# BioNT - Network for Training

Deliverable 1.5 | Instructor Training


Version 1.0

31 July 2024

| | |
|---|---|
| Grant Agreement number | 101100604 - DIGITAL-2022-TRAINING-02 |
| Action Acronym | BioNT |
| Action Title | Bio Network for Training |
| Deliverable number and title | 1.5 Instructors Training |
| Work package number and title | 1 Training design and development |
| Dissemination level | Public |
| Authors | S. Di Giorgio, K. Förstner, S. Kaspar, R. Müller, L. Paladin, I. Paredes Cisneros, P. Samarakoon, approved by all BioNT partners |
| Delivery date | 2024-07-31 |

Project partners

1. EUROPEAN MOLECULAR BIOLOGY LABORATORY (EMBL)
2. BIOBYTE SOLUTIONS GMBH (BIOBYTE)
3. HPC NOW CONSULTING SL (HPCNOW)
4. UNIVERSITETET I OSLO (UO)
5. UNIVERSITAT DE BARCELONA (UB)
6. INFORMATION CENTRE FOR LIFE SCIENCE (ZBMED)
7. SIMULA CONSULTING (SIMULA)
8. ALBERT-LUDWIGS-UNIVERSITAET FREIBURG (ALU-FR)
9. ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (EPFL)

# Table of Contents



## Project overview

The BioNT consortium is dedicated to providing a comprehensive training program and fostering a community for digital skills relevant to the biotechnology industry and biomedical sector. With a curriculum tailored for both beginners and advanced professionals, BioNT aims to equip individuals with the necessary expertise in handling, processing, and visualising biological data, as well as utilising computational biology tools. Leveraging the consortium's strong background in digital literacy training and extensive network of collaborations, BioNT is poised to professionalise life sciences data management, processing, and analysis skills.

## Fifth training workshop report in summary

BioNT delivered its fifth training workshop in June 2024, kick-starting the advanced curriculum of the project. This document reports about this workshop regarding its organisation, the applicants and participants, as well as their feedback about it. The report also touches on the different advertising channels used to reach the project’s target audience, as well as on the methods used for developing and delivering BioNT’s training workshops, which varied in comparison to the previous events.

# Instructors training

BioNT conducted its fifth training workshop titled “Strategies for training and knowledge exchange with a consulting perspective”. It was offered free of charge to the participants and took place fully online.

This hands-on workshop introduced participants to essential training theory, needs assessment techniques, and effective delivery strategies in training and consulting, followed by an introduction to consulting with a focus on bioinformatics. Participants explored the theory of learning, with emphasis on how people learn, followed by practical teaching techniques, learner-centred instruction, and how to create an inclusive classroom environment. The workshop's primary emphasis laid on hands-on teaching methods, constructive alignment, formative assessment, and providing valuable feedback to learners. Additionally, the workshop highlighted other knowledge-exchange formats, such as consulting and mentoring, offering insights into the interface between industry and academia, and how bioinformaticians can leverage their skills in related roles.

The workshops featured two types of sessions: those adapted from The Carpentries instructor training materials, which included the theory of learning, training development, and training delivery, and sessions specifically designed for this training. The latter addressed the question, “How does what we learned about training apply to other forms of knowledge exchange?”

To facilitate fruitful discussions, various forms of knowledge exchange were presented at the beginning of the workshop: classic training, consulting, mentoring, and community engagement. In the final session, BioNT trainers summarised the outcomes of the discussions in a presentation, sharing their insights on all the topics covered during the training. This approach allowed attendees to co-design the course content, focusing on the areas of greatest interest.

In the realm of community management, the key topics were motivation, roles within a community, and onboarding processes. The theoretical framework for these topics was drawn from the Center for Scientific Collaboration and Community Engagement (CSCCE) materials. For consulting and mentoring, the focus was on expectation management (including understanding needs and scoping) and project management (time management, documentation, and delegation).

All the training materials and slides used for this workshop have been deposited in Zenodo and have been downloaded more than 128 times already.

# Organisation of the workshop

This workshop ran for 2 days, from the 25th to the 26th of June 2024. The entire event was conducted virtually with no cost to participants. On both days the session was delivered from 09:00 to 16:00 CEST.

## Webpage and registrations

The CECAM event management platform, provided by the EPFL, was used to create a dedicated webpage for the workshop, which included the workshop description, learning objectives, requirements, program (Figure 1), and any further information relevant to potential participants. The webpage is accessible at https://www.cecam.org/workshop-details/-1361.

### Tuesday June 25th 2024 - Day 1

- 09:00 to 09:15 - Welcome + Ice-breaker
- 09:15 to 09:40 - Presentation of different forms of knowledge-exchange
- 09:40 to 10:10 - Theory of learning: Building Skills with Practice
- 10:10 to 10:20 - Break
- 10:20 to 11:00 - The theory of learning: Expertise and Instruction
- 11:00 to 11:40 - The theory of learning: Memory and Cognitive Load
- 11:40 to 12:30 - The theory of learning: Motivation and Demotivation
- 12:30 to 13:30 - Lunch Break
- 13:30 to 14:00 - Theory of Learning Discussion
- 14:40 to 14:50 - Break
- 14:00 to 14:40 - Training development: Strategies for surveying the training audience
- 14:40 to 15:50 - Training development: Designing learning objectives, experiences, learning paths
- 15:50 to 16:00 - Summary + Feedback

### Wednesday June 26th 2024 - Day 2

- 09:00 to 09:10 - Welcome back
- 09:10 to 09:20 - Training delivery: Working with your team part 1
- 09:20 to 09:40 - Training delivery 1 Discussion
- 09:40 to 10:10 - Training delivery: Working with your team part 2
- 10:10 to 10:20 - Break
- 10:20 to 11:10 - Training delivery: Live Coding is a skill
- 11:10 to 12:10 - Training delivery: Launches and Landings
- 12:10 to 12:30 - Training delivery 2: Discussion
- 12:30 to 13:30 - Lunch Break
- 13:30 to 13:50 - BioNT training format
- 13:50 to 15:45 - Consulting, mentoring Discussion
- 15:45 to 16:00 - Summary + Feedback

**Figure 1** - Workshop program as displayed on the event page at the CECAM platform.

For registration, the CECAM platform was used to manage the applicant's information and communication. In parallel, the EMBL servers were used to collect pre- and post-workshop information through pseudo-anonymised surveys. The survey data was linked to the applicant's data only via a unique identifier, provided in the CECAM registration process, as well as in the EMBL-based survey. This ensured that only the workshop organisers accessed the applicants' personal data while still collecting information relevant to the workshop separately. To register, applicants had to: (i) register on the CECAM platform, (ii) complete and submit the pre-workshop survey, and finally (iii) complete the application on the CECAM platform using the unique identifier provided in the pre-workshop survey.

