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PATTERN.
Empowering Open and Responsible Research and Innovation

D3.3

Evaluation of outcomes and refinement strategy

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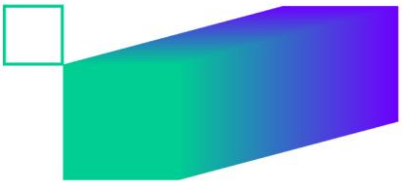

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Author(s)	Katharina Koller (ZSI), ilse Marschalek (ZSI)
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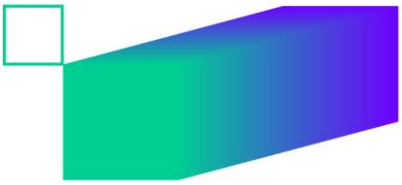

Contributors

NAME	ORGANISATION
Katharina Koller	ZSI
ilse Marschalek	ZSI

Peer Reviews

NAME	ORGANISATION
René van Horik	DANS-KNAW
Kristian Hvidtfelt Nielsen	AU
Stefania Laneve	APRE

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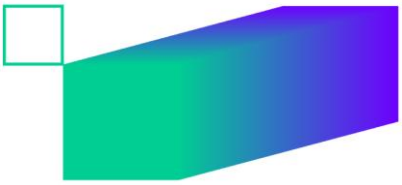
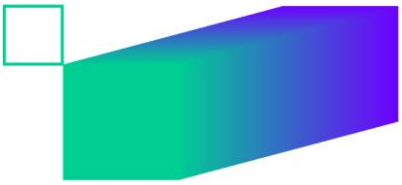


Table of Abbreviations and Acronyms

Abbreviation	Meaning
DoA	Description of Action
FAIR	Findable, Accessible, Interoperable, Accessible
OA	Open Access
OS	Open Science
RRI	Responsible Research and Innovation
WP	Work Package



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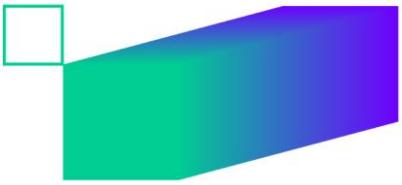

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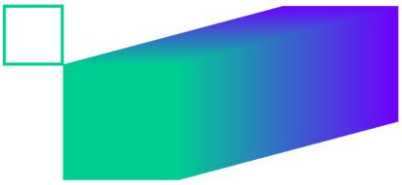


1 Executive Summary

This report evaluates the first round of training pilots conducted within the PATTERN project (Piloting open and responsible Activities and Trainings Towards the Enhancement of Researchers Networks), which aims to develop and implement high-quality trainings in open and responsible research and innovation (RRI) across Europe. The project focuses on widening participation and fostering capacity-building within the European Research Area, particularly through training activities that address themes such as FAIR data, Citizen Science, Open Access, and others.

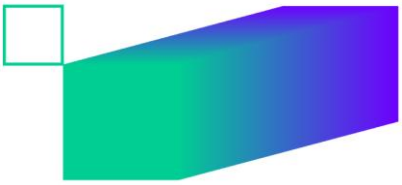
This report presents the findings of a formative evaluation of the first cycle of training implementation, providing concrete recommendations for refining the second and final cycle of PATTERN trainings. The evaluation is based on a consolidated framework of criteria, capturing perspectives at three levels: the training activities themselves, the participants, and—planned for a later stage—the institutions carrying out the trainings. The evaluation focuses on the trainings' content quality, appropriateness for target audiences, communication and presentation, perceived learning outcomes, and anticipated practical application.

Data were gathered from 27 pilot trainings implemented between May 2024 and February 2025. Evaluation instruments included quantitative participant questionnaires (441 responses), interactive evaluation activities (18 implementations), and facilitator reflection templates (25 submissions). Triangulation of these three evaluation instruments provides multi-faceted insights into training effectiveness and outcomes from two perspectives – training participants and training implementation.

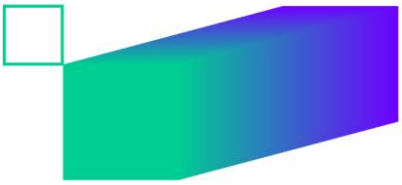
Key findings indicate that the trainings were generally well-received across diverse disciplines, career stages, and formats. Participants found the content relevant, clearly structured, and appropriately challenging. Interactive elements and practical relevance were particularly valued. While most participants reported high satisfaction and perceived learning gains, younger participants and those in larger training groups tended to rate experiences slightly less favourably, highlighting a need for more tailored approaches for early-career researchers and students. Furthermore, trainings using the Projects platform were generally evaluated less positively, indicating a need for upcoming training plans to focus more on how the platform can be flexibly integrated across various training formats.

The report concludes with specific recommendations for the second pilot round, including:

- Prioritising smaller training groups and longer sessions to facilitate participant engagement.
- Improving the adaptability and relevance of training content, especially for students and early-career researchers.
- Improving the usability and application of digital tools, particularly the Projects platform.
- Retaining or expanding the interactive, flexible formats as they were widely appreciated by participants.



These findings will guide the refinement of the next PATTERN training cycle and possibly inform broader strategies to strengthen research capacity in the European Research Area.



2 Introduction

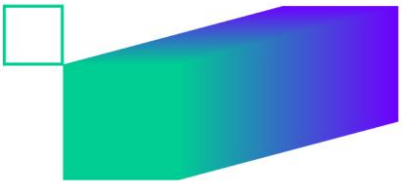
This report presents the evaluation of the first round of PATTERN pilots, focusing on the development and implementation of the evaluation framework, the methods used to assess the pilot sessions, and the resulting findings. The PATTERN initiative aims to explore and implement innovative approaches in open science trainings, and this report seeks to analyse the effectiveness and impact of the pilot activities through a structured evaluation process as outlined in the DoA.

In Chapter 3, the development of the evaluation framework is described, providing the foundation for assessing the pilots and ensuring that the methods and analysis align with the project's goals.

Chapter 4 delves into the specific evaluation methods employed during the first round of pilots, including a detailed discussion of the approaches used to collect and analyse data from the different evaluation instruments, such as participant questionnaires, interactive evaluation activities, and facilitators' reflections applied during the first cycle of piloting.

Chapter 5 presents the results from the evaluation, highlighting key findings from the different data sources. This section offers an overview of the trainings conducted, as well as the insights gained from the perspectives of participants and facilitators alike.

Finally, Chapter 6 summarizes the recommendations based on the evaluation results, offering guidance for refining and improving future iterations of the PATTERN piloting cycle 2. The insights gained from this evaluation are intended to support informed decision-making, guide future improvements, and contribute to the continued development and success of the PATTERN trainings.



3 Developing the Evaluation Framework

This chapter provides an overview of key concepts and criteria developed for evaluating the PATTERN pilots and how they were consolidated into a common framework. The evaluation framework forms the basis for developing the evaluation methodology and interpreting the outcomes in the subsequent chapters.

The evaluation criteria are defined by reviewing (a) previous work on the assessment of educational activities and (b) criteria and concepts created by partners and experts involved in PATTERN project activities, particularly in the course of WP1, which represent the expectations and objectives of pilot stakeholders. The findings from the review and the project activities were critically reviewed and compared, resulting in a consolidated framework of evaluation criteria informing the formative and summative evaluation activities.

3.1 Review of Existing Evaluation Criteria for Education

In this section we describe three relevant frameworks for assessing trainings described in the literature.

3.1.1 Good Educational Standards

Klieme et al. (2004) developed a framework of educational standards to assess the quality of the German school system. In this framework, the authors understand educational standards as defining requirements and objectives for teaching and learning. In the context of PATTERN, we can use these general criteria of educational standards to assess the quality of PATTERN trainings and draw conclusions on their quality of implementation. The criteria defined by Klieme et al. (2004, p. 20) can be adapted and applied for assessing the PATTERN trainings, as presented in Table 1.

Criterion	Application to PATTERN trainings
Subject-specificity	The training relates to a specific content area and conveys the main principles of the related discipline or subject.
Focus	The training covers a key area of the discipline or subject rather than the entire range of content.
Cumulativity	The training builds on skills and competencies previously developed by the participant and provides a learning experience that is cumulatively based on these skills and integrated with existing knowledge.
Binding for all	The training communicates the minimum requirements expected of all participants, regardless of their background.

Criterion	Application to PATTERN trainings
Differentiation	The training can provide a positive learning experience for participants of all profiles and levels of knowledge (i.e., those with higher levels and those with lower levels can all benefit from the training).
Comprehensibility	The goals of the training are communicated in a clear and understandable way
Feasibility	The training provides a challenge for participants but can be mastered with reasonable effort.

Table 1. Criteria for good education standards applied to PATTERN trainings. Adapted from Klieme et al. (2004, p. 20).

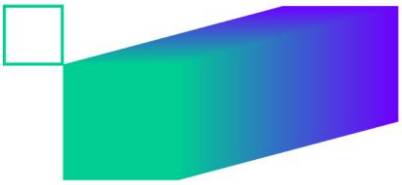
3.1.2 Continuing Professional Development Accreditation

Specific criteria have been developed to accredit trainings and providers for continuing professional development in several fields (McMahon et al., 2016; Royal College, n.d.). These accreditation frameworks are informed by several core principles defining standards for these trainings. These standards can also be useful for assessing the quality of PATTERN trainings:

- The needs of the target audience for a training should be assessed and the training should address these needs and professional gaps. This also includes determining the learning objective for the training, which should consider the participants' perspectives and the training format.
- The content developed for the training should be informed by scientific evidence and responsive to the practical needs of participants.
- The educational formats and activities should match the target group, setting, and objectives of the training. This includes tools and strategies which promote self-learning:
    - Participants should be encouraged to answer questions that result from their own practical experiences or group activities;
    - Participants should be able to identify areas for their future learning;
    - Participants should document and reflect on their participation and learning outcomes.
- The training and its contents should be independent from any external influences or interests (e.g., commercial interests).
- The desired outcomes of the training should be evaluated with appropriate methods.

3.1.3 The Four Level Model of Training Criteria in Higher Education

The four level mode of training criteria was originally developed for trainings in business organisations, but has been applied to a Higher Education context by Praslova (2010). This model provides a framework for assessing the effectiveness of



education on participant outcomes consisting of four levels of criteria: reaction, learning, behaviour, and results.

- Outcomes related to the *reaction*s criterion consist of participants' perceptions of (a) how much they enjoyed the training and (b) how much they have learned.
- Outcomes related to the l*earning* criterion cover improvements in participants' skills and knowledge.
- Outcomes related to the *behaviour* criterion go beyond the immediate training context and include a demonstration of the improvements in learning, for instance in follow-up classes, projects, or internships.
- The *results* criterion captures how the training contributed to long-term benefits for the participant or society, assuming that Higher Education aims to contribute to socio-economic goals. Positive results related to a training might include increased chances of employment and admissions to graduate programmes or responsible citizenship behaviours. This criterion is the most difficult to measure.

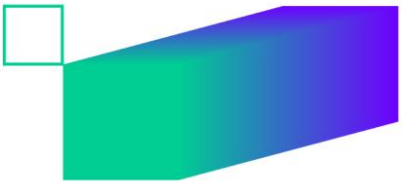
3.2 Evaluation Criteria Developed in the PATTERN Project

This section describes criteria developed in the context of WP1 of the PATTERN project, based on previous activities and the engagement of partners and external stakeholders in a joint process for mutual learning.

3.2.1 Evaluation Criteria Developed in the Mutual Learning Events

In the first Mutual Learning Event implemented in the context of PATTERN WP1, consortium members presented examples of training resources to discuss requirements of the training as well as pro and cons. Further, criteria for assessing trainings as well as developing trainings of high quality were discussed. Table 2 distils the discussions from this Mutual Learning Event to inform the evaluation criteria of PATTERN trainings.

Content Criteria	Up to date
	Soundness
	Reliability
	Comprehensibility
	In-line with the topics
	Appropriate level of detail of the information provided
Target Group Criteria (career stage)	How clearly does the training address a specific target group?
	Is the training adequate for the target group?
	Is the language appropriate for the target group?
Design and Presentation Criteria	Appeal of aspects
	Appeal of format



	Design elements
	Readability
	Visuals and sound
Extra Features Criteria	Accessibility
	Interactivity
	Flexibility and Modularity
	Clear learning outcomes
	Other special attributes of this training

Table 2. Overview of criteria from the first Mutual Learning Event.

The second Mutual Learning Event was composed of consortium members and experts in the field of open science trainings. In this event, success factors, requirements and recommendations for developing OS and RRI trainings were discussed. This discussion emphasised that both the trainings and the evaluation need to consider a) different technological trends, as trainings can be implemented in an online, face-to-face, and asynchronous format; and b) pedagogical trends, as the target groups for the PATTERN trainings can consist of students, early career researchers, or late career researchers. The perspectives and needs of these different settings and groups need to be considered. Further, the second mutual learning event provided additional criteria assessing the learning outcomes desired by the training as well as the sustainability of learning resources. The discussions of this event are summarised in Table 3.

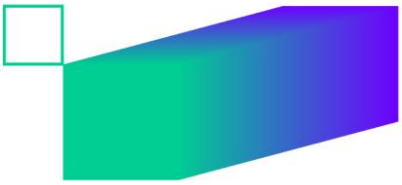
Learning outcomes and assessment	Are the learning outcomes relevant for the target group?
	Does the assessment use open, innovative, and creative methods?
	Are the assessment methods open and inclusive?
Sustainability	Are the training resources available and maintained?
	Are the training resources accessible for diverse social groups and groups with disabilities?
	Are the training resources shareable?
	Are the training resources reusable?

Table 3. Overview of additional criteria from the second Mutual Learning Event.

3.2.2 Criteria Used in WP1 Quality Assessment of Training Resources

In the context of T1.3, different criteria adapted from the EU-Citizen.Science project[1] were used to assess the quality of training resources. The purpose of this task was to identify existing training resources of high quality as well as gaps and opportunities to leverage in the development of PATTERN trainings. As these criteria were already

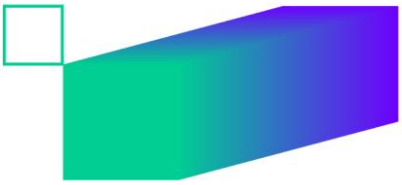
[1] https://eu-citizen.science/



used for evaluating existing trainings (Lagido et al., 2024), they can also be useful for the evaluation of the PATTERN trainings. The criteria used in this quality assessment are provided in Table 4.

Strengths	What are the strengths of the training?
Weaknesses	What are the weaknesses of the training?
Addressed gaps and needs within training topic	Which gaps and needs are addressed by the training?
Readability and Legibility	Is the training clearly structured according to the type of resource?
Clear Language	Does the training use a clear language which is easy to read and understand for its target audience?
Basic Formatting	Does the training pay attention to basic formatting (e.g., the font size is legible, and grammar and spelling are correct)
Contents	The training clearly describes its aims, goals, and methods.
Applicability	The training is easy to implement
	The training is easy to adapt to different cases.
Quality of materials	Audio, video, or image quality are good.

Table 4. Overview of criteria used for quality assessment in PATTERN T1.3, adapted from (Lagido et al., 2024)



3.3 Consolidated Framework of Evaluation Criteria

This section describes the consolidated framework of evaluation criteria informed by the literature review (section 3.1) and PATTERN project activities (section 3.2). For this consolidated framework, we compared, analysed, and synthesised the different criteria, concepts, and considerations described in the previous sections and defined criteria and dimensions for assessing all PATTERN training activities.

The evaluation of PATTERN will follow a multi-dimensional and multi-level approach. Different dimensions will be taken into account when interpreting and comparing evaluation results, particularly in the analysis of the participant questionnaire, to account for different technological and pedagogical factors that may influence learning outcomes. Thus, we will consider the following dimensions:

- The **discipline(s)** training participants are associated with (e.g., natural sciences, social sciences, arts and humanities);
- The **career stage** or **professional background** of training participants are in (e.g., PhD students, Early Career researchers, or Late Career researchers);
- The participants' **gender**;
- Which of the 8 PATTERN **thematic fields of transferrable skills** (named "themes" in the remainder of this report) are covered by the training;
- and the **format** in which the training is implemented (i.e., asynchronous/self-paced or synchronous online, in-person, or hybrid).

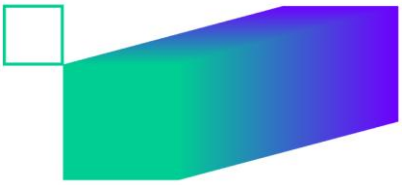
We also initially intended to include a country-level analysis. However, the strong collaboration between partners in collaboratively delivering trainings, along with the large number of countries involved, made such an analysis unfeasible, overly detailed, and of limited relevance.

Further, the evaluation framework considers three different levels of actors involved in the trainings and their perceptions to gain a comprehensive understanding of training implementation and impacts. For defining evaluation criteria, the evaluation framework thus acknowledges the level of each **training**, the level of the **participants**, and the level of the **institution** carrying out the trainings.

Despite this multi-dimensional and multi-level approach, it is critical that the evaluation of different trainings is comparable and feasible to implement. Consequently, we provide one evaluation methodology to be implemented for all trainings.

The consolidated evaluation framework – informed by the reviewed literature as well as the activities already completed as part of the PATTERN project – consists of three levels, each containing three main criteria for assessment as well as sub-criteria (see Figure 1). These criteria further informed the evaluation methodology and instruments.

On the **level of each training** that is implemented in PATTERN, we define three main criteria for evaluation as well as sub-criteria outlining how these criteria could be fulfilled successfully:



1. Content of the training
    a. Is the training covering a specific and relevant area?
    b. Is the content on an appropriate level of detail?
    c. Is the content up to date?
    d. Is the content evidence-based, well-researched, and reliable?
2. Appropriateness of the training for its target group
    a. Does the training build on participants' previous education and existing skills or knowledge?
    b. Is the effort of the training feasible for the target group, i.e. can it be mastered but still provides a challenge?
    c. Does the training address needs and gaps experienced by the participants in their work and practice?
    d. Is the language used appropriate for the target group?
    e. Are the educational activities and formats used appropriate for the target group?
3. Presentation of materials and communication between training facilitators and participants
    a. Are the requirements and learning goals of the training clearly communicated?
    b. Are the training resources of high quality (i.e., legible, appropriate design, ...)?
    c. Are the training resources accessible for a diverse audience?
    d. Is the training designed in an interactive and engaging manner?

On the **level of each participant engaged in a training**, we define three main criteria for the evaluation:

1. Perceptions of the Training
    a. Did participants enjoy the training?
    b. Did participants find the training useful?
    c. Did participants find the training interesting?
    d. What are participants' suggestions for improvement?
2. Learning outcomes
    a. Which knowledge and skills did participants develop?
3. Practical implementation
    a. How do participants expect to use what they have learned in practice?

We also propose three main criteria for evaluation on the **level of the institution responsible for implementing the training**, i.e., institutions part of the PATTERN consortium. However, these criteria will only be assessed in the second cycle of pilots.

1. Sustainability of the training resources
    a. Are the resources available and maintained beyond the duration of the training?
    b. Are the resources shareable?
    c. Are the resources reusable?

2. Institutional and societal benefits
    a. Did the implementation of the training contribute to the goals of the institution?
    b. Did the implementation of the training contribute to societal goals (e.g., contribution to third mission goals, contribution to higher science literacy among the general population, …)
3. Lessons learned by training facilitators and responsible actors
    a. What were strengths of the training implementation (what worked well)?
    b. What were challenges in implementing the training (what did not work well)?
    c. What should be changed for future implementations?

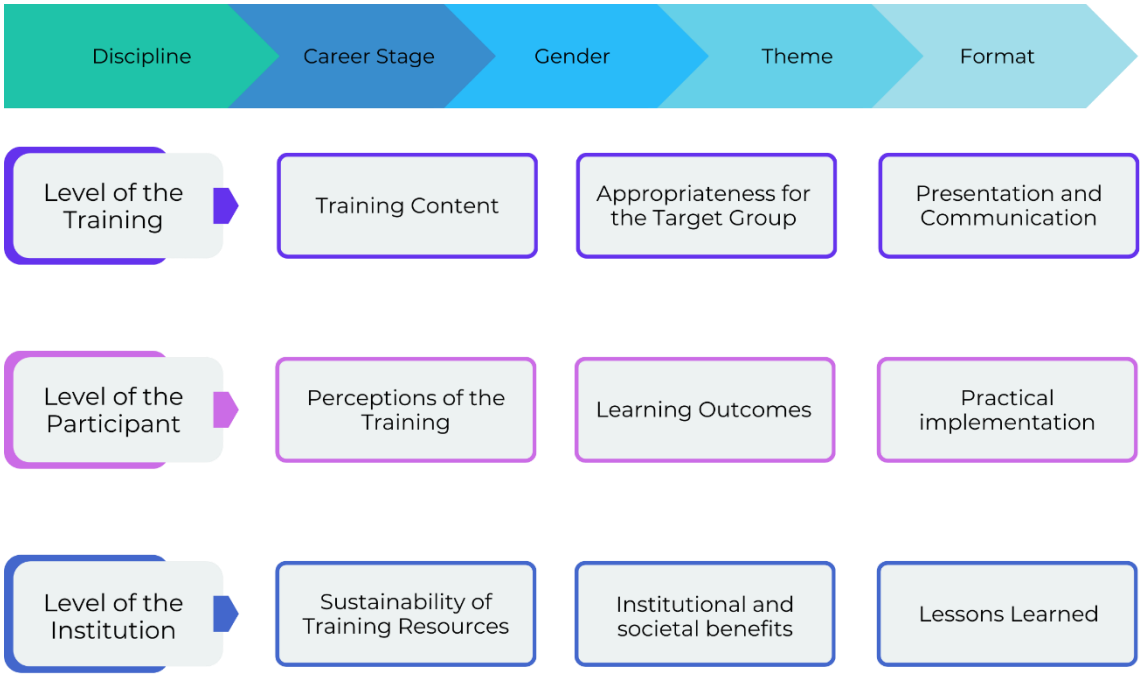


Figure 1. Consolidated Framework of Evaluation Criteria

4 Evaluation Methods for the First Round of PATTERN Pilots

According to the Grant Agreement, the evaluation of the PATTERN pilots will follow a two-step evaluation process: in the first phase, there will be formative evaluation of the initial pilots in T3.2 at M28, with suggestions for improvements to refine the second round. The second phase will employ summative evaluation of the subsequent pilots by M40, which will also feed into policy recommendations (T4.2).

This deliverable focusses only on the evaluation of the first round of pilots, providing a formative evaluation of training activities, while D3.4 (due at M40) will cover the second round of pilots, providing a summative evaluation.

Formative and summative assessment each follow a different purpose (Bin Mubayrik, 2020; Dolin et al., 2018). Formative assessment takes place during the implementation process to identify areas for improvement. Summative assessment takes place at the end of the implementation process to evaluate whether the overall objectives have been accomplished. As Dolin et al. (2018) point out, it is not the method of data collection that distinguishes formative and summative assessment but the impact and use of the assessment. However, despite their different purposes, the overall evaluation methodology should connect formative and summative assessment, for instance by using similar assessment methods.

Moreover, the evaluation methodology aims to consider multiple perspectives in the assessment of the trainings, both in terms of evaluation criteria (trainings, participants, institutions) and in terms of research partners whose perspectives will be evaluated (training participants, facilitators, institutional representatives).

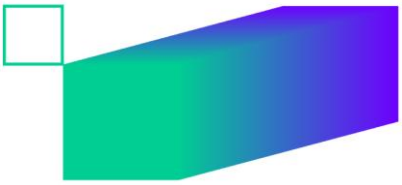
While designing this methodology, we aimed to consider the following aspects informed by previous research and PATTERN project activities:

- Considering different perspectives.
- Designing one methodology that can be implemented for different types of trainings rather than develop a specific approach for each training, which would result in granularity difficult to manage and to compare.
- Assessing learning outcomes that are relevant for the target group.
- Providing open, innovative, and creative methods.

4.1 Objectives

The evaluation of the first round of PATTERN pilots is a **formative evaluation** to assess successful and unsuccessful aspects of implementation and formulate recommendations for the second round.

Therefore, it will focus on assessing the experiences of training participants and training facilitators to infer lessons learned and support the second round of implementing the trainings. Thus, referring to the consolidated framework of evaluation criteria (see Figure 1), we will evaluate the level of the training and the level of the participant.



In the second round of pilots, we will also evaluate the **level of the institution**, and findings will be reported in D3.4 *Final evaluation and summary of training programs*.

4.2 Process Management

Managing the evaluation process in a large consortium with diverse expertise and training backgrounds is a challenging process. Given the extensive range of training experiences implemented in PATTERN and their geographic dispersion, ZSI established a structured approach to evaluation to ensure successful implementation. This process involved:

a) ZSI developing the evaluation criteria and methodology, providing guidance, overseeing implementation, and analysing the data;
b) And PATTERN project partners carrying out the evaluation methods through data collection.

To facilitate this process, ZSI undertook the following activities:

- Aligning with WP3 leaders through dedicated meetings.
- Participating in and providing guidance during weekly WP3 meetings.
- Producing a comprehensive guide for pilot organisations on implementing evaluation methods, including all necessary materials, workflow visualisations, and detailed instructions.
- Offering bilateral meetings to support project partners.
- Sending periodic email reminders to all partners about ongoing evaluation activities and the location of relevant materials and resources.

4.3 Methods

We developed different qualitative and quantitative evaluation instruments for assessing the trainings across the different criteria. Figure 2 presents an overview of how the methods and evaluation instruments implemented in Round 1 are related to the aims of the evaluation as well as to the criteria defined in the consolidated framework.

All materials were provided in English. For partners who wished to translate the evaluation materials into their local language, ZSI provided a guideline explaining methods and best practices (see Appendix D).

