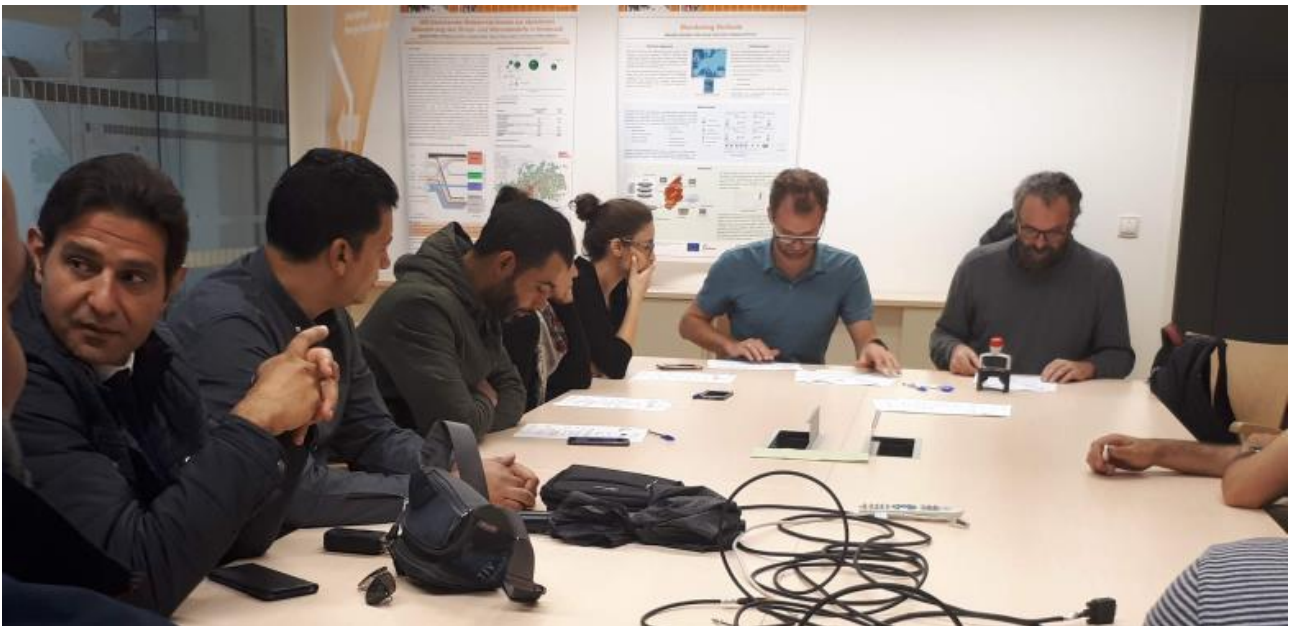
Following pictures were taken during the excursion.





Later on all the participants were requested to fill evaluation form and to share their views and suggestions to improve the training quality. In the end, Prof. Wolfgang Streicher distributed certificates to the participants and thanked them for their contribution.

The following pictures were taken during the certificate distribution and thanking ceremony.





3 Training Material

All presentations delivered and discussed during the workshop week have been collected and and shared with all participants via Dropbox folder.

ERASMUS PLUS Programme–HEBA Project Number: 585740-EPP-1-2017-1-AT-EPPKA2-CBHE-JP

