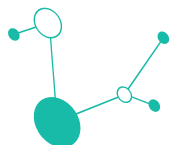


Pilot Run Reports

D 2.2.1

Project Partner: PP4 Brigg Digitales Gründerzentrum





PILOT RUN REPORTS - PP4

1. Overview of the Pilot Run

Within the DiSTT project, three complementary pilot activities were implemented to strengthen transformation-related competencies among SMEs, future employees, and apprentices. The pilots combined application-oriented technical training with the development of essential transversal skills required for digital transformation.

Rather than focusing solely on technical knowledge, all activities integrated practical problem-solving, teamwork, communication, project management, and presentation skills into real-world learning scenarios. The programs intentionally addressed different target groups—employees from SMEs, university students, and apprentices—to foster transformation competencies throughout different stages of professional development.

1.1 Activity 1 - Mini Workshops (Tool and Topic Entry)

1.1.1 Program Description

The mini workshop series was designed as short introductory training sessions (1-4 hours) enabling SME employees to gain first practical experience with emerging digital technologies.

Four workshops were successfully implemented covering:

- CNC Shaper
- Laser Cutting
- Vibe Coding
- Generative AI

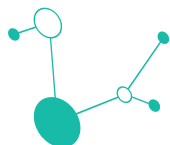
Following the initial implementation, the Generative AI workshop was revised and repeated to incorporate participant feedback and optimize the learning concept.

Additional five workshops (3D Printing, CNC Shaper and Laser Cutting repeats) had been planned. Due to limited participant demand, these sessions were not conducted. Instead, demand shifted towards longer, practice-oriented multi-session formats, particularly in Vibe Coding, Programming and Generative AI, indicating a preference for more comprehensive learning opportunities.

1.1.2 Learning Outcomes

Participants were able to

- understand the principles and practical applications of Generative AI and AI-assisted development;
- create simple digital products using Vibe Coding approaches;
- prepare digital files and safely operate CNC Shaper and laser cutting equipment;
- understand the workflow from digital design to physical manufacturing;



- apply creative problem-solving methods to practical business challenges;
- strengthen project planning and presentation skills;
- build confidence when working with unfamiliar digital technologies.

1.2 Activity 2 - Hackathon Winner Follow-Up Series

1.2.1 Program Description

The follow-up programme supported the three finalist teams from the regional hackathon over a period of approximately three months. Students and company representatives continued developing the solutions initially created during the hackathon into functional prototypes with practical business relevance.

The programme focused on strengthening interdisciplinary collaboration while advancing technical implementation and prototype development through continuous mentoring and iterative project work.

1.2.2 Learning Outcomes

Participants were able to

- transform initial concepts into functional digital prototypes;
- improve programming and software development skills;
- apply rapid prototyping methods within innovation projects;
- strengthen communication and collaboration in interdisciplinary teams;
- improve project planning and task management;
- develop practical problem-solving competencies;
- present technical solutions to different stakeholder groups.

1.3 Activity 3 - Bayernoil Apprentice Workshop Series

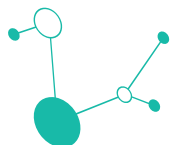
1.3.1 Program Description

Originally planned as five full-day workshops, the programme was successfully completed within four workshop days, as the learning objectives were achieved earlier than expected.

Nine Bayernoil apprentices participated in an intensive practice-oriented training programme combining digital manufacturing, programming and problem-solving methods.

The workshop series covered

- competency and skill matching
- introduction to CAD
- component design
- embedded systems
- programming fundamentals
- virtual and physical circuit construction
- logic development
- 3D printing
- laser cutting
- Arduino programming
- Scratch
- Minecraft Education
- final prototype development



The modular learning approach enabled participants to continuously apply newly acquired knowledge while developing complete functional prototypes.

1.3.2 Learning Outcomes

By the end of the workshop series, participants were able to:

- understand the fundamentals of CAD design and create simple digital components
- apply basic programming concepts using Arduino, Scratch and Minecraft Education
- understand embedded systems and develop simple hardware-software applications
- prepare digital designs for laser cutting and 3D printing and manufacture physical components
- combine digital design, programming and fabrication into functional prototypes
- apply structured problem-solving methods to technical challenges
- strengthen teamwork, communication and project planning skills in interdisciplinary tasks
- present technical solutions and explain their development process
- build confidence in using modern digital manufacturing and programming technologies

2. Methodology

The pilot activities were evaluated using a combination of quantitative and qualitative methods. Depending on the duration and objectives of each pilot, different evaluation instruments were applied to capture both immediate learning outcomes and longer-term effects.

