



DELIVERABLE 3.3

Training workshops in EU and training reports

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LIST OF CHANGES

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1.1	Dec. 11, 2021	The CS training workshop	Felipe Gil Castiñeira (UVigo)
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1.3	Dec. 14, 2021	Edits	Marios Raspopoulos (UCLAN)
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1. INTRODUCTION

1.1.Scope and Objectives

In the context of IREEDER project, this report describes the training workshops on the subjects of the Internet of Things (IoT), Cyber Security (CS) and Renewable Energy (RE). This report aims in describing the basics of each course, the contents of the training workshops and the results of the surveys that followed, regarding the workshops.

1.2.Structure of the Document

The present document is organized as follows:

- The current section describes the scope, objectives and structure of the document
- Section 2 provides a description of the basics of the IoT, CS and RE courses
- Section 3 provides a description of the IoT training workshop and its contents
- Section 4 provides a description of the CS training workshop and its contents
- Section 5 provides a description of the RE training workshop and its contents
- Section 6 provides a description of the questionnaire that was used in the surveys, in order to evaluate and gather feedback on the training workshops
- Section 7 provides an analysis of the results of the survey, for each training workshop
- Section 8 concludes the document and provides some comments on the results

2. THE COURSES

The purpose of the three courses is to present the basic principles on the subjects of IoT, CS and RE, respectively.

For the course of IoT, the main technological components of IoT will be presented, examined and evaluated, as well as the most important technological applications. The course aims to teach how to design, code and build IoT solutions. The students will gain an understanding of the main operating principles and components of IoT systems, as well as knowledge of their architecture and basic technologies and standards. They will be able to use existing platforms in order to design and implement IoT systems. They will be in a position to identify needed security measures and take part in the discussion for future IoT challenges.

The course of CS aims in presenting the fundamental concepts of CS. The course aims to teach the most important techniques in order to maximize computer and network security and teach the design of secure applications. Students will be able to apply the basic CS concepts and use tools, architectures and security design principles. They will be in a position to identify and use the main security operations and value the impact of new technologies on the subject of cyber security.

The RE course aims in presenting the main principles and architectures of RE systems. The most important technological components of RE systems will be presented and the technological applications will be reviewed. Students will be able to address the main issues regarding RE sources and understand the technologies of RE components and various systems. They will understand the various applications used in energy production, they will gain knowledge on various subjects, like different RE sources, storage systems etc. and they will be able to use equipment in order to model or design an RE system.

3. THE IoT TRAINING WORKSHOP

The IoT training workshop took place in 17-28 June 2021 and it was coordinated by Dr. Marios Raspopoulos, University of Central Lancashire, Cyprus. In this section, the programme of the IoT training workshop, for each day, will be described. The detailed timetable of the training can be seen in the next two figures. Table 3-1 shows the list of the trainees and instructors of the IoT training workshop and their affiliations.

Thursday 17th June 2021

Jordan Time	Topic	Presenter (s)
09:00-10:00	General introduction to the workshop	Dr. Marios Raspopoulos – WP2 Leader (IoT Course Leader)
10:00-11:30	Introduction to IoT and Discussion	Dr. Marios Raspopoulos
11:30-13:30	Revision of Basic Programming and IoT IDE and discussion	Dr. Nearchos Paspallis & Dr. Marios Raspopoulos
13:30-15:00	<i>Break</i>	
15:00-17:30	Software Development for IoT Embedded Systems and Discussion	Dr. Nearchos Paspallis & Dr. Marios Raspopoulos

Tuesday 22nd June 2021

Jordan Time	Topic	Presenter (s)
09:30-11:00	IoT architecture and components (1 of 2)	Dr. Marios Raspopoulos & Dr. Stelios Ioannou
11:00-12:30	IoT architecture and components (2 of 2)	Dr. Marios Raspopoulos & Dr. Stelios Ioannou
12:30-13:30	IoT architecture and components: Discussion	Dr. Marios Raspopoulos & Dr. Stelios Ioannou
13:30-15:00	<i>Break</i>	
15:00-17:30	IoT Connectivity Technologies and Discussion	Dr. Felipe Gil Castiñeira Dr Marios Raspopoulos

Figure 3-1: Schedule of the IoT training workshop (I).

Wednesday 23rd June 2021

Jordan Time	Topic	Presenter (s)
09:30-11:30	IoT Microcontrollers, Sensors for Data Acquisition and Actuators	Dr. Fabrizio Granelli and Dr Marios Raptopoulos
11:30-13:30	IoT Connectivity Protocols	Dr. Fabrizio Granelli and Dr Marios Raptopoulos
13:30-15:00	<i>Break</i>	
15:00-16:30	Data Storage and Cloud Systems	Dr. Fabrizio Granelli and Dr Marios Raptopoulos
16:30-18:00	Data Analytics and Applications	Dr. Fabrizio Granelli and Dr Marios Raptopoulos

Thursday 24th June 2021

Jordan Time	Topic	Presenter (s)
09:30-11:30	IoT Security and security Standards	Dr Eliana Stavrou & Dr. Marios Raptopoulos
11:30-13:30	Ethics in IoT Networks and Applications	Dr. Josephina Antoniou & Dr. Marios Raptopoulos
13:30-15:00	<i>Break</i>	
15:00-17:30	Key-Enabling Technologies and Applications in IoT	Dr. Marios Raptopoulos

Monday 28th June 2021

Jordan Time	Topic	Presenter (s)
09:30-13:30	IoT Practical Worksheets	Provider of the IoT equipment
13:30-15:00	<i>Break</i>	
15:00-17:30	General Discussion - Feedback	Dr. Marios Raptopoulos

Figure 3-2: Schedule of the IoT training workshop (II).

Name of Trainee	Affiliation
Naeem AlOudat	Tafila Technical University
Murad Alaqtash	Tafila Technical University
Ahmad Aljaafreh	Tafila Technical University
Bassam Abu Karaki	Al-Hussein bin Talal University
Samiha Falahat	Al-Hussein bin Talal University
Saleh Saraireh	Al-Hussein bin Talal University

Moath Alsafasfeh	Al-Hussein bin Talal University
Khaled Alawasa	Mutah University
Mohammad Zakariya Siam	Isra University
Mohammed Baniyounis	Philadelphia University
Sultan Mahmoud Al-Rushdan	Philadelphia University
Maria Papaioannou	Instituto de Telecomunicações
Yaser Sami Abd alaziz Abadah	Isra University
Nada Nabil Khatib	Philadelphia University
Khaled Matrouk	Al-Hussein bin Talal University
Jamal Zraqou	Isra University
Ra'ed Marabheh	Mutah University
<i>Name of Instructor</i>	<i>Affiliation</i>
Marios Raspopoulos	University of Central Lancashire – Cyprus
Stelios Ioannou	University of Central Lancashire – Cyprus
Eliana Stavrou	University of Central Lancashire – Cyprus
Josephina Antoniou	University of Central Lancashire – Cyprus
Nearchos Paspallis	University of Central Lancashire – Cyprus
Fabrizio Granelli	Università degli Studi di Trento
Felipe Gil Castiñeira	University of Vigo

Table 3-1: List of participants and instructors in the IoT training workshop.

The agenda of the workshop included 5 days of training, during which the fundamentals on the subject of IoT were presented. During the first day of the training workshop, there was a general introduction to the contents and purpose of the training, followed by an introduction to IoT, which presented the history of IoT and an overview of IoT technologies and basic research directions. A revision of basic programming and IoT IDE was presented, followed by a presentation and discussion on software development for IoT embedded systems.

The IoT architecture and components were presented during the second day of the training workshop. During this part, the main architectures were discussed, along with the major hardware and software of IoT. The basic concepts of IoT were also presented, like storage, CPU and data movement. IoT connectivity technologies were also presented in the final part of that day's training, with discussion on wireless technologies and sensor networks for IoT and mobile technologies.

The third day of the workshop began with the subject of IoT microcontrollers, sensors for data acquisition and actuators. The IoT connectivity protocols were presented next, followed by data storage and cloud systems and data analytics and applications. Machine learning and AI, signal processing, visualization and interpretation of data, cloud analytics and applications were



discussed, among other things. Several case studies were also presented to get a better understanding of data storage and applications.

IoT security and security standards were presented on the fourth day of the training workshop. This part included information on security threats, risk assessments, security measures and more. Ethics in IoT networks and applications were presented next, with discussions on technology's impact on society, benefits and challenges, data ownership issues and more. The day's training concluded with the subject of key-enabling technologies and applications in IoT.

The last day of the IoT workshop included IoT practical worksheets and a general discussion among the participants and presenters, along with feedback on the training workshop.

4. THE CS TRAINING WORKSHOP

The CS training workshop took place in 20-30 September 2021 and it was coordinated by Dr. Felipe Gil Castiñeira, University of Vigo, Spain. In this section, the programme of the CS training workshop, for each day, will be described. The detailed timetable of the training can be seen in the next two figures. Table 4-1 shows the list of the trainees and instructors of the CS training workshop and their affiliations.



Monday 20 th September		
Jordan Time	Topic	Presenter (s)
10:00-10:30	General introduction to the workshop	Felipe Gil Castiñeira – (CS Course Leader)
10:30-12:30	Session 1: Security and Risk Management and Discussion	Maria Papaioannou
<i>Break</i>		
16:00-18:00	Session 2: Security Engineering. Introduction and discussion	Felipe Gil Castiñeira

Tuesday 21 st September		
Jordan Time	Topic	Presenter (s)
10:00-12:00	Session 3: Security Engineering. Cryptography & Key Management and Discussion	Maria Papaioannou
<i>Break</i>		
17:00-19:00	Session 4: Security Engineering. Cryptography Services and Discussion	Eliana Stavrou

Wednesday 22 nd September		
Jordan Time	Topic	Presenter (s)
10:00-12:00	Session 5: Communications & Network Security. Introduction and Discussion	Filippos Pelekoudas
<i>Break</i>		
16:00-18:00	Session 6: Communications & Network Security. Securing network components and Discussion	Fabrizio Granelli

Thursday 23 rd September		
Jordan Time	Topic	Presenter (s)
10:00-12:00	Session 7: Communications & Network Security. Securing communication channels and Discussion	Fabrizio Granelli
<i>Break</i>		
16:00-18:00	Session 8: Security Operations. Security Assessment and Testing and Discussion	Enrique Costa Montenegro

Figure 4-1: Schedule of the CS training workshop (I).

Monday 27 th September		
Jordan Time	Topic	Presenter (s)
10:00-12:00	Session 9: Security Operations. Intrusion detection & Prevention and Discussion	Filippos Pelekoudas
<i>Break</i>		
16:00-18:00	Session 10: Security Operations. Recovery & Incident Response and Discussion	Filippos Pelekoudas

Tuesday 28 th September		
Jordan Time	Topic	Presenter (s)
10:00-12:00	Session 11: Security Operations. Login, Monitoring & Access Control and Discussion	Maria Papaioannou
<i>Break</i>		
16:00-18:00	Session 12: Security Operations. Software development security and Discussion	Cristina López Bravo

Wednesday 29 th September		
Jordan Time	Topic	Presenter (s)
12:00-14:00	Session 13: Impact of new technologies on cybersecurity and Discussion	Pablo Fondo Ferreiro

Thursday 30 th September		
Jordan Time	Topic	Presenter (s)
10:00-13:30	CS Practical Worksheets	Provider of the CS equipment
<i>Break</i>		
15:00-17:30	General Discussion - Feedback	Felipe Gil Castiñeira

Figure 4-2: Schedule of the CS training workshop (II).

Name of Trainee	Affiliation
Ahmad Al-Mahasneh	Philadelphia University
Taghred Mohammed AlTarawneh	Mutah University
Zeyad Al-Odat	Tafila Technical University
Anis Nazer	Philadelphia University
Sultan Al-Rushdan	Philadelphia University
Eman Al-Qtiemat	Al-Hussein bin Talal University
Jamal Bani Salameh	Mutah University

Mohammad Zakariya Siam	Isra University
Abdullah Alhasanat	Tafila Technical University
Nada Nabil Khatib	Philadelphia University
Maen S. Saleh	Philadelphia University
Amany Farajat	Al-Hussein bin Talal University
Bilal Ibrahim Alqudah	Al-Hussein bin Talal University
Ziyad Al Tarawneh	Mutah University
Yaser Sami Abd alaziz Abadah	Isra University
Jamal Zraqou	Isra University
Naeem Al-Oudat	Tafila Technical University
Murad Muhammad Suleiman Al-Aqtash	Tafila Technical University
Maram Bani Younes	Philadelphia University
René Lastra Cid	University of Vigo
<i>Name of Instructor</i>	<i>Affiliation</i>
Felipe Gil Castiñeira	University of Vigo
Fabrizio Granelli	Università degli Studi di Trento
Maria Papaioannou	Instituto de Telecomunicações
Eliana Stavrou	University of Central Lancashire – Cyprus
Filippos Pelekoudas Oikonomou	Instituto de Telecomunicações
Enrique Costa Montenegro	University of Vigo
Cristina López Bravo	University of Vigo
Pablo Fondo Ferreiro	University of Vigo

Table 4-1: List of participants and instructors in the CS training workshop.

The agenda of the workshop included 8 days of training, during which the fundamentals about CS were presented. During the first day of the training workshop, there was a general introduction to the contents of the workshop, followed by a session on security and risk management, where the basic concepts were discussed, like confidentiality, privacy, legal issues, risk management and more. The day ended with a session on security engineering, where an introduction was made on security models and architecture, controls and countermeasures and the vulnerabilities of various systems were discussed.

The second day included sessions on security engineering, regarding cryptography and key management, as well as cryptographic services. The cryptographic lifecycle and cryptographic types were presented and there was a discussion on digital signatures, digital rights management, methods of cryptanalytic attacks and more. The third day of the workshop began with an introduction on communications and network security, followed by a discussion on security network components, where the operation of hardware and network access control devices were discussed, among other things. The fourth day of the training workshop included a



presentation on securing communication channels and a discussion on security assessment and testing.

Security operations, like intrusion detection and prevention, as well as recovery and incident response, were discussed on the fifth day. Firewalls and intrusion detection systems were presented and recovery strategies were analyzed. The sixth day of the training workshop continued on the subject of security operations and it focused on login, monitoring and access control, as well as software development security. The seventh day of the workshop included a discussion on the impact of new technologies on cyber security. The CS training workshop's last day included CS practical worksheets and a general discussion and feedback on the topics that were presented during the previous days.

5. THE RE TRAINING WORKSHOP

The RE training workshop took place in 22-26 November 2021 and it was coordinated by Prof. Andreas Kazantzidis, University of Patras, Greece. In this section, the programme of the RE training workshop, for each day, will be described. The detailed timetable of the training can be seen in the next two figures. Table 5-1 shows the list of the trainees and instructors of the RE training workshop and their affiliations.

Monday 22nd November 2021

Time	Topic	Presenter (s)
09:30-09:45	Welcome	Prof. Andreas Kazantzidis - Coordinator
09:45-10:15	Overview of IREEDER project	Prof. Saud Althunibat
10:15-10:45	Overview of RE industry in Jordan	Prof. Ahmad Salah
10:45-11:00	General introduction to the RE workshop	Prof. Andreas Kazantzidis – WP3 Leader, RE Course Leader
11:00-11:30	<i>Coffee break</i>	
11:30-13:00	Introduction and Overview of Renewable Energy Resources (1/2)	Prof. Andreas Kazantzidis & Dr. Eferpi Nikitidou
13:00-15:00	<i>Lunch Break</i>	
15:00-16:30	Introduction and Overview of Renewable Energy Resources (2/2)	Prof. Andreas Kazantzidis & Dr. Eferpi Nikitidou

Tuesday 23rd November 2021

Time	Topic	Presenter (s)
09:30-11:00	Physics of sunlight and photovoltaics	Prof. Andreas Kazantzidis & Dr. Eferpi Nikitidou
11:00-11:30	<i>Coffee break</i>	
11:30-13:00	Solar thermal systems	Prof. Athanassios Argiriou
13:00-15:00	<i>Lunch Break</i>	
15:00-16:00	Solar resource and forecasting – Highlights from UPAT research activities	Prof. Andreas Kazantzidis
16:00-17:30	Photovoltaic system components	Prof. Elias Stathatos

Wednesday 24th November 2021

Time	Topic	Presenter (s)
09:30-11:00	Energy storage (1/2)	Dr. Marios Raptopoulos & Dr. Stelios Ioannou
11:00-11:30	<i>Coffee break</i>	
11:30-13:00	Energy storage (2/2)	Dr. Marios Raptopoulos & Dr. Stelios Ioannou
13:00-15:00	<i>Lunch Break</i>	
15:00-16:00	Solar and wind energy: Highlights from UPAT research activities	TBD
16:00-17:30	Photovoltaic system calculation, aspects and performance	Prof. Elias Stathatos

Figure 5-1: Schedule of the RE training workshop (I).

Thursday 25th November 2021

Time	Topic	Presenter (s)
09:30-11:00	Wind Energy Fundamentals	Prof. George Leftheriotis
11:00-11:30	<i>Coffee break</i>	
11:30-13:00	Wind Turbines operation and Control	Prof. George Leftheriotis
13:00-15:00	<i>Lunch Break</i>	
15:00-15:30	Overview of the installed RE lab at MU	Prof. Ziyad Altarawneh
15:30-17:30	RE Practical Worksheets	Provider of the RE equipment

Friday 26th November 2021

Time	Topic	Presenter (s)
09:30-11:00	OFF-grid/ Stand-alone systems and other topics	Prof. George Konstantopoulos
11:00-11:30	<i>Coffee break</i>	
11:30-13:00	Visit to the premises of Division of Electric Power Systems, Department of Electric and Computer Engineering	
13:00-15:00	<i>Lunch Break</i>	
15:00-17:00	General Discussion - Feedback	All participants

Figure 5-2: Schedule of the RE training workshop (II).