DISCLAIMER: *This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.*

4 Participant List

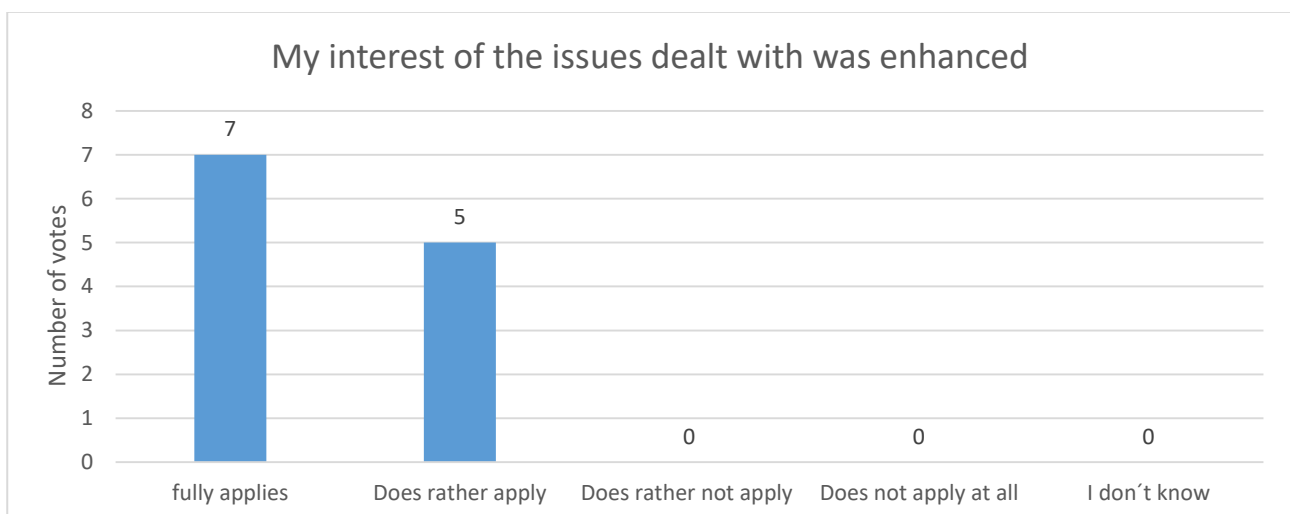
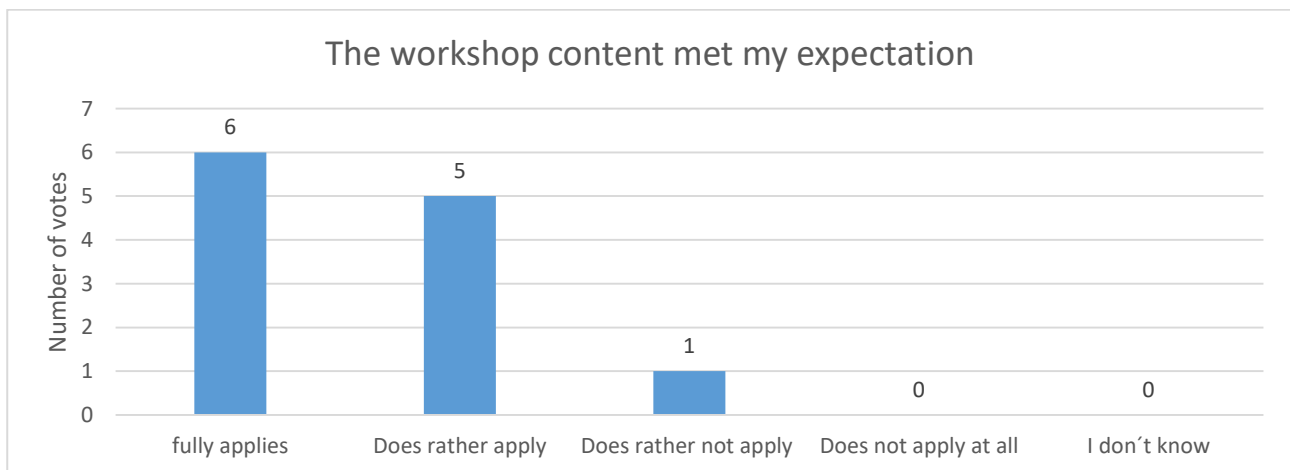
All participants had to fill a participants list in order to prove their attendance. The signed list is shown below.

