



IPR4SC

**Developing Skills in Intellectual Property Rights Open Data for
Sustainability and Circularity**

**Facilitator Handbook for implementing IPR
Simulation Labs for digital skills**



Table of Contents

Table of Contents.....	2
List of Figures.....	4
List of Tables	4
List of Acronyms	5
1 Introduction.....	6
2 Training Course Structure and Content	8
2.1 Course description	8
2.2 Purpose of the training program and expected learning outcomes.....	9
2.3 Course target audience	10
2.4 Blocks description	10
2.4.1 Block 1: Introduction to Patent Analysis.....	10
2.4.2 Block 2: Designing and Refining Search Queries and Tools for Patent Analysis	11
2.4.3 Block 3: Data Management and Visualization	11
2.4.4 Block 4: Interpreting Patent Analysis Results	12
2.4.5 Additional training materials	12
2.5 Materials and Resources	12
2.6 Learners' evaluation and certification.....	14
3 Trainer Preparation.....	16
3.1 Trainer Qualifications and Selection Criteria.....	16
3.2 Training the trainers: the Simulation Lab.....	16
4 Monitoring and Evaluation	18
4.1 Defining Key Performance Indicators (KPIs) and results achieved	18
4.1.1 Participants.....	18
4.1.2 Evaluation Tests	18
4.1.3 Results achieved	19
4.2 Participant Feedback Collection Methods.....	19
4.2.1 Questionnaire for trainers	19
4.2.2 Questionnaire for learners	19
4.2.3 Privacy policy.....	19
4.3 Feedback analysis.....	20
4.3.1 Results of questionnaire for trainers	20



4.3.2 Comments and suggestions from trainers.....	22
4.3.3 Results of questionnaire for learners	23
4.3.4 Comments and suggestions from learners.....	34
4.4 Lessons Learned from Past Implementations.....	34
5 Course recommendations for next delivery	36
Appendices	39
Appendix A – Questionnaires	39
Questionnaires for trainers.....	39
Questionnaires for learners.....	40
Appendix B – Final Essay	47



List of Figures

Figure 1: Logical flow of the training course	8
Figure 2: Pragmatical flow of the training course.....	9
Figure 3– Overview of organisations involved.....	20
Figure 4- Results on the level of satisfaction with the IPR4Data course (in numbers).....	21
Figure 5 - Results on the level of satisfaction with the IPR4Data course (in percentage)	21
Figure 6 - Number of participants and enrolled students	23
Figure 7- Information about participants (current status)	23
Figure 8- Information about participants (field of study).....	24
Figure 9 - Results on proficiency (Block 1).....	24
Figure 10 - Results on proficiency (Block 2).....	25
Figure 11- Results on proficiency (Block 3).....	25
Figure 12 - Results on proficiency (Block 4).....	26
Figure 13 - Satisfaction with the clarity of the objectives	26
Figure 14 - Satisfaction with the content relevancy	27
Figure 15- Satisfaction with the clarity of the speaker	28
Figure 16 - Satisfaction with the quality of the presentation	28
Figure 17 - Satisfaction with the usefulness for the career	29
Figure 18 - Satisfaction with the stimulation of interest in the topic.....	30
Figure 19 - Satisfaction with the discussion with trainer and learners	30
Figure 20 - Satisfaction with the English language	31
Figure 21 - Satisfaction with the level of motivation.....	32
Figure 22 - Satisfaction for recommending to friends and colleagues	32
Figure 23 - Self-assessment	33

List of Tables

Table 1- Lessons learned from the Consortium after the two deliveries of the IPR4Data course, and deriving recommendations for future implementations.....	35
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List of Acronyms

