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Author List

Organization	Name	E-Mail address
qtlabs	L. Mairhofer	lukas.mairhofer@qtlabs.at

Reviewer List

Organization	Name	E-Mail address
fragmentiX	Werner Strasser	ws@fragmentix.com
X-Net	Wolfgang Eibner	we@x-net.at

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Executive Summary

The implementation of an infrastructure for QKD entails not only the installation of the respective hard- and software, but crucially also establishing the skillset required for the operation and maintenance of this infrastructure. This requires training the workforce in this field as well as stakeholders and decision makers. To this aim we established an online learning platform on which we provide courses on Quantum Communication addressing engineers as well as decision makers. The online platform and the courses were reported in deliverable D9.1. They are the basis for pilot trainings for public and private stakeholders which are reported here in deliverable D9.2.

From early September till end of November 2025, we conducted the pilot training phase using the online courses on Quantum Communication developed in the project. These trainings focused on participants from within the consortium, although they attracted participants from other organizations as well. The feedback of the participants was continuously evaluated to draw conclusions about possible improvements of the courses. Already within the course of the pilot training phase we implemented one of those improvements in the form of a more compact version of the course "Quantum Communication for Engineers" to specifically address the needs of new employees in companies developing and providing quantum communication technologies.

We complemented these efforts by a series of in-person trainings conducted in early December 2025. These trainings addressed political decision makers, information security officers, funding agencies, users and potential workforce as well as the interested public.

The KPI for the deliverable is training 45 persons, which is clearly achieved with more than 50 users registered for the online courses as of December 3rd 2025, and with more than 160 participants in the in-person trainings.

1. Introduction

This document describes the implementation and completion of the deliverable D9.2 of the QCI-CAT project.

1.1. Purpose and scope of the document

In this report we report the completion of the deliverable D9.2. We describe the online courses and in-person trainings conducted to that aim. Furthermore, we give an overview over the participating target-groups, an account of the feedback of the participants. From this feedback, we draw conclusions on possible improvements and describe their implementation.

1.2. Target Audience

Since the dissemination level of this document is “public”, the targeted audience are involved members of the QCI-CAT consortium and government officials as well as the general public with interest in the completion of the deliverable D9.2 of the QCI-CAT project.

1.3. Relation to other project work

The deliverable depends on the prior completion of deliverable D9.1, which was already reported and accepted by the European Commision. other tasks of the project. There are no other interdependencies with the projects work, and the completion of D9.2 also constitutes the completion of the workpackage WP9.

1.4. Structure of the document

The document first outlines the deliverable in Section 2 and then describes its realization in section 3. Section 4 gives an account of the feedback of the trainees and the conclusions drawn from this feedback, as well as the implementation of improvements.

2. Description of the Deliverable

The talent gap in the field of quantum technologies is a decisive bottleneck for the implementation of quantum communication technologies. The WP9 of the QCI-CAT project addresses this talent gap, thus contributing the overall goal of the project. The deliverable D9.2 contributes to the main objective of WP9 by conducting a pilot training phase consisting both of trainings using the courses provided on the online training platform as well as in-person trainings. The KPI for the deliverable is training 45 persons, which is clearly achieved with more than 50 users registered for the online courses as of December 3rd 2025, and with more than 160 participants in the in-person trainings.

2.1. Target Groups

We identified two target groups whose training will significantly benefit the development and deployment of quantum communication technologies.
On the one hand those are engineers in the field of cybersecurity and telecommunication who implement, use and maintain the QKD infrastructure. Here the focus is on people who do not have a background in physics but rather in related fields such as Electronics, Mechanical Engineering and Informatics. These colleagues contribute significantly to the development and deployment of the QKD infrastructure, but often neither understand the underlying concepts nor speak the same disciplinary language as the physicists. This may lead to frustration and misunderstandings as well as it minimizes the possibility of those engineers to contribute to the tasks at hand.
On the other hand, we need to empower stakeholders, technology managers and decision makers who decide, plan and manage the deployment and integration of quantum communication technologies. This target groups includes politicians, funding agencies, investors, infrastructure deployers and multipliers such as journalists.

2.2. Online Trainings

From early September till end of November 2025, we conducted a pilot training phase using the online courses on Quantum Communication developed in task T9.2 of the project.