Name of Trainee	Affiliation
Moath Alsafasfeh	Al-Hussein Bin Talal University
Ahmad Salah	Al-Hussein Bin Talal University
Wael Abu Sheha	Al-Hussein Bin Talal University
Mohammad Shalby	Al-Hussein Bin Talal University
Yara Haddad	Philadelphia University
Mohammed Baniyounis	Philadelphia University
Omar Rawhi Ahmad Daoud	Philadelphia University
Firas Obeidat	Philadelphia University
Ahmad Aljaafreh	Tafila Technical University
Wail Murtada Adail	Tafila Technical University
Jumana Alshawawreh	Tafila Technical University
Eyad Almaitah	Tafila Technical University
Ziyad Almajali	Mutah University

Walaa Al-sarayrh	Mutah University
Ziyad Al Tarawneh	Mutah University
Fras Ziad Aladaileh	Mutah University
Mohammad Zakariya Siam	Isra University
Ahmad Nuseirat	Isra University
Ghaida Aburumman	Isra University
<i>Name of Instructor</i>	<i>Affiliation</i>
Andreas Kazantzidis	University of Patras
Athanassios Argiriou	University of Patras
Elias Stathatos	University of the Peloponnese
George Leftheriotis	University of Patras
George Konstantopoulos	University of Patras
Efterpi Nikitidou	University of Patras
Marios Raspopoulos	University of Central Lancashire - Cyprus
Stelios Ioannou	University of Central Lancashire - Cyprus

Table 5-1: List of participants and instructors in the RE training workshop.

The agenda of the workshop included 5 days of training, during which the fundamentals on the subject of RE were presented. The first day of the training workshop began with an overview of the IREEDER project and the RE industry in Jordan, followed by a general introduction to the RE workshop. The day continued with two sessions with an introduction and overview of the renewable energy resources. An overview of energy use was presented, along with the most important information on RE sources, the types with their characteristics, economic and environmental aspects and RE standards and regulations.

The second day of the RE training workshop began with a session on the physics of sunlight and photovoltaics, where the fundamentals of energy conversion in photovoltaic solar cells were presented, along with the most important photovoltaic technologies. The solar thermal systems were presented afterwards, with thermal storage, operating conditions and design information, followed by a session about the solar resource and forecasting, including the highlights from the research activities at the University of Patras. The day ended with a presentation on photovoltaic system components, where the PV system's power electronics and designs were discussed, among other things.

An introduction on energy storage systems, principles of their operation and applications, was given on the third day of the workshop. A session followed on the topic of solar and wind energy with highlights from the research activities at the University of Patras and the day ended with a presentation on photovoltaic system calculation, aspects and performance, where the



cost of PV systems and their life cycle were among the topics of discussion. The fourth day of the training workshop began with two sessions on wind energy fundamentals and wind turbines operation and control. The fundamentals of wind energy, the wind turbine types and their characteristics, along with control systems and forecast, were presented. The training continued with a session on the installed RE laboratory at Mutah University in Jordan, followed by RE practical worksheets.

The last day of the RE training workshop included a presentation on off-grid/stand-alone systems, along with other topics, followed by a visit to the premises of Division of Electric Power Systems at the Department of Electric and Computer Engineering. The day ended with a general discussion and feedback on the topics of the training workshop.

6. THE SURVEYS

In order to evaluate the training workshops and gather feedback, a survey was prepared and addressed to each participant of each workshop. The following questions were included in the survey.

Your details (name, country, gender, age, position, work field)

What is your motivation to take part in this training workshop?

Organization of the training on behalf of the organizing institution (e.g. registration platform, contact with the organizer, proper communication about training details, ...).

Functionality of conference tool and software used (video, sound, other technical aspects, ...).

Possibility to exchange and interact with tutor(s) and other participants (forums, sessions for discussion, Q&A, ...).

Do you have any suggestions or recommendations for improvements of organizational aspects?

When starting the course, I was well informed about the content of the training workshop.

I find the knowledge and skills I received through the training to be very useful to me.

I think the case studies added high value to the course.



I consider the provided training materials to be useful.

In my opinion the structure of the training was logical and well organized.

The training schedule and time frame were very good.

The training was appropriate for my level of experience.

The training met my expectations.

What did you most like about the training? (e.g. innovative approach, quality of training materials, case-based learning methods, ...)

What can be improved regarding structure, format and material?

The training raised my interest in the topic.

I reached the learning outcomes being specified.

The knowledge and skills I received in this training are valuable to my work/future career.

I missed some background/introductory information.

How satisfied are you with the training workshop?

Have you recognized differences as compared to other trainings?

Please provide an overview contribution about the training workshop.

Please list the new concepts/skills/topics you have learned from the training workshop.

[Table 6-1: List of questions in the survey for each training workshop.](#)

7. SURVEYS ANALYSIS

7.1. IoT training workshop

The analysis of the answers to the questions of the survey, regarding the IoT training workshop, is provided in the following figures. The first questions refer to personal details of each participant.

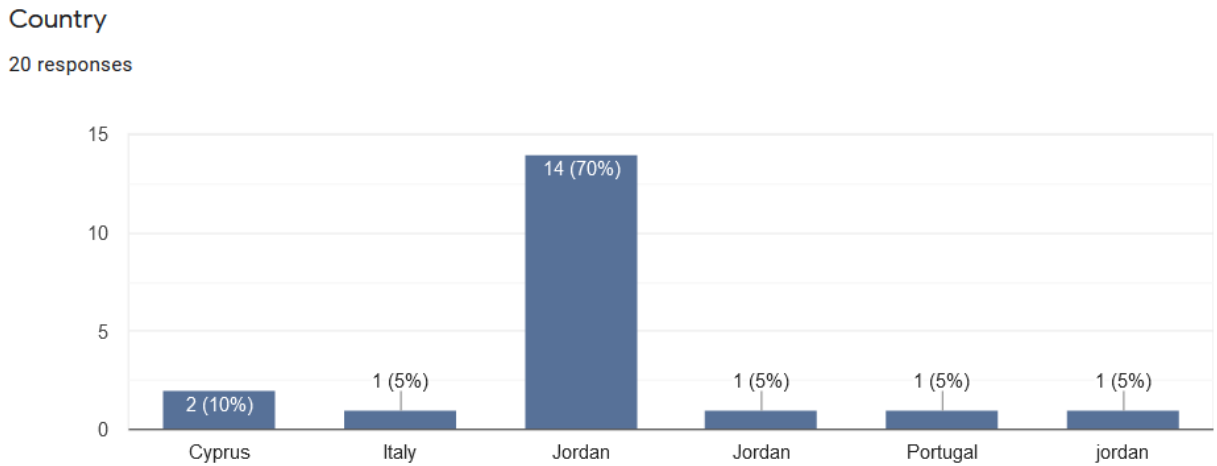


Figure 7-1. Country distribution of the IoT training workshop participants.

Figure 7-1 to Figure 7-5 present the country and age of the participant, along with information regarding their position and field of work.



Gender

20 responses

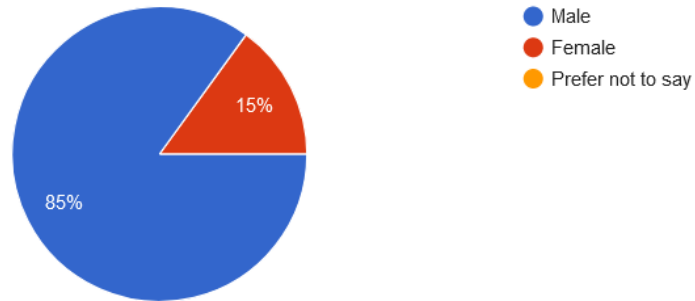


Figure 7-2. Gender distribution of the IoT training workshop participants.

Age

20 responses

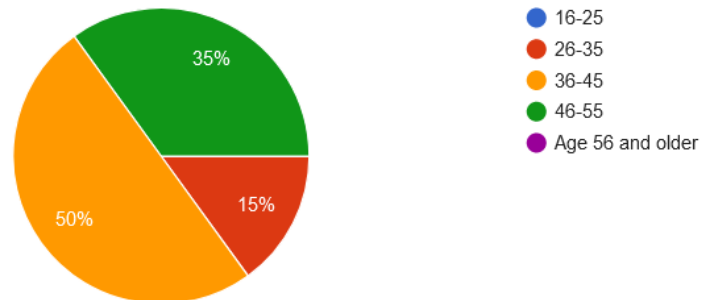


Figure 7-3. Age distribution of the IoT training workshop participants.

Position

20 responses

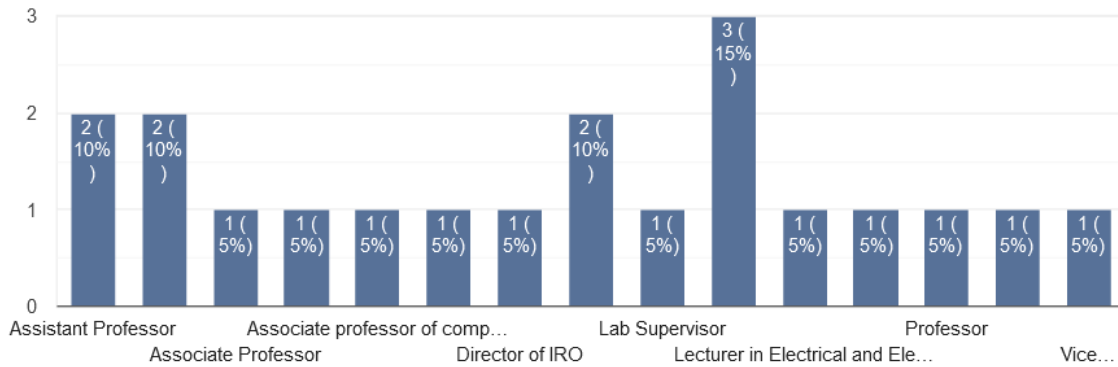


Figure 7-4. Position distribution of the IoT training workshop participants.

Work field

20 responses

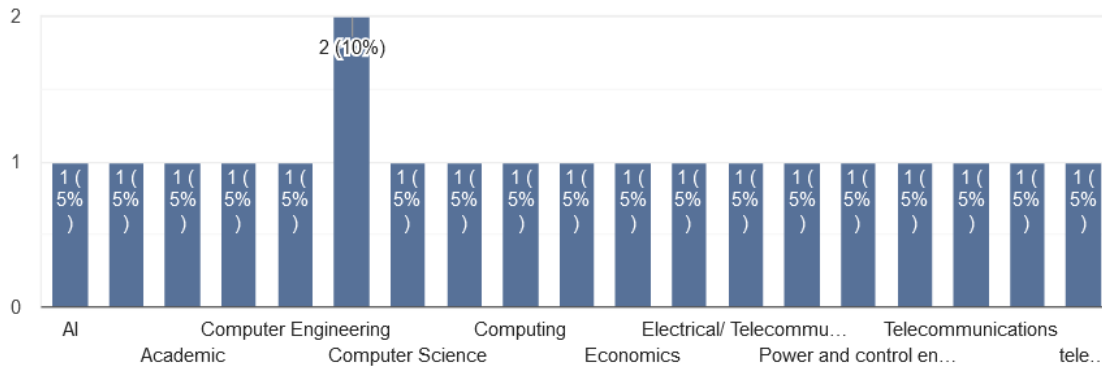


Figure 7-5. Work fields of the IoT training workshop participants.

Figure 7-6 presents the motivation of the participants to take part in the training workshop. The participants are generally interested in learning more on the subject of IoT and the latest technological advances and view it as an important course.



What is your motivation to take part in this training workshop?

20 responses

- See new ways of delivering such course and benefit from others experience
- Expand my knowledge with the introductory material about the Internet of Things and deliver the week 11 about IoT Security and security standards.
- to get to know more about IoT
- To know more about IoT and its technological advances.
- Delivered two sessions, also interested to learn more about IoT
- learn about the IoT and teach it to students
- Teaching and Research
- gain information about IoT - Planning to teach a course in IoT in my department
- Improve my skills in IoT field
- IOT is a leading technology of 4th industrial revolution
- to increase my knowledge about IT field
- To be involved with the future most important technologies.
- To teach the IoT course to Electrical and computer engineering students
- To be able to familiarize myself with the material in order to teach the module if necessary
- To be up to date with the latest updates
- To learn more about IoT
- To get more details about IoT technology.
- To be a part of one of the new trends across the world, where IoT is a solid part of the new technologies
- I am interested in IoT
- It is an interesting and important course

Figure 7-6. Motivation for participation in the IoT training workshop.

The organization of the training workshop, on behalf of the organizing institution, was satisfying, since the majority (85%) of the participants gave the highest evaluation, as it can be seen in the chart below (Figure 7-7). The evaluation of the workshop organization takes into consideration the platform for registration, the availability of the organizer to be in contact with the participants, the necessary communication regarding the workshop details, etc.

Organization of the training on behalf of the organizing institution (e.g. registration platform, contact with the organizer, proper communication about training details, ...).

20 responses

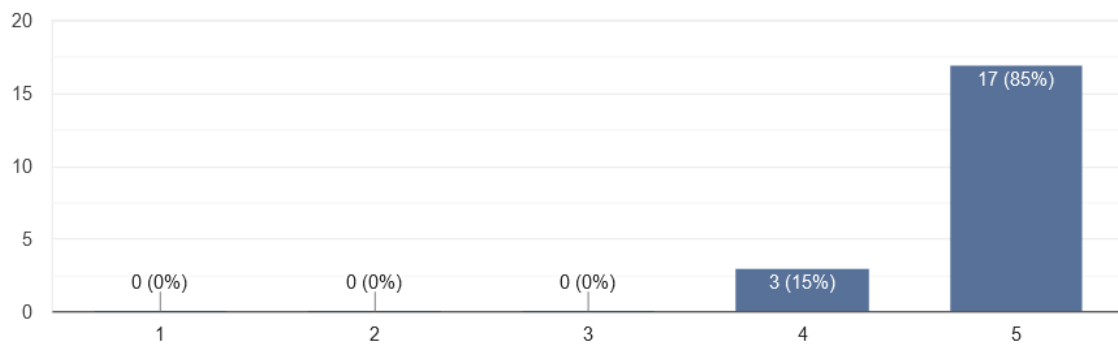


Figure 7-7. Satisfaction scale of the IoT workshop organization by the organizing institution.

Figure 7-8 shows the level of satisfaction regarding the tools and software used in the workshop, like video, sound and other technical aspects. Most of the participants (60%) were completely satisfied with the technical aspect of the workshop, while 35% gave it a high evaluation of 4/5 and only 1 participant evaluated it with 3/5.

Functionality of conference tool and software used (video, sound, other technical aspects, ...).

20 responses

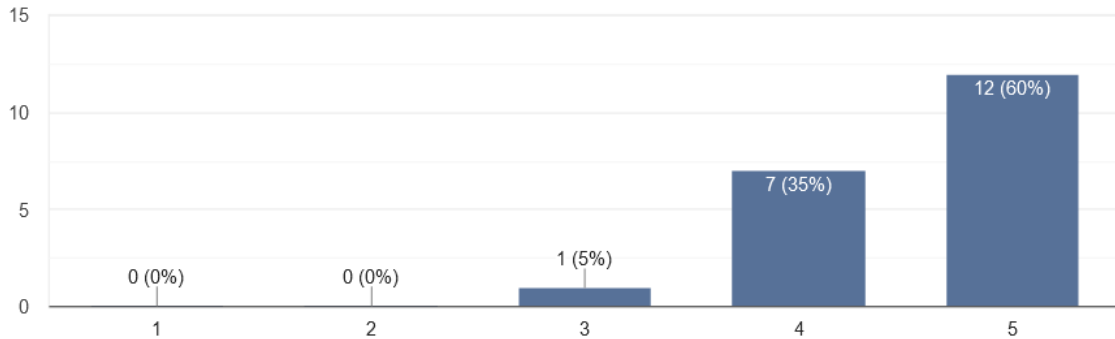


Figure 7-8. Satisfaction scale of the IoT workshop's tools and software used.

Figure 7-9 shows that 70% of the participants gave their highest evaluation to the possibility for exchange and interaction with the tutors and the other participants, during the training workshop. This includes sessions for discussion and Q&A sessions.

Possibility to exchange and interact with tutor(s) and other participants (forums, sessions for discussion, Q&A, ...).

20 responses

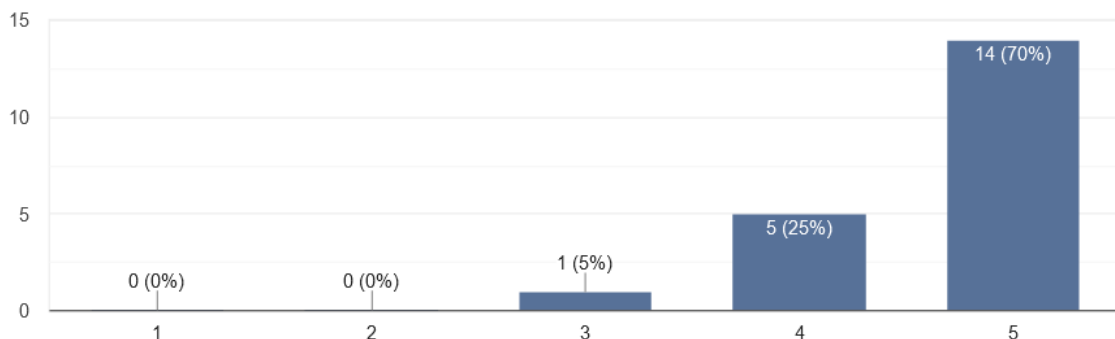


Figure 7-9. Scale of possibility for IoT participants' interaction.

The next question of the survey, asked the participants to provide their own recommendations for improvement of the organizational aspects of the training workshop. The answers are presented in Figure 7-10. Most participants were satisfied with the organization and wouldn't have any changes, while others suggested shorter sessions and more time for discussions and more practical assignments based on the topics of the workshop.