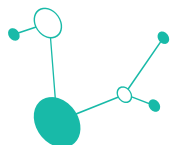
The evaluation focused on several dimensions, including:

- perceived competence and confidence,
- self-assessed learning progress and support needs,
- perceived usefulness, clarity, and practical relevance of the training,
- participant motivation and immediate reactions,
- knowledge transfer into the professional context,
- overall satisfaction and completion status,
- longer-term impact and reflection on the learning experience.

To assess these dimensions, the following methods were used:

- pre- and post-programme self-assessments,
- Mentimeter-based competence surveys,
- Google Forms questionnaires,
- structured post-event feedback,
- on-site oral feedback and retrospectives,
- instructor observations during practical exercises,
- post-programme follow-up surveys, and
- personal follow-up discussions with participants and company representatives.

For the Mini Workshops, participants completed Mentimeter-based self-assessments before and after the training to evaluate their competence and confidence in topics such as Vibe Coding, Generative AI, CNC Shaper, Laser Cutting, communication, and problem-solving. Immediate reactions, motivation, and perceived practical relevance were captured through structured post-workshop feedback and instructor observations.



For the Hackathon Follow-Up Series, participants completed competence self-assessments at the beginning and end of each workshop session. These were complemented by continuous instructor observations, allowing the development of technical competencies, teamwork, communication, and project progress to be monitored throughout the programme.

The Bayernoil Apprentice Workshop Series combined pre- and post-self-assessments with Mentimeter surveys, structured participant feedback, follow-up questionnaires, and discussions with the training manager. This approach evaluated not only competence development but also participants' confidence, satisfaction, reflection, and the transfer of acquired skills into their daily work environment.