2.2.1 Additional course

We continuously evaluated the feedback of the participants. From the evaluation it became clear at an early stage of the training phase, that a specific target group would significantly profit from a more compact version of the course "Quantum Communication for Engineers" (see below 2.2.3: Feedback and Evaluation). This target group consists of new employees in companies developing and providing quantum communication technologies, who themselves had a background in related fields rather than in Quantum Physics itself. To cater the needs of this target group, we developed a compact course "internal Training on Quantum Communication". This did not require producing new learning materials and thus entailed a reasonably small additional workload of about one person week.

The curriculum of the additional course is as follows:

- Lecture 1: Introduction to Quantum Information & Cryptography before QKD
- Lecture 2: Randomness
- Lecture 3: The Technology behind Quantum Cryptography

Table 1 lists the learning videos use in the additional course:

Table 1 - Learning Videos Internal Training Course

Lecture	Topic	Speaker

1	Basic Concepts of Quantum Information	Lukas Mairhofer (qtlabs)
1	Notes on Cryptography	Lukas Mairhofer (qtlabs)
2	Quantum Randomness I	Ramona Wolf (University Siegen)
3	The Technology behind Quantum Cryptography: Sources	Sebastian Neumann (QI)
3	The Technology behind Quantum Cryptography: Channels	Sebastian Neumann (QI)
3	The Technology behind Quantum Cryptography: Detectors	Sebastian Neumann (QI)
3	The Technology behind Quantum Cryptography: Experimental Realizations	Sebastian Neumann (QI)

2.2.2 Participants

Due to GDPR regulations, we cannot report personal details about the participants. However, in Table 2 we give an account of the numbers and the background of the participants in the respective courses.

Table 2 - Participants in Online Courses

Course	**Number of Participants**	**Disciplinary Background of Participants**	**Organisational Background**
Quantum Communication for Engineers	28	Electronics, Mechanical Engineering, Aerospace, Quantum Physics, Informatics, Information Security	Cancom, INECO, qtlabs, qssys, TÜV Nord, X-Net, zerothird, University Innsbruck, Medical University Graz, Dacoso, AIT
Quantum Communication for Decision Makers	8	Information Security, Informatics, Defense	Cancom, X-Net, Ministry of Defense
Internal Training Course QKD	15	Project Management, Electronics, Mechanical Engineering,	New employees in the companies qtlabs, zerothird, qssys

2.2.3 Feedback and Evaluation

We collected feedback from the users via feedback forms integrated in the courses on the learning platform. We asked for feedback for every lecture as well as for a general feedback to the course.

The Figures 1-9 show the results of the general feedback questionnaire. Questions 4, 7 and 8 were follow-up questions which remained empty and are thus not displayed here.