Applications were reviewed based on answers in the pre-workshop survey (containing no personal information). Applicants working in small and medium enterprises (SMEs) or who identified themselves as job seekers would have been prioritised if needed, but after a thorough assessment of technical and personnel capacity, all 24 applicants were accepted. The communication of the application outcome to all participants, as well as any additional communication, was performed via the CECAM platform.

## Advertisement

The workshop was advertised via social media, several websites, mailing lists or Slack spaces of networks and communities (ELIXIR, Bioconductor, LifeSciTrainer, OLS, BioRN cluster, NFDI4Microbiota and de.NBI, among others). For the advertising of this workshop, a tailored image was generated, which included a QR code to facilitate access to the registration platform, as shown in Figure 2.


**Figure 2** - Example of workshop advertisement through LinkedIn.

## Infrastructure for the workshop

The workshop was delivered via Zoom, allowing participants to learn directly from the trainers with opportunities for real-time interaction through chat or voice. However, to facilitate video recording, participants were asked to keep their microphones muted and cameras off during presentations. All direct interactions were instead conducted in written

form via a prestructured collaborative document, which allowed for anonymous participation. To serve the collaborative documents, a HedgeDoc collaborative space was set up by BIOBYTE, and was hosted on their server.

To further enhance the interactive experience, Zoom breakout rooms were used for exercises and discussions in small groups. This setup provided participants with a space for direct interaction and practical application of the workshop content, while ensuring that discussions remained manageable and focused. Participation in these group discussions was optional.

A **Main** collaborative document, set up by the instructors and organisers, was shared with the participants before the workshop. Each section of the workshop had dedicated *Hands-on* boxes to report on the task status, ask questions or raise issues. Helpers engaged and assisted participants by answering the questions and issues directly in this document. This Main document was updated live during the workshop. Separate boxes to answer questions were used to improve participant engagement and as an indirect learning assessment (Figure 3).

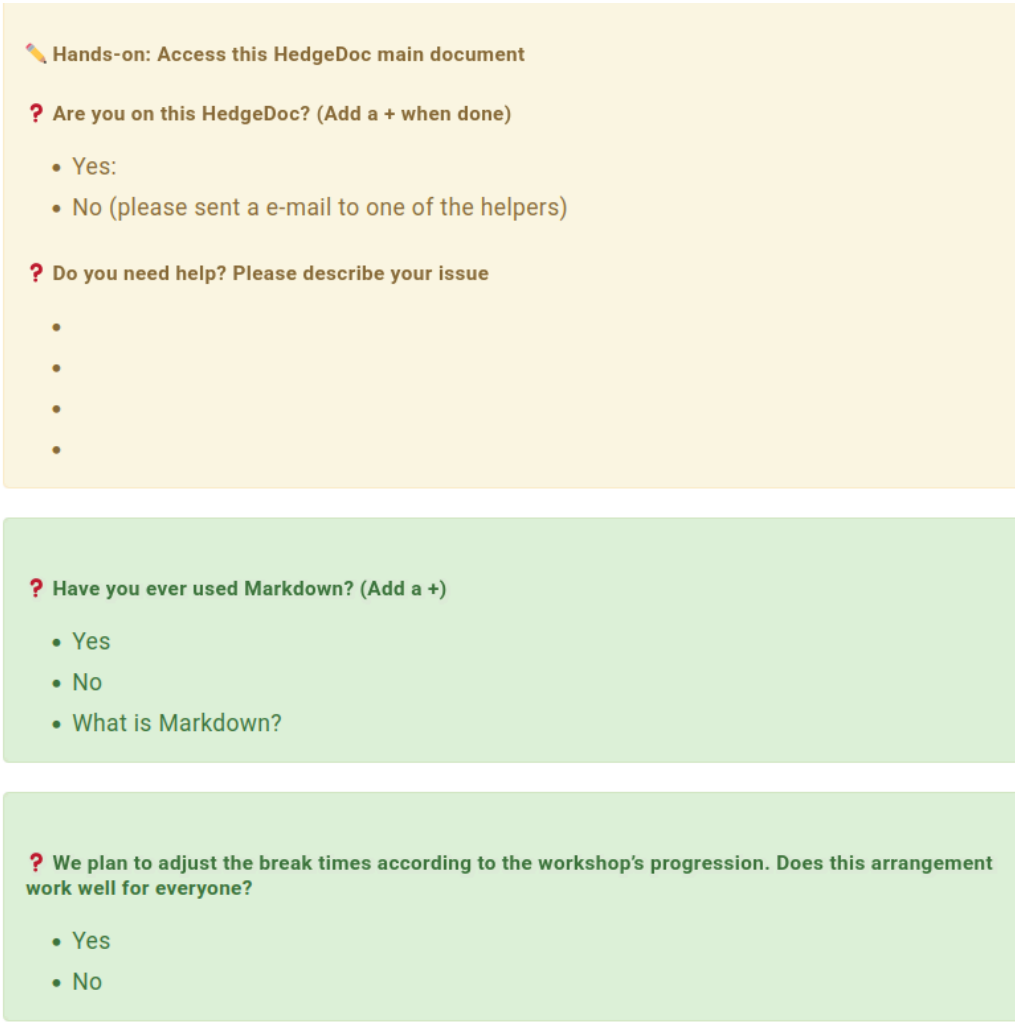


**Figure 3** - Example of question and hands-on boxes in the collaborative document.

To help with the organisation, four HedgeDoc documents were used: (i) a **Template** with all instructions and boxes for hands-on, questions, etc; (ii) the **Main** document with the information for the participants during the workshop, filled with boxes related to the section covered by the instructor to help with the navigation and cleaned during each break to avoid an overcrowded document; and (iii) a **History** document collecting all the content from the Main document. This document was shared with participants during the workshop, to grant them access to all prior conversations. In addition, (iv) a document for Helpers & Instructors was created providing the workshop setup, interactions and explaining tasks of the helpers and instructors.

The teaching materials used during this workshop, summarised in Table 1, were generated using the Train the Trainers Carpentries material, ELIXIR material, and some content specifically created for this workshop.