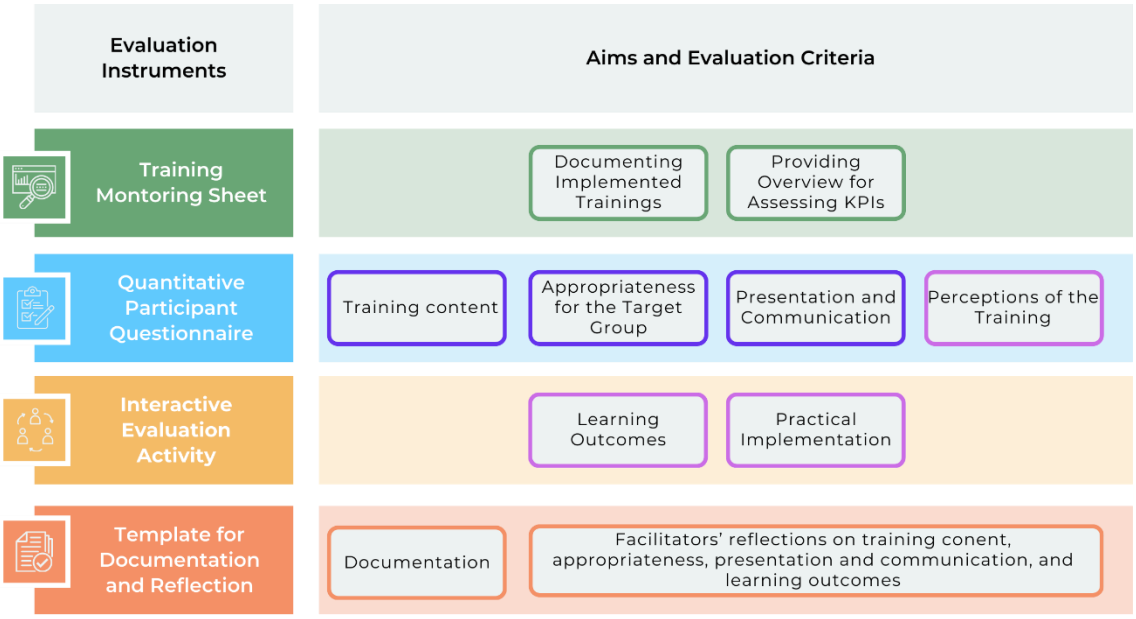


Figure 2. Overview of Evaluation Methods and Aims.

4.3.1 Training Monitoring Sheet

To document the implementation of each training, ZSI developed a monitoring sheet provided on the PATTERN SharePoint. The sheet collects information on each training such as the target group, format, and responsible institution. This information is used to characterise each training according to the dimensions defined in the consolidated framework of evaluation criteria. Project partners implementing pilots were responsible for populating the training monitoring sheet. The training monitoring sheet collected the following information:

- Training ID number for cross-referencing
- Name of the training
- Responsible institution
- Institution's country
- Date
- Level of the training (i.e., beginner, advanced, ...)
- Career stage of participants
- Discipline of participants
- Number of participants who attended
- Number of participants who registered, in case there was a large divergence
- Gender composition, only to complete if few participants completed the questionnaire and were able to self-identify their gender
- Training format (i.e., in person, online, hybrid, asynchronous)
- Specific information about the training format
- Number of training sessions
- Average length of each training
- Use of the PATTERN platforms OpenPlato and Projects
- Which evaluation instruments were used

4.3.2 Quantitative Participant Questionnaire

Criteria related to the **level of the training** (training content, appropriateness for the target group, presentation and communication) and **participants' general perceptions** were assessed using an online quantitative questionnaire. The quantitative questionnaire was used as a standardised evaluation instrument for all trainings, allowing for comparisons. The questionnaire was developed based on existing items used in previous research (Griffin et al., 2003; Kember & Leung, 2009; Rodgers et al., 2018; Visser-Wijnveen et al., 2016; Wilson et al., 1997). The questionnaire was designed to be short and resource-efficient while covering the most relevant aspects of the evaluation criteria (see Appendix A).

The questionnaire was developed and provided by the ZSI team and set up in questionnaire software. For project partners, collecting data with the questionnaire included the following steps:

- The questionnaire was set up in a Microsoft Office Form, which can be duplicated and used by anyone with a Microsoft account. A link to a tutorial was provided.[2]
- Training facilitators or pilot partners duplicated the Form and independently distributed it among their training participants.
- For ZSI's analysis, it is vital to connect participants' responses collected with the questionnaire and the specific training the participants were in. Thus, partners were asked to include training name and date in the title of the forms as well as to refer to the link or title in the training monitoring sheet.
- After the data collection was completed, training facilitator or pilot partners shared the data with ZSI.

4.3.3 Interactive Evaluation Activity

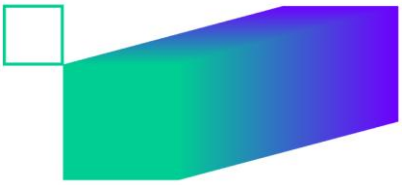
For assessing the **level of the participants**, we developed an **interactive evaluation activity** covering participants' learning outcomes and practical implementation of training contents. The ZSI team provided detailed guidelines on how to conduct the activity, along with the necessary materials (see Appendix B). Project partners were instructed to implement the activity during the final session of their training.

The evaluation activity prompted participants to add post-its along a rating scale from 0 (fully disagree) to 10 (fully agree) and to comment on the post-its, explaining their ratings and expressing their perspectives. Participants were prompted with these four questions:

- I enjoyed the training – because of …
- The training was useful for me – and why …
- I could gain new skills – and which …
- I will apply what I have learned in practice – what in specific …

The activity was designed to encourage exchange between participants and among participants and facilitators, allowing a more collective, dynamic and interactive evaluation experience. Thus, this activity also required moderation by training

[2] https://www.youtube.com/watch?v=pYWkWkkaxtM



facilitators yet allowed facilitators to follow-up on participants' inputs in case of unclarities.

The activity could be conducted using either digital or analogue methods. ZSI created a Miro board template with multiple copies of the activity, enabling pilot partners to use it without a paid subscription. This also facilitated ZSI's management of the data, supporting facilitators, and archival of the boards. For partners preferring a separate online board, a separate template link was provided. For analogue implementation, partners could either print a high-quality template mirroring the online board but adapted for offline use or recreate the activity using flipcharts.

To ensure all data was accessible to ZSI, partners were asked to document results using the designated reflection and documentation template outlined in the next section. Partners were also asked to translate non-English content or transcribe hand-written inputs.

For self-paced or asynchronous courses, we recommended embedding the Miro board within the course website (e.g., OpenPlato), possibly as a separate module. This provided a degree of interactivity for asynchronous participants, allowing them to view others' contributions, add their own insights, and make connections. While this differs from live training, it offers a complementary feedback mechanism alongside the anonymous, individual feedback questionnaire.

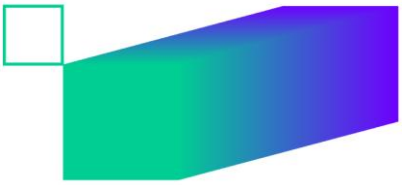
4.3.4 Template for Reflection and Documentation

This template was completed by training facilitators for two main purposes: documenting the training and evaluation activities and reflecting on the training from the facilitators' perspective (see Appendix C). The template offers space for describing the activities and uploading photos and screenshots of participants' distributions. Further, training facilitators were encouraged to provide their reflections and describe their experiences of implementing the training, including reflections on the training approach and used materials, challenges and uncertainties, things that went well, and recommendations. These reflections additionally informed the evaluation, complemented the assessment of evaluation criteria, and provided valuable insights for future training implementations.

4.4 Analysis

4.4.1 Participant questionnaire

The participant questionnaire was analysed using descriptive exploration of response frequencies, medians, median absolute deviation (MAD; a measure of variability relative to the median), and correlations. We chose the median for group comparisons because it remains more robust when group sizes differ and outliers are present, compared to the commonly used mean and standard deviation.



4.4.2 Interactive Evaluation Activity

All materials received were imported into the qualitative analysis software MaxQDA. Miro boards were exported as PDFs, which allowed to code the text on participants' post-its, while transcripts of analogue implementations and translations provided by pilot partners were imported as Microsoft Word documents.

All written post-it notes were coded and analysed using MaxQDA. Additionally, with the support of ChatGPT 4.0, an analysis was carried out to assess the positioning of the post-it notes in response to each question. This made it possible to include not only the content but also the degree of agreement in the analysis. Transcripts and handwritten notes of the responses were also taken into consideration.

4.4.3 Template for documentation and reflection

The responses to the template for documentation and reflection were exported as Microsoft Excel spreadsheet and then imported into MaxQDA using the *Categorize Survey Data* functionality. The analysis was based on this initial automated pre-coding, derived from the questions in the template. Additional subcodes were manually added to include in vitro codes in the analysis as well.

5 Results

In this chapter, we present the results of evaluating the first PATTERN training cycle, starting with an overview of implemented and evaluated trainings, followed by the results provided by each of the three evaluation instruments.

We considered only trainings conducted in the first cycle and for which evaluation data was available by 28th of February. This cut-off date ensured sufficient time for in-depth analysis.

5.1 Overview of Trainings

Between May 2024 and the end of February 2025, 29 trainings were conducted. Of these, 26 provided at least some evaluation data while one training only provided information about its characteristics. These 27 trainings provide the basis of the findings described in the following.

Among the 27 trainings, 25 included information in the facilitator template (86%), 22 distributed the participant questionnaire to attendees (76%), and 18 implemented the interactive evaluation activity (62%).

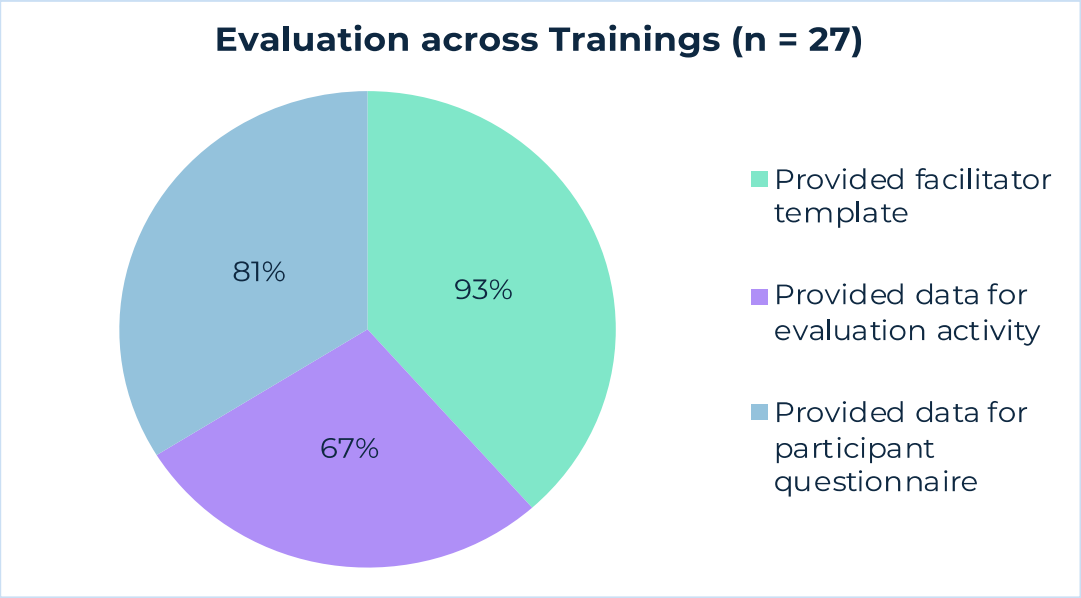
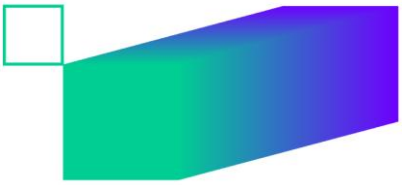


Figure 3. Use of evaluation instruments across trainings.

Participant engagement with the evaluation instruments differed considerably across trainings.

Response rates to the participant questionnaire ranged from 100% to only 4%, though the majority of trainings distributing the participant questionnaire achieved response rates of at least 50%.

Figure 4. Response rates to the participant questionnaire for each training.



We collected information about the characteristics of each training as part of the training monitoring sheet (see section 4.3.1). Accordingly, a total of 17 different PATTERN partners were involved in piloting trainings during the first cycle.

The number of participants involved in a given training varied considerably, involving 5 to 80 participants with a mean of 30 participants (*SD* = 21.3, *Md* = 22.5). Moreover, most trainings took about 2 hours, with the shortest session being one hour and the longest session about 3.5 hours (*M* = 2.15, *SD* = 0.74, *Md* = 2).

Each of the themes guiding the development of the PATTERN trainings was covered in the first cycle. The most prevalent theme was **FAIR data management** (covered by 8 trainings, 30%), followed by **Citizen Science** (6 trainings, 22%) and **Open Access** (4 trainings, 15%). There were three trainings covering **Management and Leadership**. **Dissemination and Exploitation**, **Science Communication**, and **Gender, non-discrimination and inclusion in research** were covered in two trainings each.

The majority of trainings was implemented as **in-person** format (16 trainings, 59%), while many were also conducted as **online** trainings (9 trainings, 33%). Only 2 trainings were facilitated as **hybrid**.

Most of the trainings offered **beginner** level content (15 trainings, 56%), while 11 trainings addressed **beginner and intermediate** levels (41%). Only one training targeted **advanced** participants, addressing the theme of Management and Leadership.

The PATTERN platforms are an important pedagogical and facilitation tool. 11 trainings (41% out of 27 trainings) used **Projects** as part of their training, whereas 5 trainings (19%) utilised **OpenPlato**.

When comparing the formats in which the trainings on different themes were delivered, we see that **Dissemination and Exploitation** was offered exclusively online, whereas most other trainings were primarily in-person. The only exception is **Gender, Non-Discrimination, and Inclusion in Research**, which was conducted once online and once in person. Only **Citizen Science** and **FAIR Data Management** were delivered in a hybrid format.

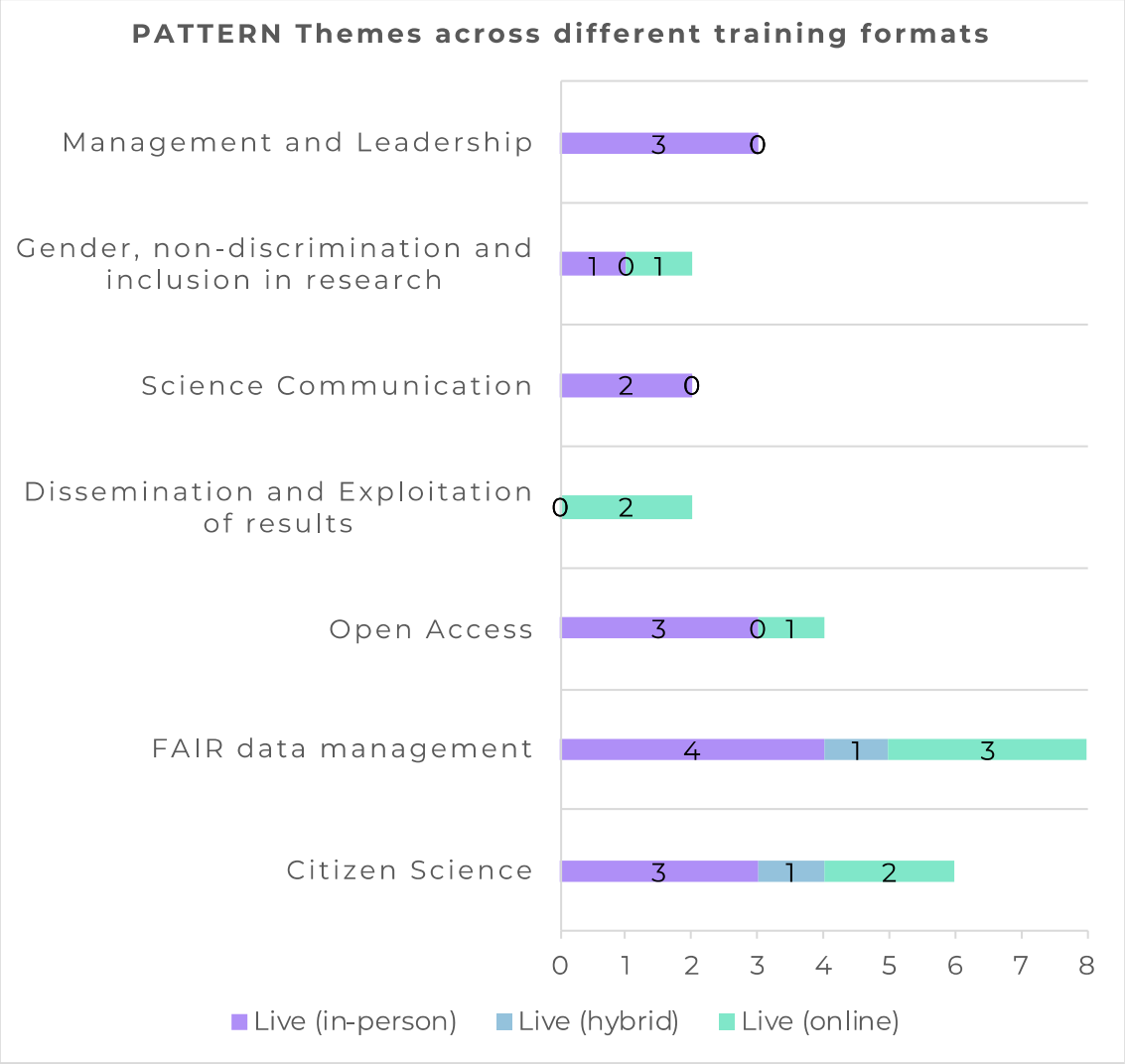
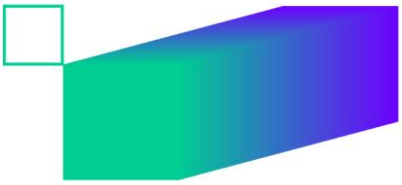


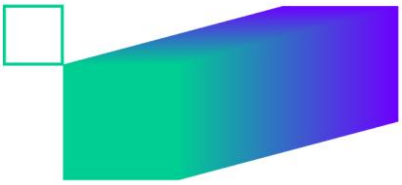
Figure 5. Implementation of the PATTERN themes across different training formats.

The trainings were able to reach participants of diverse disciplines, career stages and professional backgrounds. Many trainings targeted one specific group in terms of career, most commonly **researchers** (10 trainings) but also **PhD students** (4 trainings), **Bachelor students** (3) and in one case, **Master students**. In turn, 9 trainings were facilitated with **mixed groups**, such as researchers and librarians in one training, researchers and data professionals in another training, as well as senior scientists, PhDs, or Post docs in others.

Furthermore, the majority of trainings were facilitated with **multiple disciplines** (19 trainings, 70%), while 7 specifically covered participants with a background in **Natural Sciences** (26%) and one training specifically engaged participants from the Life Sciences.



In almost all trainings, the participant groups consisted **predominantly of women** (in 21 trainings). More detail regarding the gender dimension will be reported in the results section on the participant questionnaire, where participants could self-identify their gender. However, since not all trainings used the participant questionnaire and response rates vary, we also asked facilitators to make an assessment about the gender majority in their training.



5.2 Participant Questionnaire: Results

The participant questionnaire collected responses on 13 main questions from a total of 441 training participants across 22 trainings. Importantly, one training changed the questionnaire by removing questions, resulting in NAs for these questions. The sample size for each question is reported in the corresponding Figure.

According to the questionnaire, most participants identified as women (67%), with men making up 28%, a small proportion (1%) identifying as non-binary, and 2% preferring not to disclose their gender. The average age was around 30, though actual ages spanned from 19 to 62. In terms of career stage, 41% were bachelor's students, 13% master's students, and 15% doctoral or predoctoral researchers, while 7% were postdoctoral researchers, 10% were senior scientists or professors, and a small number served as instructors or librarians. Over half (57%) had a background in natural sciences, 17% identified "other" as their discipline, 9% were in medical and health sciences, 7% in social sciences, and 6% in the arts and humanities, with a few additional respondents from engineering and technology, and one person from business and economics.

According to the information indicated by facilitators in the training monitoring sheet, a majority (54%) participated in Citizen Science trainings, followed by 21% in FAIR data management, 13% in Open Access, and smaller shares across dissemination and exploitation, science communication, and gender- or inclusion-focused trainings. The most respondents participated in in-person sessions (74%), online sessions accounted for 22%, and a small fraction (3%) joined a hybrid format. Finally, most participants were engaged in a beginner training (79%), with the remaining 21% who joined a beginner–intermediate training.

5.2.1 Overview of Responses

Participants answered questions covering the criteria **content of the training**, **appropriateness of the training for its target group**, **presentation of materials and communication between training facilitators and participants**, and **general perceptions.**

Overall, participants judged training materials to be clear, with over half agreeing (50.7%) and nearly a third strongly agreeing (27.7%) that the content was understandable. Only a small minority (5.0% in total) expressed disagreement, overall suggesting effectively structured training materials.

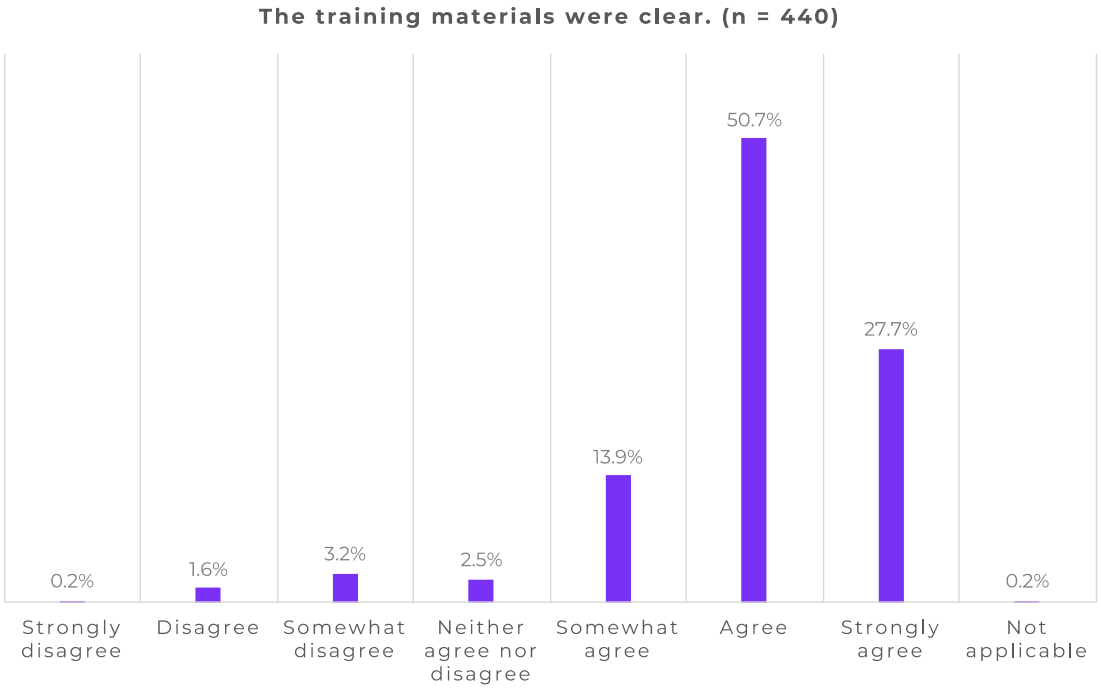


Figure 6. Overall sample responses to participant questionnaire, item 1.

Views on relevance were comparably high, with half agreeing (50.0%) and almost two in five strongly agreeing (39.3%) that the content was up to date, while a minority (1.3%) disagreed. These trends imply that participants felt the training aligned with current developments and offered credible, timely information.

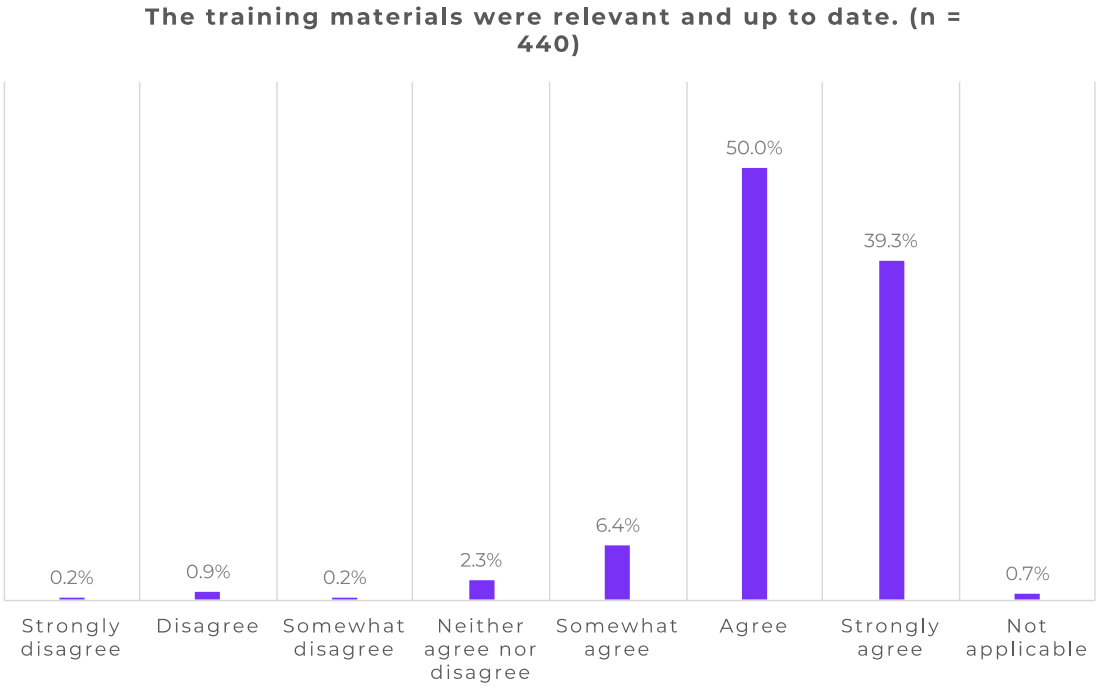


Figure 7. Overall sample responses to participant questionnaire, item 2.