Do you have any suggestions or recommendations for improvements of organizational aspects?

20 responses

No

I believe that it was very well-organized and achieved that main purposes of this workshop's realization. I would recommend the sessions to be shorter, not to go into too much detail, rather than motivate discussions between the partners and exchange ideas.

no suggestions

It was quite smooth and well organized.

The time slots assigned to the sessions was not accurate in most of the times.

larger practical part

Nothing

no suggestions .. everything is perfect

No, I'd like to thanks the organization staff for their great job.

NO

Due to the fact that the material was mostly theoretical then I believe that more breaks were required.

None

I suggest to include some assignments related to the topics of the workshop.

No. Great work

It is well organized

Figure 7-10. Suggestions for improvement of IoT workshop organization.

Figure 7-11 shows that 70% of the workshop participants found that the information received before the course started, regarding its contents, was satisfying, while only 2 of the participants gave an evaluation of 3/5.

When starting the course, I was well informed about the content of the training workshop.

20 responses

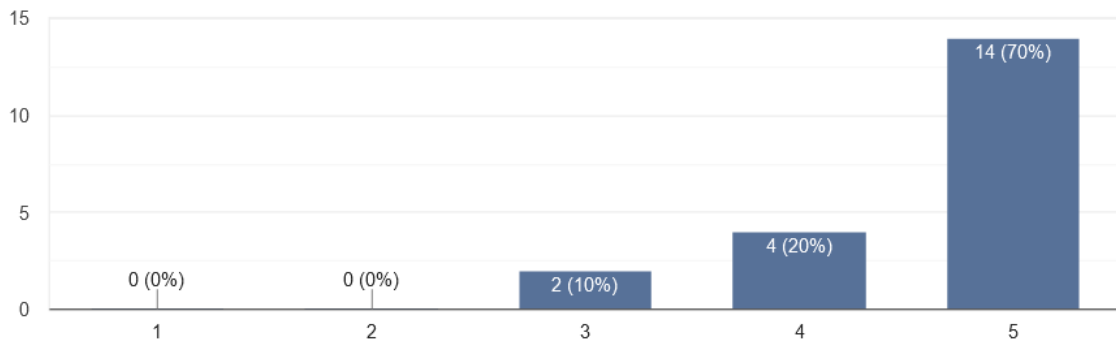


Figure 7-11. Satisfaction scale of the information received regarding the IoT workshop content.

In the next part, the participants were asked to evaluate the usefulness of the information they received during the training workshop. As it can be seen in Figure 7-12, 45% of the participants found the skills they gained from the workshop to be very useful, while 35% gave a high evaluation of 4/5 and 4 participants gave an evaluation of 3/5.

I find the knowledge and skills I received through the training to be very useful to me.

20 responses

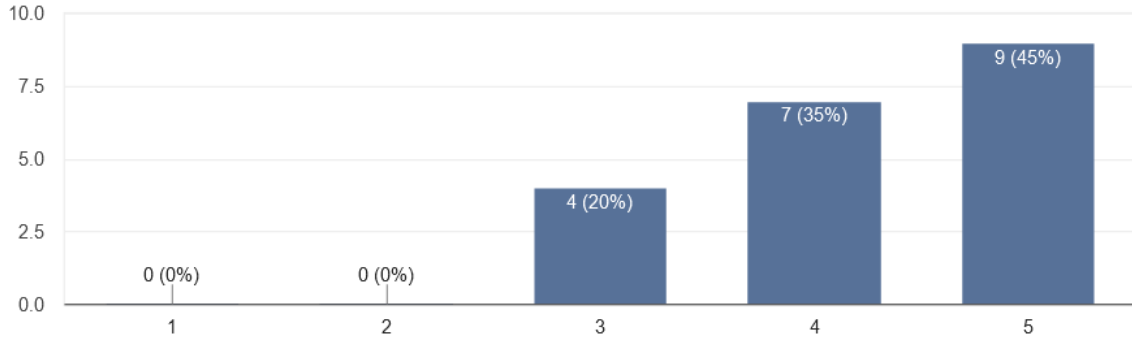


Figure 7-12. Satisfaction scale of the skills gained from the IoT workshop.

In Figure 7-13, it is shown that 45% of the participants thought that the case studies gave high value to the course (5/5), while 40% gave a high evaluation of 4/5 and 15% gave an evaluation of 3/5.

I think the case studies added high value to the course.

20 responses

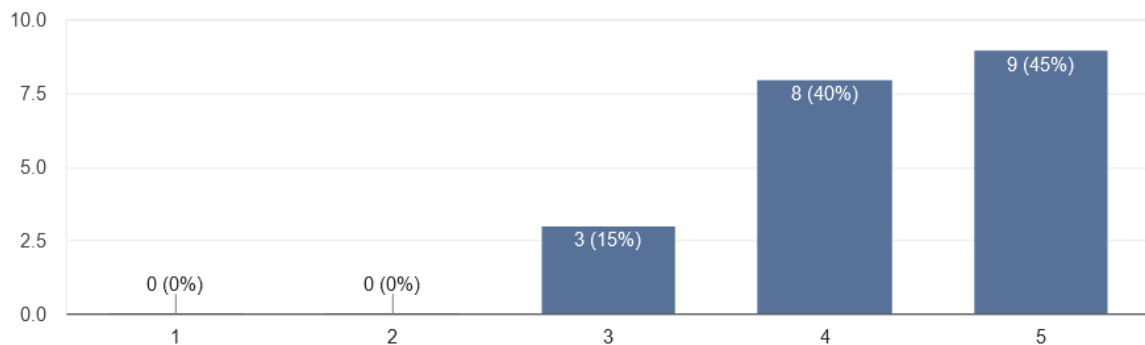


Figure 7-13. Satisfaction scale regarding the value of the IoT case studies.

In the next part, the participants were prompted to evaluate the usefulness of the provided training materials. As it is presented in Figure 7-14, 60% of the participants found the material to be very useful, while 30% gave it a high evaluation of 4/5 and 2 participants gave an evaluation of 3/5.

I consider the provided training materials to be useful.

20 responses

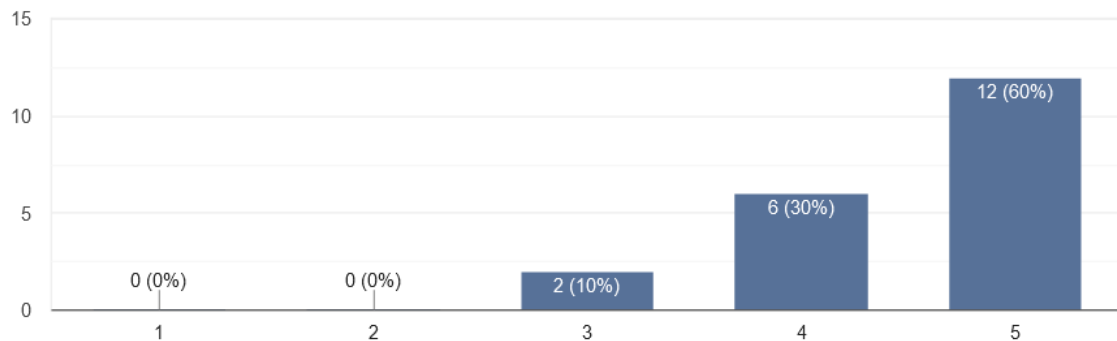


Figure 7-14. Satisfaction scale of the IoT training materials.

Regarding the structure of the training, the results can be seen in the following chart (Figure 7-15). Half of the participants thought that the structure of the training workshop was very logical and well organized, while 45% of the participants gave a high evaluation of 4/5 and only 1 participant gave an evaluation of 3/5.

In my opinion the structure of the training was logical and well organized.

20 responses

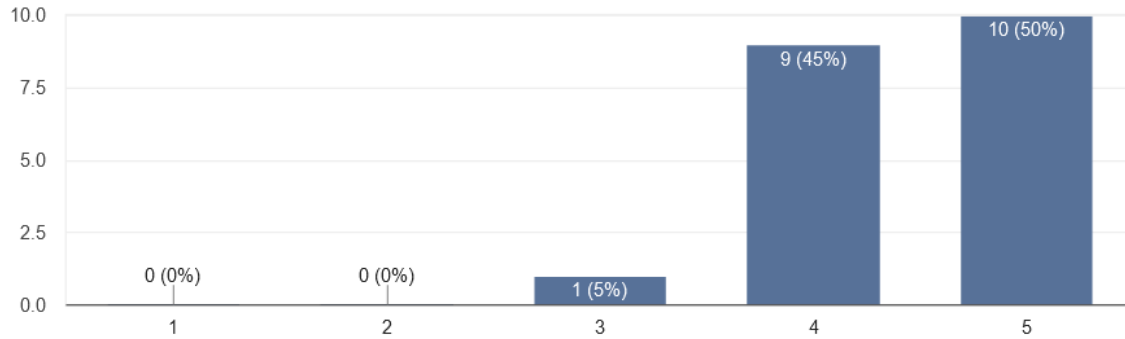


Figure 7-15. Satisfaction scale of the IoT training workshop structure.

Figure 7-16 presents the opinion of the participants regarding the time frame of the training workshop. The majority (55%) of the participants gave an evaluation of 4/5, while 25% were very satisfied with the time frame. Three participants gave an evaluation of 3/5 and one participant was not satisfied with the time frame of the workshop.

The training schedule and time frame were very good.

20 responses

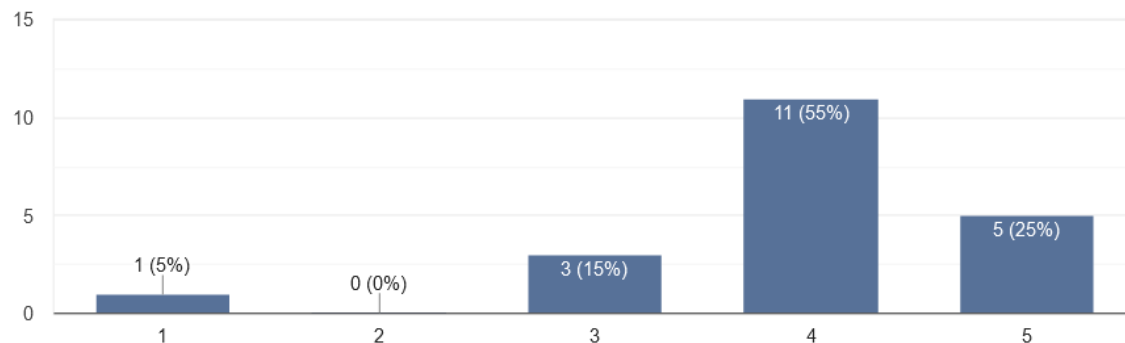


Figure 7-16. Satisfaction scale of the IoT workshop schedule and time frame.

Figure 7-17 presents the participants' opinion regarding the relevance of the training to their level of experience. The majority of the participants found the training to be appropriate for their experience level and gave an evaluation of 4/5 and 5/5, while only 3 participants gave an evaluation of 3/5.

The training was appropriate for my level of experience.

20 responses

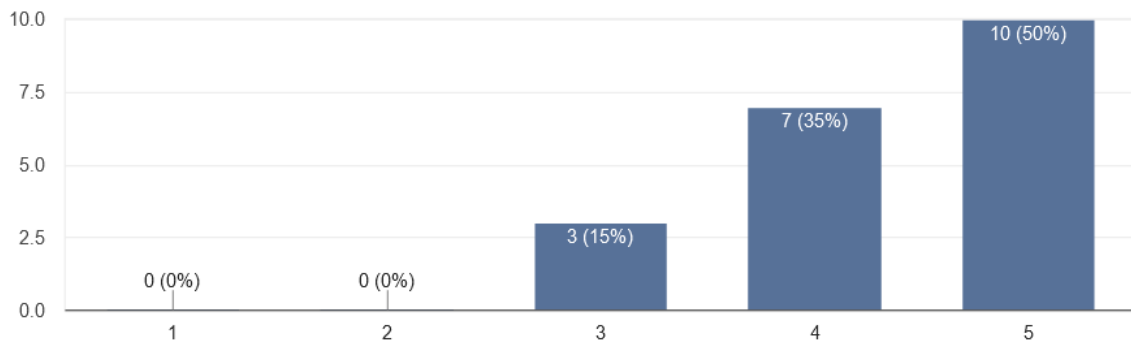


Figure 7-17. Satisfaction scale of the relevance of the IoT workshop to the participant's level of experience.

The next part asked the participants to evaluate the degree to which the training workshop met their expectations. The majority of the participants (55%) gave an excellent evaluation, 5/5, while the rest gave evaluations ranging from 2/5 to 4/5, as it can be seen in Figure 7-18.

The training met my expectations.

20 responses

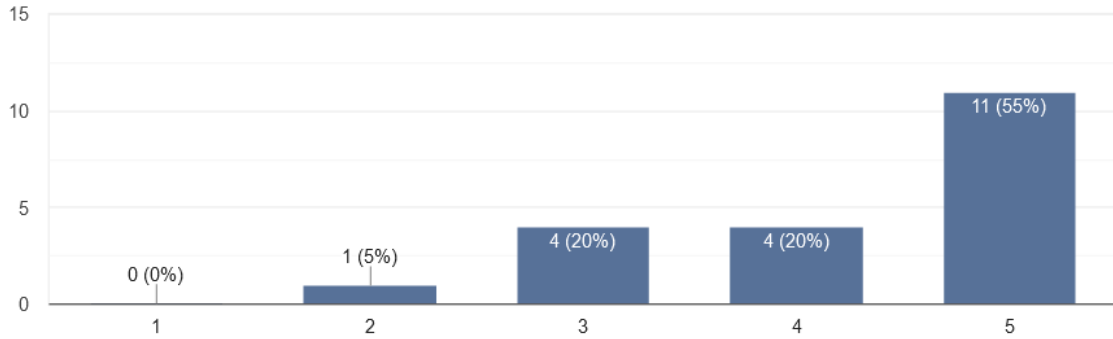


Figure 7-18. Satisfaction scale regarding the IoT participant's expectations.

In the next part, the participants were asked to mention what they most liked about the training workshop. The answers can be seen in Figure 7-19. The quality of the training materials is something most participants found satisfying, along with the variety of subjects that the workshop covered and the practical examples.

What did you most like about the training? (e.g. innovative approach, quality of training materials, case-based learning methods, ...)

20 responses

Quality of training materials
Trainers were very good in dealing with the trainees notes
High quality of training materials, interesting topics
innovative and quality of the training material
Quality of training materials.
Variety of topics covered
some sessions were well introduced and met my expectations, some less.
practical examples
Informative training materials - availability of resources
Use a comprehensive training methods
Training materials
innovative approach
INNOVATIVE APPROACH
The quality of the training materials
The simulation
Quality of materials
The coverage of many topics in IOT.
Instructors, lectures deliver, materials
innovative approach and training materials

Figure 7-19. Favorite parts of the IoT training workshop.

Figure 7-20 shows the suggestions that the participants were asked to make, in order to improve the structure, format and material of the training. These suggestions include more practical examples on the subject of IoT, less advanced details and more compressed information on the course.



What can be improved regarding structure, format and material?

20 responses

Using extensive examples could be better

Slidess can be more concise. Less info on one slide can be better.

NA

I guess nothing, it was well designed

They were good.

It could be a bit more compressed to save time

none

Teaching oriented training

material - bigger practical part

Focus on practical approaches

None

nothing .. everything is perfect

- 1) There are a little spelling and grammar errors in the slides content, for example slide number 134, sentence 3 " Devices may communication with each other either via the communication network"
- 2) It will be more benefit to give more practical examples during the explanation of the theoretical issues
- 3) Some concepts are repeated in several lectures for example the IOT overview.

I noticed that there are many redundant topics in different chapters. Moreover the course includes many advanced details which is too much INFO. for undergraduate students. Last thing is that the name of the course is Introduction to IoT which is in my opinion NOT SUITABLE for a course that will be taught to 4th or 5th year students. I suggest to remove the word Introduction and make it as : Internet of Things (IoT) Fundamentals

More examples / case studies for more discussion

The materials should be provided to all of the trainees

Nothing specific

Nothing

Nothing

Add more experience and practica examples

I hope to have more videos to be refer to in the future

Figure 7-20. Suggestions for improvement of IoT workshop's structure, format and material.

Figure 7-21 and Figure 7-22 present the satisfaction scale of the participants on whether or not the training raised their interest on the subject and the learning outcomes were reached, respectively. The majority of the participants, in both cases, was fairly satisfied and gave an evaluation of 4/5.

The training raised my interest in the topic.

20 responses

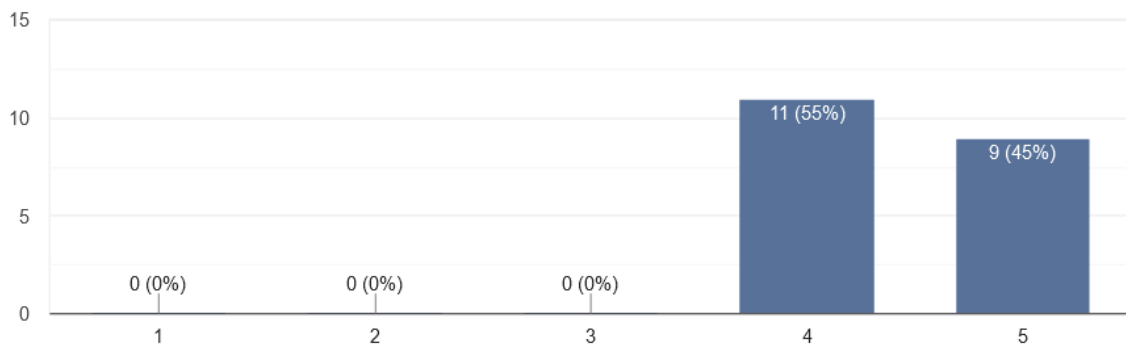


Figure 7-21. Satisfaction scale regarding the participant's interest in the topic of IoT.