- 1 AU (Algebra University):** Institution involved in delivering the summer session of the IPR4Data course.
- 2 B2B (Business-to-Business):** Refers to transactions or interactions conducted directly between businesses.
- 3 ECTS (European Credit Transfer and Accumulation System):** A standard for comparing study attainment across the European Union.
- 4 HE (Higher Education):** Refers to tertiary education provided by universities and similar institutions.
- 5 HEI (Higher Education Institution):** Academic institutions offering higher education and research opportunities.
- 6 HOU (Hellenic Open University):** Institution that digitally hosted the autumn session of the IPR4Data course.
- 7 IP (Intellectual Property):** Legal rights related to creations of the mind, such as inventions, designs, and trademarks.
- 8 IPR (Intellectual Property Rights):** Legal protections granted to IP owners, enabling them to control and monetize their innovations.
- 9 IPR4Data (Intellectual Property Rights for Data):** A training course designed to teach digital skills related to patent analysis and data management.
- 10 IPR4SC (Intellectual Property Rights for Sustainability and Circularity):** The overarching project focused on using IP for promoting sustainability and circular economy.
- 11 KPI (Key Performance Indicator):** A measurable value indicating the success of an objective.
- 12 PQAI (Patent Quality Artificial Intelligence):** A tool for enhancing patent searches and analysis using AI.
- 13 SMEs (Small and medium enterprises):** Businesses with limited staff and revenue, often benefiting from tailored training and tools to enhance innovation and competitiveness.
- 14 TV (Target Value):** The predefined goal or benchmark in the context of performance indicators.
- 15 VET (Vocational Education and Training):** Education and training aimed at equipping participants with specific job skills.
- 16 WIPO (World Intellectual Property Organization):** A global forum for intellectual property services, policy, and cooperation.

1 Introduction

This “*Facilitator Handbook for Implementing IPR Simulation Labs for Digital Skills*” serves as a comprehensive guide to enable educators and facilitators to effectively replicate the IPR4Data course, a training program designed to provide learners with a comprehensive understanding of patent analysis, enabling them to conduct effective searches, manage and visualize patent data, and interpret analysis results to support strategic business decisions with a particular focus on the Circular Economy and Sustainability. The course aims to bridge the gap between theoretical knowledge and practical application, ensuring participants are well-prepared to meet the demands of the labour market in fields related to intellectual property and innovation management.

The original course, conducted between July and November 2024, provided valuable insights and practices focused on Intellectual Property (IP) within the context of data management and digital skills training. This Handbook is designed to capture and disseminate those practices, ensuring that future facilitators can reproduce the course’s success in diverse educational and training settings.

The primary purpose of this Handbook is to outline the necessary steps and resources for successfully replicating future editions of the course. It provides detailed guidelines on key aspects of the course, including the preparation, facilitation, and assessment of learning outcomes. The Handbook is structured to guide trainers through a step-by-step process that encompasses not only the theoretical foundations but also the practical methodologies that enhance participant engagement and knowledge retention.

Core elements covered in this Handbook include:

- **Expected Learning Outcomes:** a clear articulation of the skills and competencies participants are expected to develop through the IPR4Data course, with measurable targets for assessing progress.
- **Trainers preparation:** an overview of the skills and attributes facilitators should possess to effectively transfer course content and knowledge.
- **Assessment Techniques:** a range of evaluation methods to gauge participant understanding and proficiency, ensuring alignment with learning objectives.
- **Organizational tips:** practical advice on managing tasks related to the coordination of simulation labs, from scheduling to participant communication.
- **Monitoring and evaluation guidelines and tools:** recommendations for ongoing assessment and feedback mechanisms to continuously improve course delivery and outcomes.

The target audience for this Handbook includes educators, trainers, and facilitators within higher education institutions, vocational training centres, and professional development programs who aim to incorporate IPR-focused digital skills training into their curriculum. Whether new to IPR topics or experienced in digital skills education, users will find this Handbook valuable for its actionable insights, adaptable templates, and comprehensive approach.

By equipping facilitators with this Handbook, the goal is to empower them to deliver impactful, learner-centred IPR training. This not only contributes to the broader dissemination of best practices within digital education but also enhances the ability of learners to navigate and manage intellectual property in the increasingly data-driven world.



The present handbook has been structured as follows. It begins with the *Training Course Structure and Content*, elaborates on the program's design, including its target audience, alignment with labour market needs, and detailed descriptions of the thematic blocks that make up the course, as well as evaluation and certification mechanisms. The *Trainer Preparation* chapter focuses on the qualifications, selection, and training of the trainers, ensuring they are well-equipped for their role. *Materials and Resources* reviews the tools and documentation necessary to support effective course delivery. In *Monitoring and Evaluation*, the handbook outlines methods for measuring the course's effectiveness, including feedback collection, analysis, and strategies for using evaluation data to refine future iterations. Finally, *Lessons Learned from Past Implementations* reflects on insights gained, offering tips for overcoming challenges.