Table 1 shows the content delivered during both days of training and has been used to create a handbook to help participants when using the material provided.

| Day | Topic | Tutorial |
|---|---|---|
| **Day 1** | Presentation of different forms of knowledge-exchange:<br>- Classical training<br>- Consulting<br>- Mentoring<br>- Community engagement | Presentation of different forms of knowledge-exchange |
| | Theory of Learning:<br>- Building Skills with Practice<br>- Expertise and Instruction<br>- Memory and Cognitive Load<br>- Motivation and Demotivation | Theory of Learning |
| | Theory of Learning Discussion:<br>- Recalling situations<br>- Expertise | Theory of Learning Discussion |
| | Training Development:<br>- Feedback | Training Development |
| | Training Development Discussion:<br>- Strategies for surveying the training audience<br>- Surveys (pre- and post-)<br>- Receiving feedback | Training Development Discussion |
| | Training development:<br>- Strategies for Surveying the Training Audience<br>- Designing Learning Objectives, Experiences, Learning Paths<br>- Integrating Feedback | Training development |

| | | |
|---|---|---|
| **Day 2** | Training delivery:<br>- Working with your team part 1: CoC | Training delivery |
| | Training Delivery 1 Discussion<br>- Community roles (CSCCE) and community participation model | Training Delivery 1 Discussion |
| | Training delivery:<br>- Working with your team part 2<br>- Difficult situations, 1 and 2<br>- Live Coding is a skill<br>- Launches and Landings | Training delivery |
| | Training delivery 2 Discussion:<br>- Launching role play | Training delivery 2 Discussion |
| | BioNT Training Format:<br>- Never teach alone<br>- Workshop hosts, trainers, helpers<br>- Workshop organisation | BioNT Training Format |
| | Recapitulating the previous discussion:<br>- Consulting (Academia)<br>- Consulting (Industry)<br>- Mentoring<br>- Community engagement | Recapitulating the previous discussion |

**Table 1** - Program and training material per day.

## Certificates

Certificates (Figure 4) will be provided to those participants who explicitly requested them and fulfilled these two criteria: (i) they joined at least one session on Zoom and (ii) they completed the post-workshop survey.

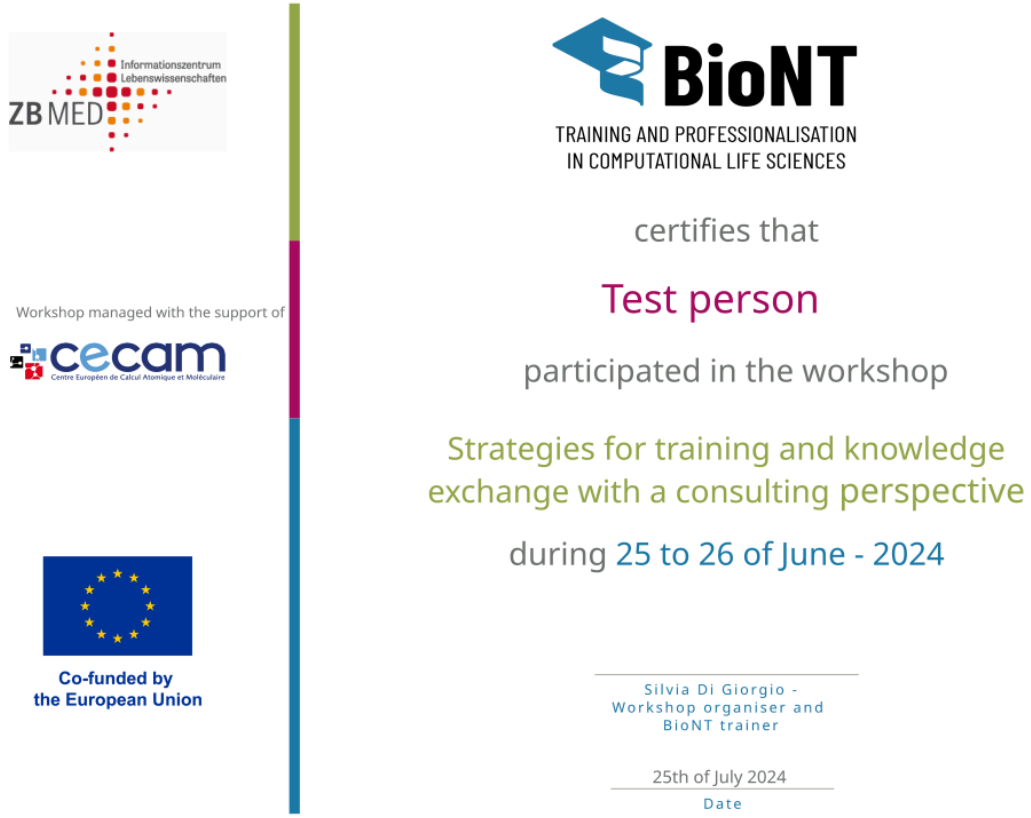


**Figure 4** - Template used to generate certificates.

# Outcomes of the workshop

## Applications and pre-workshop survey

22 applicants completed the pre-workshop survey and 24 submitted their application forms via the CECAM platform. These 22 survey answers are therefore analysed and shown in the following sections. The pre-workshop survey comprised 21 questions covering skills, demographics, and miscellaneous topics. The majority of questions were optional for the successful completion and submission of the survey.

### General information

Of the 22 applicants, 8 were male, 12 female and 1 gender variant/non-conforming. The country of origin and employment are summarised in Table 2.

| Country | Nationality | Employment | EU / non-EU |
|---|---|---|---|
| Argentina | 1 | 1 | non-EU |
| Belgium | - | 2 | EU |
| Brazil | 3 | - | non-EU |

| | | | |
|---|---|---|---|
| Canada | 1 | - | non-EU |
| Egypt | 1 | 1 | non-EU |
| Estonia | - | 2 | EU |
| Germany | 2 | 6 | EU |
| Greece | 2 | 2 | EU |
| India | 2 | 1 | non-EU |
| Italy | - | 1 | EU |
| Norway | 1 | 1 | EU |
| Somalia | 1 | 1 | non-EU |
| Spain | 2 | - | EU |
| Turkey | 1 | 1 | non-EU |
| Ukraine | 1 | - | non-EU |
| United Kingdom | 2 | 2 | non-EU |
| United States of America | 1 | 1 | non-EU |

**Table 2** - Workshop applicants' nationality and country of employment from the pre-workshop survey.

Most applicants worked or studied in the fields of Genetics, Genomics and Bioinformatics followed by Biomedical or Health Sciences (Figure 5) and were mostly academic employees (Figure 6-A) in the category of research or support staff (Figure 6-B).