I reached the learning outcomes being specified.

20 responses

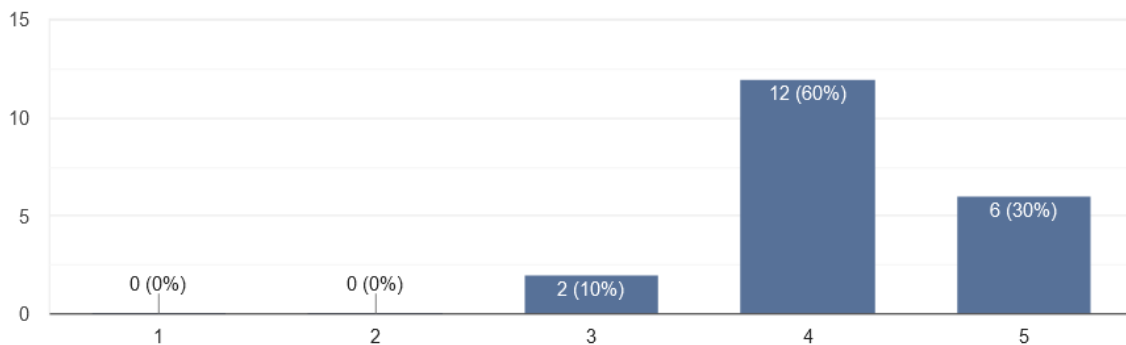


Figure 7-22. Satisfaction scale regarding the learning outcomes on the topic of IoT.

Figure 7-23 shows that most participants found that the knowledge and skills they received from the training workshop will be valuable in their career and future work and gave an evaluation of 4/5 and 5/5.

The knowledge and skills I received in this training are valuable to my work/future career.

20 responses

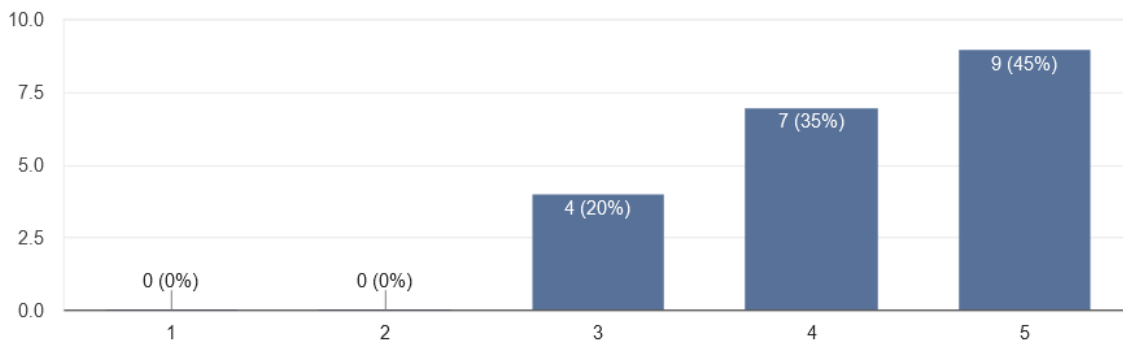


Figure 7-23. Satisfaction scale of the value of IoT skills gained regarding future work.

In the next part, the participants were asked to evaluate the background/introductory information, as it can be seen in Figure 7-24. The majority of them (60%) gave a low evaluation of 1/5 and 2/5 and feel that they missed some background information regarding the items of the training workshop. While 30% of the participants were satisfied with the background information, this issue can be further addressed to meet the needs of the rest of the group.

I missed some background/introductory information.

20 responses

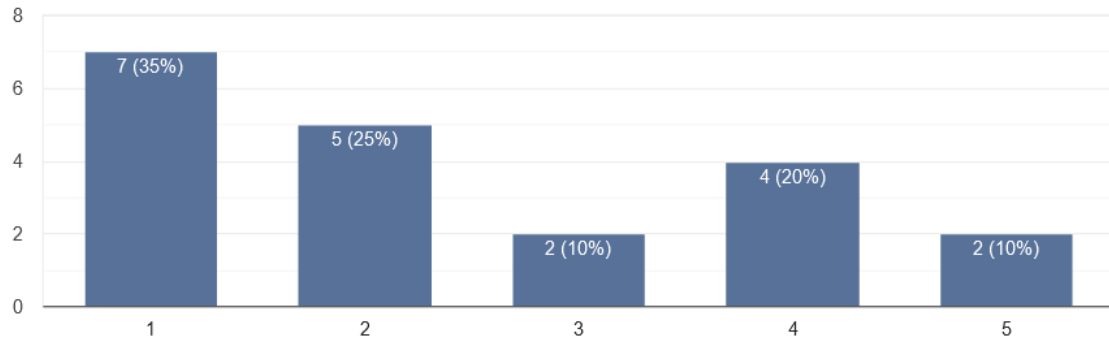


Figure 7-24. Scale of IoT background information that was missed.

Figure 7-25 presents the overall satisfaction of the participants regarding the training workshop. A high percentage of 95% gave high evaluations of 4/5 and 5/5, while only one participant gave an evaluation of 3/5. As a result, the training workshop seems to have met its objectives and pleased the participants.

How satisfied are you with the training workshop?

20 responses

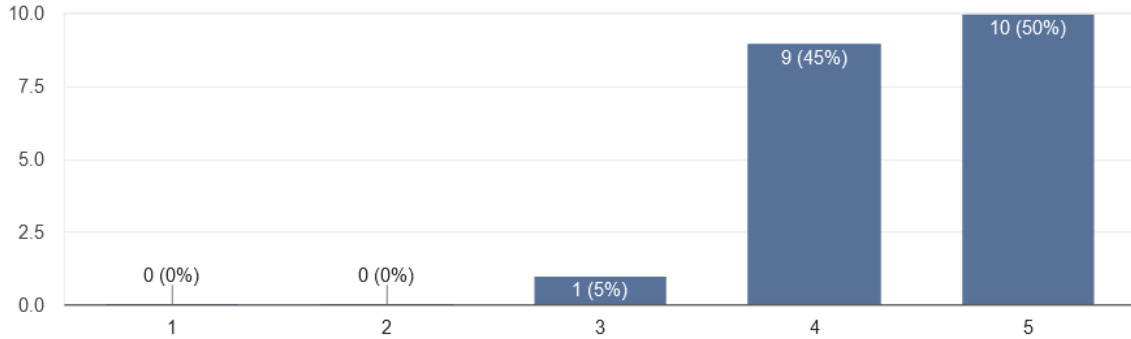


Figure 7-25. Overall satisfaction scale of the IoT training workshop.

In Figure 7-26, 55% of the participants said that they didn't recognize any major differences between the IoT workshop and other training workshops.

Have you recognized differences as compared to other trainings?

20 responses

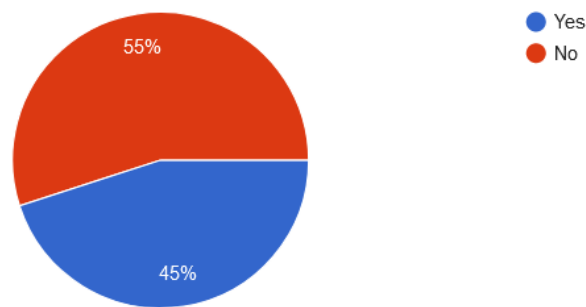


Figure 7-26. Differences between the IoT workshop and other trainings.

In the next part, as can be seen in Figure 7-27, most of the participants concluded that the training workshop was well organized and presented and it included useful material and subjects.



Please provide an over contribution about the training workshop.

20 responses

Very good
It was a well-organized training workshop, with high quality material.
it was valuable and enriching
It was useful.
It was a good training. Since it was online perhaps it would help if we spent more time at the beginning discussing about the participants backgrounds and expectations.
none
Good
non
Conduct on site training in the future
Perfect
arduino projects
In section "Software Development for IoT Embedded Systems", the presenter give simple working examples for Arduino Uno only , it is will be more useful to show how this microcontroller can be connected to the internet to achieve the main goals of the IOT.
--
The material was well explained and introduced
I would to present a real project
Well organized
It was excellent training workshop.
It was very useful and rich of IoT topics.
Great organization and wider knowledge
This course is well organized and very good represented

Figure 7-27. Over contributions about the IoT training workshop.



Please list the new concepts/skills/topics you have learned from the training workshop.

20 responses

1. Ethics as discussed 2. In depth discussion of architecture
- Enhanced my introductory knowledge about IoT fundamentals - Understood the IoT architecture and components - Developed my knowledge in Basic Programming and IoT IDE, Software Development for IoT Embedded Systems - Had the opportunity to present to the consortium Lecture 11 about IoT Security and security standards and received valuable feedback
aaa
Technological advances of IoT.
Communications in IoT, Ethics in IoT, Hardware/Software for IoT
none
IoT boards programming
communication in IoT Programming Techniques Ethical Issues regarding IoT
IoT technologies and programming concepts
IoT workshop IoT introducing IoT tools Security Connectivity Protocols
linking arduino - sensors
1) Arduino Simulator (TinkerCad) 2) Data visualization tool (Kibana) 3) IoT supply chain
--
The fundamentals required for a complete IoT system; Sensors, Processing, Transmission, etc.
The development of the Arduino boards and sensors
Protocols and architectures for IoT
IoT architecture and components, IoT Connectivity Technologies, IoT Connectivity Protocols, Ethics in IoT Networks and Applications.
IoT online platforms
Lots of gained skills and concepts from this course. Large added value for me. As the IoT is new for me.
IoT Microcontrollers, Sensors for Data Acquisition and Actuators

Figure 7-28. New skills learned from the IoT training workshop.

The skills gained by the participants are mentioned in Figure 7-28. Most of the participants gained knowledge regarding the IoT fundamentals and concepts, while they learned about the IoT architecture, technological advances, sensors and programming, among other things.

7.2. CS training workshop

The analysis of the answers to the questions of the survey, regarding the CS training workshop, is provided in the following figures. The first questions, depicted in Figure 7-29 to Figure 7-33, refer to the participants' personal details.

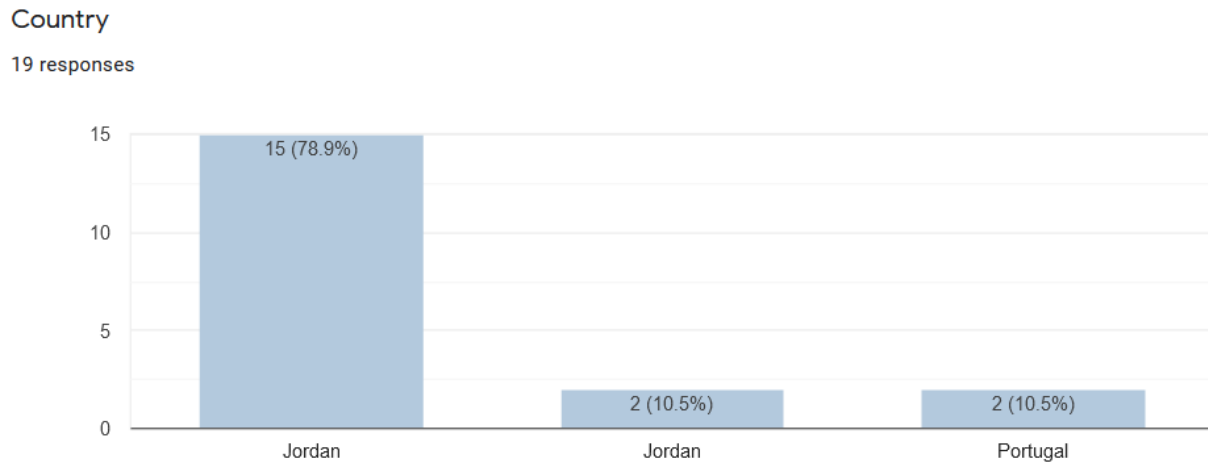


Figure 7-29: Country distribution of the CS training workshop participants.

Gender

19 responses

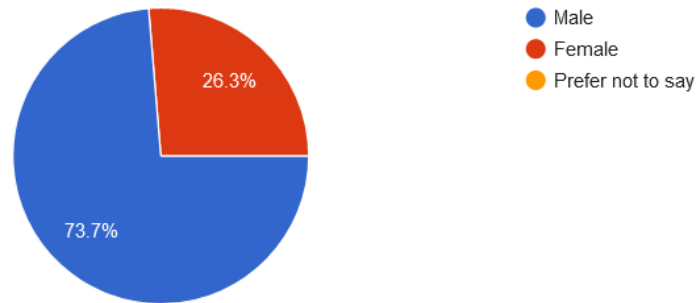


Figure 7-30: Gender distribution of the CS training workshop participants.

Age

19 responses

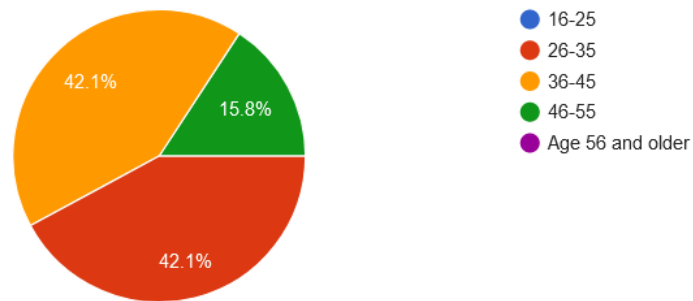


Figure 7-31: Age distribution of the CS training workshop participants.

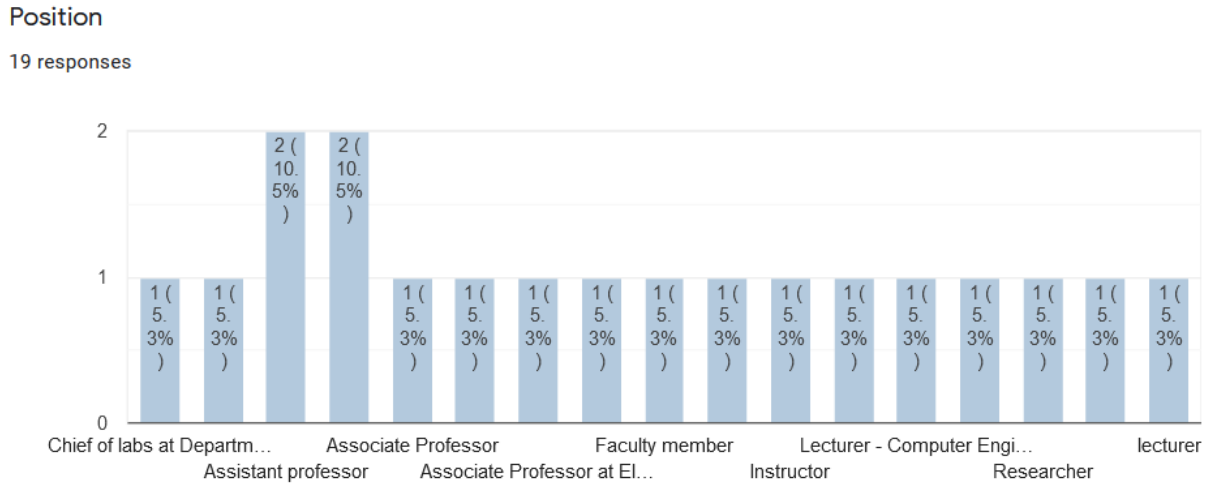


Figure 7-32: Position distribution of the CS training workshop participants.

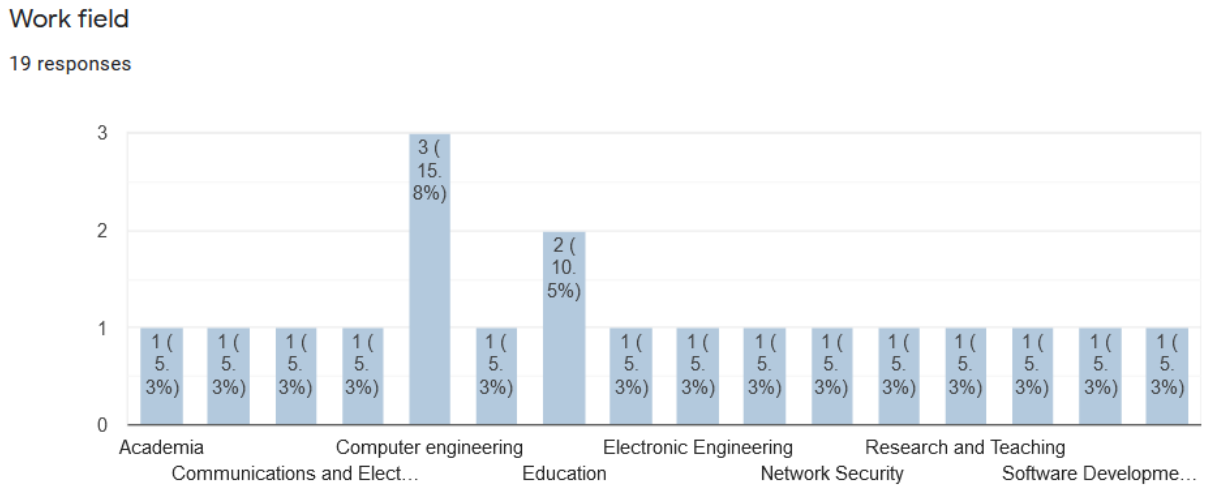


Figure 7-33: Work fields of the CS training workshop participants.

Figure 7-34 presents the participants' motivation for taking part in the CS training workshop. Many participants were interested in learning more about cyber security because they are involved in teaching relevant courses. All participants in general found the subject intriguing and were interested in broadening their knowledge on it.



What is your motivation to take part in this training workshop?