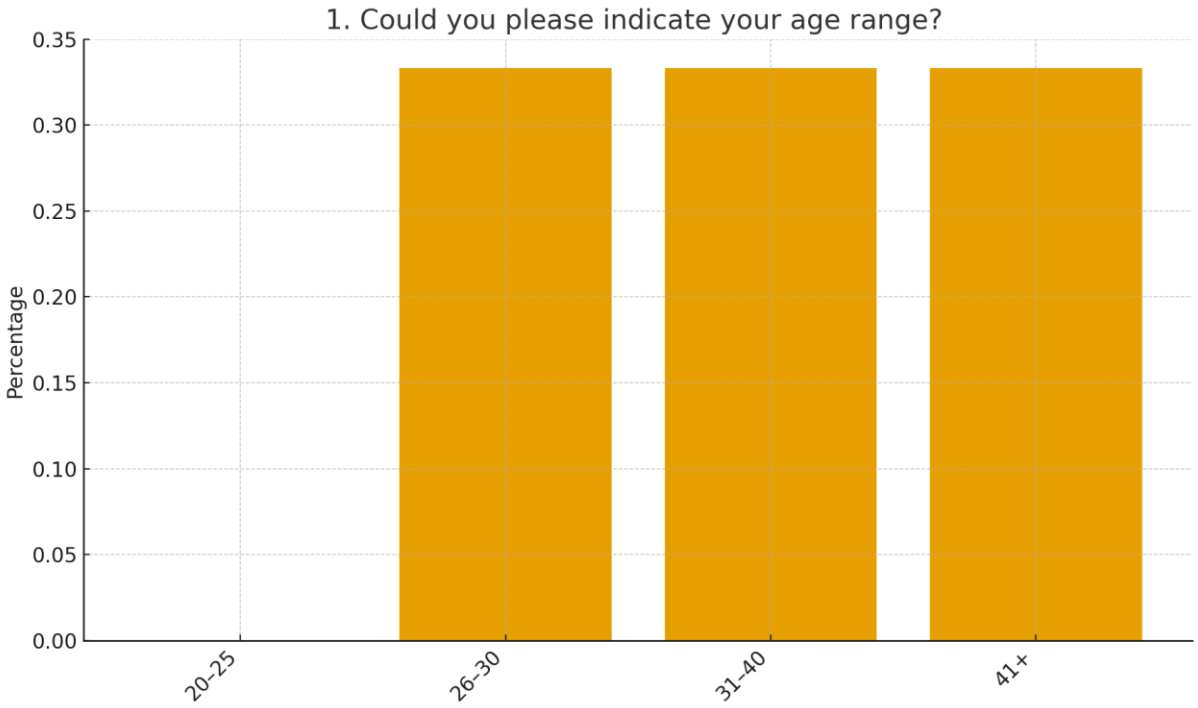

Figure 1 - Age range of participants.

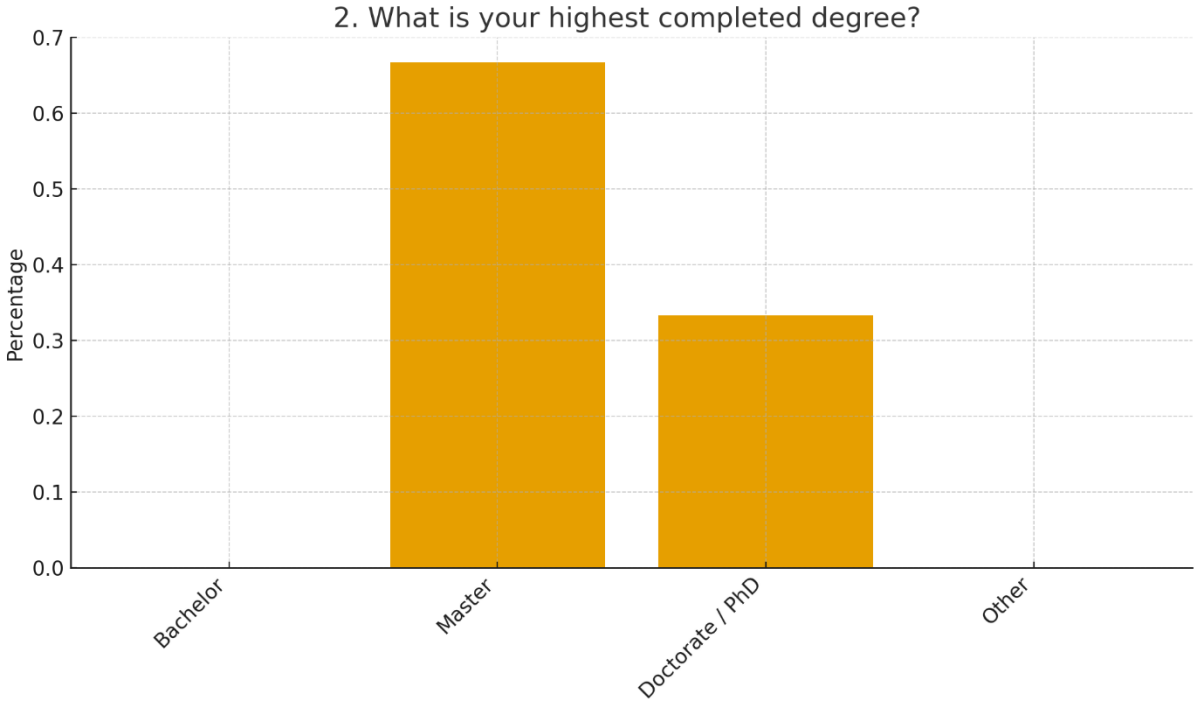

Figure 2 - Highest degree of participants.