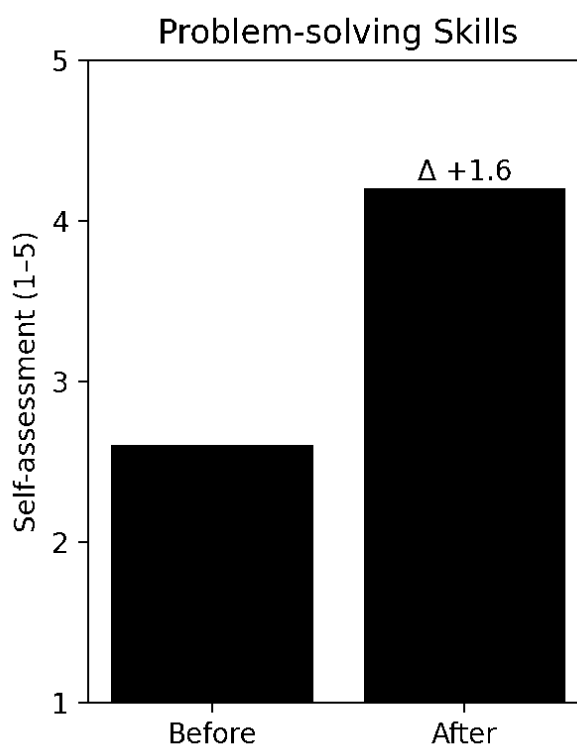
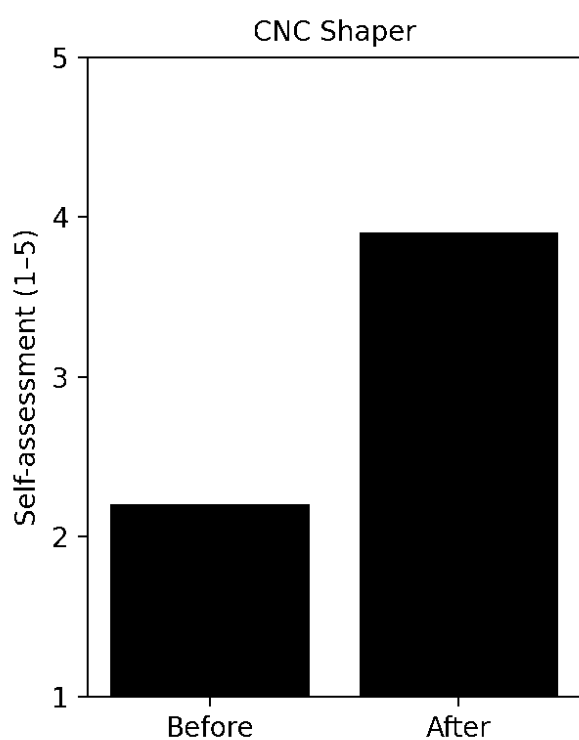
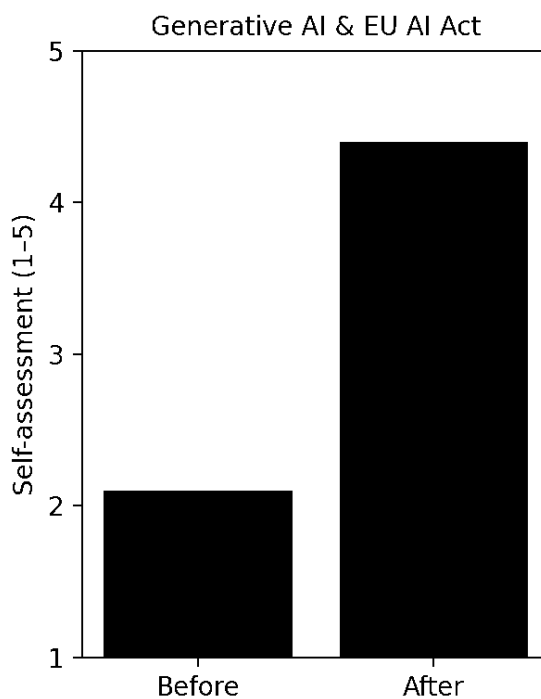
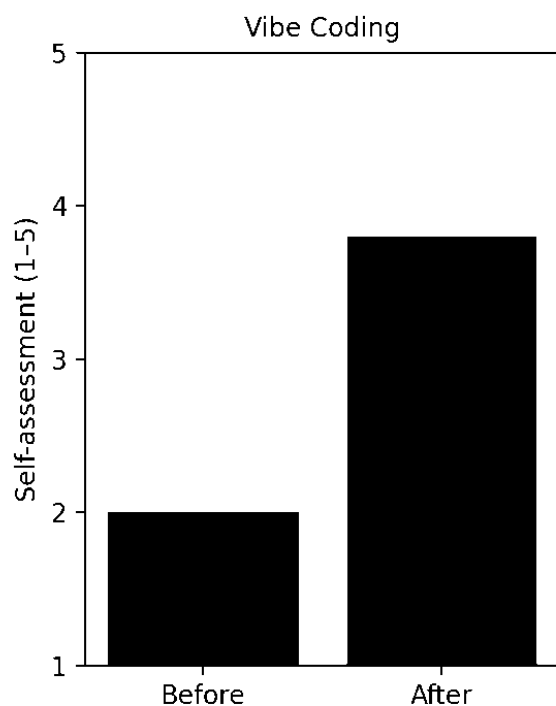
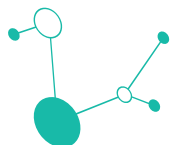
3. Program Evaluation