19 responses

To prepare a class of cyber security
to learn cyber security
Emerging needs for Cyber Security
We introduced a cyber security course in the curriculum for our program, so it is important for me to learn about the subject Also, I am personally interested in learning more about this subject since it is gaining a lot of interest in recent years
Gain new Experience - Teaching new courses
Provide training material myself improve my presentation skill and gain more insight about cyber security
I will be giving security courses so this workshop is very useful for me
interested to get a new knowledge about cyber security
To know deeply about the advances in CS
Widen my knowledge about the cyber security
The topic was very interesting. My team was also responsible for developing some of the material, so I had to give the respective presentations.
- Be aware to the process of securing user's data and network, especially with the introducing of new technologies nowadays which make this issue more crucial. - Introduce new course "Cybersecurity" in the study plan of communication program.
It's in my research field
To learn about cs
It has many good information and a good course structure to learn
To be familiar with some concepts of cyber security
To learn more about networks
To be more familiar with the security
Learn best practices in teaching this course for undergrad students

Figure 7-34: Motivation for participation in the CS training workshop.

Figure 7-35 presents the satisfaction scale of the participants, regarding the organization of the training by the organizing institution. One participant didn't find the organization satisfying, while the rest of the participants gave evaluations of 4/5 and 5/5.

Organization of the training on behalf of the organizing institution (e.g. registration platform, contact with the organizer, proper communication about training details, ...).

19 responses

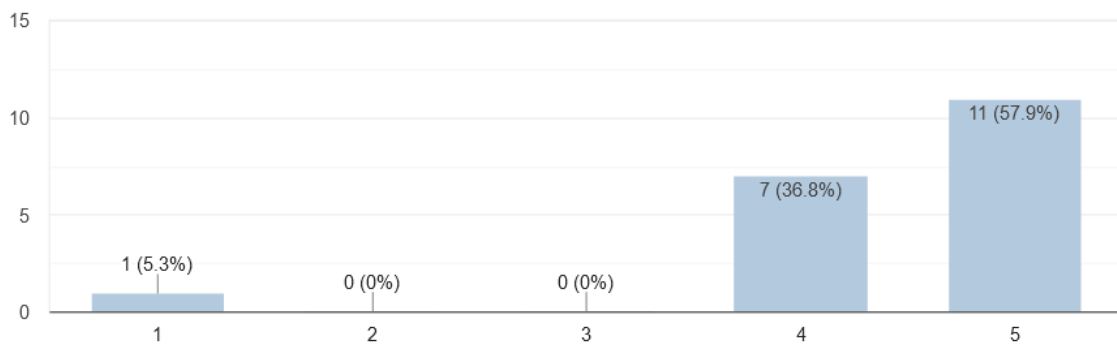


Figure 7-35: Satisfaction scale of the CS workshop organization by the organizing institution.

Regarding the functionality of the conference tools and software that were used, the majority of the participants were very satisfied and gave high evaluations of 4/5 and 5/5 (Figure 7-36). These tools include the video, sound and other technical aspects.

Functionality of conference tool and software used (video, sound, other technical aspects, ...).

19 responses

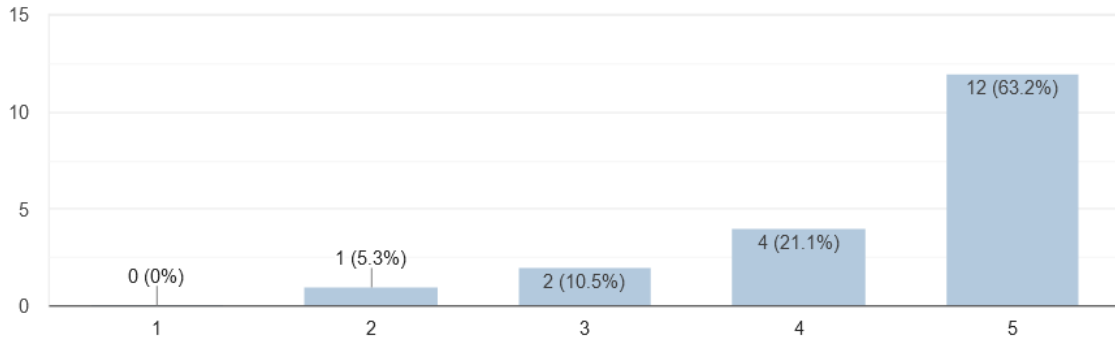


Figure 7-36: Satisfaction scale of the CS workshop's tools and software used.

In Figure 7-37, the majority of participants found the possibility to exchange and interact with the tutors and the other participants, to be quite satisfying, while two participants gave a low evaluation on this subject.

Possibility to exchange and interact with tutor(s) and other participants (forums, sessions for discussion, Q&A, ...).

19 responses

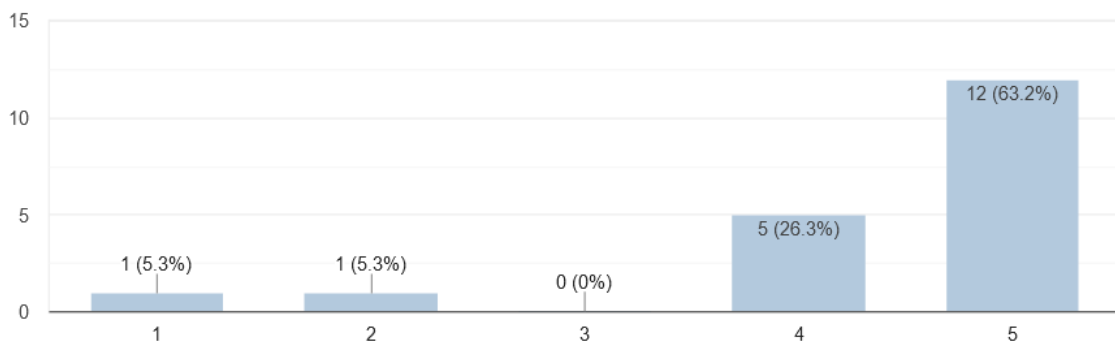


Figure 7-37: Scale of possibility for CS participants' interaction.

Figure 7-38 shows the suggestions and recommendations made by the workshop participants, in order to improve the organizational aspects of the training. Some of the suggestions include more practical examples on the subject of cyber security.

Do you have any suggestions or recommendations for improvements of organizational aspects?

19 responses

- No
- None
- it is fine
- I don't have any suggestions
- Engage with the audience through sessions
- no suggestions
- More concentration on practical part during the lectures
- I would recommend adding more examples
- To give more practical details about the tools and technologies used for the cyber security.
- I believe that the overall organizations was excellent and met my expectations.
- Practical training could be performed.
- More practical part
- to fix the access permission for recordings , forms , and get the shared storage ready ahead of the course
- Well prepared organization
- No.everything is good
- Conduct face to face meeting

Figure 7-38: Suggestions for improvement of CS workshop organization.

In Figure 7-39, the majority of the participants answered that they were well informed about the training workshop content, while two participants gave a low evaluation of 2/5 and 3/5.

When starting the course, I was well informed about the content of the training workshop.

19 responses

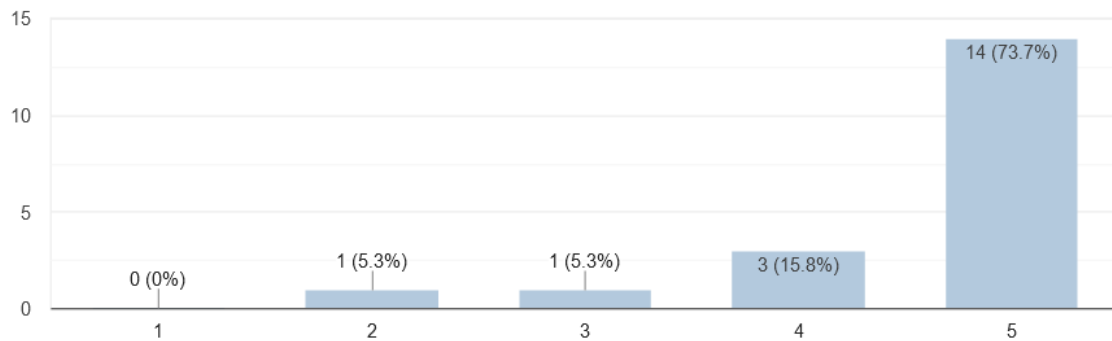


Figure 7-39: Satisfaction scale of the information received regarding the CS workshop content.

Figure 7-40 presents the satisfaction scale, regarding the knowledge and skills received through the training. Around 84% of the participants found that the skills gained through the training workshop will be very useful to them.

I find the knowledge and skills I received through the training to be very useful to me.

19 responses

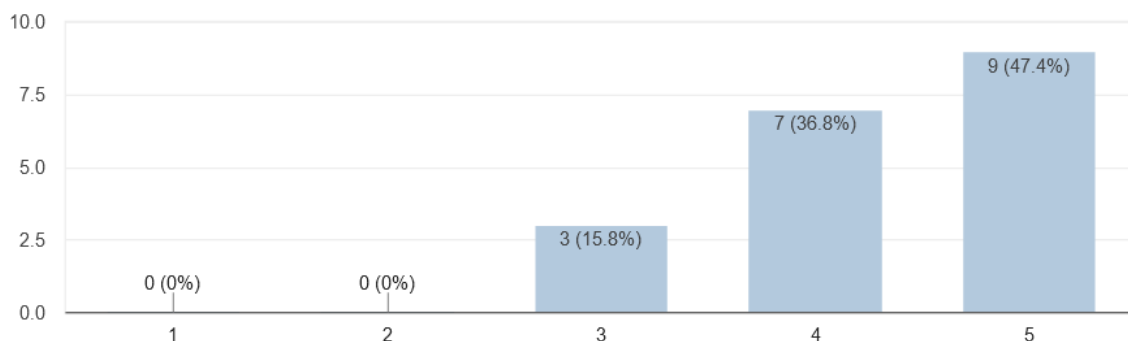


Figure 7-40: Satisfaction scale of the skills gained from the CS workshop.

In Figure 7-41, 15 participants found that the case studies added high value to the course, while 4 of them gave an evaluation of 3/5.

I think the case studies added high value to the course.

19 responses

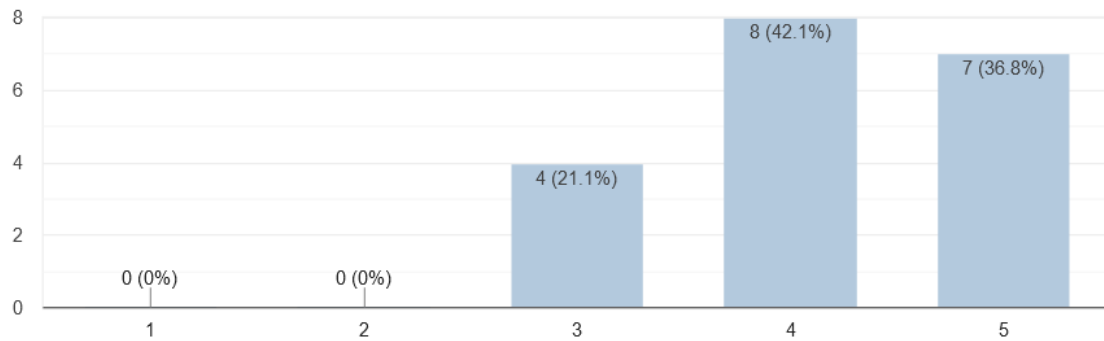


Figure 7-41: Satisfaction scale regarding the value of the CS case studies.

The majority of the participants found the training materials to be very useful and they found the structure of the training logical and well organized (Figure 7-42 and Figure 7-43, respectively).

I consider the provided training materials to be useful.

19 responses

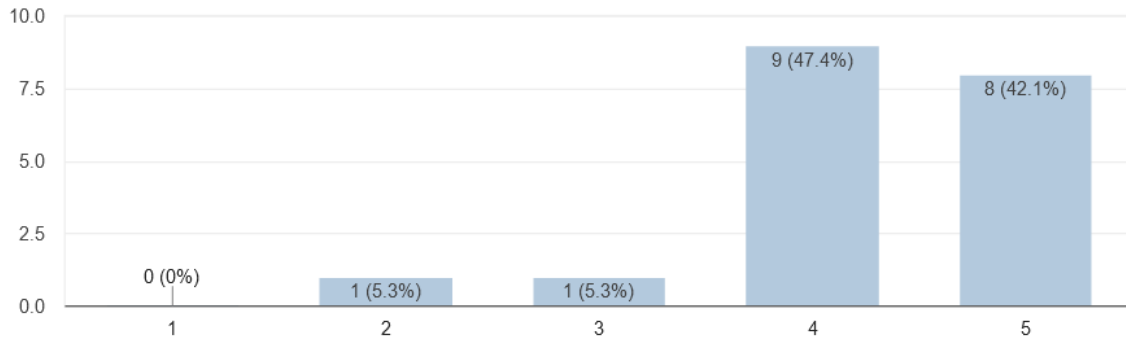


Figure 7-42: Satisfaction scale of the CS training materials.

In my opinion the structure of the training was logical and well organized.

19 responses

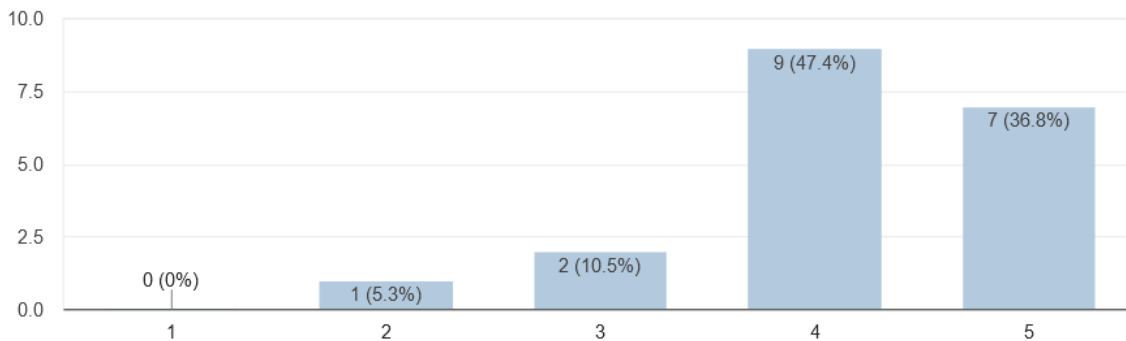


Figure 7-43: Satisfaction scale of the CS training workshop structure.

In Figure 7-44, the majority of the participants were satisfied with the schedule of the training and the time frame, while 4 participants gave a lower evaluation of 2/5 and 3/5.

The training schedule and time frame were very good.

19 responses

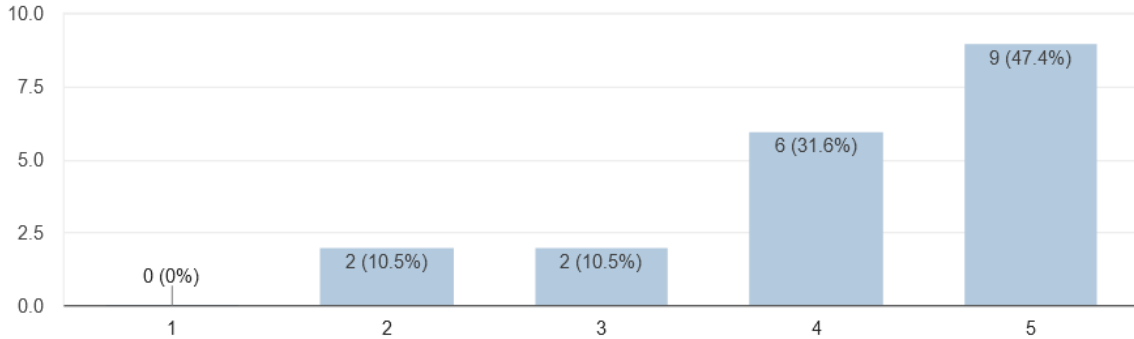


Figure 7-44: Satisfaction scale of the CS workshop schedule and time frame.

Figure 7-45 shows that 17 out of the 19 participants found that the training was appropriate for their level of experience.

The training was appropriate for my level of experience.

19 responses

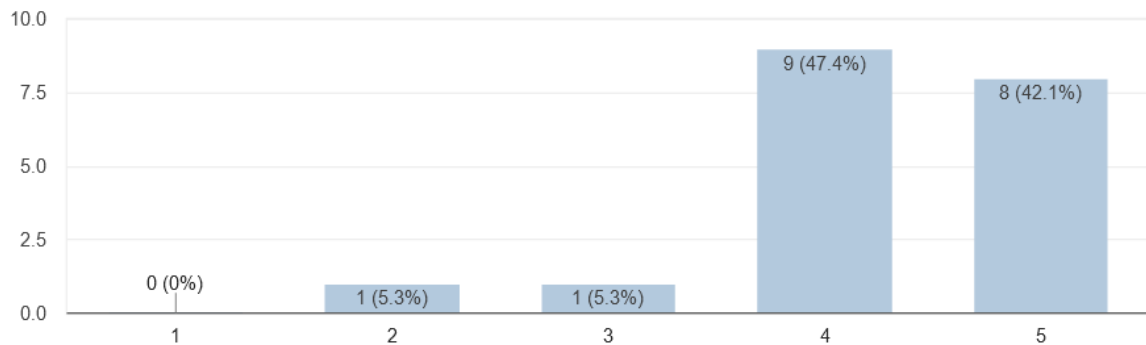


Figure 7-45: Satisfaction scale of the relevance of the CS workshop to the participant's level of experience.

Figure 7-46 shows the satisfaction scale regarding the expectations of the participants. The majority gave a high evaluation of 4/5 and 5/5, suggesting that the training met their expectations, while 5 participants gave lower evaluations of 2/5 and 3/5.

The training met my expectations.