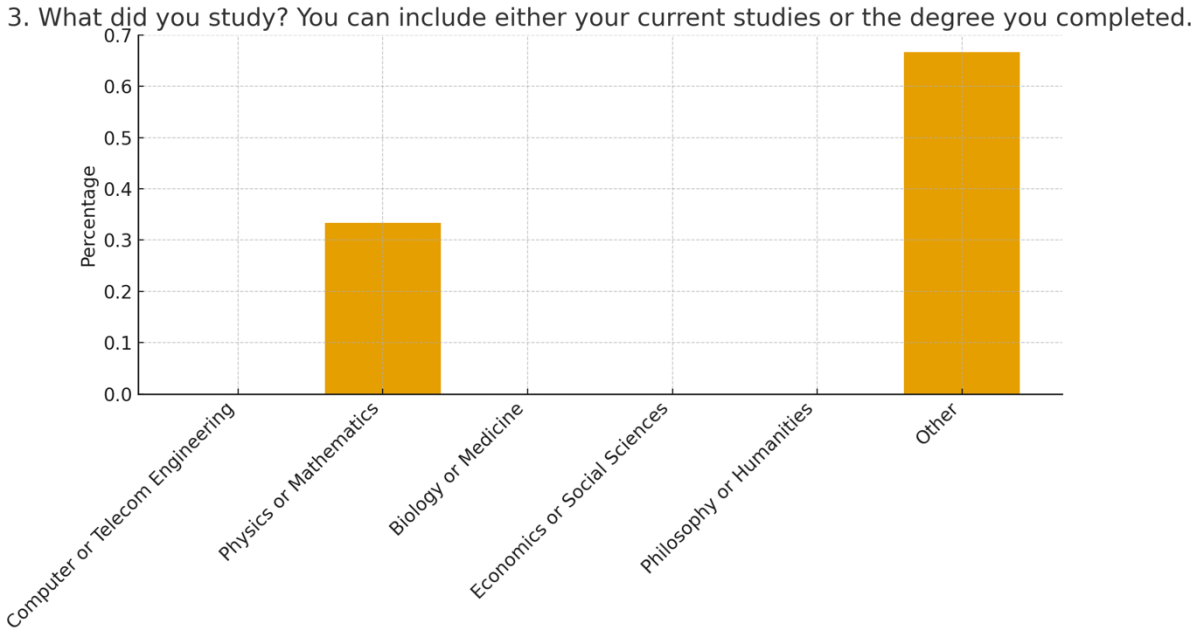

Figure 3 - Disciplinary background of participants

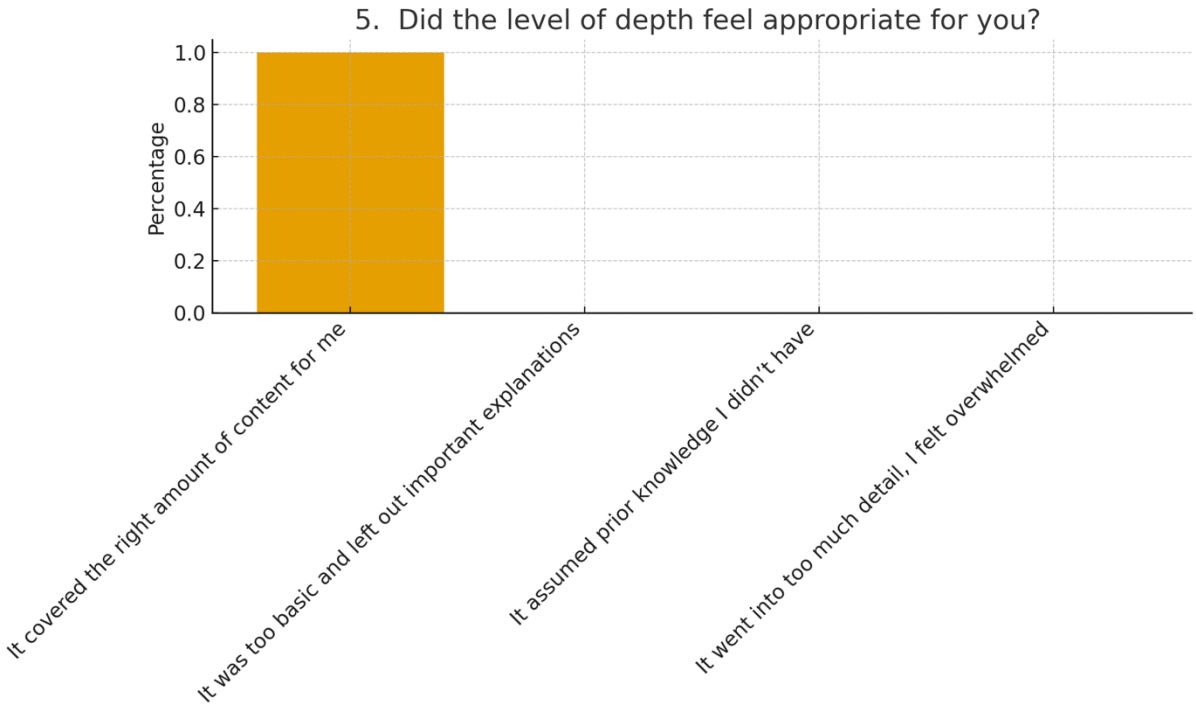

Figure 4 - Level of depth of the course

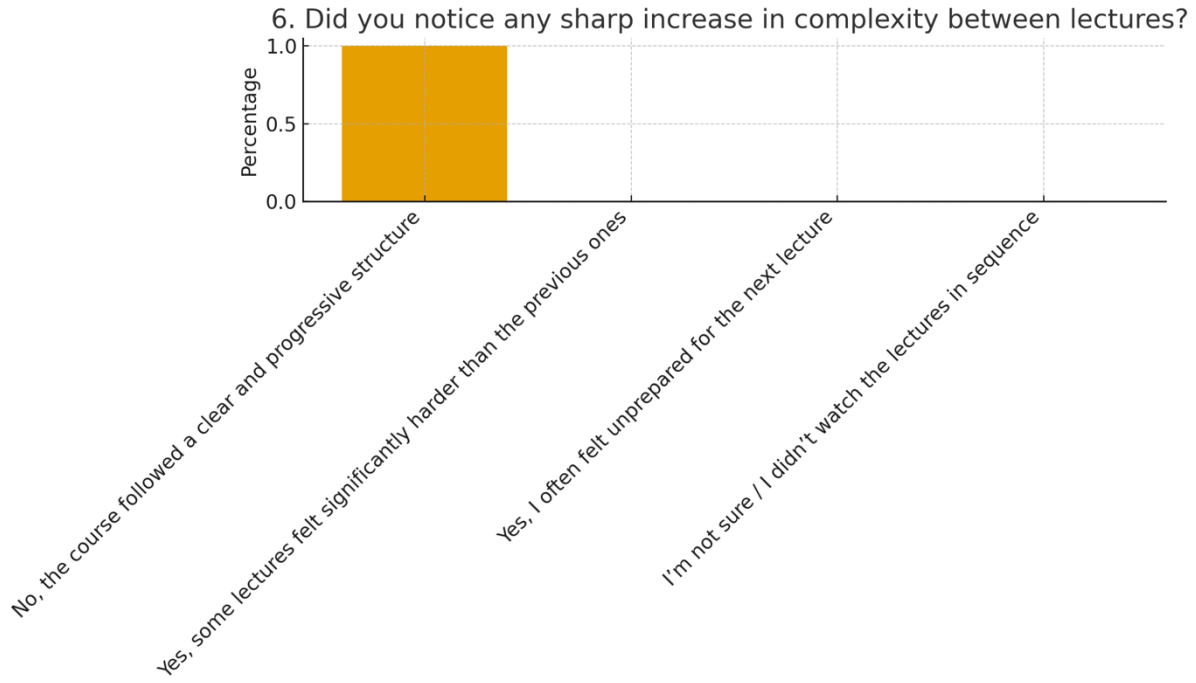

Figure 5 - Continuous development of complexity

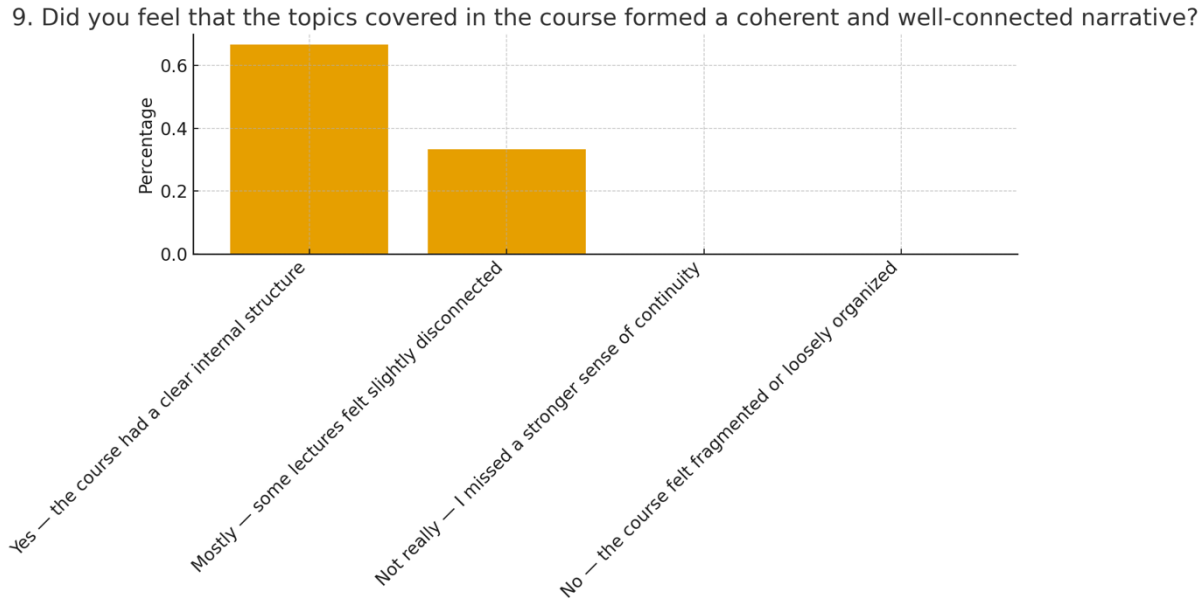

Figure 6 - Coherence of narrative

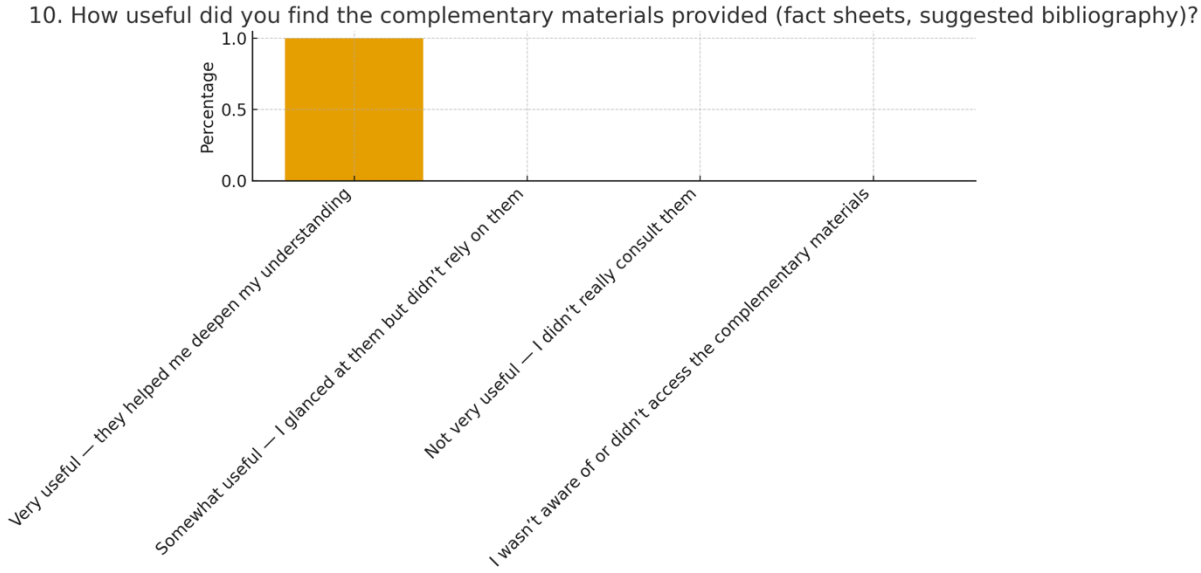

Figure 7 - Complementary Learning Materials

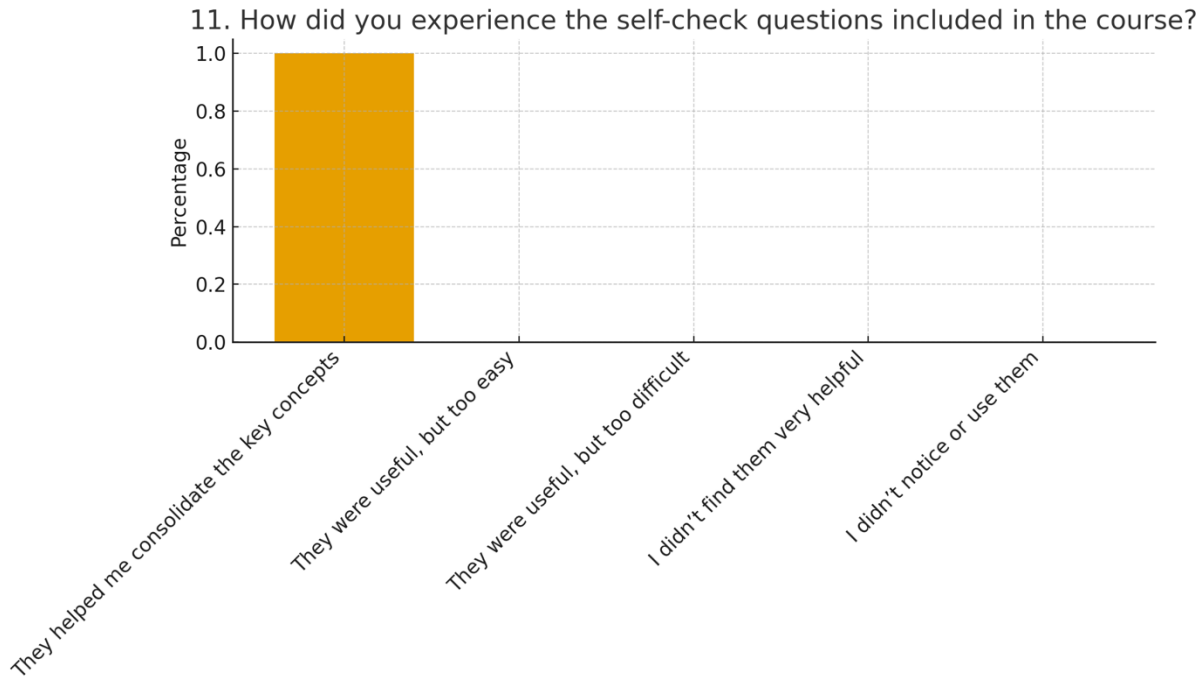

Figure 8 - Self Checks

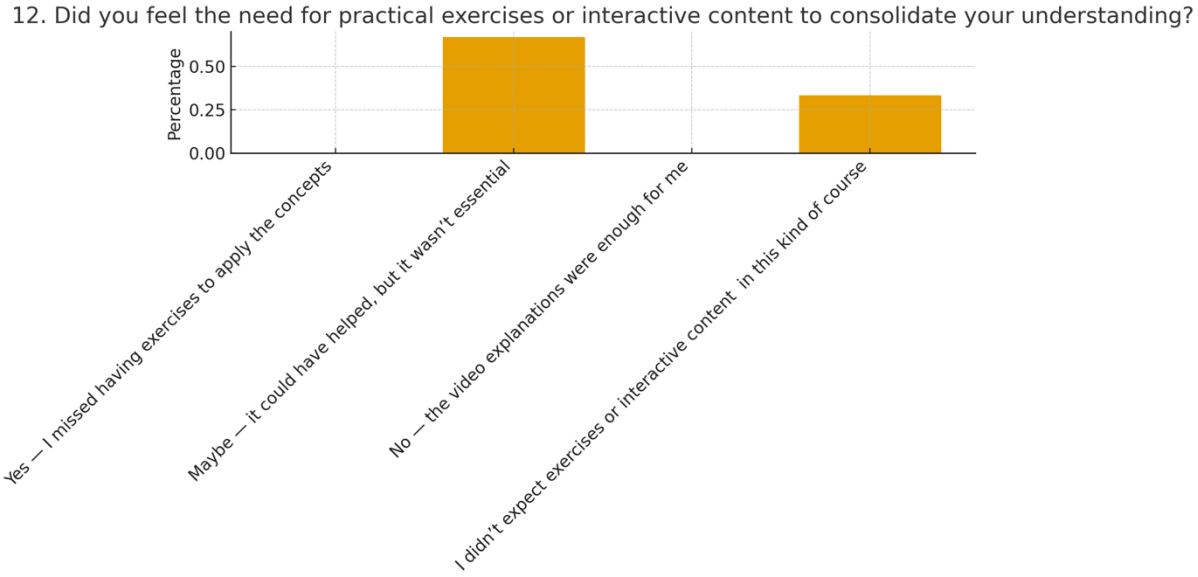

Figure 9 - Need for additional practical exercises or interactive content

However, since only 5 to 10% of the enrolled participants made use of the possibility to give feedback within the online course with varying contribution to the different questionnaires, we also asked some participants for oral feedback.