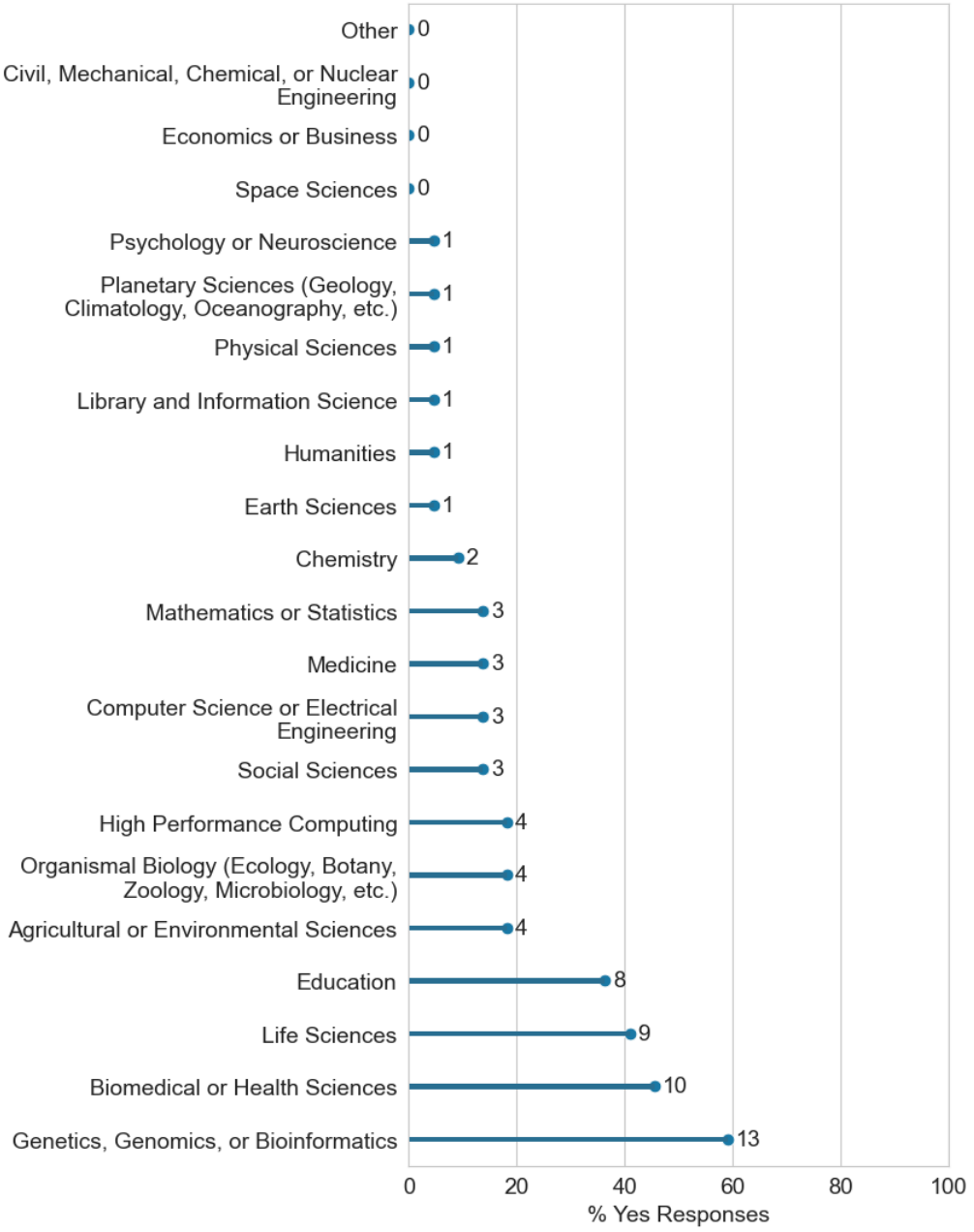


**Figure 5** - The relevant fields or disciplines (multiple choice) of the applicants for n = 21, according to the pre-workshop survey.