Concerns about an overly wide scope of trainings were uncommon. A majority disagreed (40.0%) or strongly disagreed (10.0%) with the statement that too many topics were included in the training; only a minimal proportion strongly agreed (1.8%). This indicates that the coverage was appropriate.

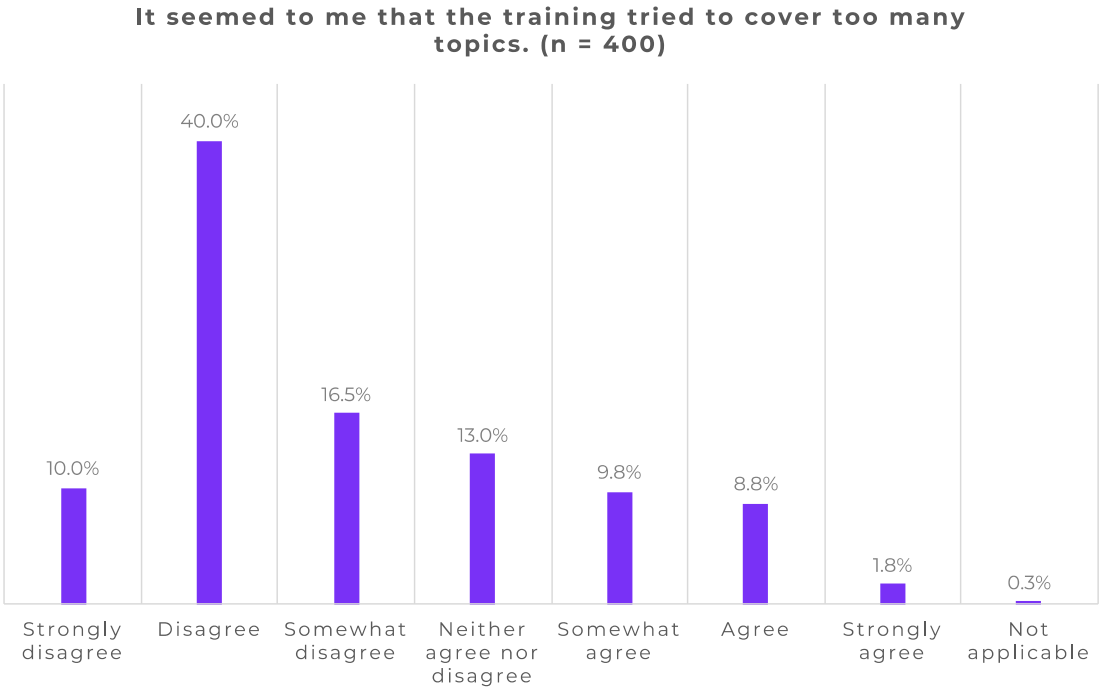


Figure 8. Overall sample responses to participant questionnaire, item 3.

The trainings seem to have delivered new knowledge without overwhelming attendees: nearly two thirds reported learning new concepts, with 38.6% agreeing, 23.2% strongly agreeing, and only 6.6% in total disagreement.

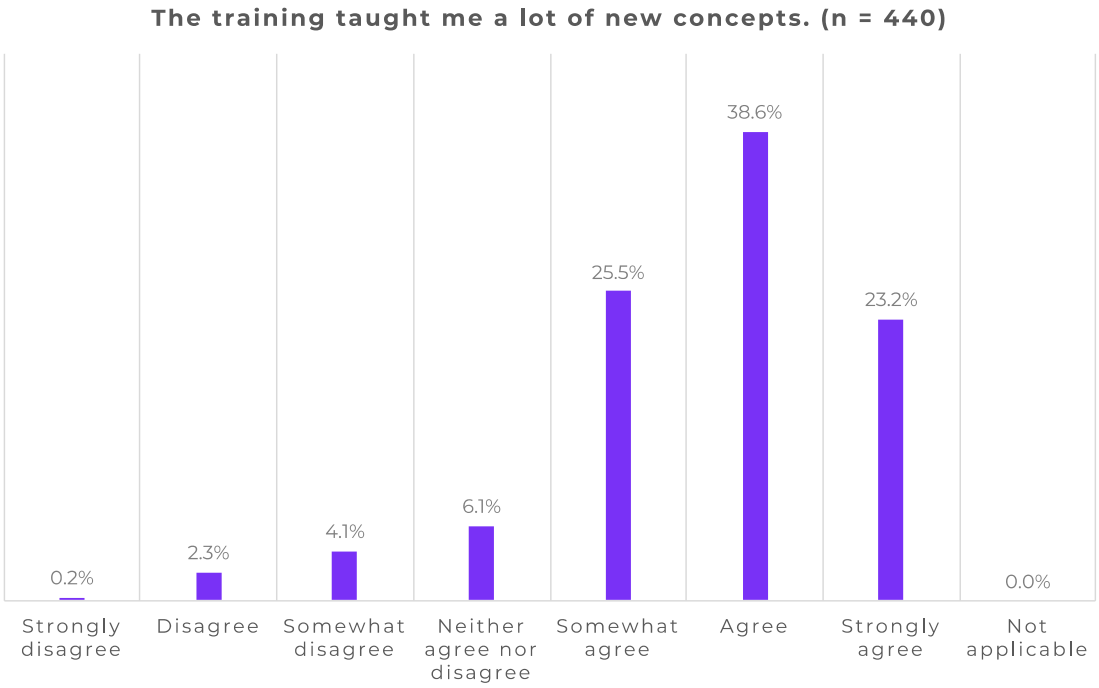


Figure 9. Overall sample responses to participant questionnaire, item 4.

Most participants also viewed the workload as manageable, with 43.3% agreeing and 32.3% strongly agreeing that they could complete the training without undue stress, and only 6.3% expressing disagreement.

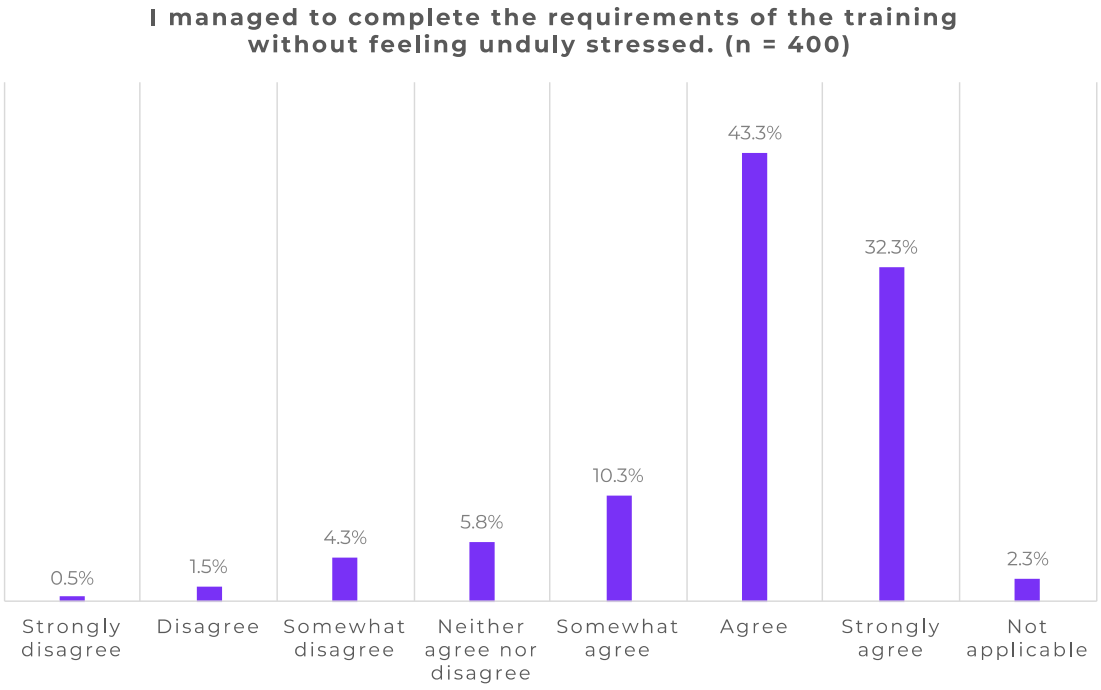


Figure 10. Overall sample responses to participant questionnaire, item 5.

Furthermore, flexibility of the trainings for participants' personal learning needs was rated positively by 63.1% overall (41.8% agreed, 21.3% strongly agreed), though 14.3% neither agreed nor disagreed, suggesting that a small portion of participants may have preferred more personalised or adaptable training approaches.

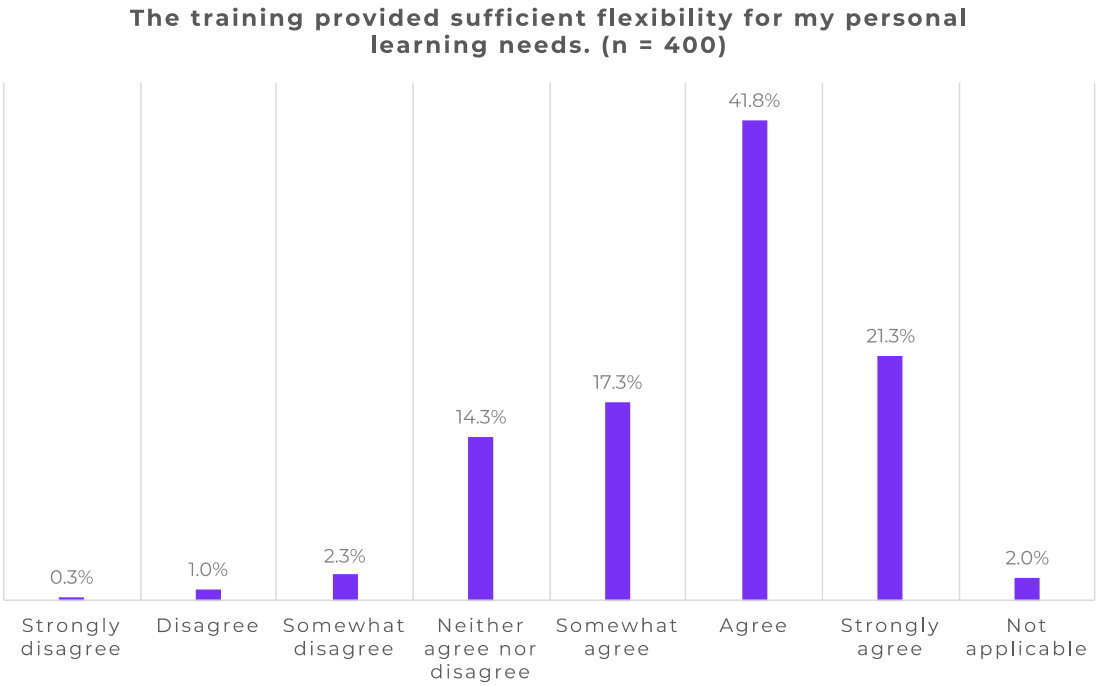


Figure 11. Overall sample responses to participant questionnaire, item 6.

The structure of the trainings received similarly positive assessments: half agreed (50.7%) and nearly a third strongly agreed (31.8%) that the training they participated in was well organised, while disagreement was almost non-existent (1.6%). This points to an effectively structured training implementation that provided clarity for participants.

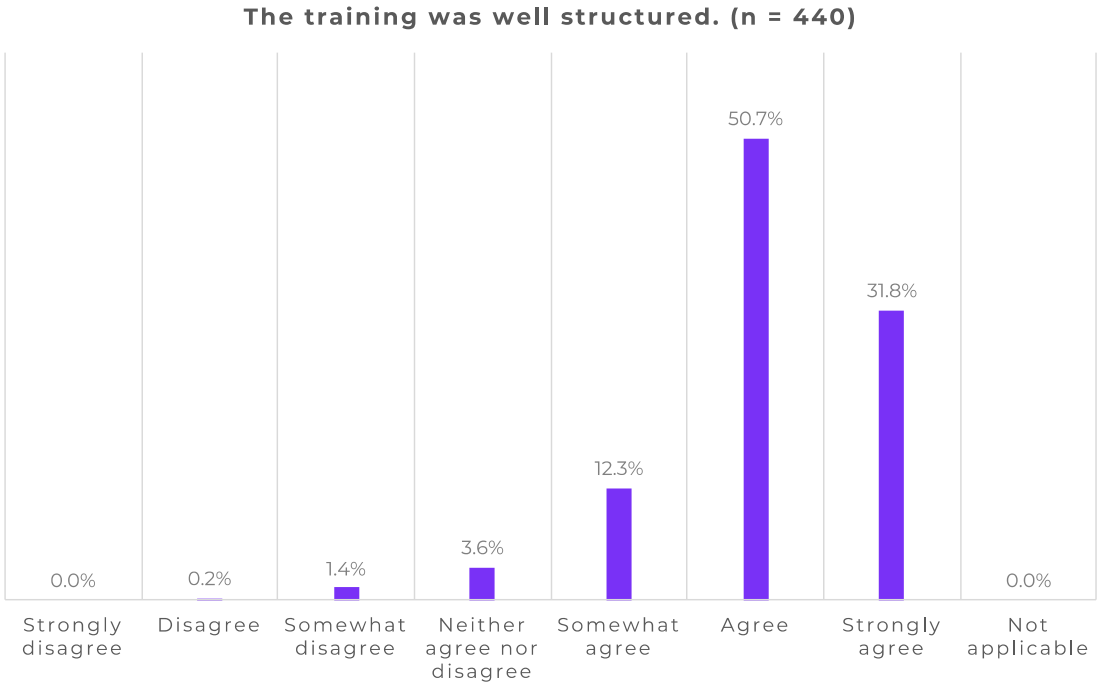


Figure 12. Overall sample responses to participant questionnaire, item 7.

Active engagement emerged as another strength of the PATTERN trainings. Close to half (49.8%) strongly agreed and 40.7% agreed that they had sufficient opportunities to participate, with disagreement almost absent (1.0%).

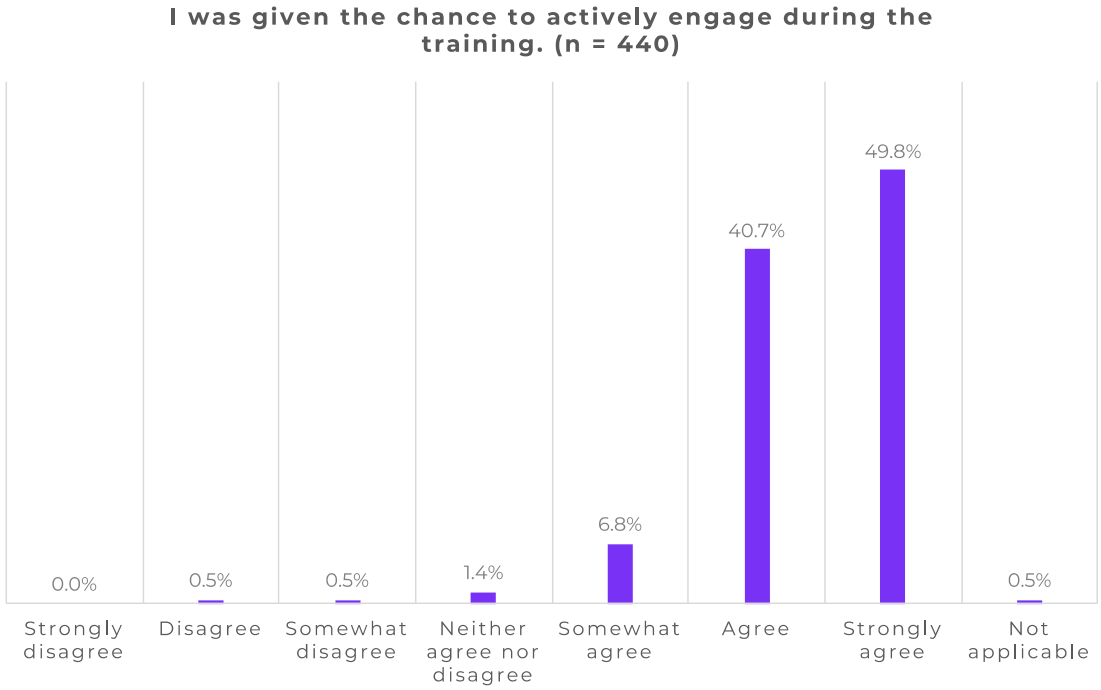


Figure 13. Overall sample responses to participant questionnaire, item 8.

Likewise, most participants dismissed the claim that aims and objectives were unclear, as 49.3% disagreed and 21.5% strongly disagreed. However, 6% were unsure and 8.3% indicated some form of agreement with the statement that aims of their training were unclear.

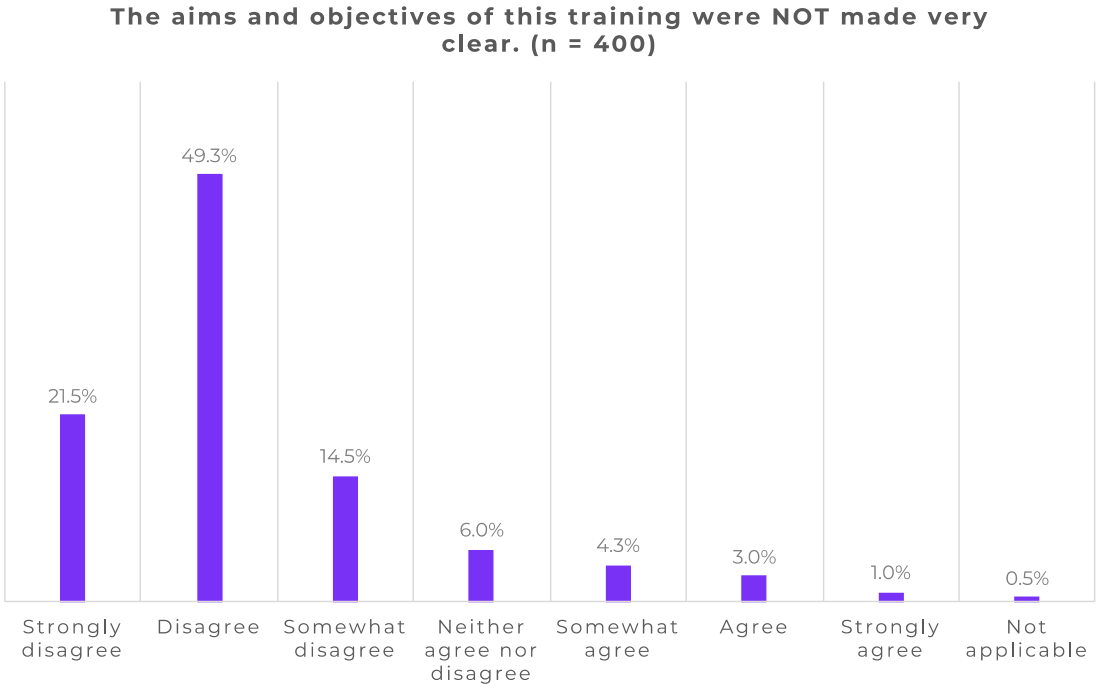


Figure 14. Overall sample responses to participant questionnaire, item 9.

Perceptions of the online platforms were similarly favourable, with 46.3% agreeing and 27.8% strongly agreeing that the virtual environment was suitable, and a small neutral group (8.5%), which may reflect different levels of familiarity with digital tools or personal preferences. However, it should be emphasised that the specific trainings varied a lot in their use of the PATTERN platforms and other digital tools.

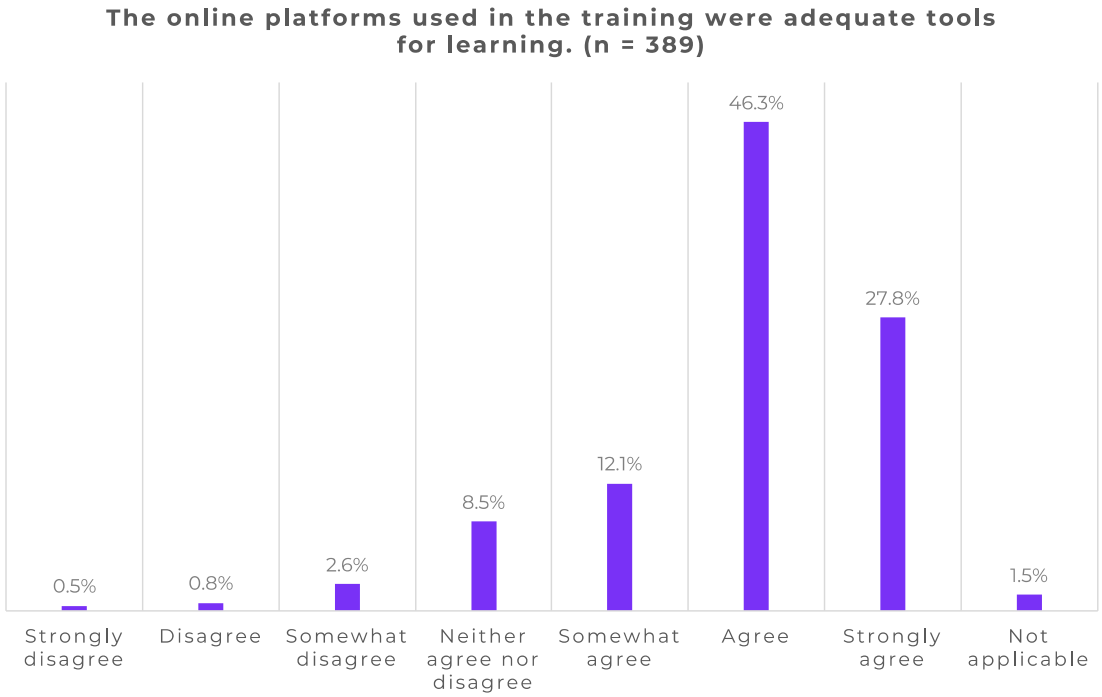


Figure 15. Overall sample responses to participant questionnaire, item 10.

Participants also reported positive outcomes regarding their growing interest in the training topic: 38.9% agreed and 30.2% strongly agreed that their interest had increased, while only a modest 5.4% expressing any form of disagreement.

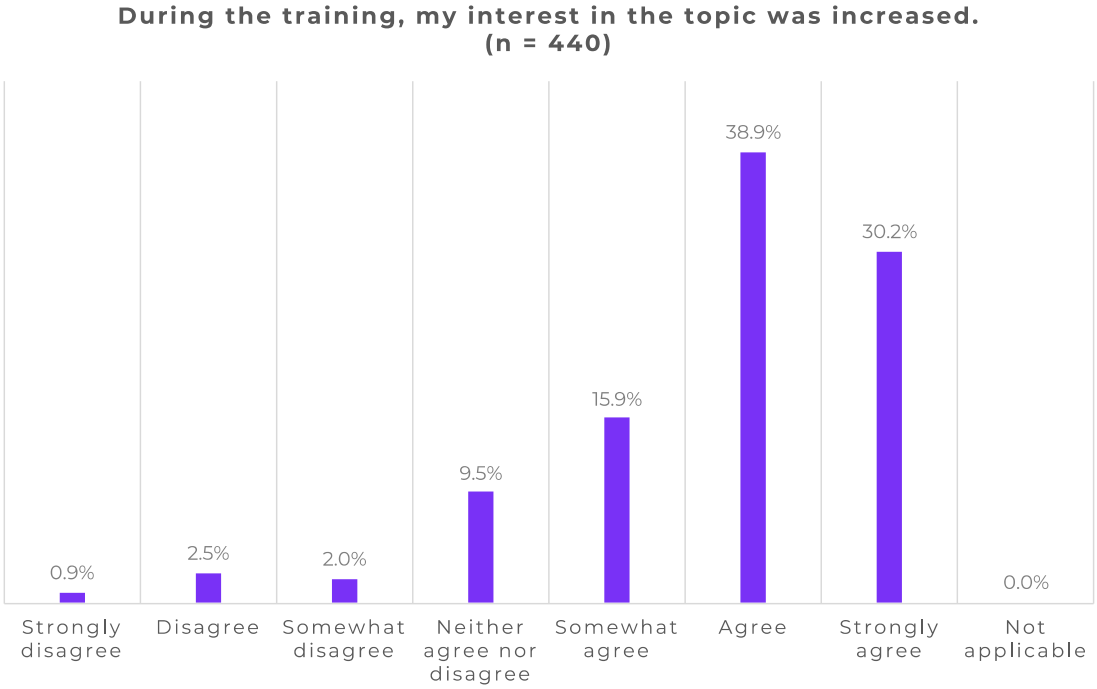


Figure 16. Overall sample responses to participant questionnaire, item 11.

When assessing their overall training experience, 41.8% agreed and 32.7% strongly agreed that the training was worthwhile, confirming that most participants considered the experience beneficial.