For the oral feedback we observe that the overall feedback was positive. Some feedback indicates that an additional correction loop in the postproduction of the videos would be helpful to reduce cuts between the two perspectives of the cameras as this sometimes creates an unruly impression. We will follow up on this feedback.

2.3. In-person Trainings

In the first week of December 2025, we conducted a series of in-person trainings, with individual sessions specifically addressing political decision makers, funding agencies, users, infrastructure deployers and journalists. Among the participants were high-level decision makers such as a minister, as well as information security officers, investors, users, journalists, and the interested public. We also dedicated a session to potential future employees in the field of quantum communication, with many students participating. This week was dedicated to showcasing technology and hardware for fibre-based as well as free-space QKD, to training stakeholders on concepts and principles of QKD and to presenting the QURIOS Quantum Technologies Academy and its online learning platform.

The Table 3 gives a detailed overview over the events during this week as well as over the numbers and background of the participants in the respective events:

Table 3 - Overview Training Week

Event	Date	Target Group	Number of Participants
Family & Friends	28.11.2025, 13:00-19:00	Interested Public	>60
Funding Agencies	1.12.2025, 09:00-11:00	National Funding Agencies	8
Ministry of Innovation & Infrastructure	1.12.2025 10:30-11:30	Minister & Staff	3

Journalists	1.12.2025 13:00-14:30	Journalists (Der Standard, Kurier, Krone, Austrian Press Agency)	4
Academia	1.12.2025 16:00-19:00	Potential future Employees in Quantum Communication Companies	>50
Clients	3.12.2025 13:00-17:00	Users and potential users of Quantum Communication Technologies	>40