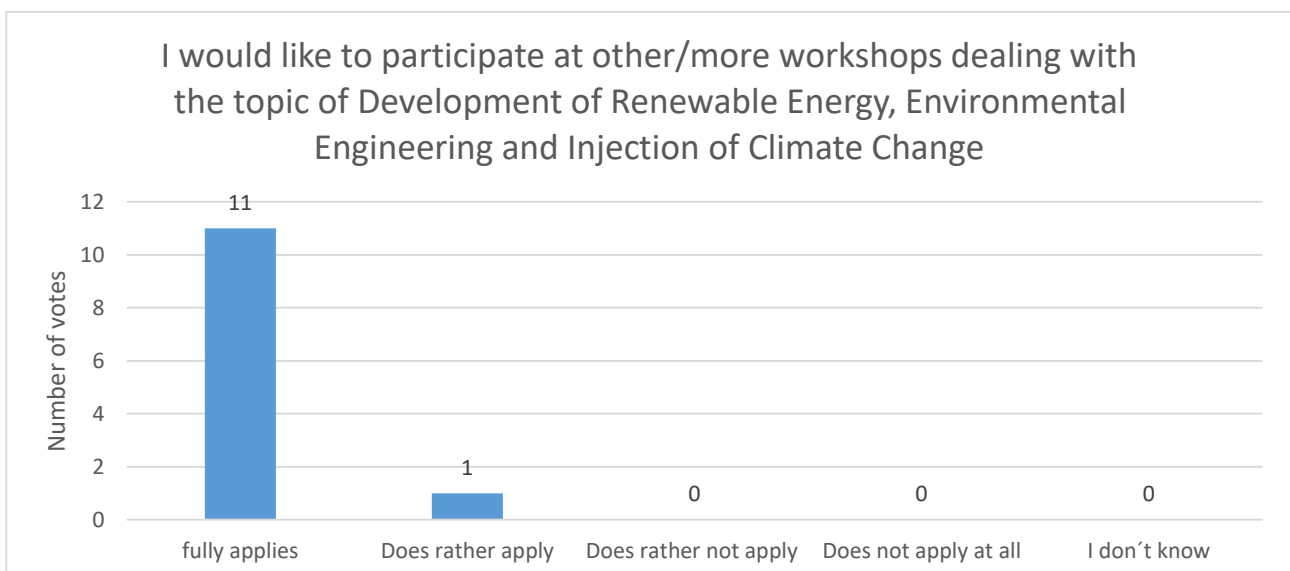
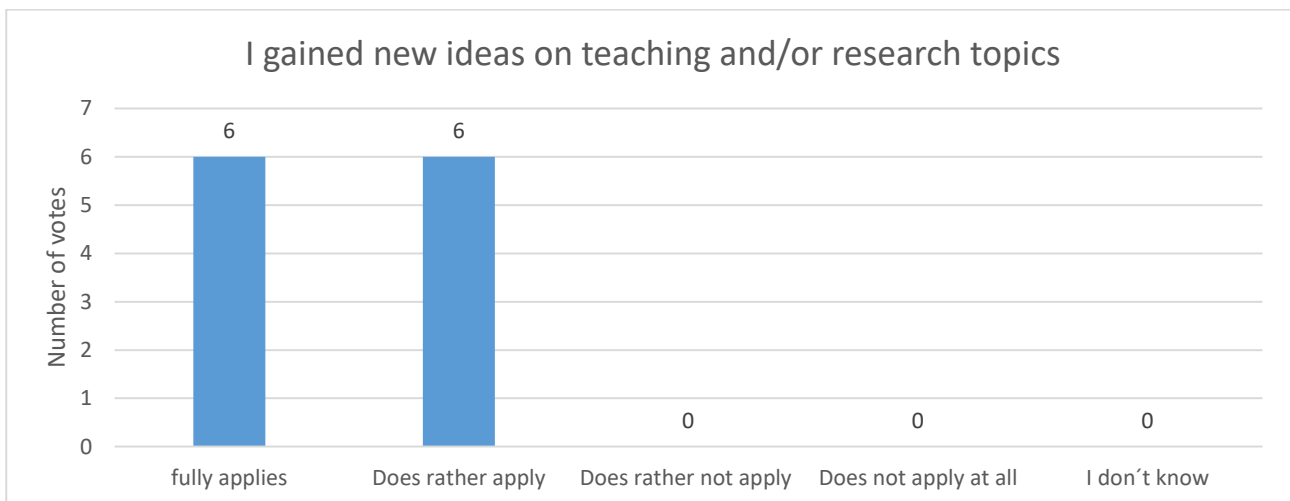
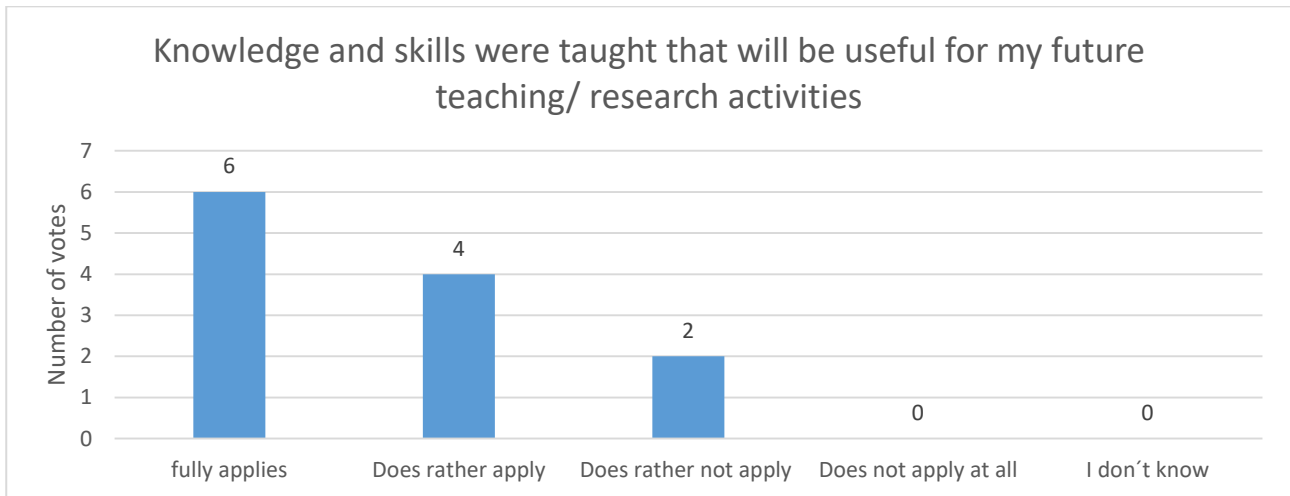
Participant name	Partner	Mo. 03.09.18	Tu. 04.09.18	We. 05.09.18	Th. 06.09.18	Fr. 07.09.18
Mr. Mohammad Hamdan	UJ					
Mr. Osama Ayadi	UJ	Osama Ayadi	Osama Ayadi	Osama Ayadi	Osama Ayadi	
Mrs. Sorina Mortada	LU					
Mr. Daoud Baalbaki	LU					
Mrs. Rayan Slim	LU	Rayan Slim	Rayan Slim	Rayan Slim	Rayan Slim	Rayan Slim
Mr. Oussama Ibrahim	LU					
Mr. Kamel Ghali	AUB					
Mr. Mohamad Ahmad	AUB					
Mr. Mohamed Mahmoud Abdelaziz Farid	HU					
Mr. Karam Mohamed Abdellatif Mohamed	HU	Karam Mohamed	Karam Mohamed	Karam Mohamed	Karam Mohamed	Karam Mohamed
Dr Marwan Darwish	AVIB					