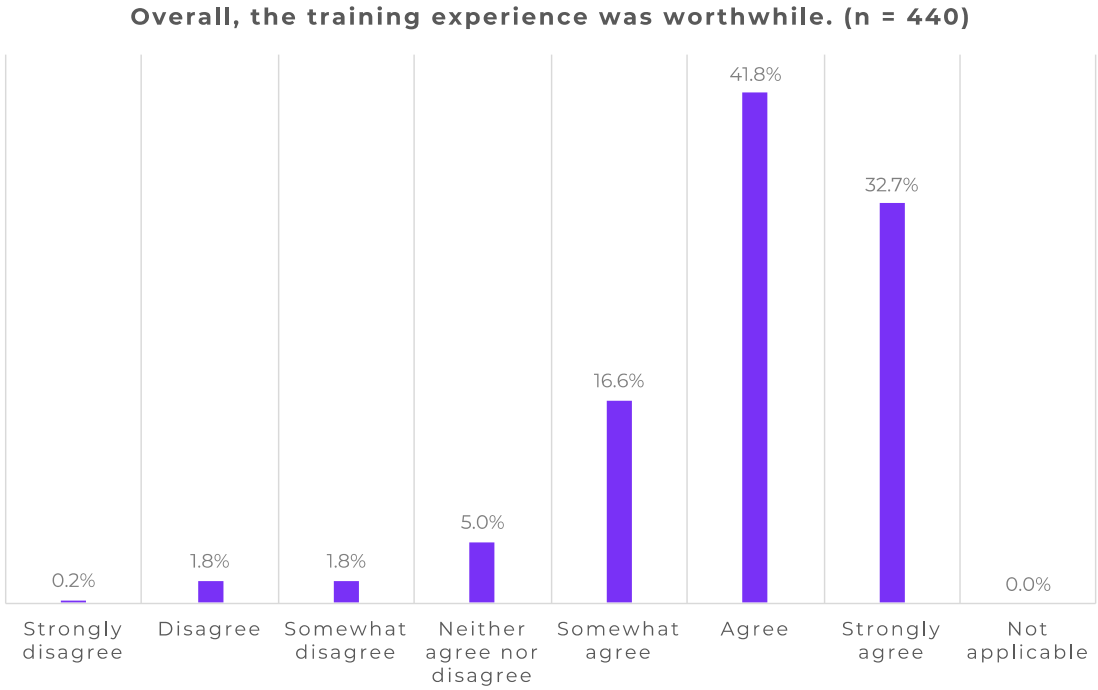


Figure 17. Overall sample responses to participant questionnaire, item 12.

Finally, satisfaction followed a similar pattern, as 47.5% agreed and 31.3% strongly agreed that they were pleased with the overall quality of the training.

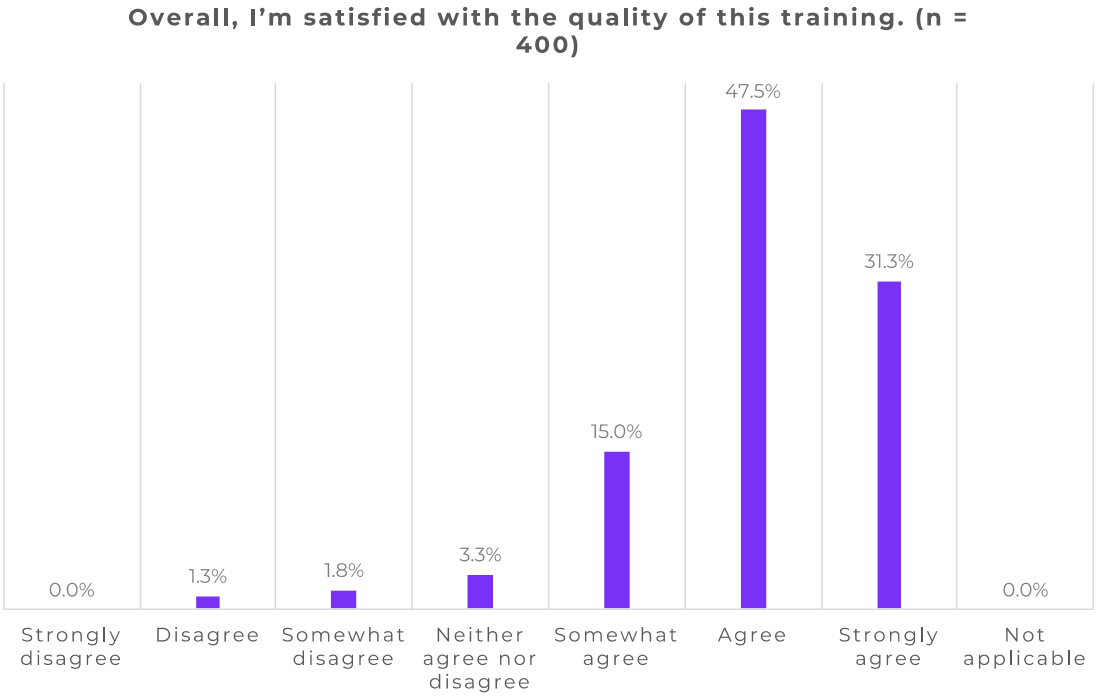


Figure 18. Overall sample responses to participant questionnaire, item 13.

Taken together, these findings suggest that the PATTERN trainings delivered relevant and engaging content, a clear learning environment, and a level of personal flexibility that met the needs of the majority of participants. Further, these findings suggest strong increases in interest and high satisfaction, supporting the conclusion that the PATTERN trainings were broadly effective across diverse contexts. This also supports wider application beyond the PATTERN pilot institutions.

To further investigate these results, we explored the extent to which different participant groups benefited from the trainings. In the following sections, we analyse questionnaire results according to the dimensions set out in the consolidated evaluation framework to identify both key opportunities and challenges across various groups and training characteristics. We highlight the most notable similarities and differences here and illustrate key findings with selected visualisations.

5.2.2 Responses by Gender

Overall, the different gender groups showed minimal differences for most questions, as indicated by similar median ratings. Though the variability of responses (MAD) sometimes differed, men, women, non-binary respondents, and those who preferred not to indicate their gender all generally recorded similar medians on key assessments of the trainings.

Differences emerged regarding the scope of topics covered in the trainings, whereby men and women both reported a median of 2, suggesting disagreement that the training tried to cover too many issues, while non-binary respondents perceived the scope of the training neither too positively nor too negatively. It should be noted that the non-binary group was extremely small compared to the other gender groups.

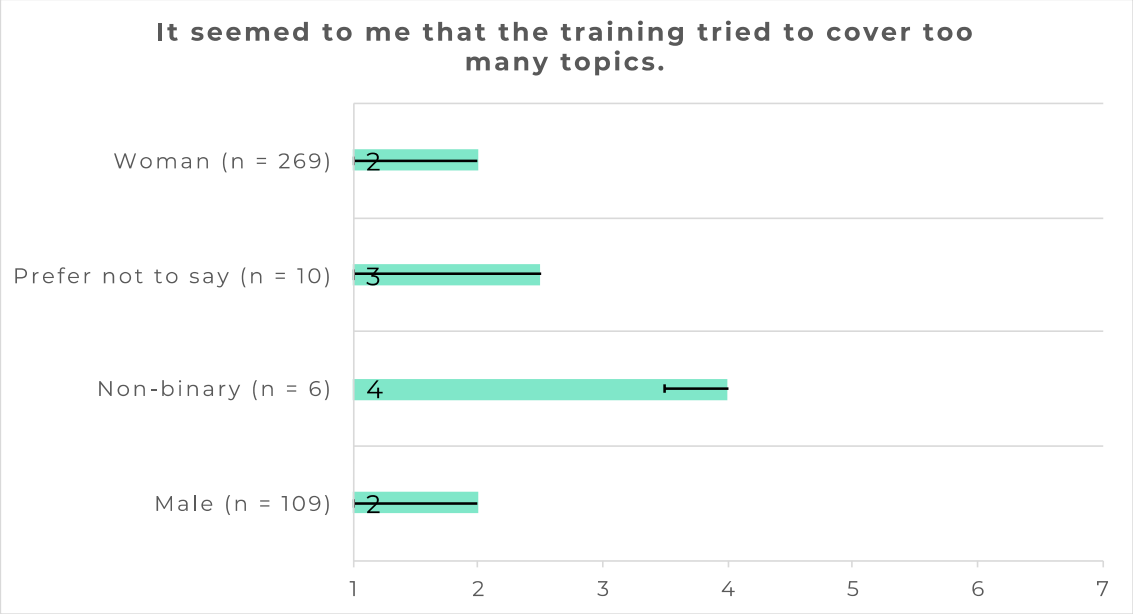


Figure 19. Responses to item 3 by gender.

Learning new concepts likewise scored a median of 6 across women and men, though non-binary participants as well as those who preferred to not indicate their gender reported less agreement that the training taught them new concepts (*Md* = 5).

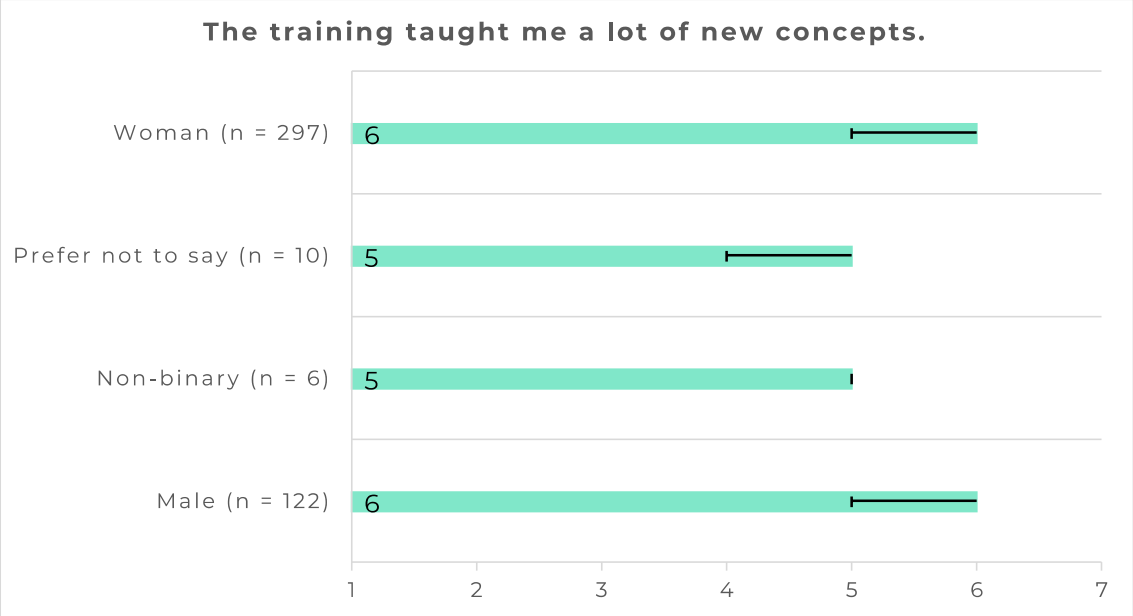


Figure 20. Responses to item 4 by gender.

Workload, flexibility, and structure commonly attracted a median of 6, indicating that participants, regardless of gender, felt the training was well organised and not unduly stressful.

Women stood out for a stronger perception of active engagement during the training (*Md* = 7), though other groups still gave positive medians of 6.

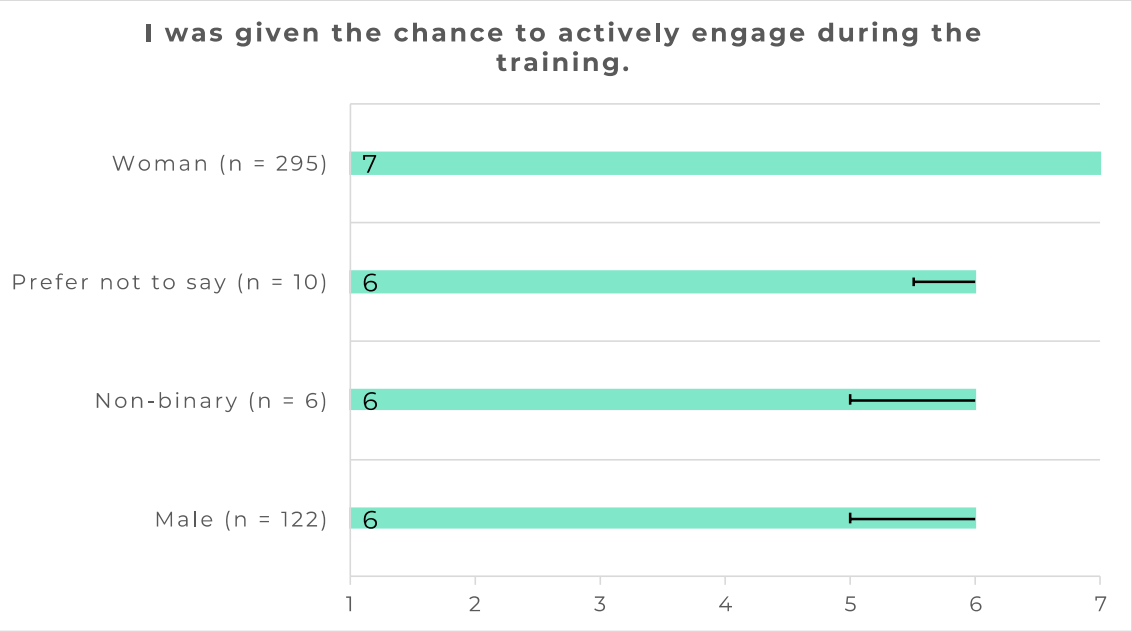


Figure 21. Responses to item 8 by gender.

Minor differences also emerged regarding increased interest in the training topic, whereby again non-binary participants and those who did not indicate their gender expressed slightly less support for the statement than women and men.

Although the few participants who identified as non-binary or preferred not to indicate their gender occasionally recorded somewhat lower or more varied scores, overall, the trainings were well received. This consistency underscores that, while

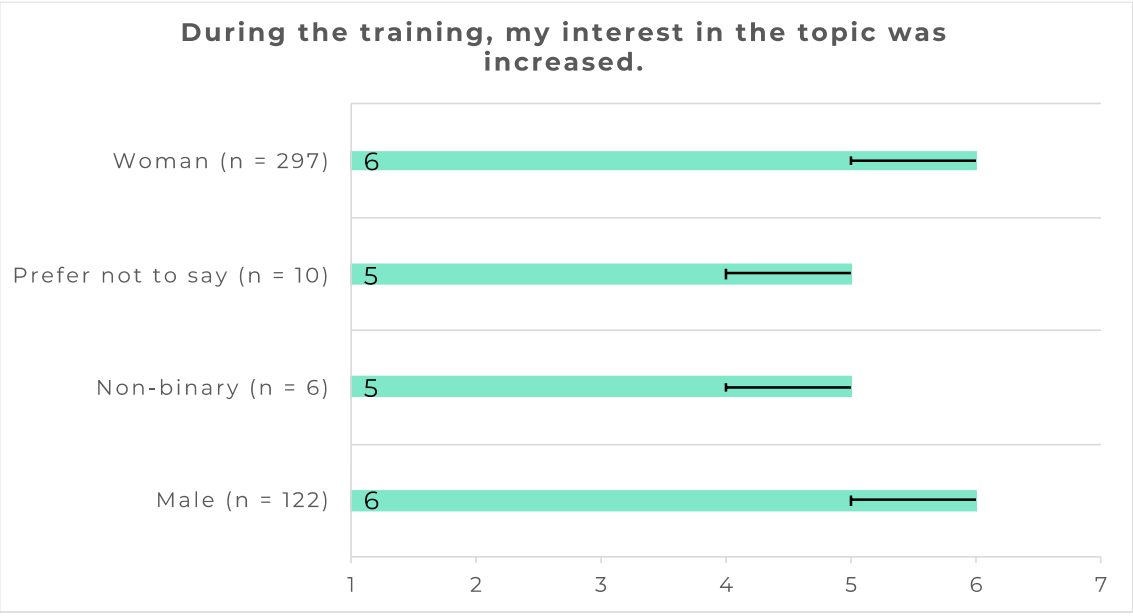


Figure 22. Responses to item 11 by gender.

minor group-specific differences exist, the training was broadly well received and beneficial across gender categories.

5.2.3 Responses by Disciplines

Across Arts & Humanities, Business & Economics, Engineering & Technology, Medical & Health Sciences, Natural Sciences, Social Sciences, and Other fields, participants generally gave high ratings, with most disciplines reporting median scores of 6 on a 7-point scale.

Social Sciences displayed especially positive feedback on clarity (*Md* = 7, other disciplines *Md* = 6), while the single respondent from Business & Economics also gave top evaluations across all questions. These findings suggest that clarity and currency consistently resonated with diverse academic groups.

On whether the course covered too many topics, most disciplines indicated medians of 2 or 3, suggesting that the scope of the trainings were acceptable. Engineering & Technology stood out with a median of 4, indicating they neither agreed nor disagreed with the statement that the training covered too many topics.

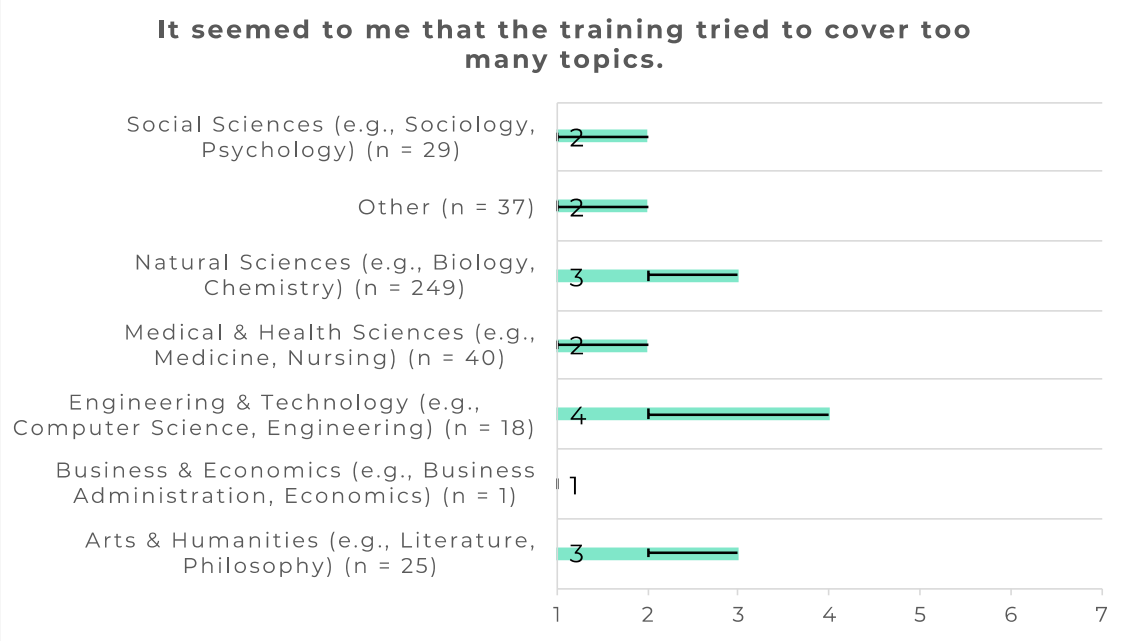


Figure 23. Responses to item 3 by disciplines.

Nearly every field reported a median of 6 for learning new concepts, and ratings on completing the training without undue stress were similarly positive. This pattern implies that the training managed to deliver substantial content without burdening participants, regardless of discipline.

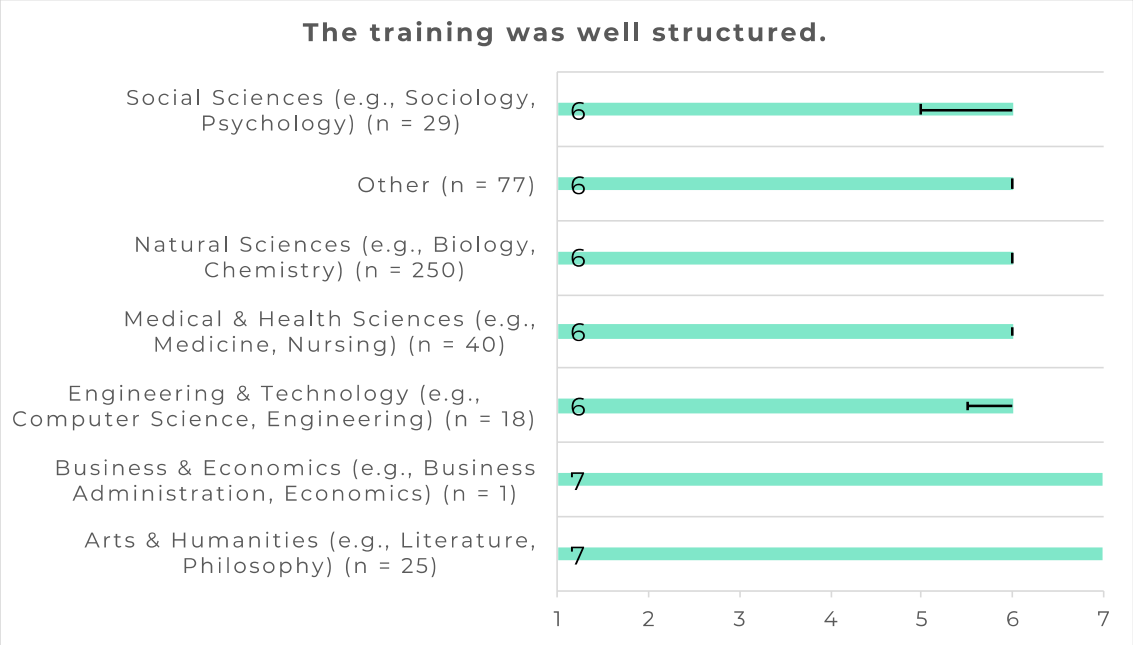


Figure 24. Responses to item 7 by disciplines.

Flexibility, structure, and engagement each recorded medians of 6 or 7, indicating broad satisfaction with the trainings across disciplines. Participants from the Arts & Humanities indicated particularly high ratings for structure (*Md* = 7), while other

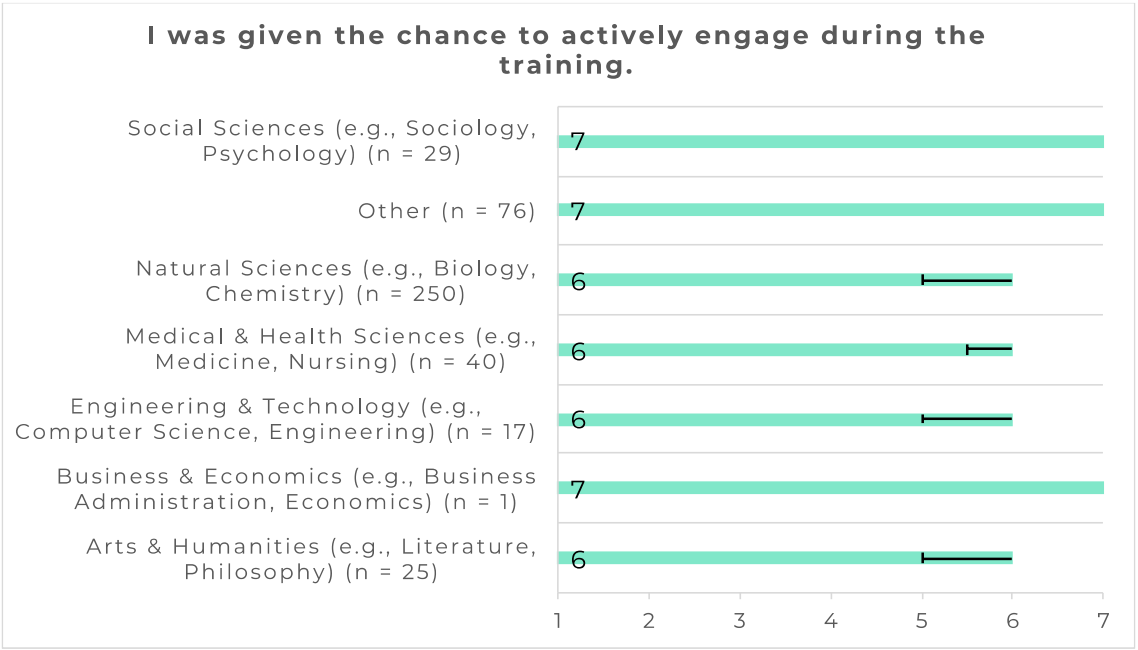


Figure 25. Responses to item 8 by disciplines.

disciplines and Social Sciences returned particularly high ratings (*Md* = 7) for active engagement.

Participants across disciplines disagreed (*Md* = 2) that aims and objectives were unclear and highlighted support for the online platforms (*Md* = 6).

Some variation emerged regarding increased interest in the topic of the training as well as for the value of the training experience, whereby "Other" and Business & Economics reported higher ratings compared to the other disciplines, which also showed more variation in their responses.

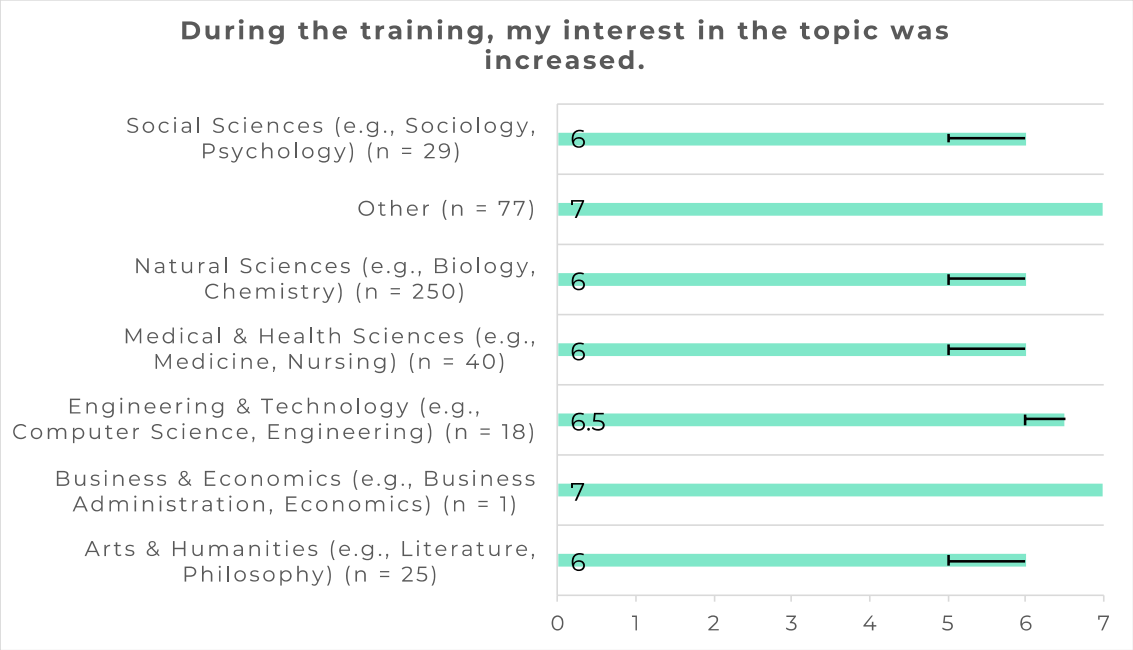


Figure 26. Responses to item 11 by disciplines.