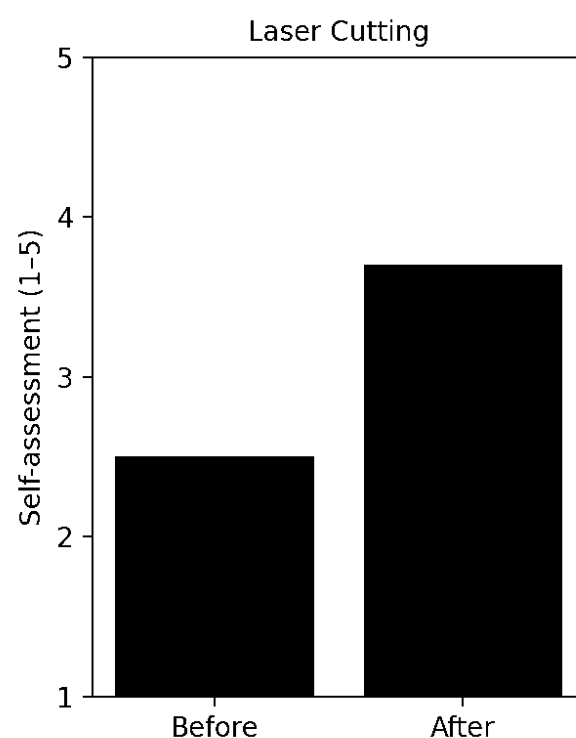
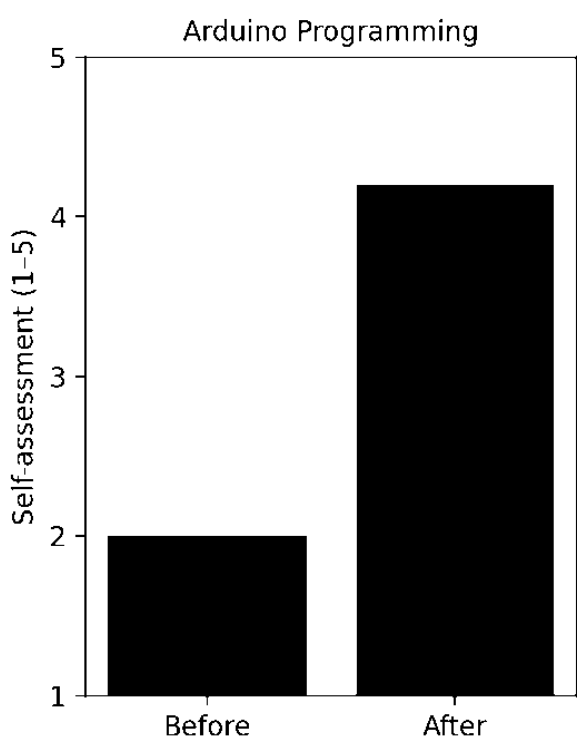
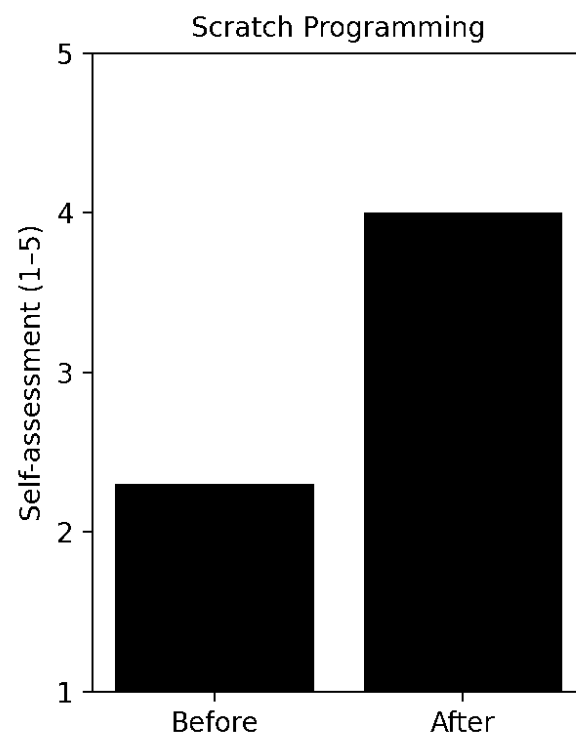
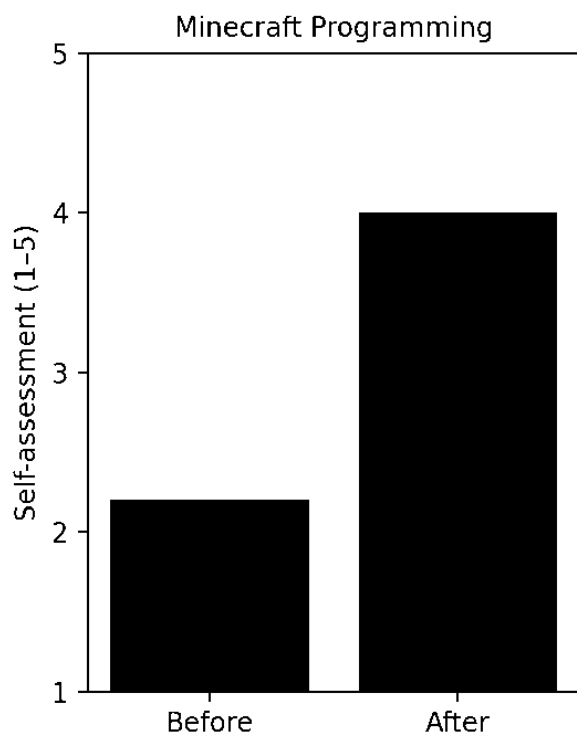
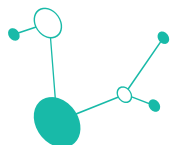
3.1 Evaluation