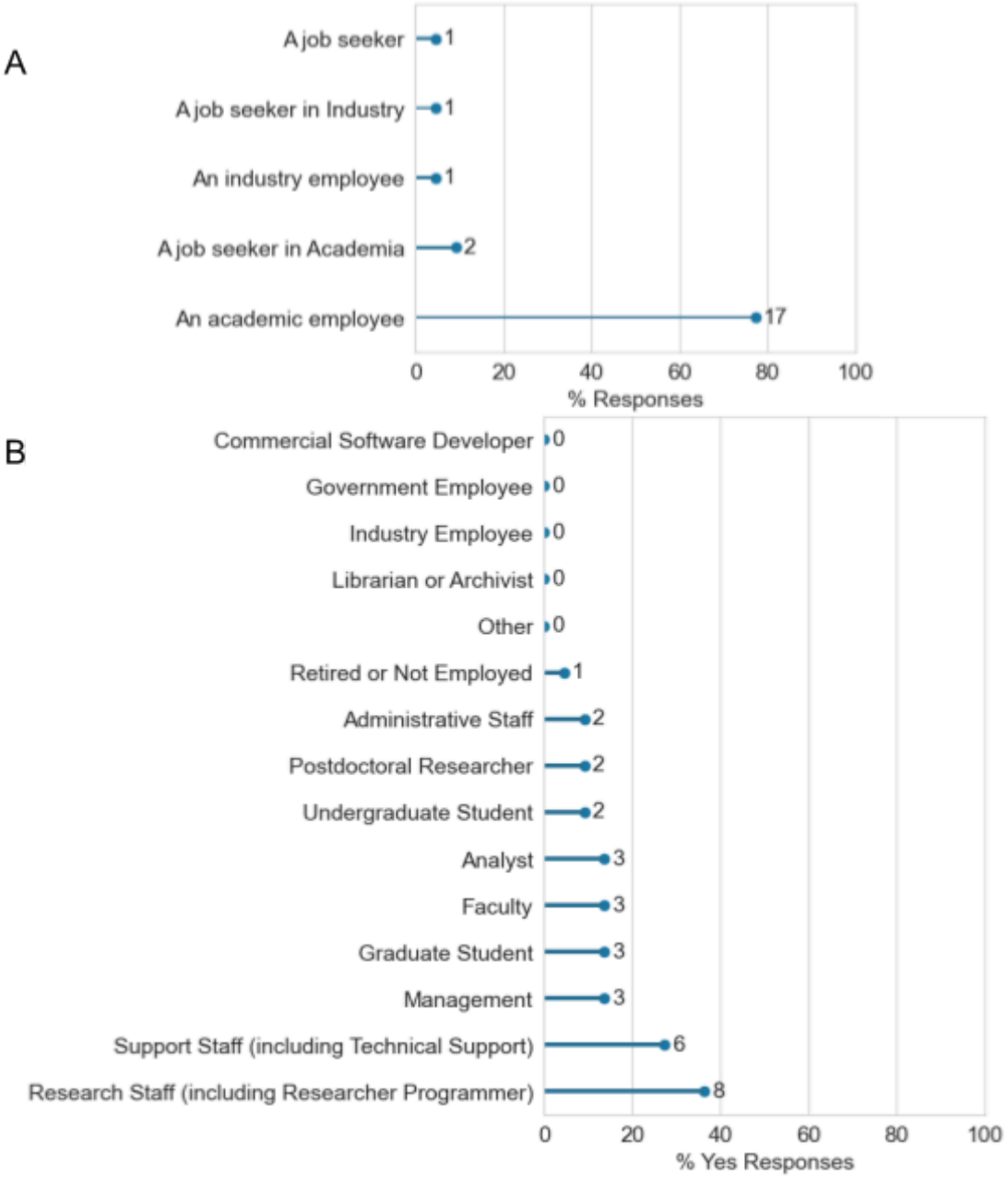


**Figure 6** - The current job definition of the applicants (single choice) (**A**) for n = 22, and the current occupation/career stage (multiple choice) (**B**) for n = 20, according to the pre-workshop survey.

Additionally, 1 applicant was industry employees and 4 were job seekers (with 2 in Academia, 1 in Industry and 1 either in academia or in industry). Regarding the connections with SMEs, 1 mentioned to be working in an SME, 5 collaborating with SME and 9 aiming to work in an SME (Figure 7).


**Figure 7** - Connection of the workshop participants to SMEs (n = 15).

Applicants found information about the workshop through various channels, as illustrated in Figure 8, with the majority learning about it via email, social media or receiving direct recommendations from friends or colleagues.

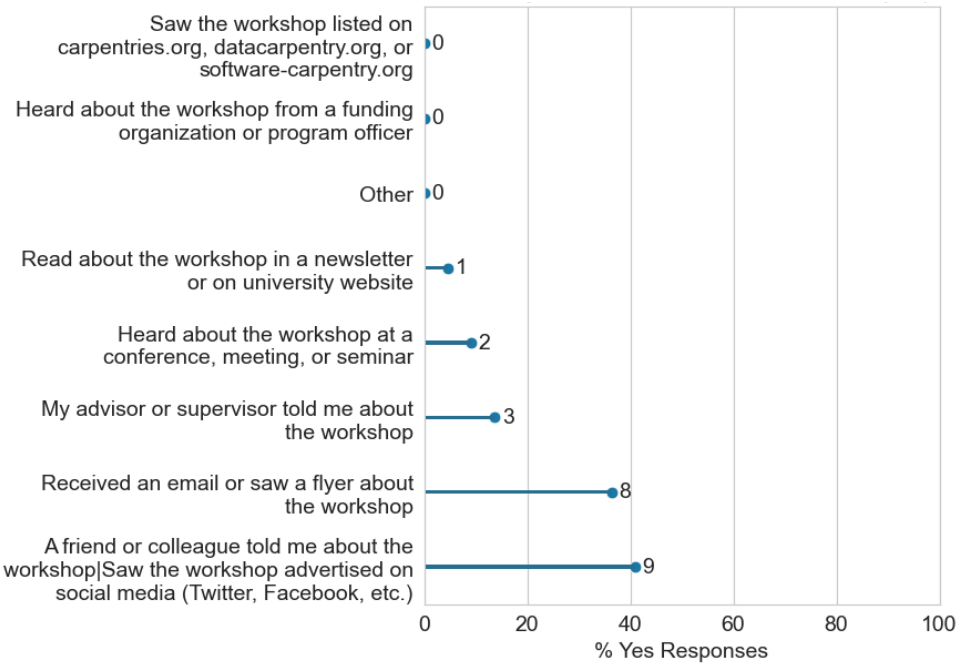


**Figure 8** - Answers to the question: “How did you find out about this workshop?” (n = 19).

## Background and expectations

When asked about the frequency they use certain tools, most participants indicated to use a programming language and the terminal/PowerShell on a daily basis. On the contrary, specialised software with a point-and-click graphical user interface and databases were used only a few times per year. Figure 9 provides a general overview of the skills and interests of the trainees in this workshop, which they might transfer to others with the newly acquired tools from this workshop.