Overall, these findings reveal that clarity, timely content, a balanced scope, and interactive structure facilitated participants' learning experiences across nearly every discipline. Some caution is warranted when interpreting the excellent ratings from Business & Economics, since this discipline was represented by only one person. Further, participants from Engineering & Technology tended to be slightly more critical in their training assessments. Yet, the overall findings suggest that the PATTERN trainings could meet the needs of a diverse academic audience and reaffirm that the trainings are beneficial across disciplinary boundaries.

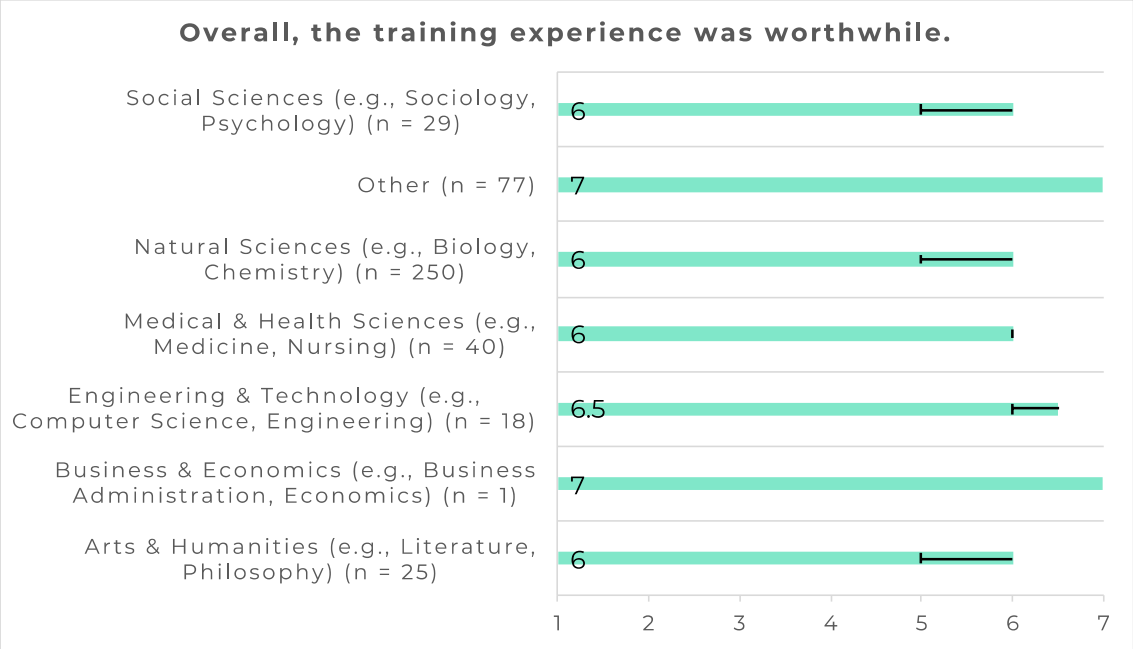


Figure 27. Responses to item 12 by disciplines.

5.2.4 Responses by Professional Background

Bachelor's students commonly rated the training at a median of 6 for clarity (*MAD* = 1), but they were slightly more varied in their views than doctoral students, who recorded the same median (6) with no variation (*MAD* = 0).

In addition, bachelor's students gave lower ratings (*Md* = 5) for learning new concepts and increased interest, suggesting a less pronounced experience of novelty or inspiration compared to master's students, librarians, postdoctoral researchers, and senior scientists or professors, most of whom reported medians of 6 or 7.

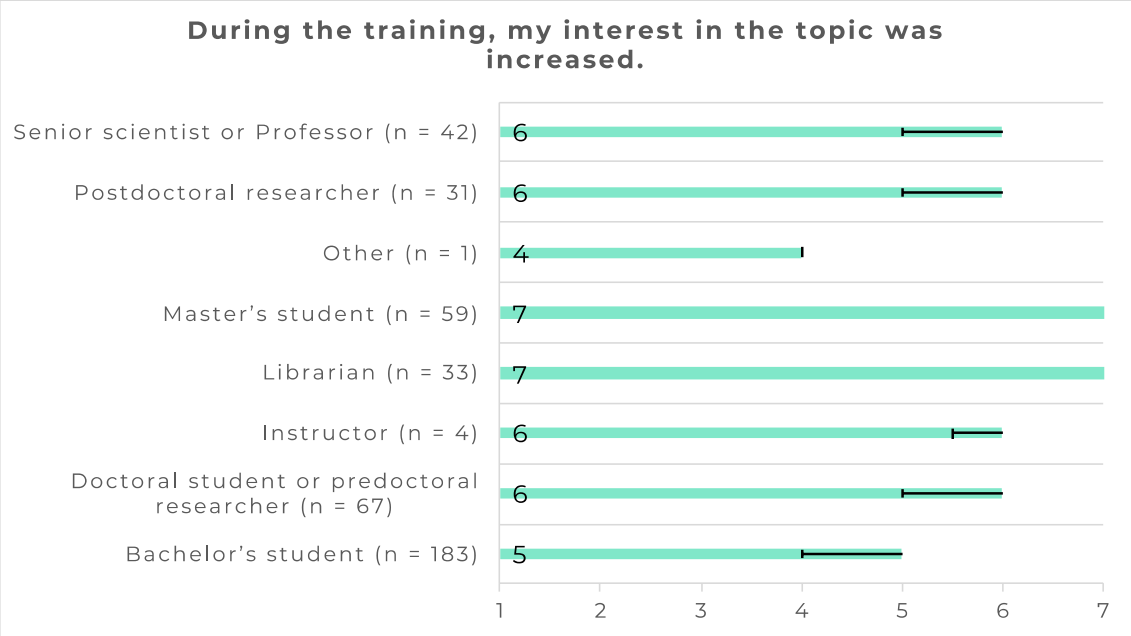


Figure 29. Responses to item 11 by professional background.

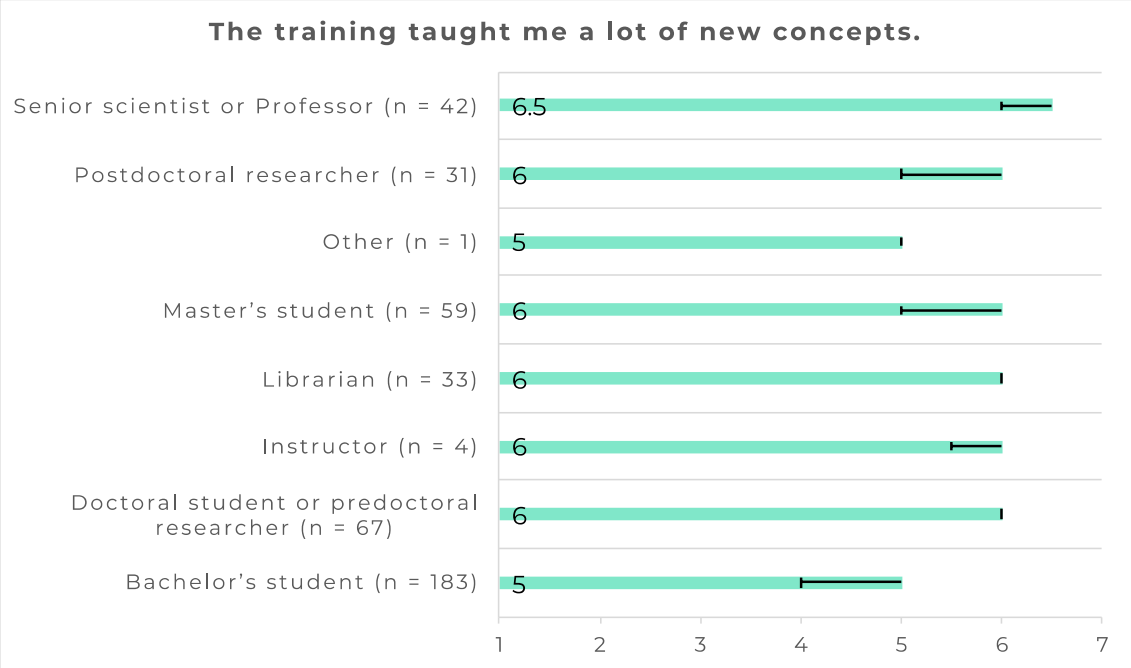


Figure 28. Responses to item 4 by professional background.

Further, senior academics stood out for giving excellent ratings (*Md* = 7) in areas such as clarity and worthwhileness, reflecting a particularly high level of satisfaction. By contrast, one "Other" participant offered an outlier perspective, rating clarity at 1

and also rating other aspects of the training with lower scores (e.g., *Md* = 4 for relevance and overall experience).

On the question of whether too many topics were covered, master's students showed slight agreement though with some variations in their views (*Md* = 5, *MAD* = 1). Bachelor's students tended to somewhat disagree with the statement (*Md* = 3, *MAD* = 1), whereas doctoral, postdoctoral, and senior respondents more strongly disagreed (*Md* = 2).

Across most groups, the training workload felt manageable, flexibility likewise scored 5 or 6, suggesting favourable impressions but with slight variations. The content structure was also rated positively, with the exception of the one "other" participant who gave a more negative assessment (*Md* = 4).

The change to actively engage during the training was also perceived as high, especially among master's students, librarians, postdoctoral researchers, and senior academics (*Md* = 7), while bachelor's and doctoral students giving slightly less positive ratings with more variations (*Md* = 6, *MAD* = 1).

In turn, particularly senior academics and librarians experienced the training as worthwhile (*Md* = 7), while other groups also indicated that the training provided a valuable experience with a median of 6 and slightly more variation; the "other" participant again provided a considerably more negative assessment than the other groups.

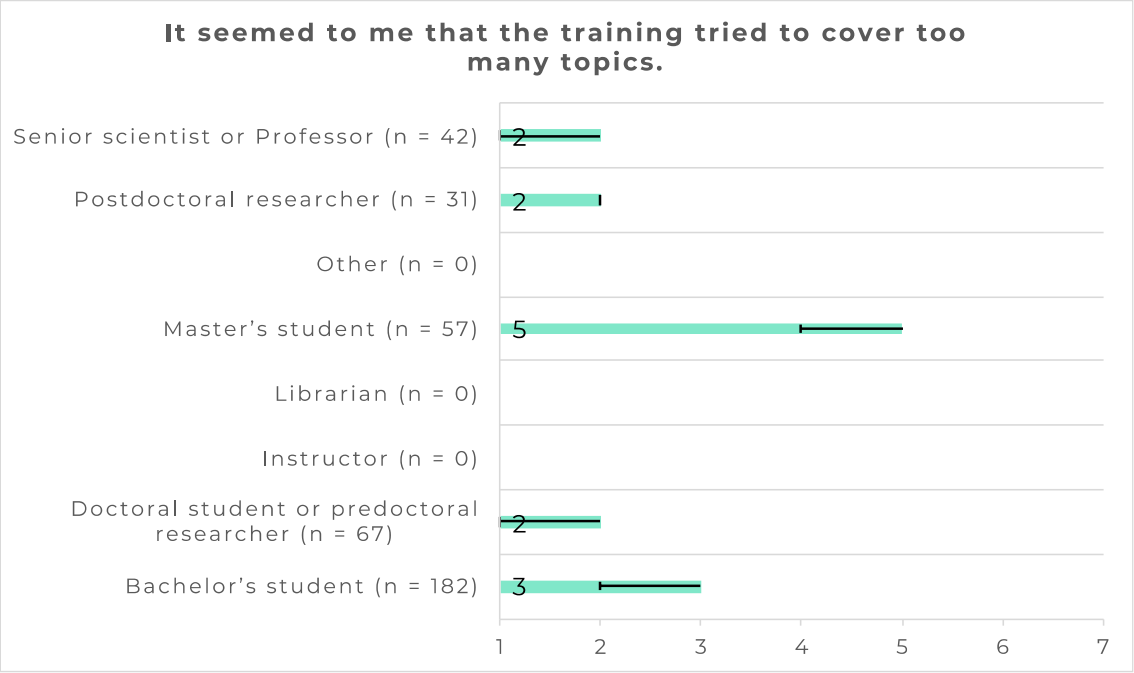


Figure 30. Responses to item 3 by professional background.

Taken together, these patterns indicate that although bachelor's or master's students sometimes found the content more extensive or less novel, all professional

backgrounds generally agreed that the training was well structured, relevant, and beneficial. At this point, we would like to note that bachelor's students were not the primary target group. Nevertheless, the trainings reached many bachelor's students. Despite the outlier in the "Other" category, overall, the responses show that the trainings succeeded in providing value across a wide range of career stages and professional backgrounds.

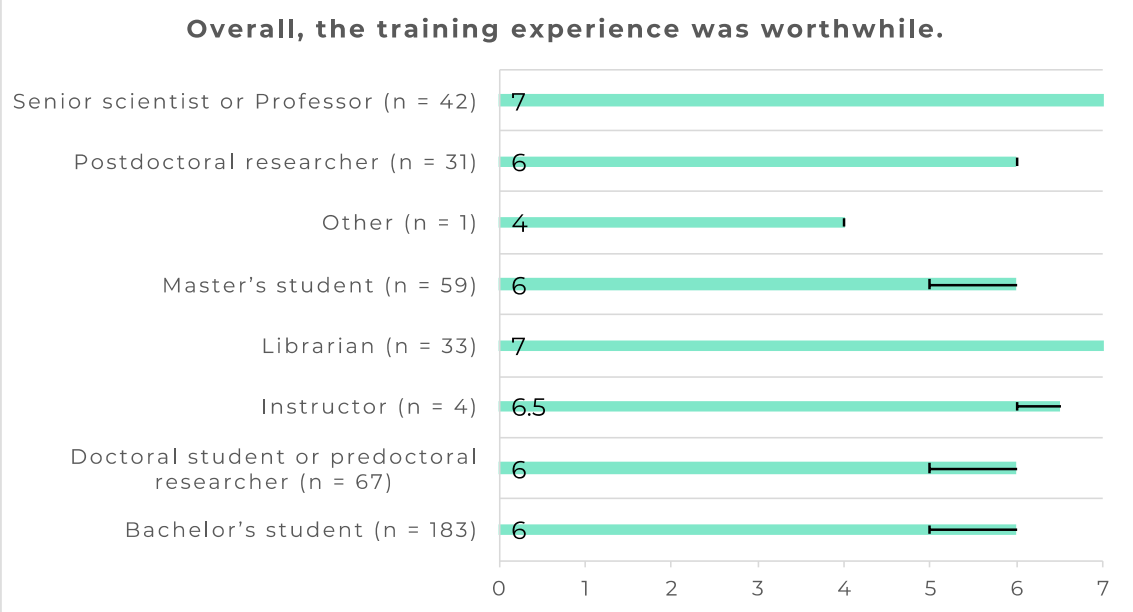


Figure 31. Responses to item 12 by professional background.

5.2.5 Responses by Themes

Overall, most aspects covered in the questionnaire received fairly similar, positive ratings across training themes, though some differences emerged.

Trainings covering the topic of Science Communication stood out as the most highly rated, frequently reaching the maximum median of 7. Participants found the content clear (*Md* = 6, *MAD* = 1) and highly relevant (*Md* = 7, *MAD* = 0), strongly disagreed that it covered too many topics (*Md* = 1, *MAD* = 0), and saw it as a source of new concepts (*Md* = 7, *MAD* = 0). It was also seen as highly flexible (*Md* = 7, *MAD* = 0), stress-free (*Md* = 7, *MAD* = 0), and well-structured (*Md* = 7, *MAD* = 0), leading to high satisfaction with the training experience (*Md* = 7, *MAD* = 0).

Open Access training followed closely in terms of perceived relevance (*Md* = 7, *MAD* = 0) and overall satisfaction (*Md* = 7, *MAD* = 0). However, its broader scope was noted as a potential drawback, with a median of 5 (*MAD* = 1) indicating agreement on the statement that it covered too many topics—higher than most other training themes, where medians typically ranged from 1 to 3.

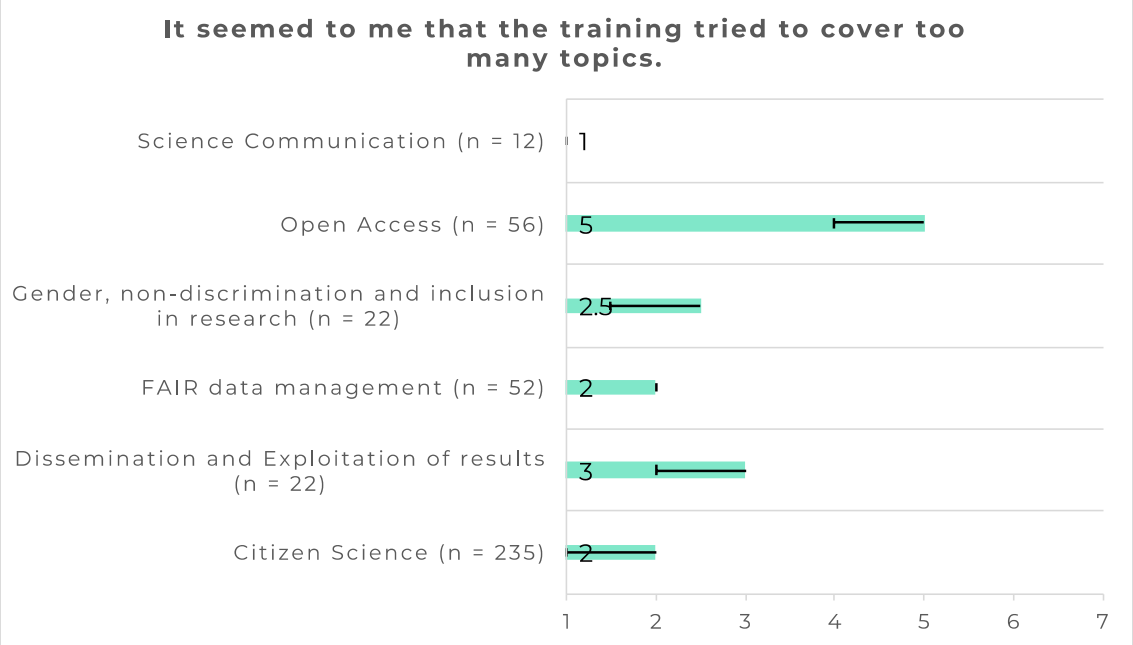


Figure 32. Responses to item 3 by training themes.

The FAIR data management trainings were also well received, aligning with Citizen Science and Dissemination and Exploitation in achieving medians of 6 for clarity, flexibility, and stress-free workload. Further, FAIR trainings stood out for their ratings on the overall training experience (*Md* = 7) and active engagement during the training (*Md* = 7).

Similarly, training on gender, non-discrimination, and inclusion recorded medians of 6 or 7, with strong ratings for structure (*Md* = 7) and increased (*Md* = 7).

Citizen Science trainings maintained consistently positive but slightly more moderate ratings compared to the other trainings themes, for instance learning new concepts (*Md* = 5, *MAD* = 1), while other aspects like training materials and online platforms were received similar to the other themes. This implies that the structure and implementation of Citizen Science trainings were well received while participants might have experienced the context as somewhat less novel or dynamic than other themes.

Trainings on the topic of Dissemination and Exploitation were well rated overall with medians generally at 6 and minimal variation of participants' responses.

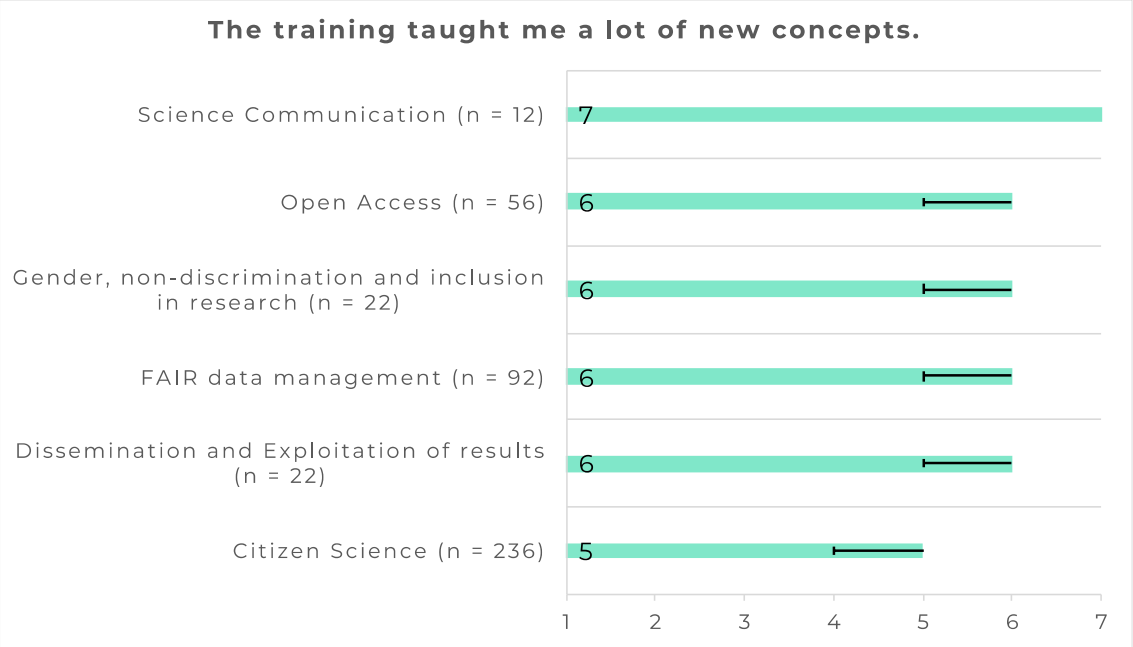


Figure 33. Responses to item 4 by training themes.

Across all themes, participants generally rejected the statement that the aims and objectives were unclear. The training materials were overwhelmingly seen as relevant and up to date, with the highest ratings again found in Open Access and Science Communication (both *Md* = 7). While all themes were well received, Open Access was perceived as covering more material than others, and Science Communication was seen as particularly engaging and conceptually enriching. FAIR data management also emerged as a particularly well-rated area, while Citizen Science, though positively received, appeared somewhat more evenly paced and less novel in its content. These patterns suggest that while all themes provided valuable experiences, Science Communication and Open Access training delivered the most consistently positive feedback, with FAIR data management close behind.

5.2.6 Responses by Formats

We also investigated differences across three different training formats: only online, only in-person, and hybrid. It should be noted that hybrid trainings include a considerably lower sample size than the other formats, and we also don't know how exactly participants in hybrid formats joined.

Hybrid, in-person, and online sessions all received broadly positive feedback, with median ratings of *Md* = 6 across most items. For clarity of training materials, all formats recorded *Md* = 6, though in-person training showed more variability (*MAD* = 1), whereas hybrid and online participants reported no variation (*MAD* = 0).

A similar trend emerged for relevance of training materials (*Md* = 6), though hybrid training (*MAD* = 0.5) and in-person training *MAD* = 1) exhibited slightly more variation

in responses, suggesting a broader range of opinions on the training materials among those attending in person.

The most notable difference between the different training formats appeared in perceptions of scope of the topics covered. In-person participants were somewhat more likely to feel that the training covered too many topics (*Md* = 3, *MAD* = 1), compared to hybrid and online learners, who disagreed more strongly (*Md* = 2, *MAD* = 0 or 1). This suggests that some in-person attendees found the training denser, while hybrid and online learners viewed it as more appropriately scoped.

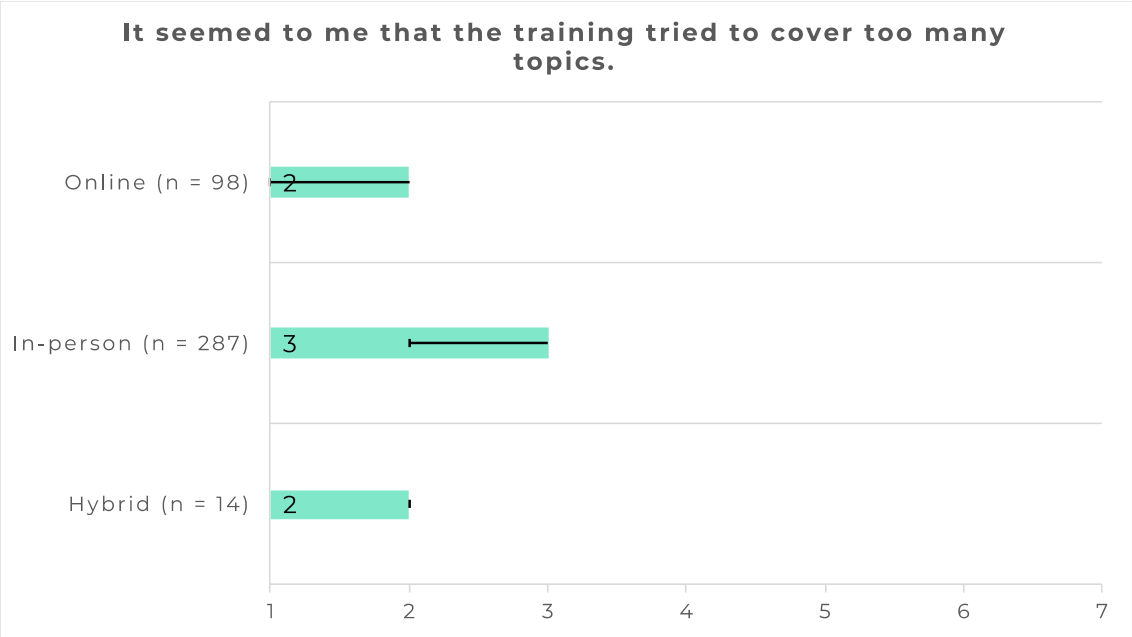


Figure 34. Responses to item 3 by training format.