19 responses

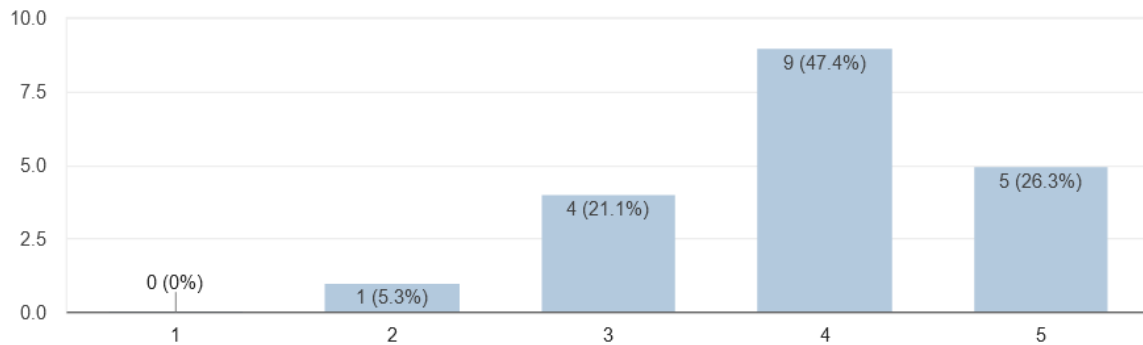


Figure 7-46: Satisfaction scale regarding the CS participant's expectations.

In the next question of the survey, the participants were asked to mention the parts of the training that they liked best and the answers are presented in Figure 7-47. The quality of the training materials was highly appreciated by the majority of the participants, while the organization and the content of the training workshop were also among their favorite parts.



What did you most like about the training? (e.g. innovative approach, quality of training materials, case-based learning methods, ...)

19 responses

Quality of training materials
quality of training materials
Training material
training materials
Quality of the slides
the training material is of high quality and detail
very informative - provide s good knowledge
Présentation
Quality of training materials
Presenters and presentation materials
The training was very well-organized and I was well informed about the content of the training workshop through the communication of the organizers. Last but not least, the training material was of high quality and outputted fruitful discussions.
I like the approach used in chapter 4 which it is delivering interesting activities to students to let them deeply understand the topic.
The quality of materials
the new method of presenting the material
Case based learning methods
Innovation

Figure 7-47: Favorite parts of the CS training workshop.

Figure 7-48 presents the suggestions, made by the participants, for improvement of the workshop's structure, formal and material. Some participants believe that the material could be reduced a little, while others suggest that more practical examples were added for better understanding of the material.



What can be improved regarding structure, format and material?

19 responses

Nothing

Dense material can be reduced a bit

improved structure

Coherence of the material

maybe incorporate more practical examples with some simulations

non

Add more definitions

size of the material

It is really good

add practical workshop materials

I believe that the overall material are well-done.

- There are some concepts which explained more than once in different chapters.
- The theoretical materials need more practical examples to let the student effectively understand the topic.

Adding more study cases

More practical

use more effective group management (teams and files)

the format and structure of the material well prepared

No suggestions

It is ok

Figure 7-48: Suggestions for improvement of CS workshop's structure, format and material.

Figure 7-49 and Figure 7-50 show that the majority of the participants found that the training raised their interest in the topic and they reached the learning outcomes that were specified, respectively.

The training raised my interest in the topic.

19 responses

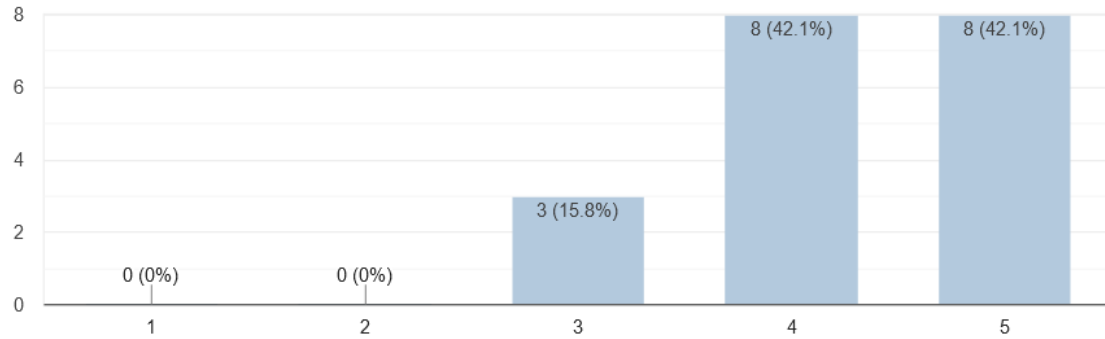


Figure 7-49: Satisfaction scale regarding the participant's interest in the topic of CS.

I reached the learning outcomes being specified.

19 responses

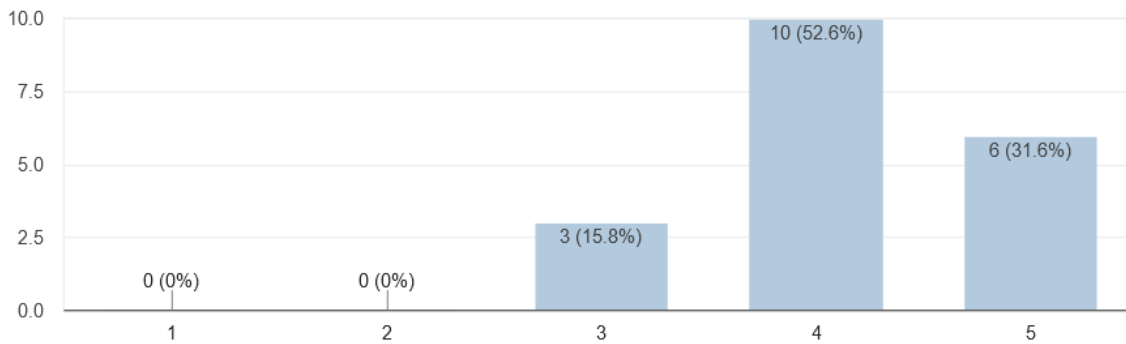


Figure 7-50: Satisfaction scale regarding the learning outcomes on the topic of CS.

In Figure 7-51, it can be observed that most of the participants believe that the knowledge and skill, gained in the training, will be valuable in their future work.

The knowledge and skills I received in this training are valuable to my work/future career.

19 responses

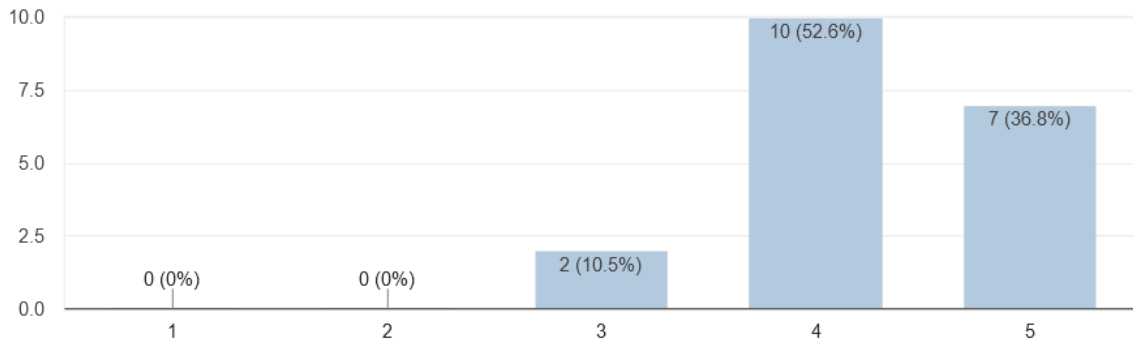


Figure 7-51: Satisfaction scale of the value of CS skills gained regarding future work.

Figure 7-52 shows that around 47% of the participants thought they missed some background information regarding the content of the training workshop. Around 41% were satisfied with the introductory information, but this issue could be further addressed to cover the needs of the rest of the participants.

I missed some background/introductory information.

19 responses

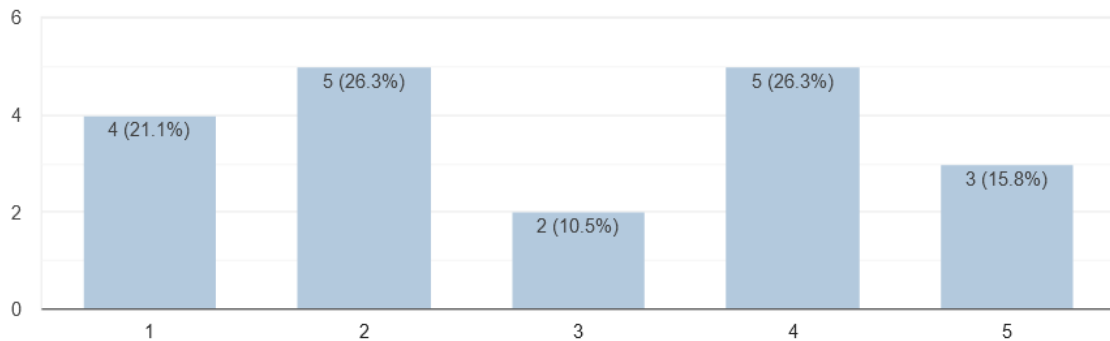


Figure 7-52: Scale of CS background information that was missed.

Almost all participants were very satisfied with the training (Figure 7-53), while around 74% of them recognized differences when compared to other trainings (Figure 7-54).

How satisfied are you with the training workshop?

19 responses

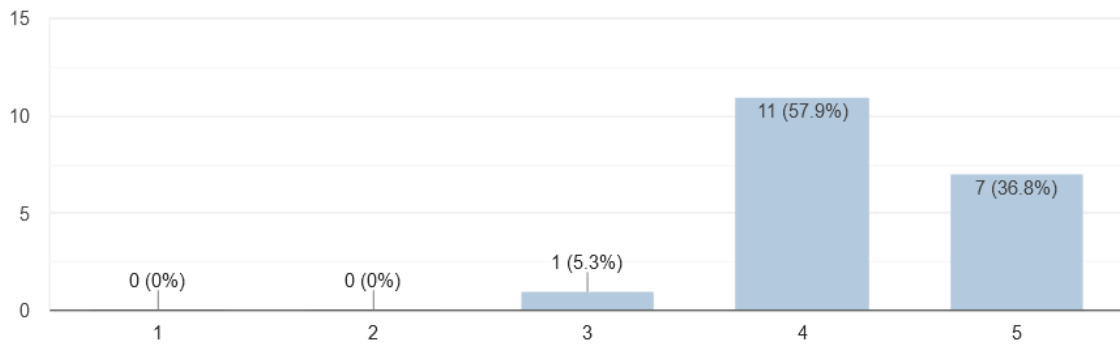


Figure 7-53: Overall satisfaction scale of the CS training workshop.

Have you recognized differences as compared to other trainings?

19 responses

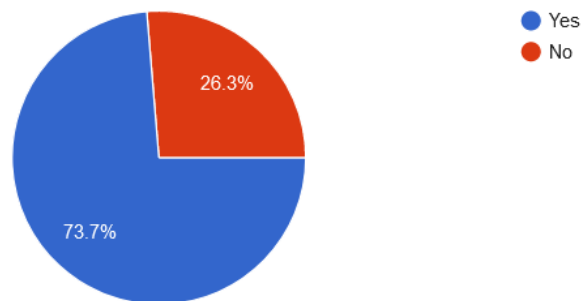


Figure 7-54: Differences between the CS workshop and other trainings.

Most participants found the training to be very interesting and informative on the subject of cyber security, while they felt the need for more practical applications (Figure 7-55).

Please provide an over contribution about the training workshop.

19 responses

-
Very useful and informative especially for people with engineering/information technology background.
- Train the students on cyber security
.
It was very good and informative workshop
it was useful
It was really perfect
I have gained some new information and background
At first place, I had to present the material that my team developed, and I received interesting discussions and feedback. At second place, I developed my knowledge on Communications & Network Security and the main Security Operations. The section on the Impact of new technologies on cybersecurity and Discussion was very interesting and constructive for me.
The practical part of this workshop needed to be organized with the theoretical part.
Add practical training
It was very good
practical side need more care
The schedule was good
Contribution was perfect
Proposing the state of the art in the field of cyber security
Material quality and delivery method is interesting

Figure 7-55: Over contributions about the CS training workshop.



They skills that they have learned through the training include infrastructure on cyber security, networking fundamentals, cryptography principles, security protocols and many more (Figure 7-56).

Please list the new concepts/skills/topics you have learned from the training workshop.

19 responses

basic security principles, cryptography principles, attacks types, enterprise security, cyber-physical systems security.
General aspects in cyber security
Cyber Security infrastructure
Attack types
information security and software life cycle
Cyber security, IPsec, security protocols and best practices
I have learned many new topics especially in the security engineering part
good background, threats, countermeasures about cyber security
I got several new concepts
I have gained some new information and background
- Develop my knowledge on the basic security operations needed to secure a system - Be aware of the impact of new technologies on cybersecurity
Actually most of the topics is new for me because my background is communication engineering.
Dealing with sec. Threats
Computer security component
the Organization of security training sessions
The training is very informative
Networking fundamentals
Being familiar to prevent my network from the hackers
It is mainly how to deliver such material to the students

Figure 7-56: New skills learned from the CS training workshop.



7.3. RE training workshop

The analysis of the answers to the survey, provided by the participants of the RE training workshop, are presented in the following figures.

Figure 7-57 to Figure 7-61 present the personal details of the training's participants.

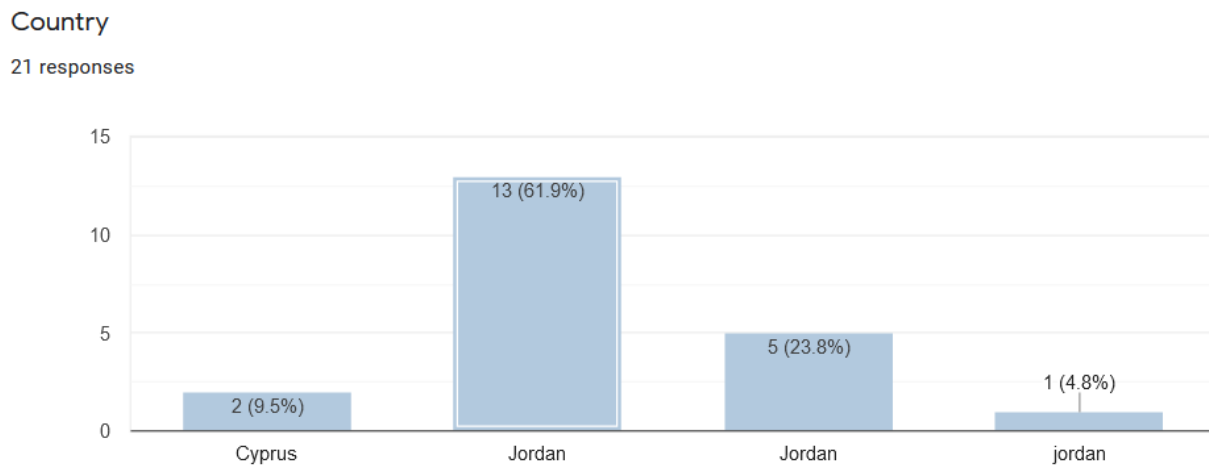


Figure 7-57: Country distribution of the RE training workshop participants.

Gender

21 responses

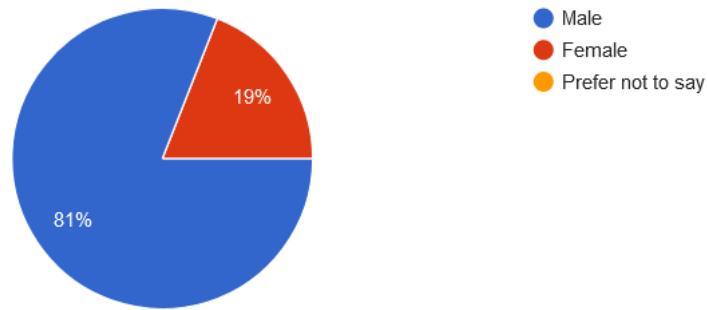


Figure 7-58: Gender distribution of the RE training workshop participants.

Age

21 responses

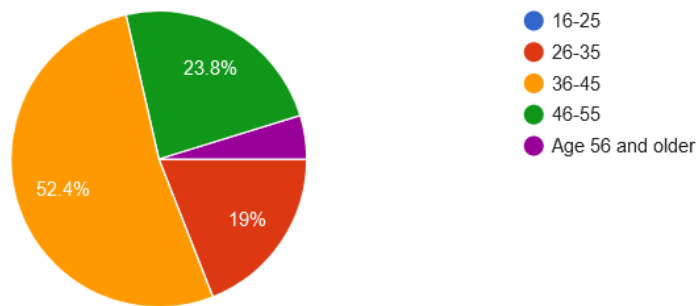


Figure 7-59: Age distribution of the RE training workshop participants.

Position

21 responses

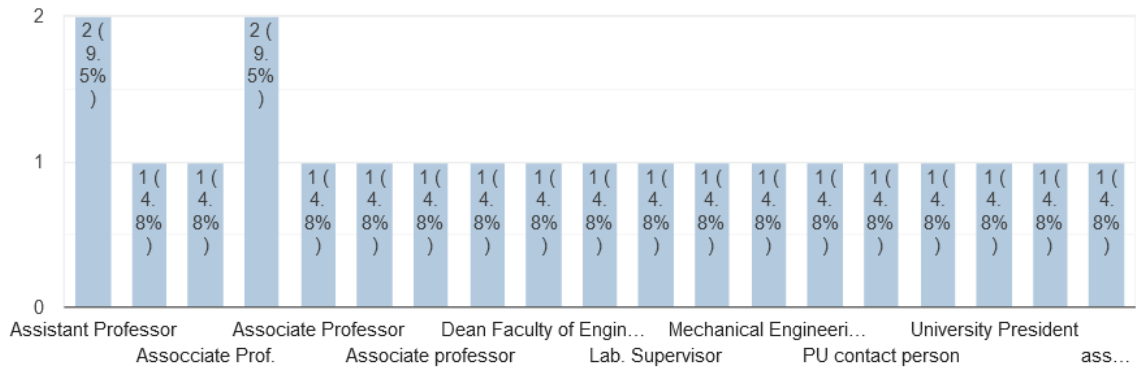


Figure 7-60: Position distribution of the RE training workshop participants.