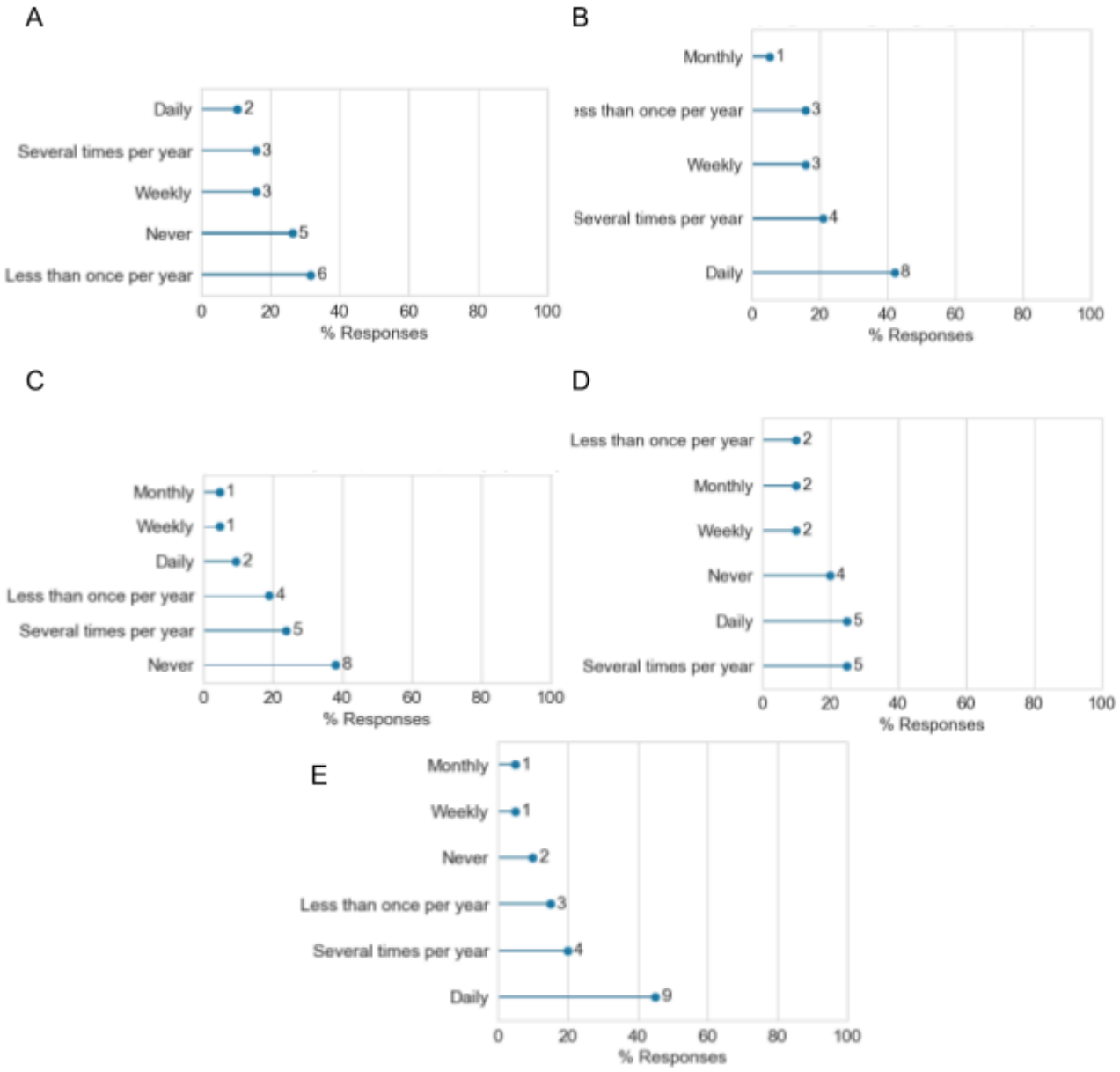


**Figure 9** - Answers to the question: “How often do you use any of the following?”. This question was optional and trainees could answer to none, some or all the questions (n = 22): **A** - A specialised software with a point-and-click graphical user interface (e.g. SPSS, SAS, ArcGIS, QGIS, Geneious); **B** - Programming languages: R, Python, C++, etc.; **C** - Databases (SQL, Access, etc.); **D** - Version control software (Git, Subversion (SVN), Mercurial, etc.); **E** - Terminal and macOS or PowerShell on Windows.

Most participants were keen on acquiring new skills, with some specifically interested in learning those applicable to their current occupation. Additionally, 12 participants expressed their intention to leverage the acquired skills either to secure a promotion within their current job or to pursue new employment opportunities (Figure 9).

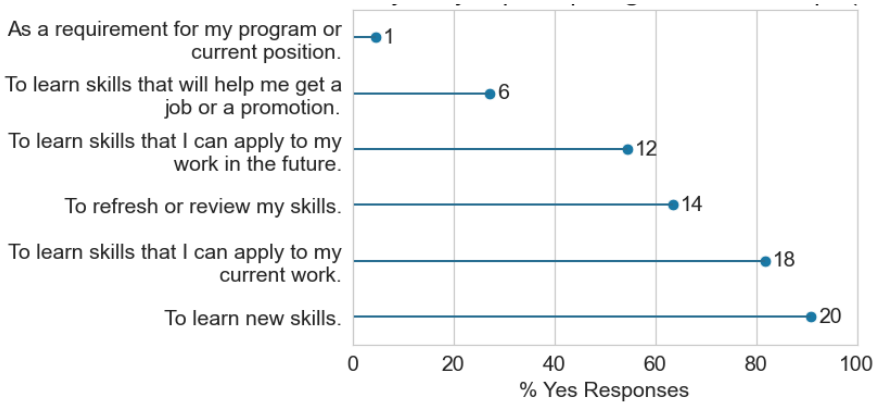


**Figure 9** - Answers to the question: “Why are you participating in this workshop?” (n = 20).

Regarding other training communities connected to BioNT, and in particular to the creation of this workshop, the trainees indicated to have heard about ELIXIR and The Carpentries but many were not aware of Galaxy (Figure 10).