Furthermore, hybrid participants had the impression that they learned slightly less new concepts (*Md* = 5, *MAD* = 1) compared to in-person and online learners (*Md* = 6, *MAD* = 1).

Despite these minor variations, participants in all three formats indicated that the workload was manageable (*Md* = 6), and flexibility was well rated across all formats, though in-person and hybrid formats showed slightly more variations in their opinions (*MAD* = 1).

Active engagement was most strongly felt in in-person sessions, which reached *Md* = 7 (*MAD* = 0), while hybrid and online participants rated engagement slightly lower (*Md* = 6, *MAD* = 1). This suggests that face-to-face settings provided a more consistently interactive experience.

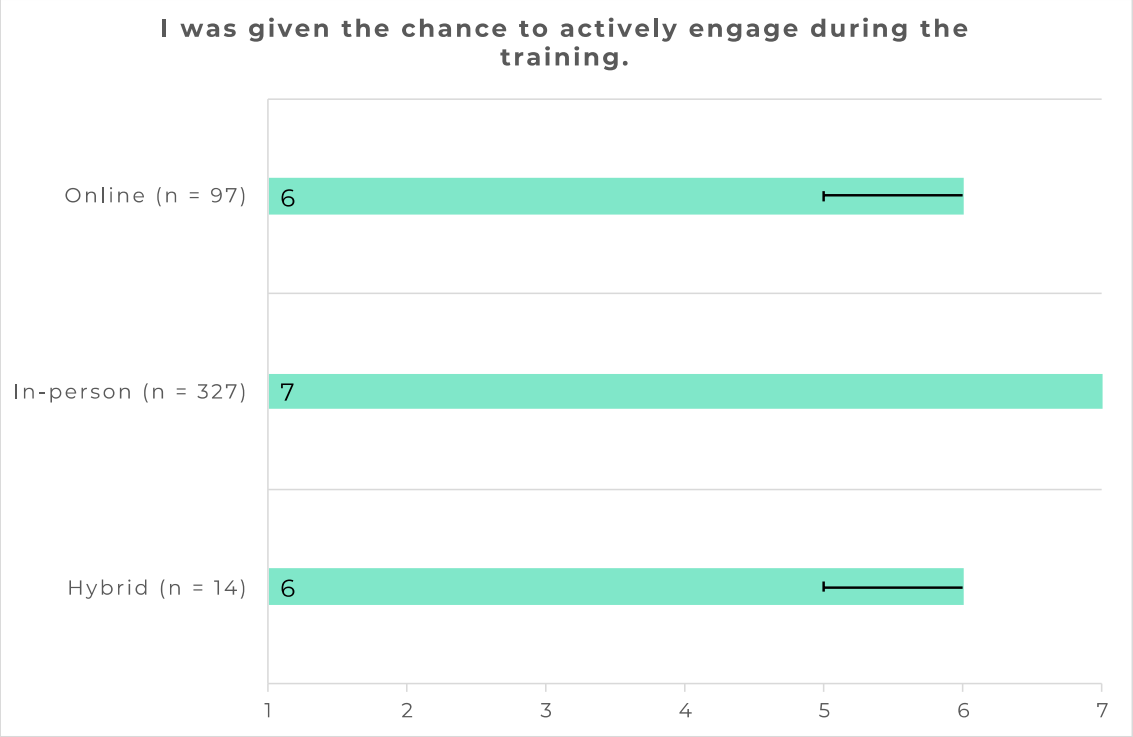


Figure 35. Responses to item 8 by training format.

All groups strongly disagreed that the training's aims and objectives were unclear (*Md* = 2), and participants in every format found the online platforms adequate for learning (*Md* = 6).

Hybrid learners reported the highest increase in interest in the topic (*Md* = 7, *MAD* = 0), exceeding both in-person and online groups (*Md* = 6, *MAD* = 1).

Perceptions of the training as a worthwhile experience were largely similar with *Md* = 6 for online and in-person formats, though hybrid participants again rated it slightly higher (*Md* = 6.5, *MAD* = 0.5). Overall, satisfaction with the training quality remained consistent across all groups (*Md* = 6), with minimal variation for each format.

These findings suggest that while all formats were well received, in-person training fostered the strongest engagement, while hybrid sessions generated the greatest increase in interest and highest sense of overall value. Further, hybrid learners showed the most enthusiasm for the learning experience. Across all modes, the training was seen as beneficial, flexible, well organised, and appropriately challenging.

5.2.7 Correlational Analysis

The table below provides an overview of Spearman correlations between the questions and different training characteristics for a final, more holistic analysis. We only interpret correlations significant at the p ≤ .005 (marked with an asterisk in the table).

Older participants rated the training more positively across multiple aspects. They perceived the materials as clearer (r_s= 0.31), the structure as more effective (r_s = 0.34), and the training as more flexible (r_s = 0.34). They also felt they learned more new concepts (r_s = 0.29) and found the online platforms adequate (r_s = 0.21). Interest in the topic (r_s = 0.41), overall worthwhileness (r_s = 0.47), and satisfaction (r_s = 0.41) similarly increased with participants' age. At the same time, older participants were less likely to find the aims and objectives unclear (r_s = -0.36), suggesting they found the training well-structured and easy to follow.

Further, we analysed the use of the Projects platform on the training level, indicating less favourable evaluations. Participants rated clarity (r_s = -0.30), structure (r_s = -0.34), flexibility (r_s = -0.31), and novelty of concepts (r_s = -0.34) lower and were less likely to find the training worthwhile (r_s = -0.49) or engaging (r_s = -0.14). Interest in the topic (r_s = -0.38) and satisfaction (r_s = -0.45) were also lower for those using this platform, indicating that it may not have been as effective for fostering engagement and might have confused participants.

The use of the OpenPlato platform on the training level showed no significant correlations with most aspects of the training, suggesting it did not strongly impact participants' perceptions either positively or negatively. Only perceptions of the overall trainings experience as worthwhile (r_s = 0.10), and satisfactory (r_s = 0.11) were impacted slightly positively.

The format of the training, whether in-person or online, showed only minor differences in training assessments. There was a slight negative correlation with flexibility (r_s = -0.11), indicating that online formats were perceived as somewhat more adaptable. In-person participants also experienced slightly less increases in interest (r_s = -0.12). However, no strong relationships appeared for other measures.

Larger training groups, however, were associated with lower ratings across multiple aspects. Clarity (r_s = -0.15) and relevance of training materials (r_s = -0.11), learning new concepts (r_s = -0.26), stress-free completion (r_s = -0.23), flexibility (r_s = -0.26), structure (r_s = -0.20), engagement (r_s = -0.13), clarity of objectives (r_s = 0.17), the perception of online platforms (r_s = -0.12), as well as valuing the training experience (r_s = -0.31) and overall satisfaction (r_s = -0.24) all declined as the number of participants increased. This suggests that larger groups may have reduced individual engagement and made the training feel less tailored to participants' needs.

Training length was positively correlated with many key measures. Longer trainings were perceived as using clearer (r_s = 0.35) and more relevant materials (r_s = 0.18), more structured (r_s = 0.40), and more flexible (r_s = 0.42). They also resulted in higher ratings for learning new concepts (r_s = 0.31), online platforms (r_s = 0.23), and overall

satisfaction (r_s = 0.42). Longer sessions were linked to increased interest in the topic (r_s = 0.38) and greater perceived worthwhileness (r_s = 0.45). Additionally, training length was associated with greater clarity of aims and objectives (r_s = -0.34), suggesting that extended sessions provided a more coherent learning experience.

Overall, these findings indicate that training experiences were influenced by session length, group size, and use of the Projects platform (but not OpenPlato). Longer trainings provided a clearer and more engaging experience, while larger groups appeared to reduce perceived effectiveness and learning outcomes. Trainings using the Projects platform were rated lower, possibly due to lack of previous user experience or platform usability. These results suggest that designing training sessions with smaller groups and longer durations could promote engagement, learning outcomes, and overall satisfaction. A surprising finding is that all aspects of the trainings were rated more positively if participants were older, which is in line with previous finding that students tended to assess their trainings slightly more negatively compared to more senior academics

	Age	OpenPlato	Projects	Format	Nr of participants	Length
The training materials were clear.	0.31*	0.05	-0.3*	-0.09	-0.15*	0.35*
The training materials were relevant and up to date.	0.18*	0.04	-0.18*	0.03	-0.11*	0.18*
It seemed to me that the training tried to cover too many topics.	-0.22*	-0.03	-0.02	0.04	0.15*	-0.12
The training taught me a lot of new concepts.	0.29*	0.05	-0.34*	-0.08	-0.26*	0.31*
I managed to complete the requirements of the training without feeling unduly stressed.	0.17*	0.01	-0.19*	0	-0.23*	0.21*
The training provided sufficient flexibility for my personal learning needs.	0.34*	0	-0.31*	-0.11*	-0.26*	0.42*
The training was well structured.	0.34*	0.04	-0.34*	-0.06	-0.2*	0.4*
I was given the chance to actively engage during the training.	0.15*	-0.02	-0.14*	0.05	-0.13*	0.1*
The aims and objectives of this training were NOT made very clear.	-0.36*	-0.09	0.31*	0.06	0.17*	-0.34*
The online platforms used in the training were adequate tools for learning.	0.21*	0.03	-0.25*	-0.05	-0.12*	0.23*
During the training, my interest in the topic was increased.	0.41*	-0.02	-0.38*	-0.12*	-0.21*	0.38*
Overall, the training experience was worthwhile.	0.47*	0.1*	-0.49*	-0.05	-0.31*	0.45*
Overall, I'm satisfied with the quality of this training.	0.41*	0.11*	-0.45*	-0.04	-0.24*	0.42*

*Table 5. Correlational analysis of training characteristics and questionnaire items. Format is coded as 1 (in-person), 0 (online); trainings which used the Projects or OpenPlato platforms were coded as 1. * indicates coefficients were significant at the p ≤ .05 level.*

5.3 Interactive Evaluation Activity: Results

A look at the images created with post-its on Miro, considering their positioning, shows that Category 3 (5.1 - 7.5) contained the most cards. This indicates that the majority of participants placed their agreement within this moderate-high range of the scale – reflecting positive evaluations, though not exclusively the highest level of agreement (10). This, in turn, suggests an overall predominantly positive approval across all areas.

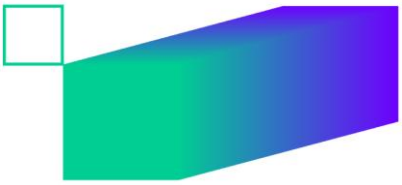
Figure 36. Graphical overview exemplifying post-its placements in interactive evaluation activity.

In the following sections the content (what participants have written on the post-its) was analysed according to the four main questions.

5.3.1 I ENJOYED THE TRAINING BECAUSE OF …

The trainings were widely perceived as valuable, engaging, and well-structured, with participants highlighting the clear progression of topics, the balance between theory and practice, and the interactive learning format. While a few adjustments in pacing and scheduling were suggested, the overall response was highly positive, with many participants expressing enthusiasm for applying what they learned in their professional and academic work.

Participants expressed high levels of satisfaction with the training, frequently highlighting the well-structured nature of the sessions and the balance between theoretical content and interactive elements. Many appreciated the logical progression from basic to advanced topics, describing the sessions as comprehensive and informative. One participant noted, "*It was a good progression to basic and advanced skills*" (4). The content was often described as clear, well-structured, and engaging, making it easy to follow and absorb. Some particularly valued the concise nature of the training, while others felt that certain topics deserved more time to be fully explored.



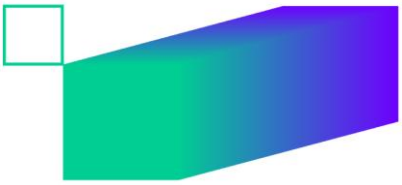
A recurring theme in the feedback was the relevance of the training to participants' professional needs. Several noted that the training introduced them to completely new concepts, particularly in areas such as Citizen Science, FAIR Data, and Open Access. For those already familiar with these topics, the sessions provided deeper insights and new tools that they could directly apply in their work. One participant reflected, "*I learned new things about Citizen Science. The concept is new for me*" (5). The presence of concrete examples and real-world applications contributed to a sense of practical usefulness. The sessions also helped participants identify useful resources, as stated in, "*It gave me a fresh reminder of all the previous knowledge I had over OA, and it gave me a couple of new websites to check that I didn't know before*" (6).

Engagement was another key factor in participants' enjoyment of the training. Many reported that the interactive format, including discussions, group exercises, and hands-on activities, made the sessions dynamic and stimulating. The exchange of ideas with trainers and fellow participants enriched the learning experience, particularly when discussions involved interdisciplinary perspectives. One participant highlighted, "*Possibility to participate actively and discuss in the small group" (17). Another stated, "Interdisciplinary participants from different cultures brought an interesting perspective to the discussion*" (17_AU). The workshops were described as creating a friendly and open atmosphere, where participants felt comfortable sharing their thoughts and asking questions. A participant appreciated the engagement of both trainers and attendees, stating, "*Because of pleasant working atmosphere, respect for all participants and their opinions, creativity in presentation and simulation of real problems*" (13). The ability to engage with knowledgeable trainers was particularly valued, as it helped clarify complex topics and facilitated meaningful discussions. One participant noted, "*The facilitators were very passionate and managed to address a wide range of concepts in a coherent manner, offering practical and concrete examples. Highly recommend*" (17).

While the majority of participants found the training highly engaging, a few noted that they would have preferred a slightly different structure. Some suggested that breaking down longer sessions into multiple shorter ones would have allowed for a deeper exploration of certain topics. Others mentioned that the timing of the training could have been more flexible to better accommodate their schedules, as one stated, "*I would have preferred for the presentations to be on the afternoons or on the weekends so that I am able to attend since I wouldn't be working*" (8). A small number of participants felt that their prior knowledge of certain topics made parts of the training less relevant, although they still acknowledged the overall value of the sessions.

5.3.2 THE TRAINING WAS USEFUL FOR ME AND WHY

The training was widely perceived as highly useful, particularly for those engaged in research, data management, and science communication. Participants valued the practical exercises, real-world applicability, and introduction to new tools and concepts. While some found certain aspects less relevant to their current work, the majority expressed appreciation for the clear structure, hands-on learning opportunities, and relevance of the content to their professional growth. The feedback suggests that future training sessions could benefit from deeper



discussions on exercises and tailored content for different participant backgrounds to enhance immediate applicability.

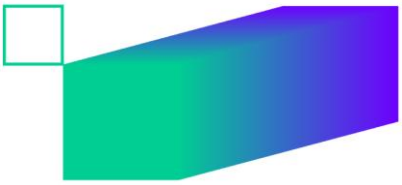
Participants provided varied perspectives on the usefulness of the training, with many emphasizing its practical application, the expansion of their knowledge, and its relevance to their work or research. The majority of responses reflect a strong appreciation for the training's content, structure, and interactive elements, while some participants noted that the training was less immediately relevant to their current work but still valuable in a broader sense.

A significant portion of participants found the training useful because it introduced them to new concepts and provided a structured way to learn about key topics. Several commented on how the sessions helped them build a solid foundation in FAIR Research Data Management (RDM), particularly through practical exercises and assignments. One participant noted, "*Great overview of everything concerning FAIR, links to sources, experiencing practice in assignments*" (4). Another participant stated, "*Building a solid foundation in FAIR RDM*" (4). The hands-on exercises were particularly appreciated, although some wished for more discussion of their answers. "*I liked the exercises so much, it helped me think of what we learned. I didn't like that we didn't discuss the answers*" (4).

For some, the training was especially relevant because it related to their current research or professional responsibilities. One participant working on a Citizen Science project stated, "*I am currently working on a project that involves people to collect precipitation samples for me, and so this helps me to know what to look out for*" (17). Another reflected, "*It was useful as I'm collaborating in designing a bird-window collision project and we wish to add a strong citizen science component to it*" (17). Several PhD students also noted the direct applicability of the training to their research: Others mentioned that the training provided useful resources for future research planning, such as "*Very possible that I'll start using repositories in the future*" (8) and "*Useful for future planning*" (17).

The practical applications of the training were another highly valued aspect. Many participants found that the training introduced new tools and strategies that they could use in their work. One participant emphasized, "*It helped me learn about tools related to preparing, publishing, and sharing data, making it FAIR*" (16). Another noted, "*I learned about Zooniverse and MICS and had nice discussions*" (17). Some appreciated how the training helped them better understand scientific communication and dissemination, with one participant stating, "*Because of the easily understandable way in which the most important aspects regarding presentation of scientific results to the broader audience were highlighted, I realized which aspects I have to work more on*" (13). Others highlighted the importance of learning how to handle toxic behaviour in scientific discourse, such as "*The training was useful for me because it gave me effective tools to address toxic behavior in everyday interactions, helping create a more respectful environment*" (20).

While most participants found the training useful, a few expressed mixed opinions about its immediate relevance to their work. One participant remarked, "*Not especially applicable. Interesting knowledge and method*" (5), while another noted,



"*But not relevant. It was nice to know*" (5). A small number of participants felt that the training did not significantly expand their knowledge, as one stated, "*I did not feel as if I learned anything*" (5), and another commented, "*It didn't add a lot more to what I knew*" (12). However, even in these cases, most acknowledged that the training still provided valuable perspectives or reaffirmed prior knowledge.

5.3.3 I COULD GAIN NEW SKILL AND WHICH

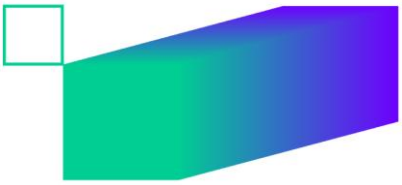
The responses indicate that the training was highly effective in providing practical skills for data management, citizen science, and science communication. Many participants gained concrete abilities in FAIR data handling, Open Access tools, citizen engagement, and scientific communication strategies. While some participants felt that they gained knowledge rather than hands-on skills, others emphasized that the training expanded their professional capabilities and provided useful resources for future application. The feedback suggests that including more hands-on exercises, interactive discussions, or simulations could enhance skill-building opportunities in future training sessions.

The responses regarding newly acquired skills show a diverse range of experiences, with some participants gaining practical skills directly applicable to their work or research, while others felt that they acquired knowledge rather than hands-on skills. The level of skills gained largely depended on prior knowledge, engagement with the exercises, and the specific training topic.

Many participants gained skills related to FAIR data management and Open Access tools. Several noted that they learned practical steps to make research data FAIR and how to work with repositories and Data Management Plans (DMPs). One participant stated, "*Background on FAIR, lots of useful tips on how to make data FAIR*" (4). Another highlighted the importance of metadata and proper data organization, noting, "*I familiarized myself with reading metadata and the application of the FAIR principles in them. Also important that we saw how DMPs are made and how to better manage our planning from the start*" (8). Some felt more confident applying these skills in practice, with one participant emphasizing, "*Now I feel ready to use the DataRepositoriUM and prepare research FAIR*" (16). Others appreciated gaining insight into new tools and databases that they could use in their work, "*New tools to check OA availability*" (6).

For some, the training provided important methodological knowledge, particularly in designing or evaluating Citizen Science projects. Several participants highlighted their new ability to identify relevant Citizen Science initiatives, with one stating, "*Finding Citizen Science projects*" (5). Others gained skills in recruiting and engaging participants, such as "*Application and strategies for citizen recruitment*" (5). A participant working in this field noted that they now have a better understanding of how to integrate public and patient involvement into research, "*Citizen science, public and patient involvement in my research project*" (18). Some also emphasized the importance of considering participant motivation, stating, "*Participant motivation is key! Never thought about that before*" (18).

For those focused on science communication and public engagement, the training provided valuable skills in writing, presenting, and interacting with diverse audiences. Many participants appreciated learning how to tailor their



communication depending on the audience and medium. One participant noted, "*Ability to adjust the content to different audiences, how to make complex matter understandable to a wider audience, proactive approach during interviews*" (13). Another highlighted the importance of presentation skills, stating, "*Preparing presentations for different audiences, writing popular summaries, preparing for interviews, focusing on the message, being positive and open, using AI tools in writing*" (13). The training also helped participants improve their ability to engage in media interactions, with one participant emphasizing, "*How to stream interviews in a desirable direction, how to present to a broader audience*" (13).

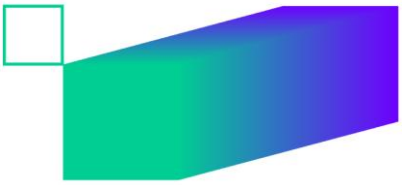
In some trainings, actual skills were not conveyed, but rather theoretical content, which was sometimes criticised. A few noted that the training provided useful information but was not necessarily skill-building. One participant stated, "*Not actual skills*" (5), while another remarked, "*We can't do anything now that we couldn't do before*" (5). Some participants, particularly those with prior experience in the subject matter, felt that the training mainly reinforced what they already knew rather than introducing new competencies, "*Was already familiar with theory, so mainly gained in practicing*" (4). Others expressed that the training opened up opportunities for learning rather than directly providing skills, with one participant stating, "*More opportunities than skills*" (5).

5.3.4 I WILL APPLY WHAT I HAVE LEARNED IN PRACTICE

The training provided valuable, practical knowledge that participants intend to integrate into their research, data management, scientific communication, and Citizen Science projects. Many participants found direct applications, particularly in FAIR data principles, Open Access publishing, research dissemination, and participant engagement. While some remained unsure about immediate application, the training has clearly influenced their awareness and future considerations. The feedback suggests that providing follow-up resources, case studies, and continued support could enhance long-term integration of these skills into professional practice.

Participants provided diverse perspectives on how they plan to apply what they have learned, with many identifying concrete steps for integrating training insights into their professional or academic work. Others indicated potential future applications, while some remained uncertain about how immediately relevant the knowledge would be to their current roles.

A significant number of participants emphasized practical applications in data management and research practices. Several stated their intention to integrate FAIR data principles into their work, including setting up Data Management Plans (DMPs) and ensuring proper data storage and sharing. One participant noted, "*I will set up a DMP for our group incorporating what I learned here*" (4). Another emphasized, "*Can't wait to apply what I've learned in my research life. Mainly, to be able to produce FAIR data myself and transmit this practice to those around me*" (8). Others planned to apply best practices in Open Access and data repositories, such as "*I will apply the knowledge to deposit the research data from the Marie-Curie project*" (16).



For those involved in Citizen Science, the training inspired them to engage more actively in participatory research. Several participants expressed interest in starting or participating in Citizen Science projects, stating, "*Possibly sign up for a Citizen Science project*" (5) and *"I'll try to start my own Citizen Science project, also in collaboration with colleagues from my lab*" (17). Others mentioned that they would apply methods for participant engagement and communication, particularly in ensuring effective training and motivation of volunteers. One participant reflected, "*How to contact volunteers and how to train them*" (18), while another noted, "*I will apply/suggest what I learned today with the team on the project I'm collaborating in order to maximize the principles covered for Citizen Science, particularly involving participants since the design stage*" (17).

Some participants saw direct applications in academic publishing and dissemination strategies. Several noted plans to apply Open Access principles in their publishing work, with one stating, "*Look for Full OA journals in my field of research*" (6). Another mentioned, "*I will apply what I have learned during self-archiving*" (6). Others planned to integrate structured communication strategies into grant writing and research dissemination, such as "*I will try to apply to the next project I will write, and now to the project I have just won to improve dissemination and communication*" (12).

For participants engaged in scientific communication and public engagement, the training provided concrete techniques that they plan to implement in their professional interactions. Many participants highlighted interview preparation, message structuring, and audience engagement as key takeaways. Additionally, some participants saw applications in creating impactful research summaries and engaging broader audiences, as noted by one participant: "*Preparation of presentation and popular summary, focus on the main message*" (13).

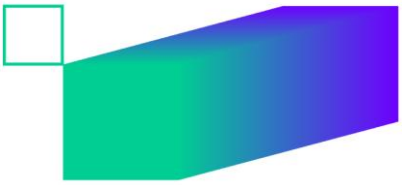
While many participants provided concrete applications, some remained uncertain about how they would implement what they learned. A few expressed that they might apply the knowledge in the future if they enter a relevant field, with one stating, "*Maybe when we become researchers ourselves*" (5). Others were less confident in finding an immediate application, such as "*We don't know if we can use it in our future careers*" (5) or "*We cannot imagine using the skills obtained in this training*" (5).

5.3.5 IDEAS FOR IMPROVEMENT

Participants provided constructive feedback on areas where the training could be improved, with suggestions focusing on time management, audience relevance, accessibility of materials, and the inclusion of more practical insights. While some participants expressed that they were satisfied with the training as it was, others suggested adjustments to enhance the learning experience.

5.3.5.1 Time Management and Scheduling

Some participants noted that the length of the sessions affected focus and engagement, suggesting that a more condensed schedule would be beneficial. One participant stated, "*Focus would be better if it didn't go until 5 o'clock*" (5). Another pointed out that the duration was justified given the breadth of topics covered, "*The*



time is okay because there are too many topics" (6), suggesting that while the training was intensive, the volume of content warranted the time allocated.

5.3.5.2 *Enhancing Interactivity and Practical Insights*

Several participants suggested ways to make the training more engaging by adding real-world applications and interactive elements. Some wanted to see completed case studies and their impact, stating, "*Hear about completed projects and whether it helped to use the population*" (5). Others suggested improving participation in gamified learning activities, with one participant proposing, "*Participation in the game (Stallcatchers) would be more attractive if we could read about the results*" (5).