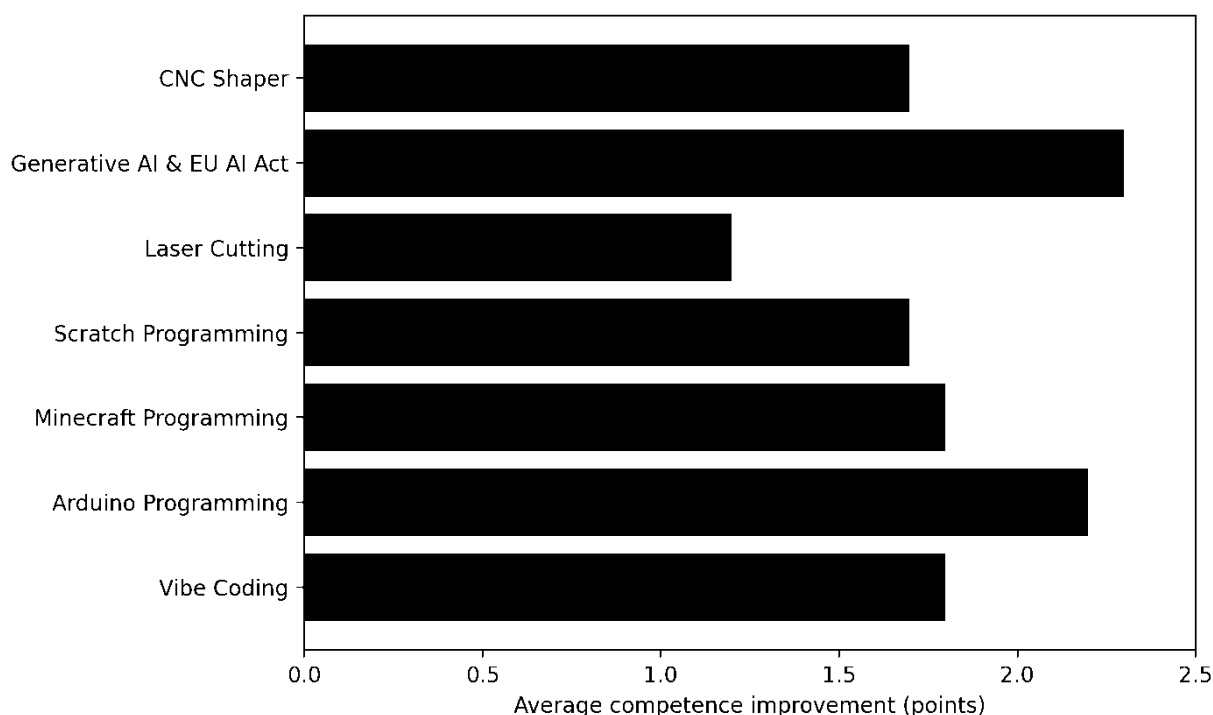
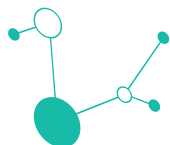
The evaluation combined structured pre- and post-programme self-assessments with instructor observations and participant feedback. The primary assessment tool was a Mentimeter-based survey allowing participants to reflect on their competencies before and after each programme. This approach enabled continuous monitoring of both technical and transversal skill development while providing instructors with valuable insights for adapting workshop delivery.

Across all pilot activities, participants reported clear improvements in their technical competencies. On average, self-assessed hard skills increased by approximately two points, particularly in Generative AI, programming, Vibe Coding, CNC Shaper operation and Laser Cutting. The practical, hands-on learning approach proved especially effective in enabling participants to transfer newly acquired knowledge directly into real-world applications.

Soft skills such as communication, teamwork, project organisation and collaborative problem-solving also improved throughout the programmes, although to a lesser extent than technical competencies. The evaluations nevertheless confirmed that working on practical challenges within interdisciplinary teams significantly strengthened participants' confidence, collaboration and innovation capabilities.