2 Training Course Structure and Content

The following paragraphs provide a detailed overview of the structure and content of the IPR4Data training course. Together, they outline the course's pedagogical framework, ensuring a clear understanding of its structure, goals, and mechanisms for measuring success.

It begins with a general description of the course (Section 3.1), offering a broad understanding of its design and target audience. The chapter then elaborates on the purpose of the training program and the expected learning outcomes (Section 3.2), outlining the skills and knowledge participants are intended to acquire. Section 3.4 presents a detailed description of the course's learning blocks, highlighting their specific focus areas and how they contribute to achieving the training program's objectives. The full list of training material developed is presented in Section 3.5. Finally, the chapter addresses learners' evaluation and certification (Section 3.6), explaining the methods used to assess participant progress and the certification process to acknowledge their accomplishments.

2.1 Course description

The course is structured into several interconnected learning "blocks", each dedicated to a specific aspect of patent analysis. The course structure is visually represented in the diagram of Figure 1.

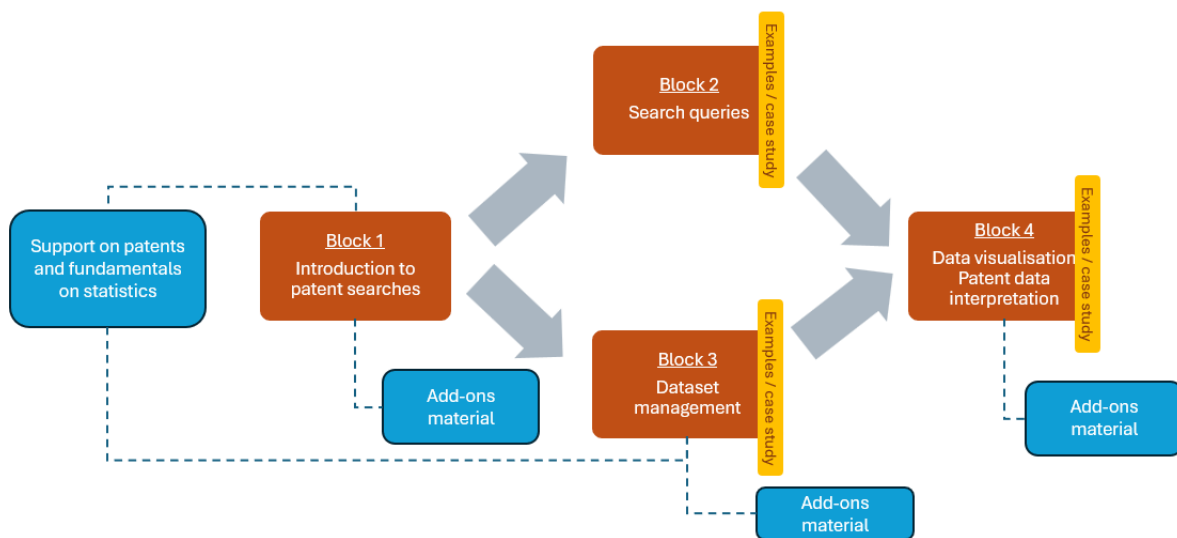


FIGURE 1: LOGICAL FLOW OF THE TRAINING COURSE

This modular structure ensures that each block is sufficiently comprehensive to function independently while maintaining a logical progression that supports an effective learning journey. The main course consists of four primary blocks that cover the essential pillars of patent data analysis:

- Understanding what a patent is;
- Designing search queries and familiarize with tools for patent analysis;
- Manage data;
- Visualize and interpret your data.

Additionally, an introductory block (so-called 'Block 0') is available for beginners, along with add-on material for those wishing to explore more advanced topics.

Each block is interconnected, with training materials sufficiently complete for independent teaching. However, a specific order for presenting the material is recommended for the best learning experience. From a practical perspective, the sequential delivery shown in Figure 2 is suggested. The same sequence was also implemented during the Simulation Lab held in Pisa in May 2024, and for the IPR4Data Summer and Autumn sessions.