A few participants highlighted the importance of practical exercises and resources, requesting self-paced learning options and a structured list of useful links. One participant suggested, "*Practice in a self-paced way*" (6), while another emphasized, "*To give a list of links*" (6). These comments suggest that providing additional resources for independent study could enhance the learning experience beyond the live sessions.

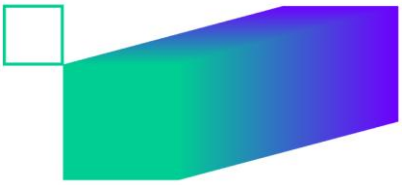
5.3.5.3 *Relevance of Audience and Content*

Some participants expressed that the training could be more targeted toward specific disciplines, recommending a more relevant audience selection. One participant suggested, "*Find a more relevant audience (e.g., biologists or archaeologists)*" (5), implying that tailoring content to different scientific fields could improve applicability. Another participant noted that some attendees may not yet have had the necessary background in research, stating, "*We don't have a full idea of science and research yet*" (5), suggesting that some foundational concepts might need to be covered beforehand for certain groups.

5.3.5.4 *Material Distribution and Platform Optimization*

A few participants commented on the distribution and accessibility of materials, noting that physical printouts were unnecessary if slides were already available. One participant stated, "*No need for print. We have the slides*" (5). Others suggested that knowing the web resources in advance would have improved preparation and engagement, with one participant stating, "*It would have been an advantage to know the web resources in advance*" (5).

There was also a suggestion regarding improving interaction on the PATTERN platform, where one participant recommended, "*Remove other people's answers from the comments on PATTERN*" (5), indicating a possible need for more structured or private feedback mechanisms.



5.4 Facilitators' reflections: Results

5.4.1 Training Accessibility

The data suggests that the training sessions were generally accessible to participants, with structured content, practical applications, and participant background knowledge contributing to engagement. Reports indicate that progressive content structuring, real-world relevance, and prior exposure to the topic were key factors in ensuring accessibility. However, challenges related to specialized terminology, platform usability, and the relevance of certain theoretical discussions were noted.

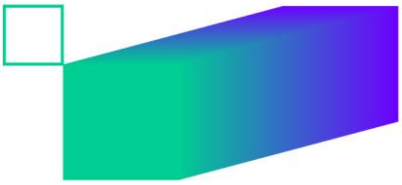
Trainers assess that incremental learning structures significantly enhanced accessibility. Reports highlight that when training was divided into multiple sessions—starting with an introductory webinar followed by a more advanced discussion—participants were able to build on prior knowledge, making it easier to engage with the material (17 & 18). Similarly, the five-session structure of FAIR RDM training allowed early-career researchers with little prior knowledge to gradually absorb concepts, improving accessibility (8).

Reports also indicate that prior knowledge contributed to accessibility. In several cases, participants had already been introduced to key concepts in previous lectures or professional contexts, which made engagement easier. For instance, in a citizen science training, some participants were already running public participation projects, making the material directly relevant to their work (3, 7). Similarly, trainers state that scenario-based learning helped participants apply theoretical concepts more effectively, particularly for those with PhD-level academic backgrounds (27, 28).

The reports suggest that practical application of concepts improved accessibility. Trainers assess that workshops incorporating real-world case studies, hands-on exercises, and discipline-specific examples were particularly effective in making abstract concepts more tangible. Training sessions involving data management plans (DMPs) and ReadMe files were found to be directly relevant to researchers, increasing engagement and accessibility (16). Similarly, in the proposal writing and research communication training, the Day 1 introduction ensured that the more advanced Day 2 content was accessible and built upon familiar concepts (14).

However, trainers also identify challenges affecting accessibility. Reports indicate that specialized terminology posed difficulties, particularly in training sessions that involved linguistic or philosophical frameworks unfamiliar to some participants (20). In addition, the level of detail in certain content areas posed a challenge. In the FAIR RDM training, while the broader discussion provided a comprehensive overview of the topic, some details were not immediately actionable for researchers, making it harder for them to apply the concepts to their work (4).

Technical accessibility was also identified as an issue, particularly regarding platform usability. Some reports highlight that participants struggled with authentication and navigation on platforms such as Projects, whereas OpenPlato had a smoother authentication process (25, 26).



5.4.2 What was useful, what was difficult

Overall, the training sessions demonstrated strong engagement, particularly when interactive and hands-on elements were integrated. However, technical challenges, low online participation, and time constraints often hindered the effectiveness of the sessions.

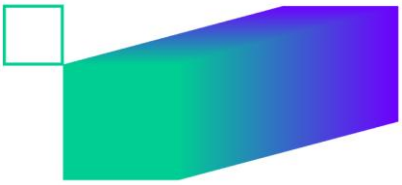
A key strength of the training sessions was their interactive nature, which encouraged active participation. Elements such as case studies, practical exercises, and group discussions were frequently praised for helping participants apply theoretical concepts in meaningful ways. The World Café sessions were particularly effective in allowing participants to consolidate insights from the workshop day and explore future collaboration opportunities (7). Similarly, the breakout rooms successfully engaged participants in discussions, though facilitators noted the importance of ensuring at least three participants per group to maintain dynamic interaction (17 & 18).

Hands-on activities were especially well received, as they helped participants apply abstract concepts. The practical exercises on data management plans (DMPs), ReadMe File exercises, and working with data in publications were identified as highly useful tools for reinforcing key concepts (16). Likewise, the integration of real-world examples in FAIR principles training allowed participants to see direct applications of theoretical content (8). The Train-the-Trainer pilot recordings were another valuable resource, allowing trainers to reuse pre-prepared materials efficiently. However, some facilitators suggested that a structured presentation script would be even more useful than relying solely on recorded materials (23).

The quality of the training materials was also highlighted as a strong point. Several trainers noted that the materials were well-structured, clear, and relevant, making it easier for participants to follow complex topics (19, 21). For example, the case studies used in AU sessions were described as particularly engaging and led to high levels of participant involvement (5, 15). However, some trainers felt that the training materials, while generally well-prepared, needed additional customization to fit specific participant needs (19).

Despite these strengths, trainers faced various challenges in implementation. One of the most frequently mentioned difficulties was engaging participants in online or hybrid formats. In several cases, participants kept their cameras off, avoided interaction, and did not respond to direct questions, which forced facilitators to introduce polls and alternative engagement strategies (6). In hybrid settings, interactive elements were difficult to implement for online participants due to the lack of dedicated online facilitators (7). As a result, many online participants disengaged early, particularly when evaluation activities were scheduled at the end of the session (27, 28).

Time management emerged as another recurring challenge. Several trainers had to reduce content to fit within session timeframes, sometimes skipping valuable exercises or discussions to ensure completion (4, 16). In some cases, the interactive exercises embedded in PowerPoint presentations took longer than expected, requiring trainers to omit or modify activities (16). Additionally, the time investment



required from participants was a barrier, particularly for researchers who had to balance training with other academic and research responsibilities (4).

5.4.3 Engagement of participants

Trainers generally report high levels of engagement, with many sessions characterized by lively discussions and active contributions. Some describe participants as very engaged, citing interactive sessions, World Café discussions, and case study-based group work as particularly effective in facilitating participation (7, 5, 3, 15, 13). In some cases, structured tasks, such as presentations and guided activities, ensured consistent engagement throughout the sessions (13, 19).

Reports also suggest that group work played a crucial role in engagement. For example, in one session, students worked in small groups (2–4 participants) to analyse a citizen science case study, engaging in discussions both within their groups and in plenary (3). Similarly, in problem-based learning (PBL) assignments, engagement was high, with more experienced participants taking on leadership roles to guide others (8).

Trainers note that in-person engagement was consistently strong, while online engagement was more challenging to assess. Some trainers describe online participants as engaged and actively contributing, with discussions observed in chat functions (4). Others report that online participants responded well to interactive elements, such as questionnaires (e.g., using Particify) and breakout room activities (4).

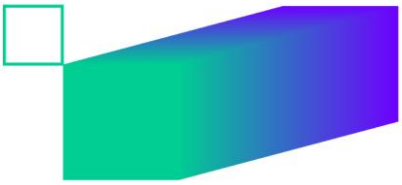
However, multiple trainers highlight low engagement in online and hybrid settings, where interaction was often limited or non-existent. In some cases, “not a single question was asked, and no participant turned on their camera”, making it difficult to gauge whether the content was being absorbed (12). Some sessions experienced a complete lack of interaction, with no discussion taking place (6, 14).

Reports also indicate that technical issues in hybrid settings affected participation, with in-person attendees struggling to interact effectively with online participants (20).

5.4.4 Tools performance

The Projects platform, in particular, was found useful for sharing case study descriptions, tasks, and discussion questions (17 & 18). In some cases, it successfully enabled participants to access materials and complete tasks (15). Similarly, OpenPlato was noted as a satisfactory self-paced learning tool, with participants expressing positive feedback on its content and usability (22).

However, the reports also highlight several challenges and limitations. Trainers indicate that enrolling students onto digital platforms like Projects was difficult, suggesting that authentication and access processes need improvement (25, 26). Additionally, while the Projects platform functioned well for sharing content, its interactive features, such as the comment function, were underutilized, with participants not actively engaging in discussions via the platform (4, 8).



One notable issue was the difficulty of integrating and navigating the Projects Platform. Reports indicate that most participants preferred alternative communication methods rather than using the comment section, which was primarily utilized for administrative queries. Additionally, the platform's lack of a search index or table of contents made it cumbersome to find specific information, reducing its efficiency as a reference tool. Trainers also note that students struggled with enrolment, further suggesting the need for a more streamlined registration process with direct navigation links (4, 25).

Several trainers also report issues with tool integration and usability in live sessions. One report suggests that the OpenPlato self-paced course was not ideal for presentation purposes, as slides would have been a more effective format for in-session learning (6). Another trainer notes that while Projects allowed for feedback collection, it was difficult to highlight key comments, making the discussion flow less structured (3).

In certain workshops, the Projects platform was only used as a repository rather than a space for live engagement, reducing its effectiveness as a collaborative tool (14). Some sessions opted to minimize tool usage altogether to avoid potential disruptions, instead relying on standard formats such as email distribution of materials (13).

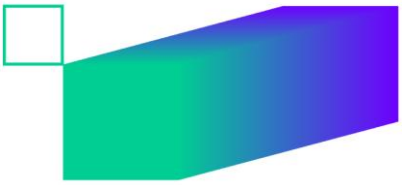
Reports also indicate that several trainers chose not to use digital tools, either because their training format did not require them or due to concerns about usability (19, 27, 28, 20, 23). In these cases, traditional methods of content delivery, such as face-to-face discussions and email distribution of materials, were preferred over digital alternatives.

5.4.5 Uncertainties

The data suggests that overall, few uncertainties arose during the training, with multiple trainers explicitly stating that they did not observe any major issues or confusion among participants (Reports: "None," "No uncertainty arose," "N/A") (24, 16, 19). However, specific uncertainties were identified, particularly concerning the applicability of certain practices, engagement with training tools, technical terminology, and the effectiveness of collaborative tools.

One key area of uncertainty was the relevance and practicality of the training content for participants. While trainers noted that they received some input from participants on potential additions or modifications, no significant concerns were raised about the overall suitability of the training (4). However, one report indicates that some participants questioned whether the practices introduced in the training were immediately beneficial or required too much effort to implement, suggesting a perceived gap between theoretical concepts and their short-term application (Report: "Maybe that those practices can be beneficial long-term, but for now it seems to be too much work and thought that need to be put into it.") (12).

Another major uncertainty relates to participant engagement with training tools and exercises. Trainers express concerns about whether participants actually practiced using the tools presented or if they simply listened passively without engaging in hands-on exercises (5). Similarly, limited insight into how participants



worked on Project-Based Learning (PBL) exercises between sessions made it difficult to determine how effectively they were applying the concepts (4).

Technical barriers also created uncertainties. For instance, trainers report that sound system issues in some classrooms negatively affected the clarity of presentations and discussions, requiring them to use their own equipment (6). Additionally, navigation problems with the Miro board made it difficult for students to locate the correct sections, hindering their ability to engage with interactive (25).

A significant challenge was the difficulty some Humanities participants faced in understanding technical terms, particularly concepts such as metadata schemas and Knowledge Organization Systems (20). This suggests that the training content may not have been sufficiently adapted for participants from non-technical backgrounds, requiring additional explanations or alternative instructional approaches.

Further, there was uncertainty regarding the use of collaborative tools, as some participants did not perceive their necessity. Specifically, a Collaborative Document designed to support activities and collect feedback was underutilized, with many participants unsure of its purpose ("There were uncertainties regarding the use of a Collaborative Document we had created to support activities and collect comments or observations, as many did not perceive it as necessary.") (8).

Another area of concern was uncertainty about where to find recommended data repositories. Some researchers expressed a preference for a curated list of repositories rather than searching for them independently, indicating that navigating the landscape of data storage options may be overwhelming for some participants (22).

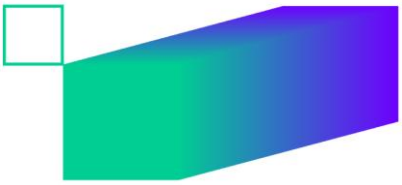
Finally, a lack of session-specific feedback made it difficult for trainers to evaluate the strengths and weaknesses of individual training components. While general feedback was collected, trainers note that more detailed, session-specific input would have been valuable in refining specific elements of the training (4).

5.4.6 External Training Evaluation

According to the reports training evaluations were conducted inconsistently across different sessions, with some trainings implementing structured assessment methods while others relied on informal feedback or did not conduct evaluations at all.

Several training sessions included formal evaluations through surveys and questionnaires. For instance, a training experience survey was conducted, with 40 out of 45 participants responding. The results showed high satisfaction levels, with over 90% of participants finding the training materials clear, relevant, and up-to-date, and 93% agreeing that the training was well-structured (11).

Other evaluations were conducted using Zoom polls, where participants rated their satisfaction on a five-step scale, with responses generally ranging between 4 and 5 ("Not an evaluation per se, but at the end of each session Zoom polls were addressed to the participants to express their content and satisfaction with the training experience.") (8).



For some PhD courses, a standard evaluation questionnaire is provided; however, it is not mandatory and has a low response rate (20).

Some trainers emphasize long-term engagement as an indirect evaluation method, tracking participants' development through social media, interviews, and ongoing contact rather than structured surveys (13).

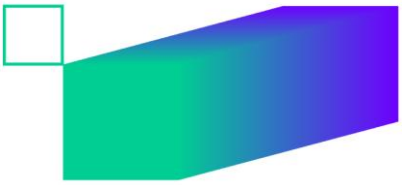
However, many trainings did not conduct any formal evaluation. Several reports explicitly state that no assessment was carried out, or that evaluation links were shared but not used.

6 Summary and Recommendations

The evaluation of the first learning cycle demonstrates that the PATTERN trainings provided a valuable and positive experience across training topics, formats, and participant groups. In particular, the trainings' engaging and interactive aspects, relevant and applicable content, contributions to skill-building, and use of digital tools were praised. Nevertheless, the evaluation also pinpoints areas for improvements that should be addressed in the next cycle and provides recommendations.

Figure 37. Summary of key evaluation results.

Participants highlighted the value of interactive and engaging formats. Activities such as discussions, small-group work, and hands-on exercises enabled meaningful exchange and knowledge sharing, contributing to a positive and inclusive learning environment. The interdisciplinary and intercultural composition of the groups further enriched the experience. Participant engagement during in-person trainings was consistently high, whereby structured discussions and problem-based learning fostered participation. Experiences in hybrid and online formats showed some variation; while some virtual sessions benefitted from breakout rooms and chat-based interaction, others experienced limited engagement, with participants remaining passive and cameras turned off. In hybrid settings, challenges such as technical issues and a lack of integration between in-person and remote participants emerged which impacted the quality of interaction.



In terms of relevance and applicability, the training was considered useful and applicable across for participants' academic and professional development. Participants appreciated the introduction to new concepts, such as Citizen Science, FAIR Data, and Open Access, and noted the direct applicability of these topics to their own research, particularly for PhD students. Nevertheless, several participants—especially those from bachelor's and master's programmes—found the training too broad or abstract. Some expressed uncertainty about how to implement the concepts in their specific disciplines or fields. The content appeared more relevant to senior academics as opposed to students, suggesting a misalignment between participant backgrounds and scope of the trainings.

The programme also supported skill development, with participants reporting increased confidence and proficiency in areas such as writing, presenting, or interacting with diverse audiences. New tools and resources were introduced, and many participants noted an improved understanding of research practices such as data management. However, some participants noted that their trainings' theoretical focus limited opportunities for developing practical skills. This lack of hands-on skills was due to a lack of real-world applications, practical exercises, or simulations.

Digital tools played an important role in supporting the trainings. Specifically, the PATTERN platforms OpenPlato and Projects were useful for accessing materials and completing tasks during the training. OpenPlato received positive feedback for its content and usability as a self-paced learning tool. The Projects platform was useful for sharing case studies and discussion questions and in some instances, for collaboration between participants. However, challenges emerged in using the platforms, as some participants faced issues with navigation, search functionality, and enrolment processes—particularly on the Projects platform. Communication within platforms was also seen as limited, with many participants preferring external tools for discussion. Overall, while the platforms were useful in some training contexts, their design and user experience often limited their effectiveness.

Training structure and organisation were also areas of concern. While smaller groups encouraged active engagement, larger sessions tended to be more passive. Some participants found sessions too long or unfocused, and the broad scope of topics made it difficult to engage deeply with individual themes. Preferences for more flexible scheduling and shorter, more concentrated sessions were voiced while sessions during the afternoon or weekends could have provided better access to the trainings.

6.1 Recommendations based on Evaluation Results

The evaluation results suggest several recommendations for improving training content and implementation in the next learning cycle, covering each of the key challenges discussed.

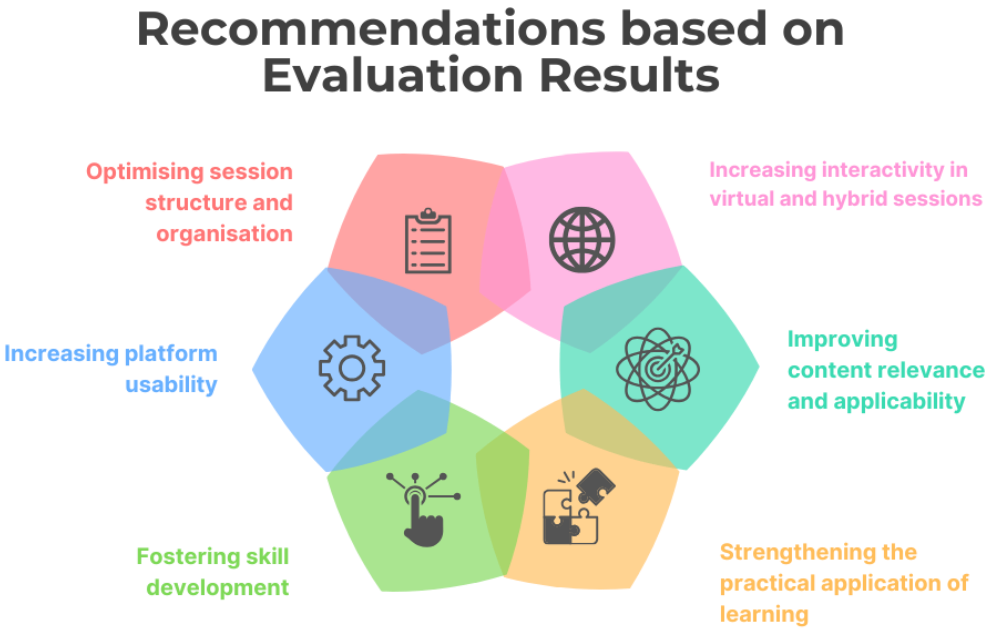


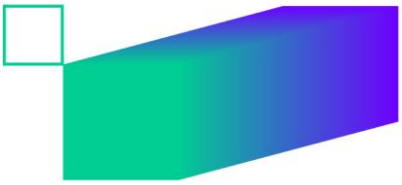
Figure 38. Recommendations based on evaluation results.

Increasing interactivity in virtual and hybrid sessions. Facilitators should dedicate moderators specifically to manage participation and interaction. Sessions should incorporate structured group activities and interactive exercises, such as polls, required discussion contributions, and providing specific tasks and objectives during breakout room.

Improving content relevance and applicability. Trainings should align more closely with participants' professional backgrounds and disciplines. Sessions should feature discipline-specific examples and simplified explanations tailored to participant backgrounds, explicitly highlighting immediate practical benefits, relevance to participants' work, and connecting the skills and knowledge conveyed during the training to long-term impact on their career path.

Strengthening the practical application of learning. Integration of case studies and real-world scenarios is essential, alongside hands-on exercises to reinforce learning. Scenario-based learning and breakout room discussions should be employed to facilitate the application of abstract concepts.

Fostering skill development. Trainings should differentiate clearly from webinars by emphasising practical skill acquisition through interactive exercises and simulations, as opposed to webinars focusing on conveying theoretical knowledge. Pre-training skill assessments could inform content more tailored to participants' levels and backgrounds. Smaller and homogeneous groups facilitate a more targeted learning experience and promote applications of skills.



Increasing platform usability. Pre-training onboarding would ensure that participants are familiar with the digital tools before the training begins. This should include a more streamlined login, enrolment, and authentication process and encouragement to actively use the collaborative features of the platform. It is advised to clarify the benefits and structured usage of tools clearly, provide recommended repositories, and consider balancing digital with analogue formats if necessary. Importantly, training facilitators should ensure that participants use the platforms on desktop devices and avoid the use of mobiles and smartphones. We strongly recommend additional investigations into the user experience in the next cycle to better pinpoint the reasons why the Projects platform was evaluated negatively.

Optimising session structure and organisation. Sessions should be shorter and more topic-specific, with sufficient breaks to maintain participants' focus. Small-group activities can encourage interactive learning and discussions among participants. Offering more flexible scheduling options, including afternoon or weekend sessions, could improve accessibility.

6.2 Recommendations based on Open Studio

As part of the Open Studio sessions in PATTERN T4.2, ZSI and APRE facilitated a co-creation workshop to identify strengths, weaknesses, opportunities, and threats (SWOT) to inform the next training cycle and upcoming project activities. As this analysis offers a high-level assessment of the first learning cycle from the partners' perspective, we summarise key findings to support recommendations and guide adjustments for the second cycle.

6.2.1 Strengths

The training activities are strengthened by strong collaborations with institutions like universities, enhancing credibility and expanding reach. Embedding PATTERN courses in PhD programs ensures academic legitimacy and enables replicability, while the diverse, collaborative teaching approaches cater to a wide range of learning styles. The modularity and flexibility of the courses offer customization for participants, and the high-quality content remains highly relevant. Additionally, the availability of some courses (i.e. FAIR RDM) in multiple languages increases global accessibility and fosters co-ownership. These factors collectively create a solid foundation for continued success and potential for growth.

6.2.2 Weaknesses

Several internal factors hinder the efficiency and success of the training activities, including limited pilot testing, a lack of uniqueness in the training programs, and cultural resistance to open science. Challenges also arise from the perception of open science training as "extra-curricular," difficulty in integrating courses into curricula, bureaucratic hurdles, and barriers to accessing training materials. Additionally, the absence of PATTERN's partners in key networks like EOSC, unclear

procedures for reusing materials, and the lack of a clear plan for the next learning cycle further complicate the training's effectiveness and growth potential.

6.2.3 Opportunities

External opportunities such as allowing the training materials to be integrated into platforms like Moodle, promoting the program's uniqueness, utilizing active learning formats, and collaborating with global partners can enhance the reach and quality of the PATTERN training. Additionally, securing grants, adapting content based on feedback, expanding translations, and building a community-driven approach will help improve accessibility and ensure the program remains relevant and impactful.

6.2.4 Threats

External threats such as researcher overload, potential outdated content, ownership issues, unforeseen political and funding changes, and institutional reorganizations could negatively impact the training's acceptance, relevance, and sustainability. Addressing these threats proactively through clear planning and strategic partnerships will be essential for ensuring long-term success.

6.2.5 Conclusions

The SWOT analysis of the first PATTERN learning cycle highlights five key takeaways that summarise the project's current position and outline what is needed for success in upcoming project activities in the next cycle.

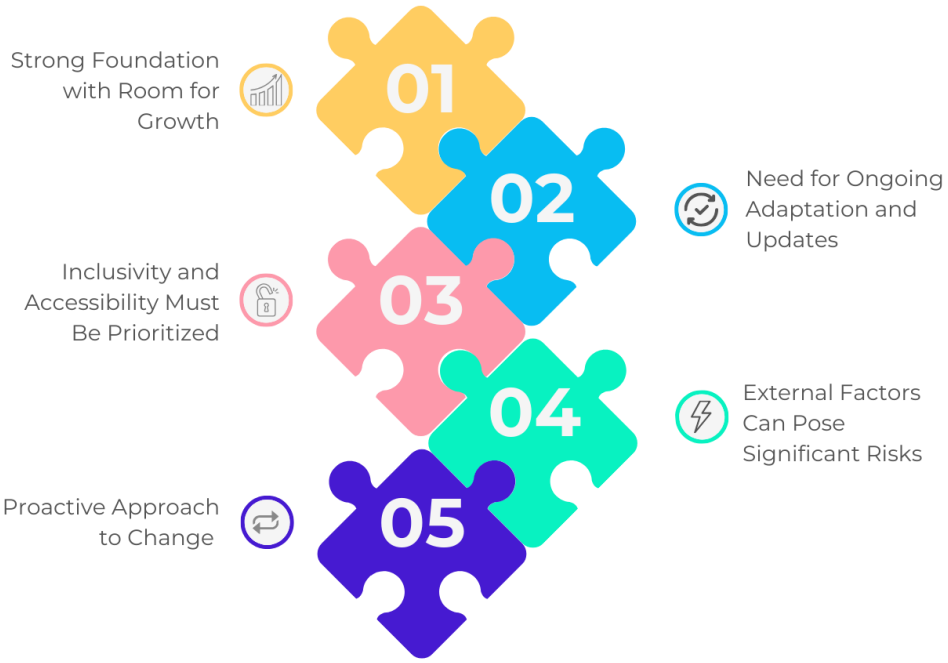
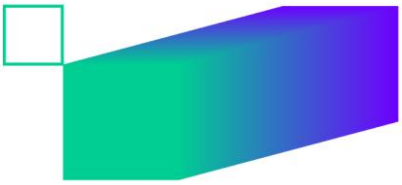


Figure 39. Main take-aways based on the SWOT analysis.