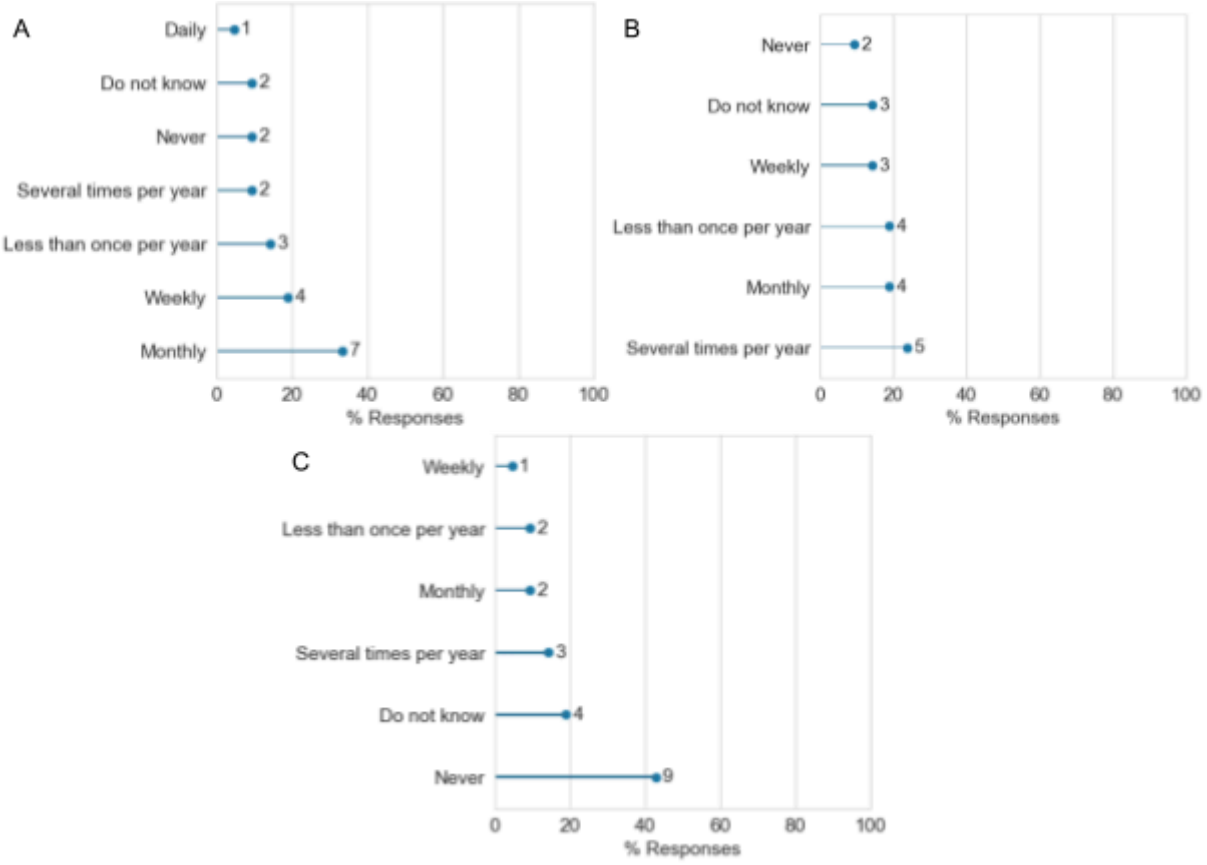


**Figure 10** - Answers to the question: “You know what…” (n = 21): **A** - ELIXIR is and you are involved in some form with it (even just recurrently receiving updates); **B** - The Carpentries is and you received information from it; **C** - Galaxy is and you use it.

## Participation

All 24 applicants who submitted their complete application were chosen to take part in the workshop. Of these 24 applicants, a total of 19 participants attended the workshop live, although not all of them stayed for the entire duration (Table 3). All 24 received the self-learning materials for them to consult at any time.

| Day | Participants | Instructors | Helpers |
|---|---|---|---|
| 1 | 19 | 4 | 4 |
| 2 | 18 | 4 | 3 |

**Table 3** - Number of participants, instructors and helpers per day. The number of participants was obtained from the participant login information captured by Zoom.

After the workshop, 13 participants requested a certificate. The certificate will be provided to those participants who attended the Zoom live session at least once and completed the post-workshop survey.

## Daily feedback

At the end of each day, participants were asked for feedback on the following three points:

- Please share one thing that was good about today
- Please share one thing that could be improved about today
- Do you have any other comments?

The daily feedback is summarised in the following Table 4.

| Day | Good about today | To improve | Any other comments? |
|---|---|---|---|
| 1 | Interactive exercises and useful tips<br>Keen and enthusiastic approach to making the workshop interactive<br><br>Effective use of HedgeDoc for communication and time management<br><br>Inspiring content that provokes further thought<br><br>Quality speakers<br><br>Practical tips and tricks shared<br><br>Techniques taught are applied in the teaching style<br><br>Knowledge application<br><br>Gentle session pacing | Clarify expectations about participation: initial emphasis on anonymity conflicted with later breakout sessions and discussions<br><br>The pace of the workshop is slow<br><br>Workshop slightly below expectations<br><br>Need for short breaks each hour<br><br>More frequent and shorter breakout sessions (3-5 mins) | |

| | | | |
|---|---|---|---|
| | Kind and open-minded approaches to human interactions<br><br>Well-organised structure<br><br>Valuable material for future use (diagrams, course-building approach) | Clear policy needed for camera and mic use in breakout rooms<br><br>Shorten session lengths to avoid awkwardness in Zoom interactions<br><br>Detailed explanation of each role (mentors, consultants, community managers) for better understanding, especially for junior professionals in life sciences | |
| 2 | Respectful and kind. Thank you! | The explanation of some activities (not all). Maybe sometime you can add more examples to understand | Thank you for a great workshop! |

**Table 4** - Daily feedback collected in the HedgeDoc document.

## Post-workshop survey

At the end of the workshop, participants were asked to complete the post-workshop survey consisting of 14 questions, 13 of them optional. In total, 13 participants completed this survey.

Regarding the workshop environment and the possibility of interacting with the trainer and helpers, the answers were overall positive (Figure 11 A-B). All participants perceived the instructors as enthusiastic about the workshop and knowledgeable about the material being taught (Figure 11 C-D). Except for one participant, all others could get clear answers to their questions from the instructors (Figure 11-E). Except for one neutral answer, all the participants expressed confidence in their ability to immediately apply what they learned at the workshop (Figure 11-F). Regarding accessibility requirements all participants either answered “No” or did not answer at all. One participant answered "No" to this accessibility question but indicated “Yes” to the question "Were there any accessibility issues that affected your ability to participate in this workshop?" and included a comment regarding their unstable internet connections. Participants mostly viewed the interaction with the HedgeDoc document and the questions answered on the fly by the helpers as positive and helpful for their learning experience. They also liked that trainers were using the same concept they were teaching, empowering the messages behind the workshop.