Work field

21 responses

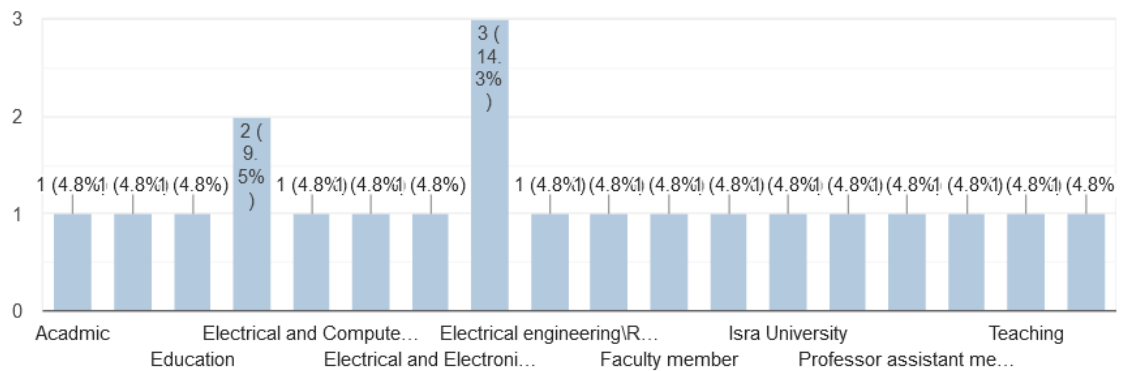


Figure 7-61: Work fields of the RE training workshop participants.

Figure 7-62 shows the different motivating reasons for taking part in the RE training workshop. Most participants were interested in increasing their knowledge on renewable energy sources and applications, while others are involved in teaching RE courses and found the training helpful and informative.



What is your motivation to take part in this training workshop?

21 responses

To enrich my knowledge of Renewable Energy problems that can be solved by computer engineering
Have more knowledge in Renewable energy technology and practical experience
as the course lecturer
Teaching renewable energy course and doing research
To learn how to teach RE course
Part of the training of trainee
To have the knowledge in order to be prepared for teaching the course which is part of the curriculum
I am teaching some courses in renewable energy systems
To develop my knowledge about the principles of operation of renewable energy sources.
To have a good training for the RE course
Deliver sessions
I'm teaching the introduction to renewable energy topic to the mechanical engineering students. Thus, this training workshop helped me to how to improve my skills and information.
enhance my abilities and capacity building to share it with students and local community to extend project benefits
My motivation to participate in this workshop is to learn about the basic principles of renewable energy in addition to studying the main technological components and applications of this type of energy.
To present my contributions in Energy Storage Technologies and to follow the contributions of others
To learn more about renewable energy for teaching Purpose
Exchange ideas
Part of my work in laboratories
to get training on different aspects of renewable energy
developing my skills
To gain knowledge and skills about teaching renewable energy courses

Figure 7-62: Motivation for participation in the RE training workshop.

All participants were satisfied with the organization of the training on behalf of the organizing institution and gave high evaluations of 4/5 and 5/5, as it can be observed in Figure 7-63.

Organization of the training on behalf of the organizing institution (e.g. registration platform, contact with the organizer, proper communication about training details, ...).

21 responses

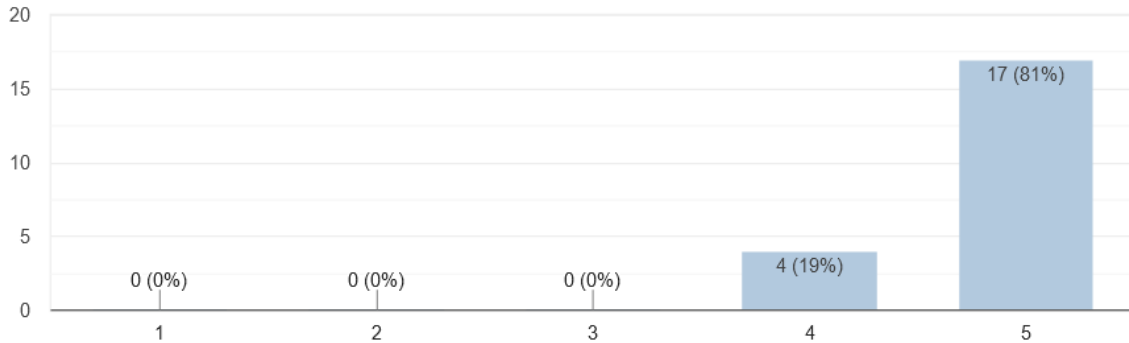


Figure 7-63: Satisfaction scale of the RE workshop organization by the organizing institution.

The majority of the participants also gave high evaluations, regarding the functionality of the conference tools and software that was used (Figure 7-64).

Functionality of conference tool and software used (video, sound, other technical aspects, ...).

21 responses

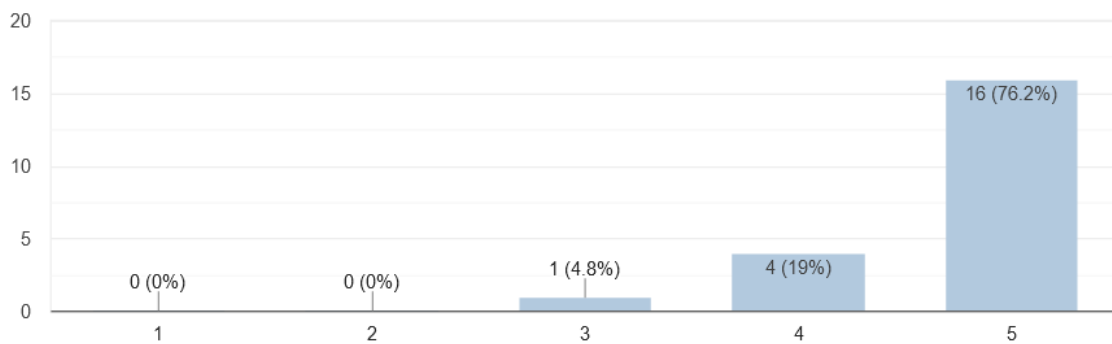


Figure 7-64: Satisfaction scale of the RE workshop's tools and software used.

In Figure 7-65, it can be observed that all participants gave high evaluations regarding the possibility to interact with the tutors and other participants, in the form of forums or sessions for discussion during the training.

Possibility to exchange and interact with tutor(s) and other participants (forums, sessions for discussion, Q&A, ...).

21 responses

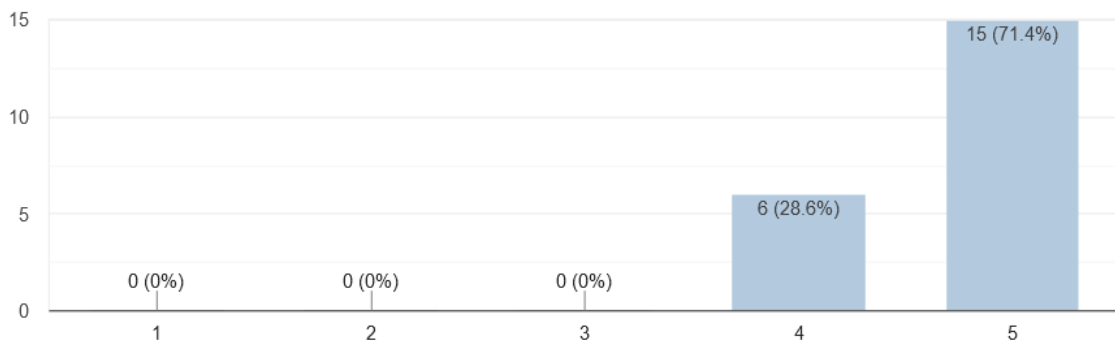


Figure 7-65: Scale of possibility for RE participants' interaction.

In the next question of the survey, the participants were asked to make suggestions in order to improve the organizational aspects of the training. The answers can be seen in Figure 7-66. Most of them were very satisfied with the training and didn't have anything to add regarding the organization, while others suggested more practical applications and thought it would be useful to have the training materials in advance.



Do you have any suggestions or recommendations for improvements of organizational aspects?

21 responses

No

Nothing

noting, it was very good workshop

It was great

perfect

It was very useful training, many thanks

None

Starting intensive training workshops in each university

It was very good organised

Face to face interaction is much better than the online

The organization was very good, but I recommend that the program be more research

no. the workshop was well organized

Having the training materials in advance

Figure 7-66: Suggestions for improvement of RE workshop organization.

Most of the participants were satisfied with the information they had received about the content of the workshop, prior to the beginning of the training (Figure 7-67).

When starting the course, I was well informed about the content of the training workshop.

21 responses

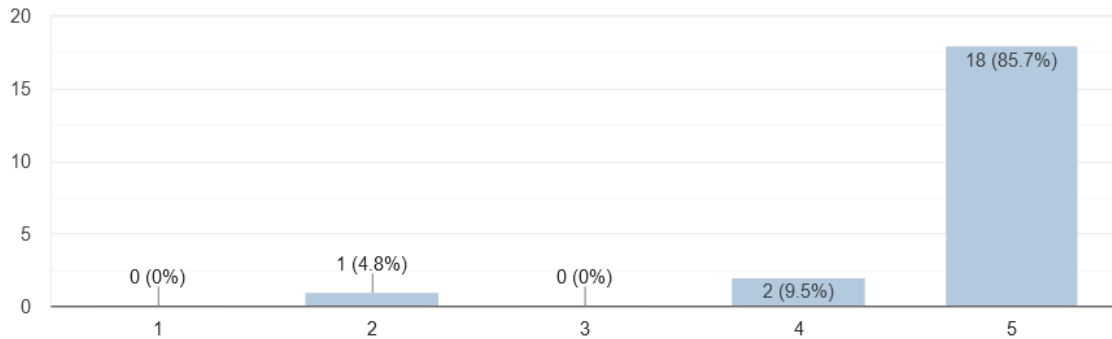


Figure 7-67: Satisfaction scale of the information received regarding the RE workshop content.

All participants gave high evaluations regarding the knowledge and skills they received through the training and their usefulness (Figure 7-68).

I find the knowledge and skills I received through the training to be very useful to me.

21 responses

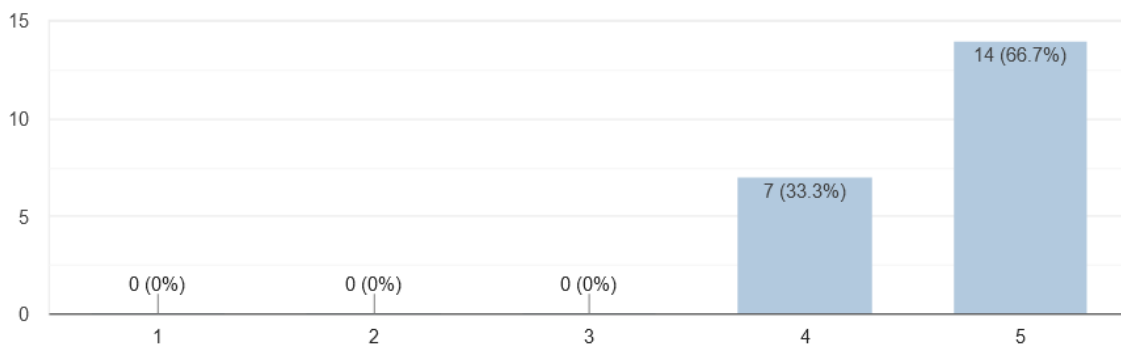


Figure 7-68: Satisfaction scale of the skills gained from the RE workshop.

Almost all participants found the case studies to add high value to the training, while only one participant gave an evaluation of 3/5 (Figure 7-69).

I think the case studies added high value to the course.

21 responses

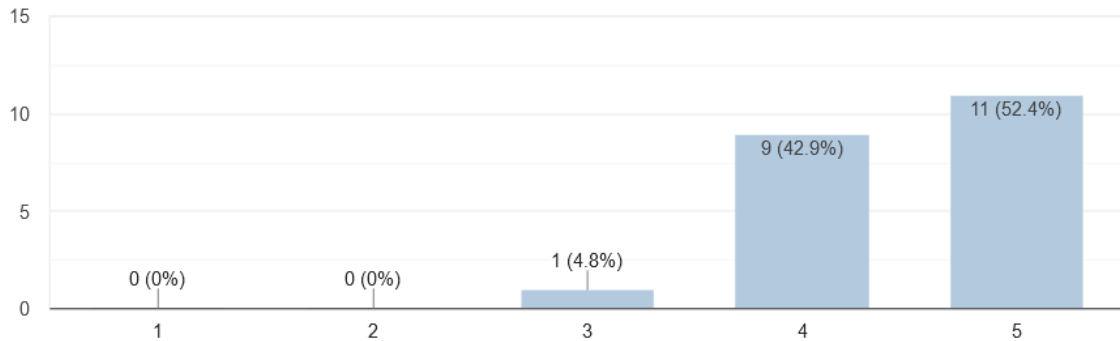


Figure 7-69: Satisfaction scale regarding the value of the RE case studies.

Regarding the usefulness of the materials that were provided in the training, all participants were very satisfied and gave high evaluations, as it can be observed in Figure 7-70.

I consider the provided training materials to be useful.

21 responses

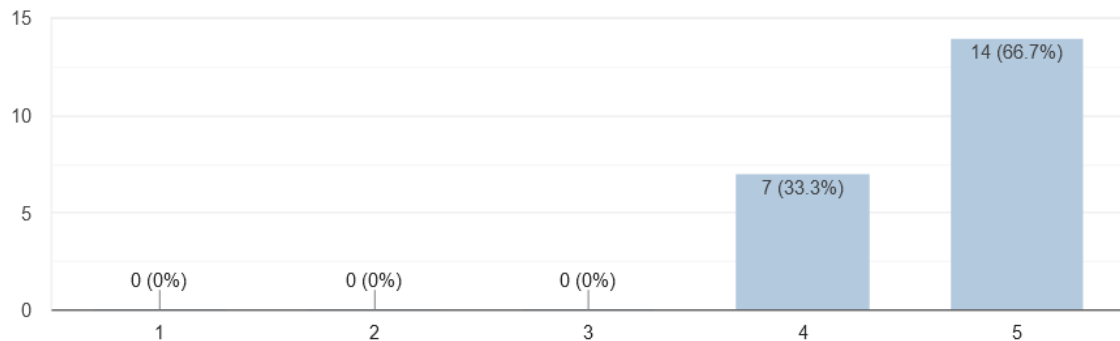


Figure 7-70: Satisfaction scale of the RE training materials.

Figure 7-71 and Figure 7-72 show the satisfaction scale of the participants, regarding the structure of the training and its schedule and time frame, respectively. The participants were satisfied in regards to all these aspects and only 2 participants gave an evaluation of 3/5, when the time frame of the training was concerned.

In my opinion the structure of the training was logical and well organized.

21 responses

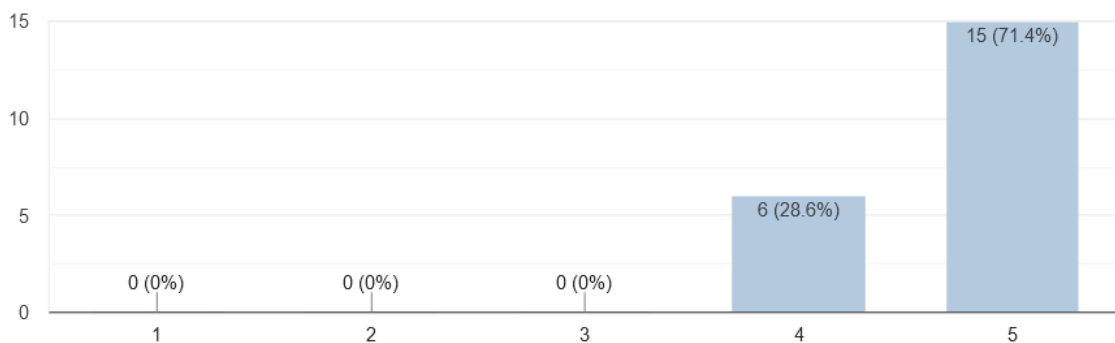


Figure 7-71: Satisfaction scale of the RE training workshop structure.

The training schedule and time frame were very good.

21 responses

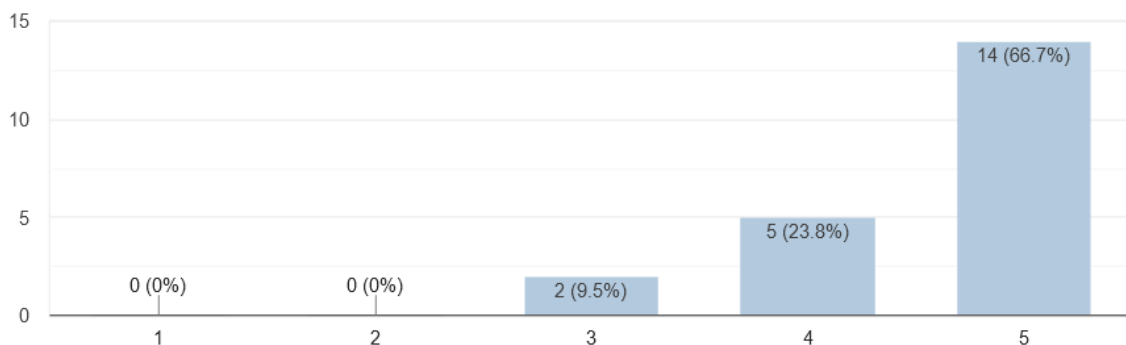


Figure 7-72: Satisfaction scale of the RE workshop schedule and time frame.