Firstly, PATTERN was able to establish a strong foundation for its upcoming activities through intense collaboration with different institutions, developing high-quality content, and flexible and adaptable trainings. However, as part of the next cycle, there is a need to further promote what PATTERN has to offer and increase reach and visibility through social media as well as new and existing partnerships.

Secondly, the relevance of the trainings' contents and how ownership of training materials is organised are long-term concerns. On the one hand, Open Science and RRI are developing fields so materials can become outdated fast. On the other hand, defining ownership of materials and attributing authors and contributors is especially important since training materials should be re-used. Thus, the project must establish a clear plan for maintaining and updating content after the project ends to ensure it stays current. Additionally, ensuring clear ownership of materials will support sustainability and avoid conflicts.

Thirdly, materials and trainings developed within PATTERN need to be open and accessible for all. However, this aim requires continued attention to inclusivity and accessibility for diverse groups, including those with disabilities or from marginalised backgrounds. Adapting learning formats and ensuring materials are accessible in multiple languages support the aim of *Open for All* and broaden the project's impact.

Fourthly, external factors need to be more explicitly considered at the project level, as these can pose risks to project implementation and may jeopardise the project's impact. This may include political changes, funding cuts, or institutional reorganization. Building partnerships, diversifying funding sources, and ensuring strong relationships within institutions can mitigate these risks.

Finally, from a pedagogical perspective, PATTERN needs to manage rapid changes in learning methodologies and AI. These developments present both opportunities and challenges. Staying agile and integrating innovative tools and teaching methods into PATTERN trainings and as part of the PATTERN platforms will promote engagement and ensure the trainings remain interesting and competitive compared to other training providers.

7 References

Bin Mubayrik, H. F. (2020). New Trends in Formative-Summative Evaluations for Adult Education. *SAGE Open*, *10*(3), 215824402094100. https://doi.org/10.1177/2158244020941006

Cheung, H., Mazerolle, L., Possingham, H. P., Tam, K., & Biggs, D. (2020). A methodological guide for translating study instruments in cross-cultural research: Adapting the 'connectedness to nature' scale into Chinese. *Methods in Ecology and Evolution*, *11*(11), 1379–1387. https://doi.org/10.1111/2041-210X.13465

Dolin, J., Black, P., Harlen, W., & Tiberghien, A. (2018). Exploring Relations Between Formative and Summative Assessment. In J. Dolin & R. Evans (Eds.), *Transforming Assessment* (Vol. 4, pp. 53–80). Springer International Publishing. http://link.springer.com/10.1007/978-3-319-63248-3_3

Griffin, P., Coates, H., Mcinnis, C., & James, R. (2003). The Development of an Extended Course Experience Questionnaire. *Quality in Higher Education*, *9*(3), 259–266. https://doi.org/10.1080/135383203200015111

Kember, D., & Leung, D. Y. P. (2009). Development of a questionnaire for assessing students' perceptions of the teaching and learning environment and its use in quality assurance. *Learning Environments Research*, *12*(1), 15–29. https://doi.org/10.1007/s10984-008-9050-7

Klieme, E., Avenarius, H., Blum, W., Döbrich, P., Gruber, H., Prenzel, M., Reiss, K., Riquarts, K., Rost, J., Tenorth, H.-E., & Vollmer, H. J. (2004). *The Development of National Educational Standards: An Expertise*. Bundesministerium für Bildung und Forschung / Federal Ministry of Education and Research (BMBF).

Kunst, J. R., & Bierwiaczonek, K. (2023). Utilizing AI questionnaire translations in cross-cultural and intercultural research: Insights and recommendations.

International Journal of Intercultural Relations, *97*, 101888. https://doi.org/10.1016/j.ijintrel.2023.101888

Lagido, C., Kragh, G., & Nielsen, K. (2024). *D1.1 Report on the analysis of existing training activities and quality assessment*. https://doi.org/10.5281/ZENODO.10640916

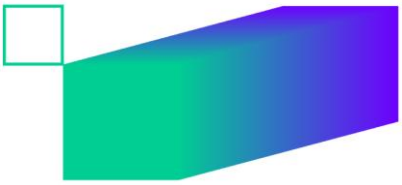
McMahon, G. T., Aboulsoud, S., Gordon, J., McKenna, M., Meuser, J., Staz, M., & Campbell, C. M. (2016). Evolving Alignment in International Continuing Professional Development Accreditation. *Journal of Continuing Education in the Health Professions*, *36*(1), S22–S26. https://doi.org/10.1097/CEH.0000000000000075

Praslova, L. (2010). Adaptation of Kirkpatrick's four level model of training criteria to assessment of learning outcomes and program evaluation in Higher Education. *Educational Assessment, Evaluation and Accountability*, *22*(3), 215–225. https://doi.org/10.1007/s11092-010-9098-7

Rodgers, S., Wang, Z., Maras, M. A., Burgoyne, S., Balakrishnan, B., Stemmle, J., & Schultz, J. C. (2018). Decoding Science: Development and Evaluation of a Science Communication Training Program Using a Triangulated Framework. *Science Communication*, *40*(1), 3–32. https://doi.org/10.1177/1075547017747285

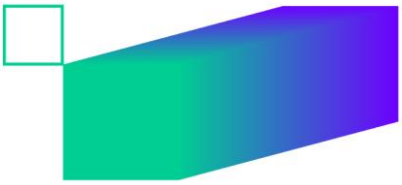
Royal College. (n.d.). *Becoming a CPD provider: Accreditation standards*. Royal College of Physicians and Surgeons of Canada. Retrieved 29 January 2024, from https://www.royalcollege.ca/en/cpd/royal-college-accredited-cpd-providers/becoming-cpd-provider-accreditation-standards.html

Visser-Wijnveen, G. J., Van Der Rijst, R. M., & Van Driel, J. H. (2016). A questionnaire to capture students' perceptions of research integration in their courses. *Higher Education*, *71*(4), 473–488. https://doi.org/10.1007/s10734-015-9918-2



Walde, P., & Völlm, B. A. (2023). The TRAPD approach as a method for questionnaire translation. *Frontiers in Psychiatry*, *14*, 1199989. https://doi.org/10.3389/fpsyt.2023.1199989

Wilson, K. L., Lizzio, A., & Ramsden, P. (1997). The development, validation and application of the Course Experience Questionnaire. *Studies in Higher Education*, *22*(1), 33–53. https://doi.org/10.1080/03075079712331381121



8 Appendix A: Quantitative Participant Questionnaire

8.1 Introduction

Thank you for participating in the PATTERN training!

We would like to ask you some questions about your training experience. Completing the questionnaire will take approximately 5 minutes.

Your honest feedback allows us to improve and refine our trainings.

All your answers are anonymous and cannot be traced to you. Your participation is entirely voluntary, and you may withdraw at any time. No personal identifying information will be collected. Your responses will be kept confidential. Aggregated responses will solely be used for research purposes and improvements of the training. By proceeding, you consent to participate in this survey. Thank you for your time.

Please indicate how much you agree or disagree with the following statements about your training experience.

8.2 Response scale

Response scale:

1	2	3	4	5	6	7	NA
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree	Not applicable

8.3 Items

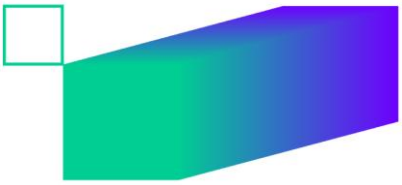
Items should be randomised (except for sociodemographics)

Questions about the content of the training

1. The training materials were clear.
2. The training materials were relevant and up to date.
3. It seemed to me that the training tried to cover too many topics.

Questions about the appropriateness of the training for its target group

4. The training taught me a lot of new concepts.
5. I managed to complete the requirements of the training without feeling unduly stressed.
6. The training provided sufficient flexibility for my personal learning needs.



Questions about presentation of materials and communication between training facilitators and participants

7. The training was well structured.
8. I was given the chance to actively engage during the training.
9. The aims and objectives of this training were NOT made very clear.
10. The online platforms used in the training were adequate tools for learning.

Questions about general perceptions of the training

11. During the training, my interest in the topic was increased.
12. Overall, the training experience was worthwhile.
13. Overall, I'm satisfied with the quality of this training.

Sociodemographic items

14. What is your age? (in years)
    a. [open field]
15. What is your gender?
    a. Male
    b. Female
    c. Non-binary
    d. Prefer not to say
    e. Other: [open field]
16. What is your primary academic discipline or field of study?
    a. Arts & Humanities (e.g., Literature, Philosophy)
    b. Social Sciences (e.g., Sociology, Psychology)
    c. Natural Sciences (e.g., Biology, Chemistry)
    d. Engineering & Technology (e.g., Computer Science, Engineering)
    e. Medical & Health Sciences (e.g., Medicine, Nursing)
    f. Business & Economics (e.g., Business Administration, Economics)
    g. Other: [open field]
17. What best describes your current academic or professional stage?
    a. Bachelor's student
    b. Master's student
    c. Doctoral student or predoctoral researcher
    d. Postdoctoral researcher
    e. Senior scientist or Professor

9 Appendix B: Guideline and Materials for Interactive Evaluation Activity With Participants

This includes a how-to for the activity targeting facilitators and a template that can be used for implementing the activity. The template is provided in Miro (and on the PATTERN SharePoint as a print version) and can be used online or offline.

If you use the Miro board with your participants in an offline, in-person setting, make sure that participants have a computer for navigating the board, as using Miro on a phone can be challenging!

We provide an explanation of how to use an analogue version of the activity further below.

How-to implement the activity using an online Miro board?

The training facilitators are asked to use the **provided Miro board link**.

Find an empty frame (with no results in it) and name it:

Institution_Name of YOUR training activity_Date.

At the conclusion of your training activity, allocate a few minutes to share the Miro board link with your participants.

Click your frame and then share the Miro board link with your participants. By opening Miro, they land directly on the frame.

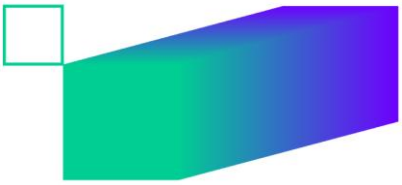
Allow your participants time to place the provided sticky notes along the sliders to indicate their level of agreement or disagreement on the provided questions.

- I enjoyed the training - because of
- The training was useful for me - and why
- I could gain new skills - and which
- I will apply what I have learned in practice - in specific

Each participant places a sticky note on the slider according to their level of agreement or disagreement and writes a note or explanation on it. The entire group's results will be documented. This process can also be carried out in small groups.

Encourage participants to write any additional comments or information on the sticky notes if they wish, and welcome suggestions for improvement in the adjacent section of the board.

When participants are finished populating the board, you can ask them to further comment on what they wrote to facilitate a discussion between participants.



When the activity is completed and you are sure that no participant will add anything else, take screenshots for documentation. Then notify the ZSI team and we will archive the frame on a different board.

Figure 40. Miro board for interactive evaluation activity (left part).

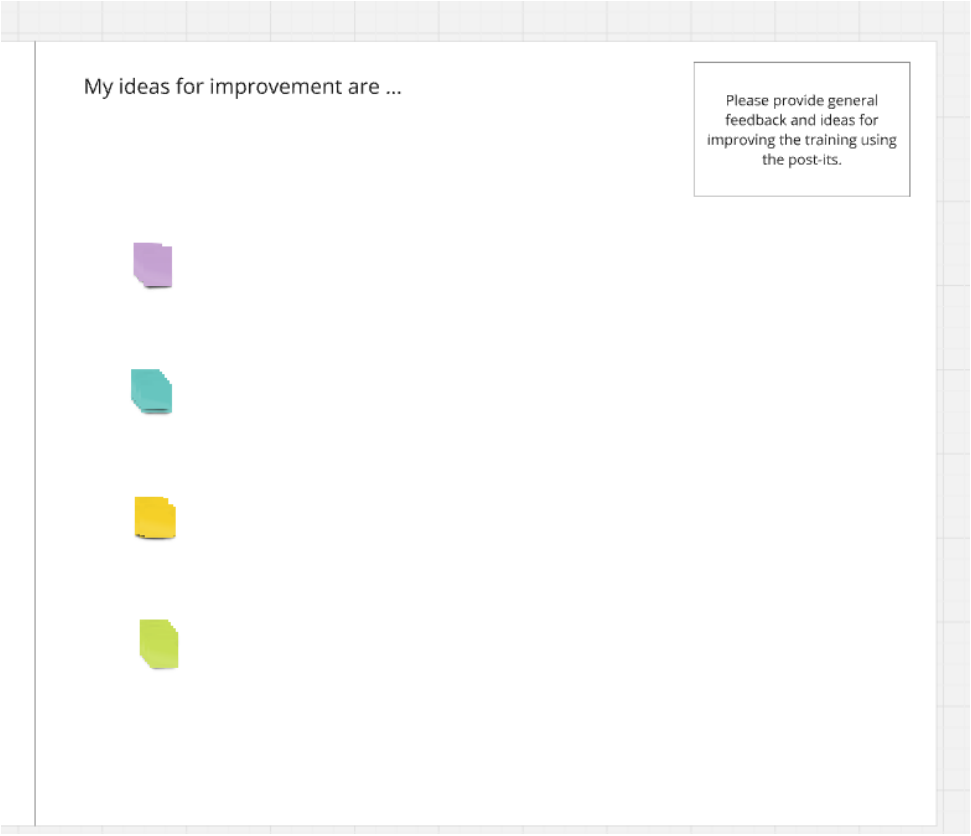
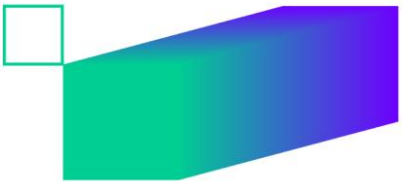


Figure 41. Miro board for interactive evaluation activity (right part).



You don't need an account for using this board. This also allows us to access the data more easily and reduces the steps necessary for sharing and exporting.

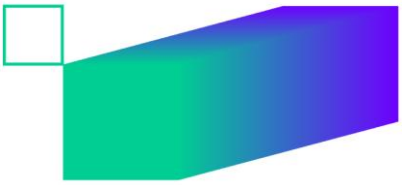
If you want to copy the template into your own Miro board, you can copy it from here: https://miro.com/app/board/uXjVKe9YGK8=/. Please make sure to share everything with us and export the board as an Excel file.

How-to implement the activity using an offline, analogue board?

Alternatively, you can use a similar analogue tool, such as **flip-chart paper or print version of the Miro board**, for in-person use. We have provided PDFs for printing on the PATTERN Sharepoint folder.

Simply write the provided statements on the flip-chart paper, including scales between agreement and disagreement. Alternatively, print a large version of the board and hang it on a wall.

Distribute sticky notes to participants and ask them to place them along the scales for each question. Encourage participants to write any additional comments or information on the sticky notes and provide another flipchart for suggestions for improvement. Each participant should place his or her sticky-notes on the scales for each question. Remember to document the results afterward by taking a photo and transcribing the contents of the sticky notes. These can then be added to your reporting template (see next section).



10 Appendix C: Facilitator Template for Documentation and Reflection

This template provides instructions on how to document the interactive evaluation activity. It also provides space for reflections of facilitators on how they experienced the training.

Please complete the template in the online form.

You can find an overview of the questions below but **please use the online form for completing the template.**

Dear training facilitator,

This template serves as a reporting tool for documenting your experiences and reflections on the PATTERN training activity you conducted. It is designed to gather information on each activity and contribute to the improvement of future activities. Effective documentation of activity results is essential for the evaluation process. With it, the ZSI team will be able to analyse results and draw conclusions accurately.

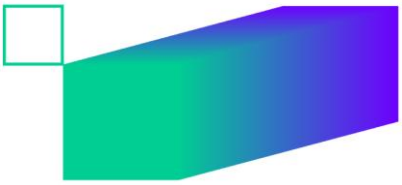
We do not expect training facilitators to complete a documentation/reflection template for every session of a given training, once per training course is sufficient. Please ensure to document your activity concisely and clearly.

Training Institution:	
Name of training (as published):	
Date: year/mm/dd	
Facilitator/Contact person:	

Basic information about the training

Please describe basic information about your training. The level of detail will depend on the information you have already provided in the Excel monitoring sheet. If you have already completed the Excel monitoring sheet, please indicate the row nr. below and move on to the next section.

Item	Description
Indicate nr of corresponding row in the Excel monitoring sheet	



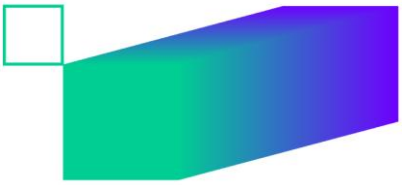
Details	
Topic	
Format	
Target group	
Other information	

Training approach

Item	Description
Please give a short summary including the pedagogic approach of your training	
Which activity/materials did you use? **What was useful and beneficial, what was difficult or to implement?**	

Self-Reflection on the training

Item	Description
How accessible was the topic for the participants?	
How did the tools perform, e.g., the project platform?	



Were the participants actively engaged?	
Which uncertainties arose?	
Which improvements do you suggest from your perspective?	
General observations, if any	

Documentation of collected feedback from participants

Item	Description
Please use the provided Miro board link and let participants complete the board – preferably take a screenshot. **Alternatively: Make photos of flip-chart paper and transcribe written results.**	
Please comment on the results - How can you explain this evaluation result?	
Was the training evaluated within your institution? If yes, please briefly provide results.	

Thank you!

11 Appendix D: Guideline for Translation

All materials provided by the ZSI teams are in English. If you want to translate the materials for training participants to a different language, you can follow the guidelines outlined below.

11.1.1 Participant Questionnaire

Standardised questionnaires such as the online questionnaire for participants (see 4.3.2) should be translated carefully and systematically. Since the questionnaires are supposed to be standardised to enable comparison of responses across different groups, it's important to stick as closely as possible to the original meaning.

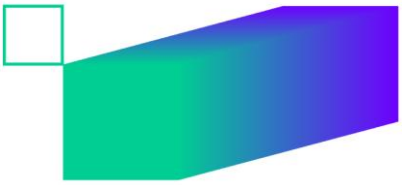
We have outlined best practices for the translations of standardised or quantitative questionnaires below. We are aware that translation can be a tedious and effortful process and advise you to adapt the process to your own resources.

The TRAPD method is considered best practice for questionnaire translation (see e.g. Walde & Völlm, 2023 or https://europeanvaluesstudy.eu/methodology-data-documentation/survey-2017/methodology/the-trapd-method-for-survey-translation/). It consists of several steps:

- Translation: a questionnaire is translated by at least two independent translators;
- Review: the translators and an additional reviewer compare the translations and decide on one translation;
- Adjudication: the reviewer compares the reviewed translation with the master questionnaire (i.e., the original);
- Pretest: the approved translation is pretested in the field and revised based on the pre-tests;
- Documentation: the whole process and the final translation is documented.

Forward-Back translation is another approach very often used in questionnaire translation, whereby a questionnaire is translated into the target language, then translated back into the original language by different translators, and both versions are compared to increase accuracy. Cheung et al. (2020) report on such a translation process consisting of 5 steps:

1. Recruiting a balanced translation team including people familiar with the topic and content of the questionnaire (e.g., familiar with concepts of trainings in high education) and familiar with the target language (i.e., native speaker or qualified translator). Cheung et al. (2020) recommend to recruit at least four translators with different skills who are grouped into balanced pairs.
2. Forward translation, assuming the translation team consists of 2 pairs: the first pair creates a forward translation, translating the original questionnaire into the target language. This translation is discussed with a fifth person acting as reviewer and revised if necessary.
3. Back-translation: the second pair of translators use the translated questionnaire and translates it back to the original language. The two



versions of the questionnaire in the original language are compared to highlight potential misunderstandings or inaccuracies.

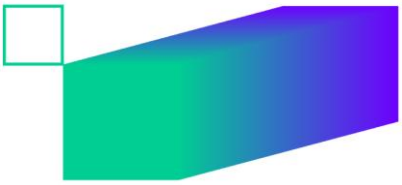
4. Consolidation: the entire team of translators examines and revises the translation based on the different versions of the questionnaire. They then agree on a single translation.
5. Pilot testing and finalising: the questionnaire agreed upon in the previous step is pilot tested with 10 to 40 participants who provide feedback. This provides the basis for a final revision and finalisation of the translated questionnaire.

Notably, these best practice procedures take a lot of effort and time. There are simpler methods of translation, which might reduce the questionnaire's validity in favour of using less resources.

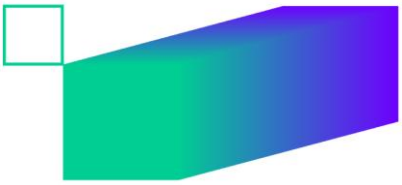
Recently, researchers have proposed a forward-back translation process using machine-generated translations which were of similar quality to human-generated translations (Kunst & Bierwiaczonek, 2023). This is especially effective with languages that share the same language family. Such a machine-supported translation process may include the following steps:

- Forward translation: The questionnaire is translated into the target language using one machine translation app (e.g., DeepL).
- Back-translation: the translated questionnaire is translated back to its original language by a different machine translation app which is based on a different language model.
- A bilingual researcher compares and adjusts the translations, resulting in a final translated questionnaire. If possible, these comparisons and adjustments should be done in a team through joint discussions.

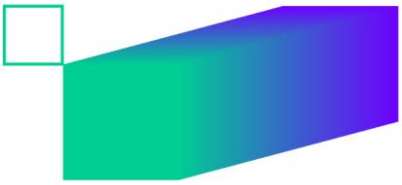
After you have decided on a translation procedure, we ask you to use the template below to document the final translation you use for the questionnaire and share it with the ZSI team.



Target Language of the Translation:		
	English Original	**Translation**
Introductory text	Thank you for participating in the PATTERN training! We would like to ask you some questions about your training experience. Completing the questionnaire will take approximately 5 minutes. Your honest feedback allows us to improve and refine our trainings. All your answers are anonymous and cannot be traced to you. Your participation is entirely voluntary, and you may withdraw at any time. No personal identifying information will be collected and collected data will be treated in compliance with the GDPR. Your responses will be kept confidential. Aggregated responses will solely be used for research purposes and improvements of the training. By proceeding, you consent to participate in this survey. Thank you for your time. Please indicate how much you agree or disagree with the following statements about your training experience.	
Response Scale	Strongly disagree	
	Disagree	



Target Language of the Translation:		
	English Original	**Translation**
	Somewhat disagree	
	Neither agree nor disagree	
	Somewhat agree	
	Agree	
	Strongly agree	
	Not applicable	
Item 1	The training materials were clear.	
Item 2	The training materials were relevant and up to date.	
Item 3	It seemed to me that the training tried to cover too many topics.	
Item 4	The training taught me a lot of new concepts.	
Item 5	I managed to complete the requirements of the training without feeling unduly stressed.	
Item 6	The training provided sufficient flexibility for my personal learning needs.	
Item 7	The training was well structured.	
Item 8	I was given the chance to actively engage during the training.	



Target Language of the Translation:		
	English Original	**Translation**
Item 9	The aims and objectives of this training were NOT made very clear.	
Item 10	The online platforms used in the training were adequate tools for learning.	
Item 11	During the training, my interest in the topic was increased.	
Item 12	Overall, the training experience was worthwhile.	
Item 13	Overall, I'm satisfied with the quality of this training.	
Age	What is your age? (in years)	
Gender	What is your gender?	
	Male	
	Female	
	Non-binary	
	Prefer not to say	
	Other: [open field]	
Discipline	What is your primary academic discipline or field of study?	
	Arts & Humanities (e.g., Literature, Philosophy)	
	Social Sciences (e.g., Sociology, Psychology)	
	Natural Sciences (e.g., Biology, Chemistry)	
	Engineering & Technology (e.g., Computer Science, Engineering)	
	Medical & Health Sciences (e.g., Medicine, Nursing)	
	Business & Economics (e.g., Business Administration, Economics)	
	Other: [open field]	
Career Stage	What best describes your current academic or professional stage?	

Target Language of the Translation:		
	English Original	**Translation**
	Bachelor's student	
	Master's student	
	Doctoral student or predoctoral researcher	
	Postdoctoral researcher	
	Senior scientist or Professor	

Table 6. Translation template for participant questionnaire.

11.1.2 Interactive Evaluation Activity

The interactive evaluation activity (see 4.3.3) consists of quantitative and qualitative questions. We suggest using the same translation procedure as for the online questionnaire.

Please use the template below to document the final translation you use for the activity and share it with the ZSI team.

Target Language of the Translation:		
	English Original	**Translation**
Instruction text (left-hand side)	Rate the statements by dragging the post its along the line. Write comments and thoughts on the post-it you dragged.	
Item text	The training I participated in, I rate as follows ...	
Item 1	I enjoyed the training - because of ...	
Item 2	The training was useful for me - and why ...	
Item 3	I could gain new skills - and which ...	
Item 4	I will apply what I have learned in practice - what in specific ...	
Response Scale	Fully disagree	
Instruction text (right-hand side)	Please provide general feedback and ideas for improving the training using the post-its.	
Item text	My ideas for improvement are ...	

Table 7. Translation template for Interactive Evaluation Activity.

PATTERN.

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pattern-openresearch.eu

info@pattern-openresearch.eu