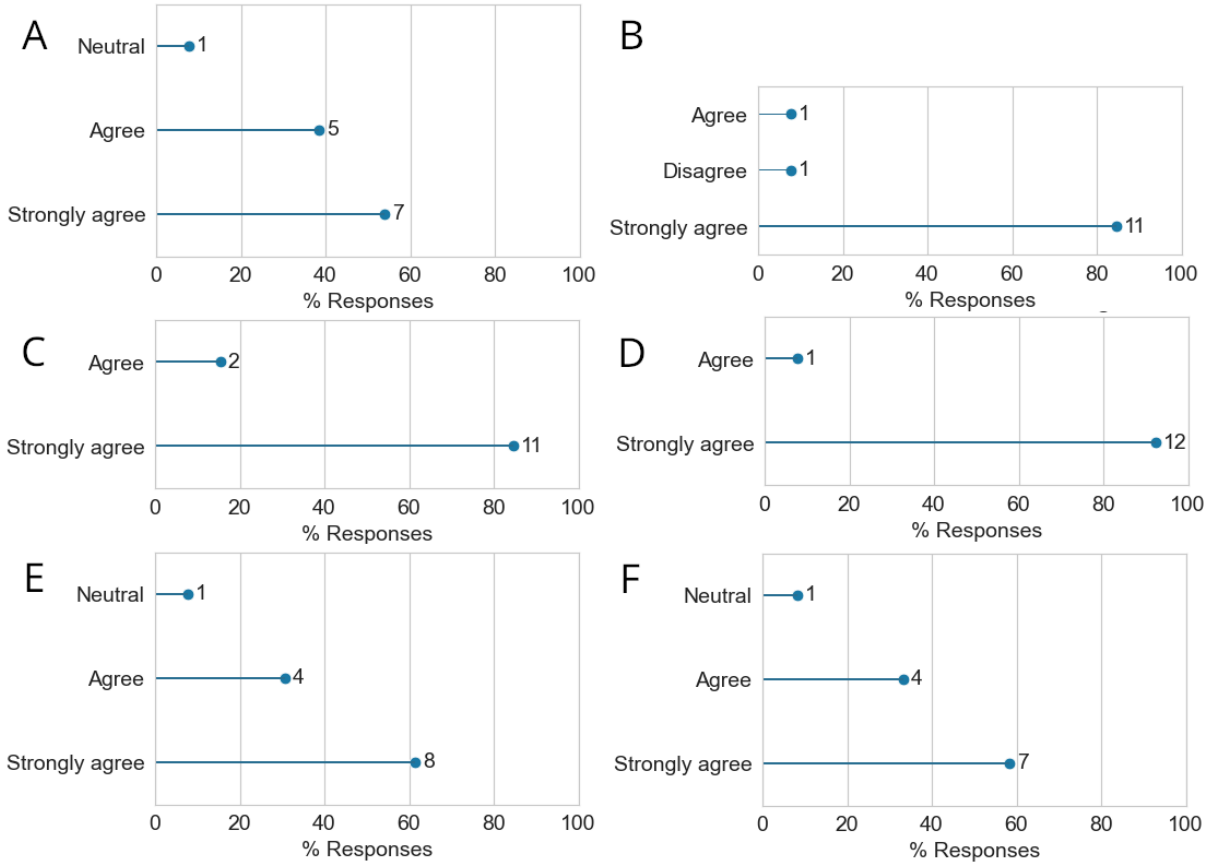


**Figure 11** - Rating of participant's agreement with the following statements: **A** - I felt comfortable learning in this workshop environment (n = 13); **B** - I felt comfortable interacting with the instructors (n = 13); **C** - The instructors were enthusiastic about the workshop (n = 13); **D** - The instructors were knowledgeable about the material being taught (n = 13); **E** - I was able to get clear answers to my questions from the instructors (n = 13); **F** - I can immediately apply what I learned at this workshop (n = 12).

Participants were also asked about strengths and ways to improve the workshop.

The major strengths of the workshop have been summarised in the following points:

- Using HedgeDoc was an enjoyable experience.
- The instructors were friendly, accommodating, and provided excellent presentations with easy-to-follow slides and quick responses.
- The format, structure, organisation, time management, and balance between practical activities and theory were outstanding.
- The interactivity was effective, and the content was very useful, covering topics like Memory Models, Smart Goals, Bloom's Taxonomy, Community, and Consulting & Mentoring discussions.
- The online format made the sessions highly accessible, and the trainers were open to discussions and questions.
- The learning environment was excellent, with friendly and respectful communication, well-organised materials, and competent instructors who answered spontaneous questions effectively.

The major areas for improvement of the workshop are summarised below:

- The contrast between the main room with no cameras or live interaction and being put in a Zoom room with 1-2 people was awkward.
- Participants could be encouraged to share their contact or social media accounts (e.g., LinkedIn) to stay in touch.
- More content on consulting was desired, as it was considered a unique value of the workshop compared to others. Providing more details about potential consultancy opportunities or networks and offering more practical options and advice, like those in the last session, was suggested.
- Sharing slides and contents before the workshop would be helpful.
- For role play activities, providing a small story or description to follow would be beneficial, and having the instructor mediate to guide participants would have been beneficial

The feedback on the post-workshop survey was positive and participants were likely to recommend this workshop to a friend or colleague (Figure 12).

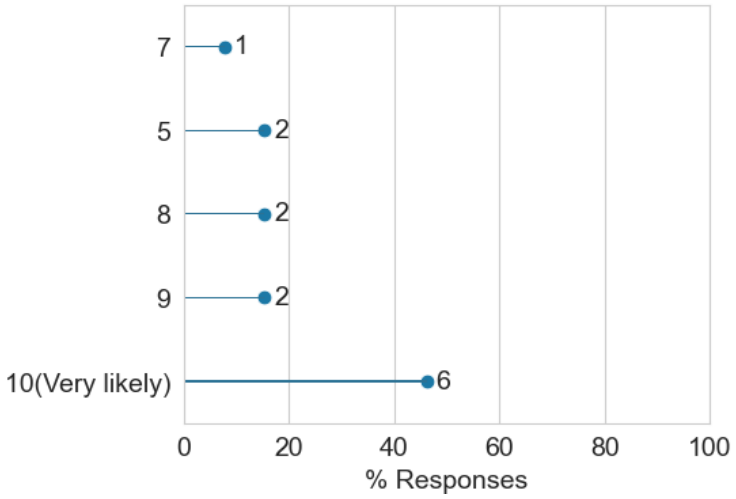


**Figure 12** - Answers to the question: How likely would participants recommend this workshop to a friend or colleague? (n = 13). The answers from “0 - Very unlikely” to 4 are not shown as no responses were given in this range.1-3: No, 4-7: Maybe, 8-10: Yes.

# Conclusion

The fifth BioNT workshop, “Strategies for training and knowledge exchange with a consulting perspective”, was successfully held on June 25th - 26th of 2024, online and cost-free for participants.

The setup for the fifth workshop benefited from the experience gathered during the first four BioNT workshops. This workshop was slightly different from previous BioNT workshops, as a certain level of interaction was necessary. Allowing participants to speak and interact during the discussion session in the main Zoom room and in the breakout sessions led to some challenges due to privacy issues. However, the general approach to interaction with the

participants was appreciated. Successful participation in the training required no installation of any software, but the use of a dual-screen setup was recommended.

Compared to previous BioNT courses, the fifth workshop had fewer registrations and participants. This aligns with the purpose of the workshop, as it is not designed for beginners but for advanced trainees in academia and industry interested in knowledge exchange. This decreased interest aligns with the results from the Bioinformatics Training Needs Survey, which indicated that this workshop was not as appealing for participants in academia and industry as other workshops offered by the consortium.

One distinguishing factor of this workshop was the creation of specific training materials designed for its objectives. The pace of the workshop was notably more favourable compared to previous ones, allowing trainers time to interact with participants, address issues, and maintain engaging discussions throughout the session via the HedgeDoc document and live.

One significant challenge for this course, as mentioned, was the requirement for a certain level of interaction between participants. The training team addressed this problem by ensuring that participants did not require to show their name, affiliation, or face, and by encouraging interactions through the HedgeDoc document. Additionally, the exercises in breakout rooms were not mandatory.

The consortium will take the improvements and the individual challenges of the fifth workshop into consideration to further enhance the training provided by BioNT. Overall, the BioNT consortium concludes that the workshop successfully achieved its goals.