In order to minimize costs and workload we collaborated with the company zerothird for the organization of this series of events.

Figures 10-12 show pictures from these training events.



Figure 10 - Peter Hanke, Minister for Infrastructure and Innovation, participating in the Presentation on Hardware for Quantum Key Distribution on December 1st 2025 . Photo (c): zerothird/Ben Leitner



Figure 11 - Workshop on Quantum Key Distribution for the future Workforce on December 1st 2025. Photo (c): zerothird/Ben Leitner



Figure 12 - Potential Costumers and Users during the presentation on Quantum Key Distribution on December 3rd 2025. Photo (c): zerothird/Ben Leitner

Summary

The QCI-CAT project, funded by the EU's Digital Europe Programme, aims to establish a secure quantum communication infrastructure in Austria. An important deliverable of this project is the pilot training phase for private and public stakeholders, in which we conduct both trainings using the online learning platform developed in task T9.2 as well as in-person trainings. During this phase we collected feedback to the online-courses. The evaluation of this feedback indicated that a more compact course for internal training of colleagues in companies of the consortium would be useful and we implemented such a course. In total, as of December 3rd 2025, more than 50 participants were enrolled in the courses of the online platform. By December 5th, more than 160 participants have attended in the in-person workshops and presentations on Quantum Key Distribution. This significantly exceeds the KPI of 45 persons trained and successfully concludes the work package WP9.

Appendix A - List of Acronyms

AIT: Austrian Institute of Technology
QKD: Quantum Key Distribution
qtlabs: Quantum Technology Laboratories