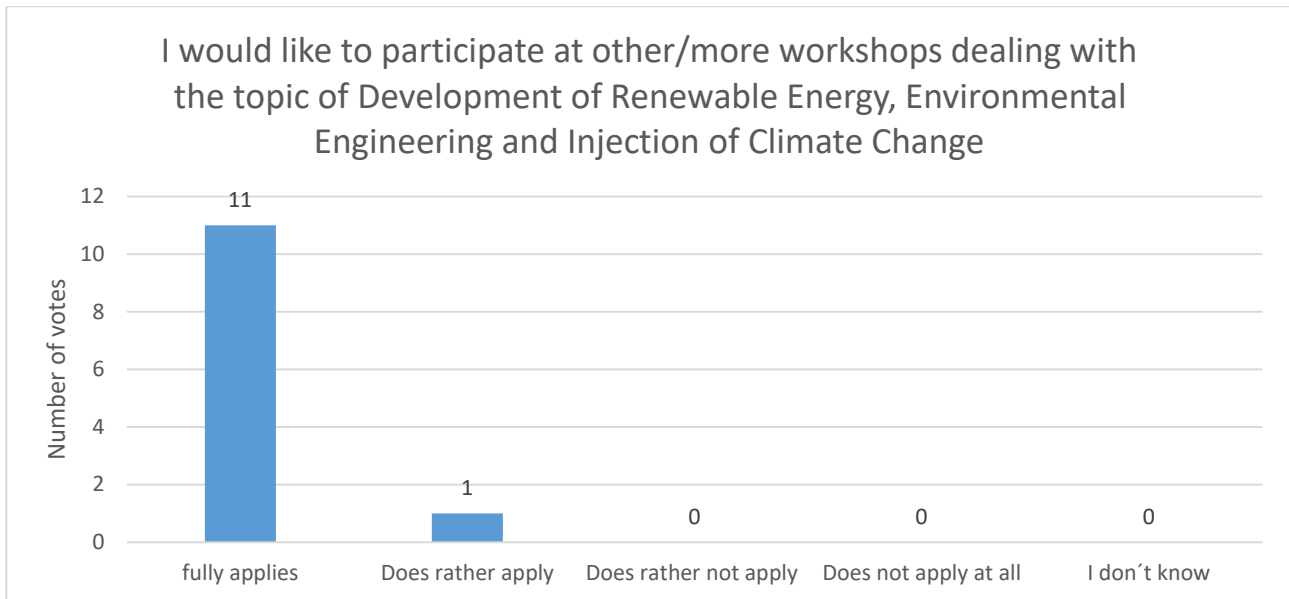
Mr. Ahmed Ayman Ahmed Ali	HU	Ahmed Ali	Ahmed Ali	Ahmed Ali	Ahmed Ali	Ahmed Ali
Mrs Iman Osama Mohamed Abdelgawad	HU	Iman Osama	Iman Osama	Iman Osama	Iman Osama	Iman Osama
Mr. SHOUIB NOUH ALI MA'BDEH	JUST					
Mr. JASER KHALAF QASEM MAHASNEH	JUST					
Mrs. ASMA' MAHMOUD FALEH BATAINEH	JUST					
Mrs. HIND MOHAMMAD HUSSAIN ALMOMANI	JUST					
Mrs. Apeksha Shandilya (Trainer)	UIBK					
Mr. Wolfgang Streicher (Trainer)	UIBK					
Mr. Martin Hauer (Trainer)	UIBK					
Dr. Hatem Diab	AAST	Hatem Diab	Hatem Diab	Hatem Diab	Hatem Diab	Hatem Diab
Prof. Ahmed AL-Sakymeh	UJ					