All participants though that the training was appropriate to their level of expertise and gave evaluations of 4/5 and 5/5 (Figure 7-73).

The training was appropriate for my level of experience.

21 responses

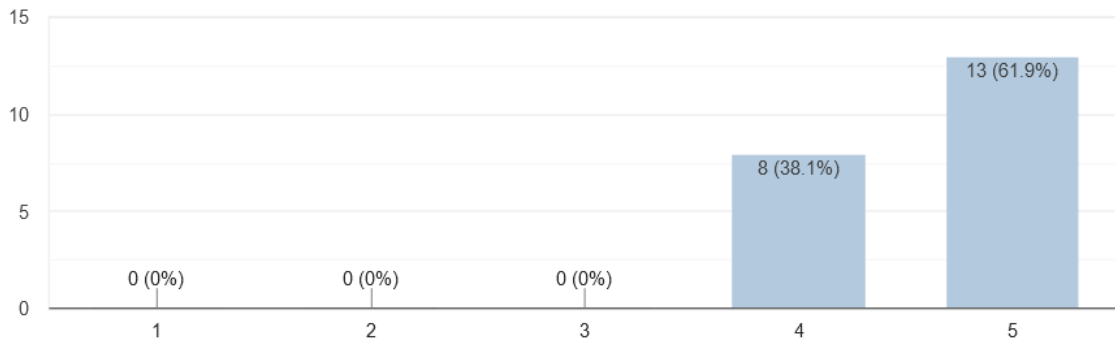


Figure 7-73: Satisfaction scale of the relevance of the RE workshop to the participant’s level of experience.

The majority of them also stated that the training met their expectations and only one participant gave an evaluation of 3/5 (Figure 7-74).

The training met my expectations.

21 responses

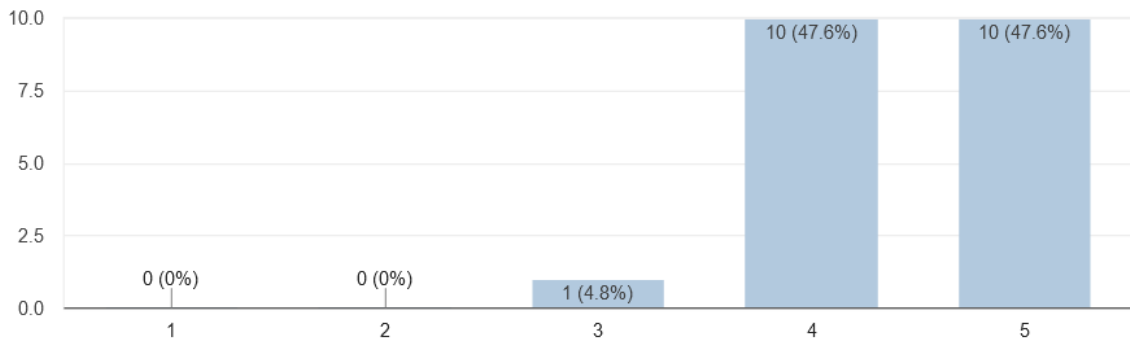


Figure 7-74: Satisfaction scale regarding the RE participant’s expectations.



Figure 7-75 lists the parts of the training workshop that the participants liked best. The quality of the training materials, the experience of the training’s speakers and the innovative approaches are among the participants’ favorite parts.

What did you most like about the training? (e.g. innovative approach, quality of training materials, case-based learning methods, ...)

21 responses

Quality of training materials
the organization
Quality of training materials and experience of the trainers
comprehensive training materials
Innovative approaches
Approach and training materials
N A
The organization
Training materials and skilled speakers.
Quality of presentations
Real-life practical examples
innovative approach and quality of training materials
Innovation approach and case based learning methods
For me, the most like about the training where the quality of training materials.
The interactive lecture and discussion with other colleagues
Case base Learning method
Case based learning methods
quality of training materials
The way to display the information is good
Practical aspects

Figure 7-75: Favorite parts of the RE training workshop.



The suggestions made by the participants in order to improve the training's structure, format and material, include more practical applications and case studies and more detailed information on some of the training's sessions (Figure 7-76).

What can be improved regarding structure, format and material?

21 responses

nothing
More practical work
practical training
Nothing
None
NA
The material should be more oriented toward the BSc students level
Some sessions for detailed information.
In my opinion, structure, format, and materials were very appropriate
It is good
nothing
The material provided was good, and it could be expanded to meet a postgraduate study in renewable energy.
More specialised in the field of training
A visit to the renewable energy implementation sites.
In my opinion it was very good and does not need any changes
Including more practical cases
Practical applications
I suggest that the discussion of topics should be based on the principle of discussion and exchange of valuable information instead of lectures of the nature of information indoctrination
i think the structure of the material is perfect
Focus on the practical part rather than the theory
More practical cases

Figure 7-76: Suggestions for improvement of RE workshop's structure, format and material.

The majority of the participants found that the training raised their interest in the topic of RE and gave high evaluations, as it can be observed in Figure 7-77.

The training raised my interest in the topic.

21 responses

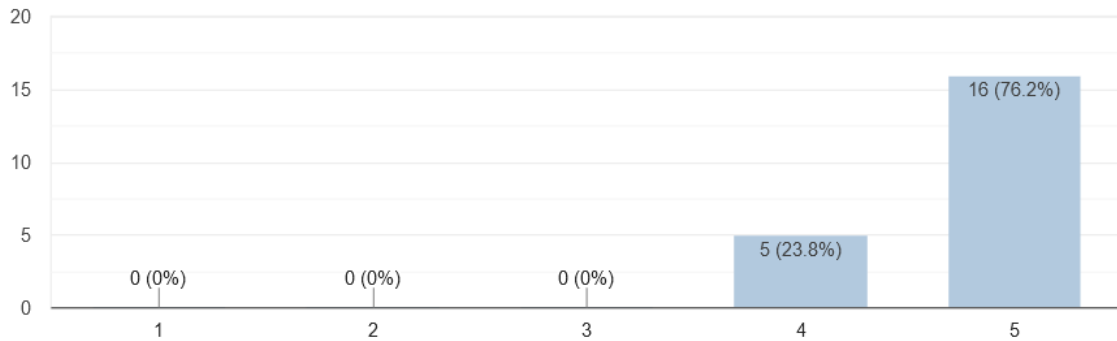


Figure 7-77: Satisfaction scale regarding the participant's interest in the topic of RE.

All of them answered with high evaluations in regards to reaching the learning outcomes that were specified in the training (Figure 7-78).

I reached the learning outcomes being specified.

21 responses

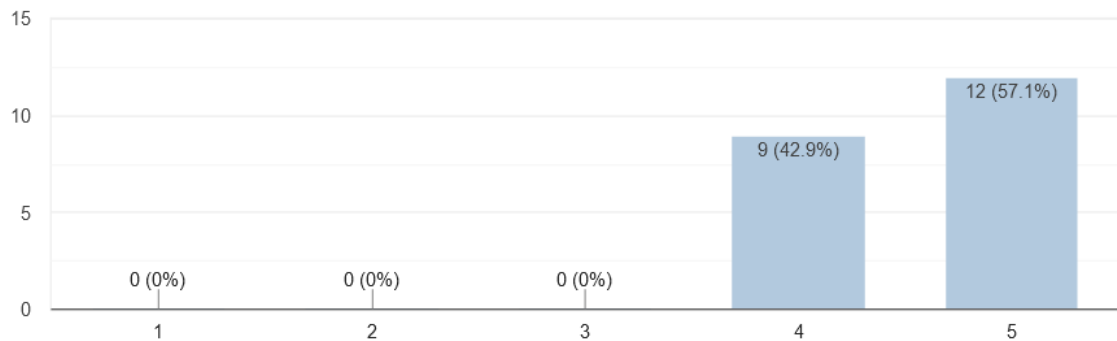


Figure 7-78: Satisfaction scale regarding the learning outcomes on the topic of RE.

Over 71% of the participants believe that the skills they received in the RE training will be valuable in their future work, while the rest also gave a high evaluation of 4/5 (Figure 7-79).

The knowledge and skills I received in this training are valuable to my work/future career.

21 responses

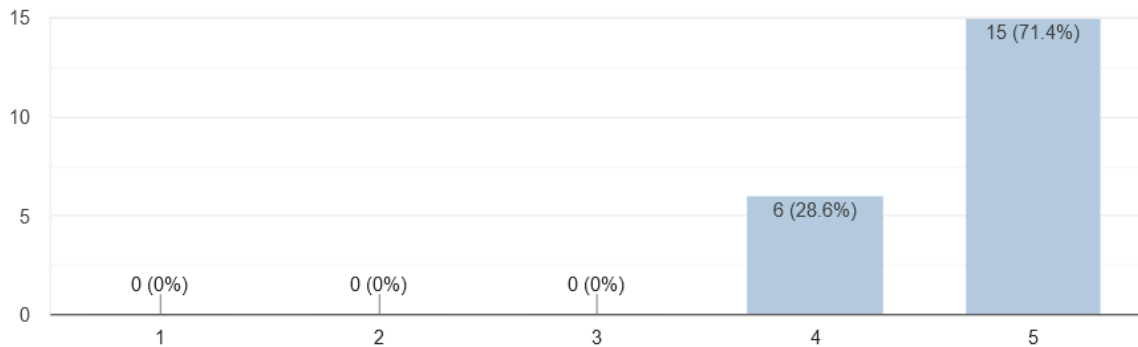


Figure 7-79: Satisfaction scale of the value of RE skills gained regarding future work.

When questioned about the background information they received (Figure 7-80), the majority of the participants thought that they missed some introductory information, so maybe this issue can be further assessed and addressed, in order to satisfy the participants' needs.

I missed some background/introductory information.

21 responses

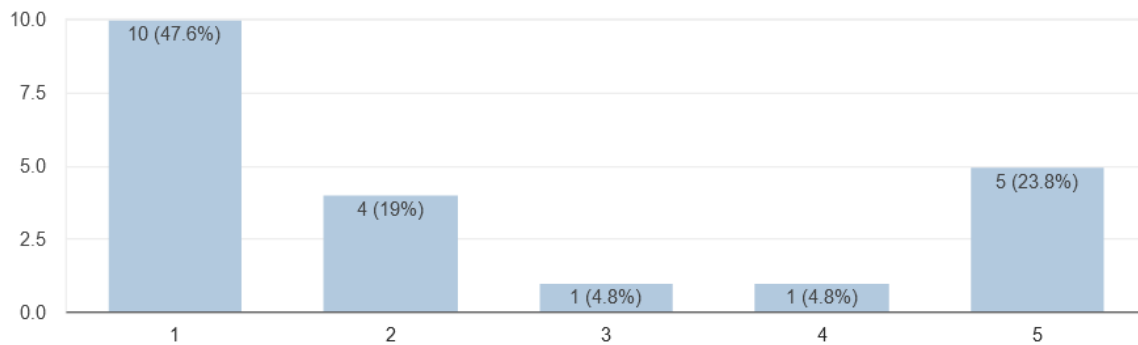


Figure 7-80: Scale of RE background information that was missed.

In overall, the participants were very satisfied with the training workshop and this can be observed in Figure 7-81, as they all gave high evaluations of 4/5 and 5/5.

How satisfied are you with the training workshop?

21 responses

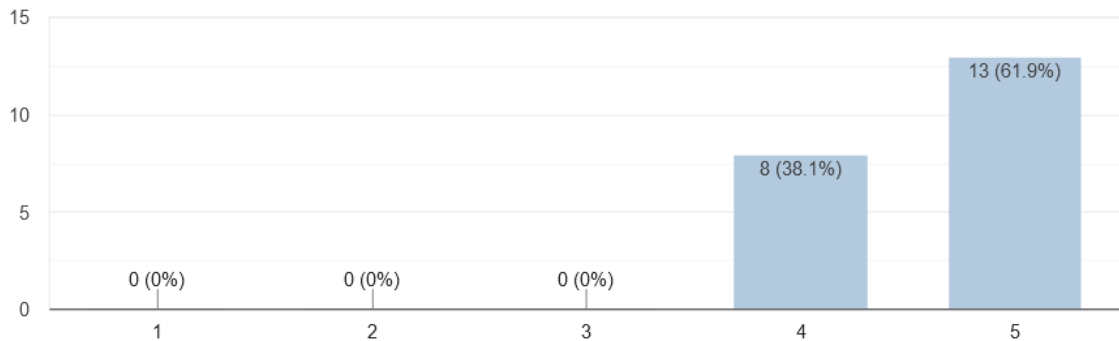


Figure 7-81: Overall satisfaction scale of the RE training workshop.

Figure 7-82 shows that around 67% of the participants recognized differences between the RE training and other training workshops.

Have you recognized differences as compared to other trainings?

21 responses

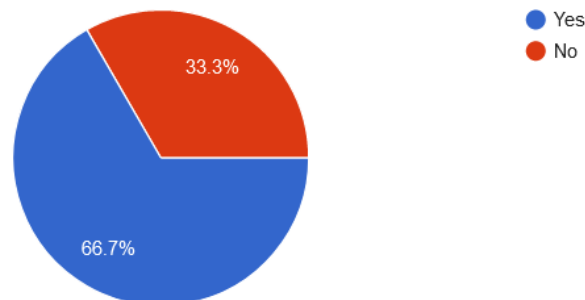


Figure 7-82: Differences between the RE workshop and other trainings.



The participants were next asked to provide an overview contribution regarding the training workshop and the results can be seen in Figure 7-83. Most of them were very satisfied with the training and believe it was a good introduction on the subject of RE. The participants liked the selection of the topics and the experience of the trainers, some of them would like more practical applications and the discussion sessions were also among the parts that the participants appreciated.



Please provide an over contribution about the training workshop.

21 responses

Excellent
It is very good
nice and comprehensive training
Good
None
NA
It is satisfactory however I hoped to be well trained on the hardware part not just remotely.
Social networking and new information about renewable energy.
The training workshop gave me a perfect introduction about the renewable energy sources and developed my knowledge about it. Some case studies and researches results have been provided and shown. Useful softwares have been also introduced such as LabVIEW.
It was good
x
Held a series of training workshop annually to update the information in the field of renewable energy.
The selective of training topics and the experience of the trainers
.
Face to face workshops provide an interactive environment with better discussions regarding the presented topics
Nothing
It was a very good course because in large part it relied on discussion and dialogue, and the team was distinguished in terms of scientific experiences
it was well organized and informative training
Focus on the practical part .
Not clear

Figure 7-83: Over contributions about the RE training workshop.

Please list the new concepts/skills/topics you have learned from the training workshop.

21 responses

The technology of Wind Turbines and the manufacturing and installing it
More about materials of PV systems and learn more about solar energy
I am familiar with wind and solar... The new concepts/skills/topics are the other types
Thermal energy part
RE sources; energy storages,
NA
The basics about different types of RE topics....some of the RE new concepts.... lecturing thoughts.
I learned more about storage systems.
Bioenergy- Geothermal energy- Marine energy- Wave energy converters- Energy storage systems (electrochemical, electromagnetic, chemical, etc.), Solar radiation, Photovoltaic technologies (generations), Principles of the electronic components in the PV systems, Concentrated solar power technologies, PV economics, Components of wind turbines (generators, converters, etc.), Aerodynamics of wind turbines, Off-grid, stand-alone, and mini-grid systems, RE integration challenges, etc.
RE practical concepts
x
1- It provided me with a way to create an intensive educational experience in a short amount of time. 2- It allowed me to meet participants who work at another university during the training workshop. 3- This workshop spurred me to investigate further on teaching skills.
Capacity building
Solar energy, types of photovoltaic panels, wind energy, hydro energy, biomass energy.
The presented PV Technologies and how the addition of dye might also improve existing technologies
Organic pv, case Studies for microgrid
Organic solar cells
New and valuable research information in the field of renewable energy Communication and dialogue with greater confidence
wind energy...organic solar cells
Solar resource and forecasting – Highlights from UPAT research activities
Transparent solar cells

Figure 7-84: New skills learned from the RE training workshop.

The new skills that the participants gained from the training workshop are listed in Figure 7-84. The participants learned more about RE systems, PV materials, energy storage applications and more. They widened their knowledge on the different types of RE sources and they had the chance to exchange views and information with other colleagues, also experienced on the subject.

8. CONCLUSIONS

This deliverable aimed in describing the training workshops on the subjects of IoT, CS and RE that took place in the context of the IREEDER project.

The basics of each course were first presented, followed by a description of the contents of each training workshop. The participants of the workshops were asked to complete a survey in order to provide feedback and comments on the training workshops. The full content of the survey was presented in this report, along with analysis of the results.

Based on the analysis of the survey, the participants were interested in learning more on the subjects of IoT, CS and RE and their technological advances, which is why they took part in the training workshops. The majority of the participants were satisfied with the organizational aspects of each workshop, the functionality of the tools and software that were used and the level of interaction with the workshop's tutors and the other participants. Suggestions for improvement of the organizational aspects included shorter workshop sessions and more practical applications on each subject.

Most of the participants found the training workshops to be useful, as they gained knowledge and skills, and appreciated the structure of each workshop. Regarding the schedule and time frame, there was a small percentage who was not satisfied with it.

The majority of the workshops' participants found the trainings to be appropriate for their own level of experience and believed that they met their expectations. The aspects of the trainings that most participants liked were the quality of the training materials, the variety of topics that each workshop covered and the innovative approaches that were used. Some suggested more practical examples in order to improve the structure and format of each workshop but in overall, the participants commented that the trainings succeeded in raising their interest in the topics.



Most of the trainings' participants believed that the skills they received from the workshops will be valuable for them in terms of future work. Most of the participants commented that they missed some background and introductory information on the subjects but in overall, the majority of them were very satisfied with the projects. Concluding, the training workshops on the subjects of IoT, CS and RE managed to provide the participants with more knowledge on each topic and raised their interest on these subjects.