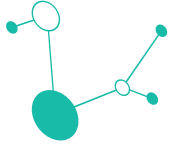
1.Challenges, Lessons learned and Next Steps

Challenges

- Recruiting participants for short introductory workshops proved difficult, while demand shifted towards longer, practice-oriented programmes.
- The complexity of topics such as Generative AI requires more time than can be provided within short workshop formats.
- Collecting feedback after the workshops proved challenging. Both printed and digital surveys achieved only low response rates unless participants were contacted personally.
- Pre-programme self-assessments were occasionally influenced by overconfidence, particularly among participants with previous exposure to digital technologies, resulting in initially inflated self-ratings.
- Some digital evaluation tools presented practical limitations, including restricted account access and difficulties exporting results.

Lessons Learned

- Practical, hands-on learning generated the highest participant satisfaction and the strongest competence development.
- Working on real business challenges significantly increased participant motivation, engagement, and perceived relevance.
- Combining technical competencies with communication, teamwork, project management, and problem-solving produced greater learning outcomes than purely technical training.



- Participants clearly preferred developing complete prototypes instead of learning isolated digital tools.
- Continuous mentoring over several weeks resulted in deeper learning and stronger confidence than single-session workshops.
- Early involvement of students, apprentices, and SME employees supports the long-term development of transformation-related competencies.
- On-site oral feedback and workshop retrospectives proved to be the most effective evaluation methods, as they generated immediate, detailed, and nuanced feedback while achieving consistently high participation rates.
- Mentimeter-based self-assessments provided an efficient way to monitor changes in participants' perceived competence over time and enabled quick competence checks during group sessions.
- Instructor observations complemented participant self-assessments by providing rich qualitative insights into collaboration, communication, and practical skill development that could not be captured through surveys alone.
- Personal follow-up calls were essential for obtaining meaningful feedback after programme completion, whereas standalone post-workshop questionnaires generated only limited responses.
- Using multiple evaluation methods provided a more comprehensive understanding of programme impact by combining quantitative competence development with qualitative reflections on learning experiences.

Next Steps

- Expand successful topics such as Vibe Coding, Programming, and Generative AI into multi-session learning formats.
- Replace isolated introductory workshops with modular learning pathways that allow participants to progressively build competencies.
- Continue integrating technical and transversal skills through project-based learning using real business challenges.
- Strengthen follow-up support to facilitate the transfer of newly acquired competencies into participants' professional environments.
- Further standardise the evaluation framework while maintaining a mixed-method approach that combines self-assessments, instructor observations, and structured participant feedback.

The evaluation across all pilot activities demonstrated that combining different assessment methods provides the most reliable picture of learning outcomes and programme impact. Several key conclusions can be drawn:

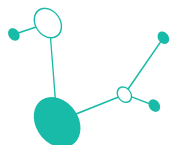
Immediate, on-site verbal retrospectives proved to be the most effective evaluation method, generating the richest, most detailed, and most actionable participant feedback.

Passive post-pilot surveys showed limited effectiveness. Reliable follow-up data was only obtained when participants were contacted personally after the programme.

Personal follow-up discussions significantly increased response rates and provided valuable qualitative insights, although this approach is resource-intensive and difficult to scale for larger participant groups.

Pre-programme self-assessments frequently overestimated participants' competence levels, while post-assessments became more realistic after participants gained practical experience and a better understanding of the technologies.

Mentimeter proved to be an effective low-threshold evaluation tool, allowing quick competence assessments, high participation rates, and easy comparison of perceived learning progress in group settings.



Instructor observations and manual feedback collected during workshops complemented self-assessments by capturing practical behaviour, collaboration, and problem-solving that could not be measured through questionnaires alone.

Reliable evaluation depends on robust digital infrastructure. Access restrictions, account limitations, and export issues can become significant barriers to continuous data collection and long-term programme evaluation.

A mixed-method evaluation approach, combining live feedback, self-assessments, instructor observations, and targeted follow-up interviews, produced the most comprehensive and reliable assessment of programme outcomes.

These findings provide a solid foundation for the design of future transformation programmes and their evaluation, highlighting the importance of practical learning environments, continuous participant interaction, and flexible, multi-method assessment strategies.

2. Participants Overview

The following table provides an overview of the implementation pilot activities.

Activity	Number of Participants	Number of SMEs	Number of hours
Mini Workshops	25	14	12
Hackathon Winner Follow-Up Series	24	3	27
Bayernoil Apprentice Workshop Series	9	1	32