5 Evaluation Results

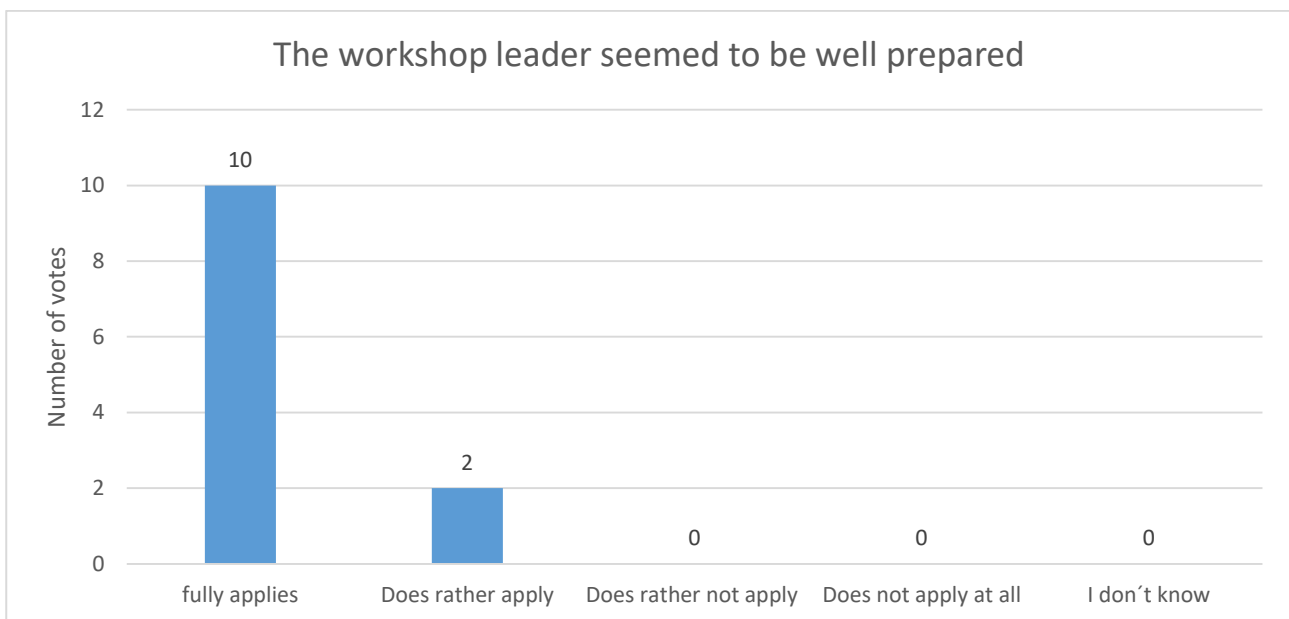
5.1 Benefit and knowledge gain

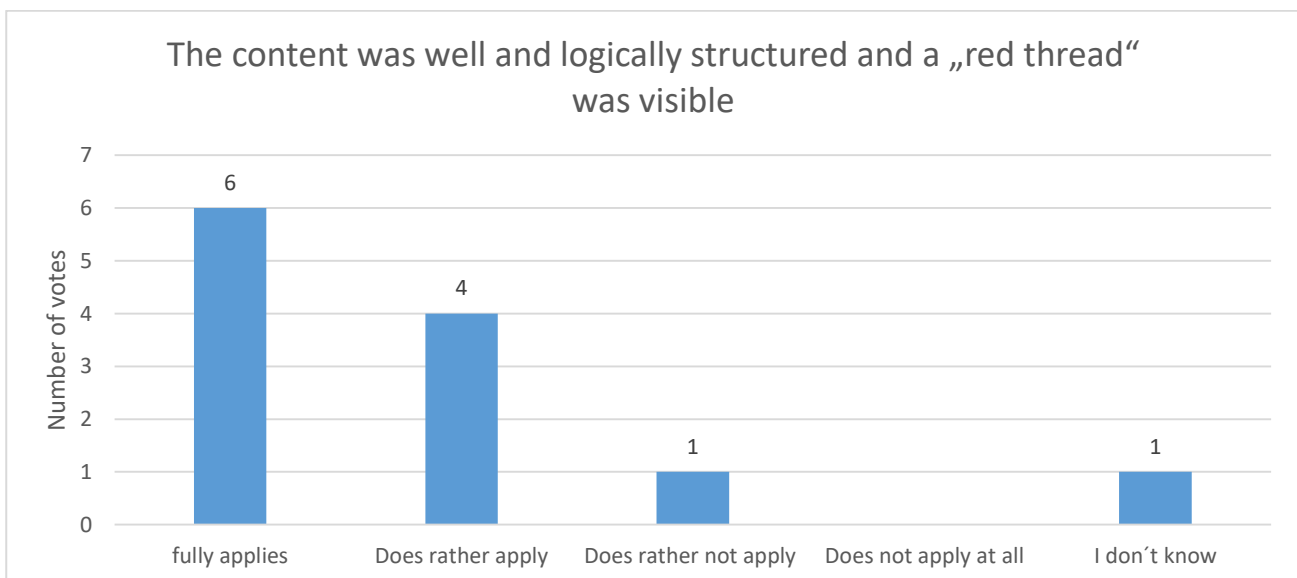
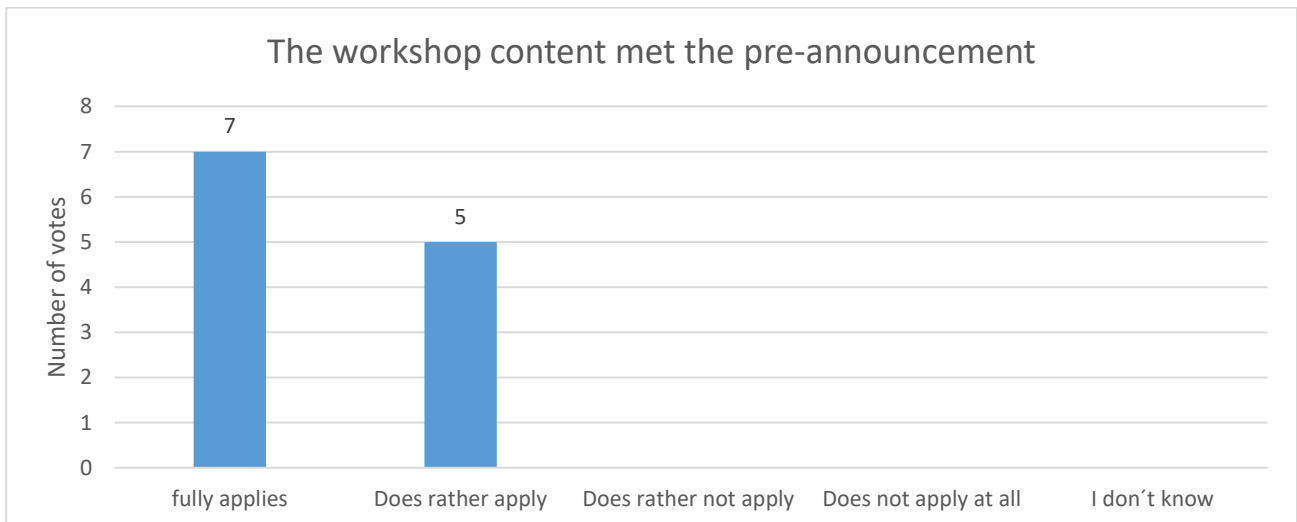
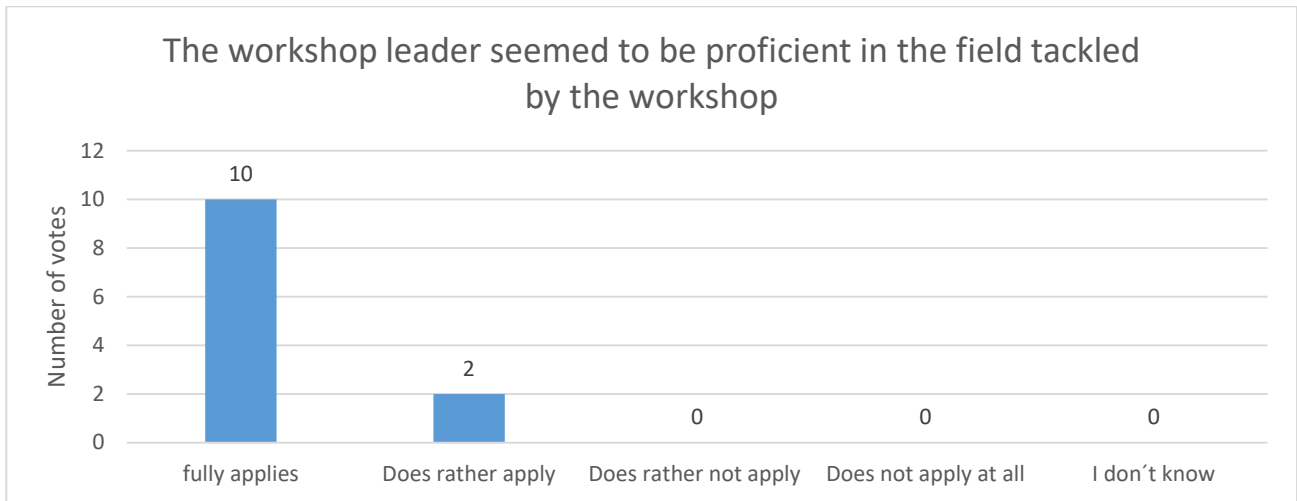


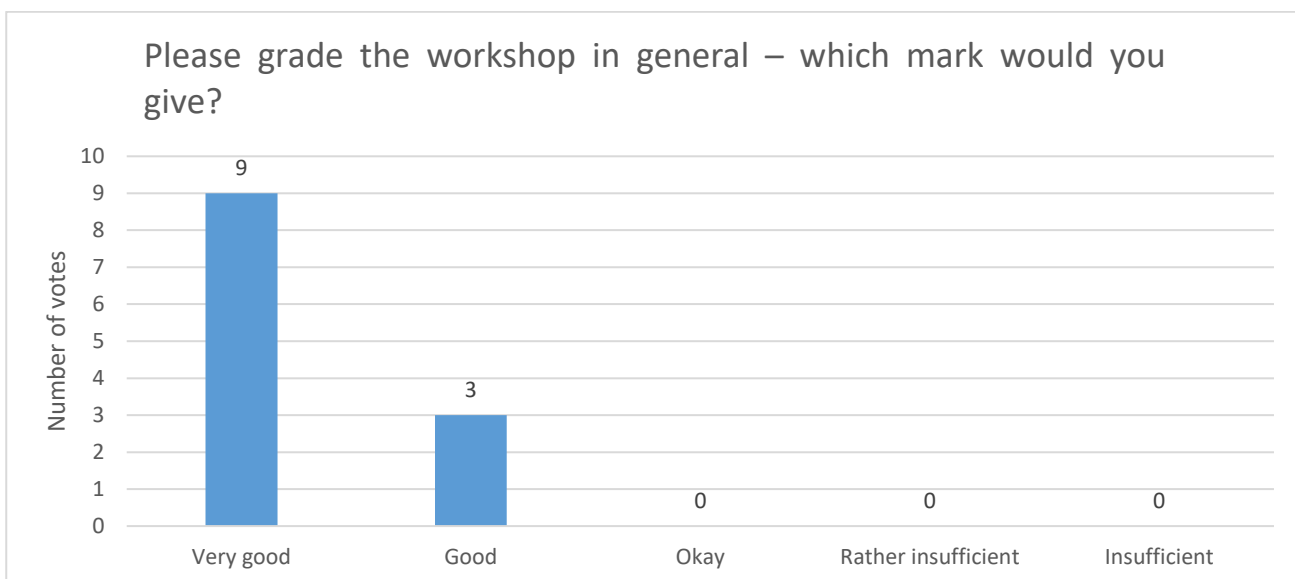
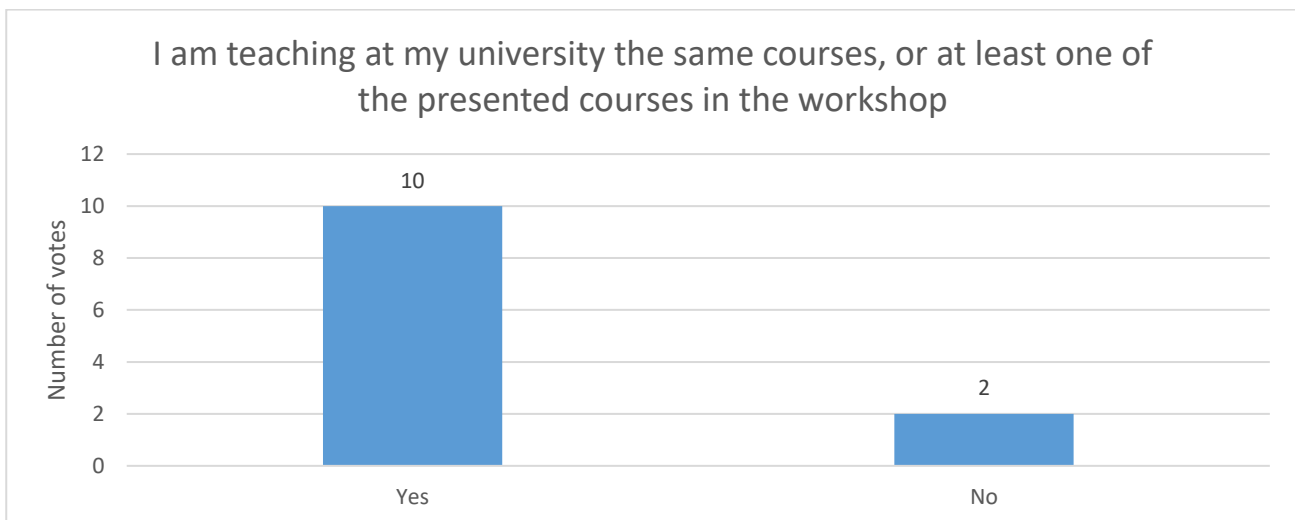
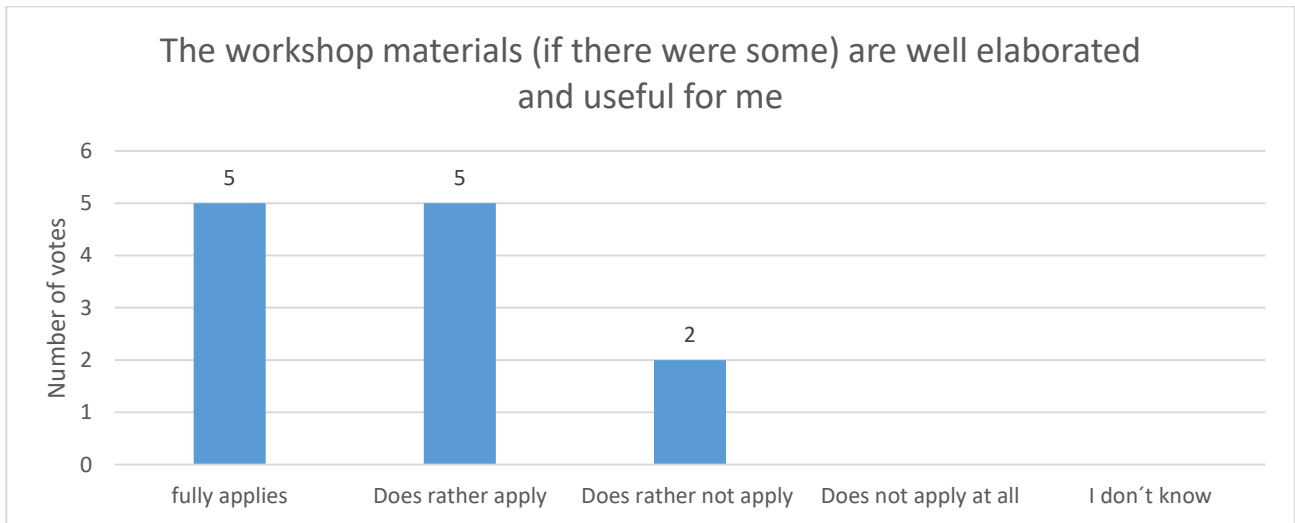




5.2 Workshop Quality







What did you like about the workshop?

- Workshop leader and assistants are proficient in the field and they know how to transfer the knowledge.
- In the workshop, participants were introduced to the European system of passive design and energy efficiency solutions.
- The discussion about zero energy building certificates and European standards.
- The opportunity of interacting with a large group of people from different engineering background.
- Presentations and case studies.
- Knowledge and patience of the instructors.
- Everything was prepared with the best possible quality.

What did not you like? What could be improved?

- Some participants lacked a complete knowledge of the topics covered, so we could not discussed the advanced topics.
- Some terminologies were not understandable for architects.
- Should add some topics related to energy saving audit's relation with electrical power consumption and loads shading and management.
- Simulation is better done step by step with notes to follow or tutorials.
- OpenStudio and Sketchup had to have some handouts.
- It would have been better to have people aware of the theory & application / simulation in buildings.