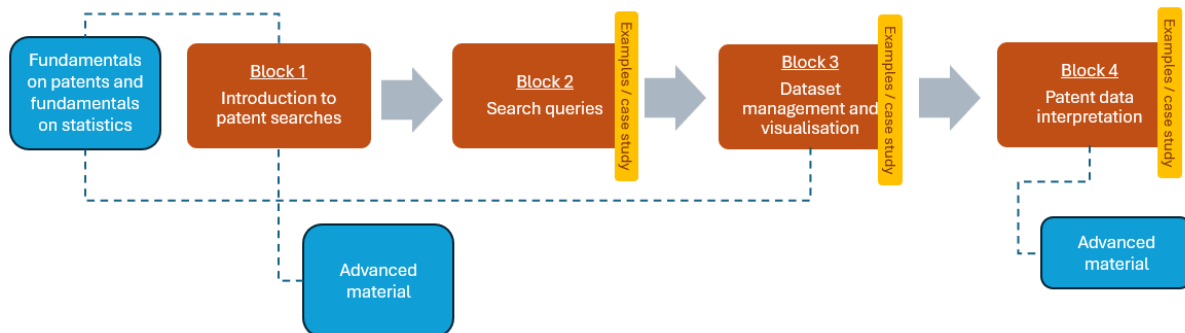


FIGURE 2: PRAGMATICAL FLOW OF THE TRAINING COURSE.

2.2 Purpose of the training program and expected learning outcomes

The primary purpose of the IPR4Data course is to provide participants with a comprehensive understanding of patent analysis, enabling them to conduct effective searches, manage and visualize patent data, and interpret analysis results to support strategic business decisions. The course aims to bridge the gap between theoretical knowledge and practical application, ensuring participants are well-prepared to meet the demands of the labour market in fields related to intellectual property and innovation management.

Participants in this course will gain a robust set of new skills essential for modern patent analysis. The topics cover the design and refinement of search queries, effective management and visualization of patent data, and the interpretation of analysis results to support strategic decisions. Practical, hands-on experience is emphasized through examples and workshops, ensuring that learners can apply theoretical knowledge to real-world scenarios. Additionally, the course provides foundational knowledge for beginners and advanced material for those looking to deepen their expertise, catering to a diverse range of learning needs and ensuring that all participants can develop their proficiency in patent analysis.

Upon completion of the training program, participants will have developed the skills to:

- **Understand Patents:** Gain a thorough understanding of what patents are, their significance in intellectual property, and their role in fostering innovation.
- **Conduct Patent Searches:** Perform comprehensive patent searches using various databases and tools, ensuring accurate and relevant results.
- **Design and Refine Queries:** Create effective search queries and refine them for optimal precision in retrieving patent information.
- **Manage Patent Data:** Organize and manage large datasets of patent information efficiently.
- **Visualize Patent Data:** Utilize various techniques to visualize patent data, identifying trends, patterns, and insights.

- **Interpret Analysis Results:** Analyse and interpret patent data to derive meaningful conclusions that support strategic decisions.
- **Apply Analytical Techniques:** Implement advanced analytical techniques to conduct in-depth patent analysis.
- **Support Strategic Decisions:** Leverage patent analysis to inform and support strategic business decisions, contributing to the organization's competitive advantage.
- **Engage in Practical Application:** Apply theoretical knowledge through hands-on workshops and real-world examples, ensuring practical expertise in patent analysis.

2.3 Course target audience

This training program is designed for a diverse audience, including professionals, students, and researchers involved in intellectual property, innovation management, and technology-driven fields. It is particularly beneficial for those working in legal firms, corporate R&D departments, and research institutions who need to enhance their skills in patent analysis. The course caters to both beginners with no prior knowledge of patent data analysis and individuals with some foundational understanding looking to deepen their expertise. The modular structure allows participants to progress from basic concepts to advanced analytical techniques, ensuring a comprehensive learning experience tailored to varying levels of experience and professional needs. By equipping participants with the necessary skills to conduct thorough patent searches, manage and visualize data, and support strategic decisions, this training program prepares them to meet the growing demands of employers in an increasingly innovation-focused market.

2.4 Blocks description

The IPR4Data course is organized into a series of interdependent blocks, each designed to cover specific aspects of patent analysis comprehensively. This modular structure allows for a logical and progressive learning path, ensuring that each participant gains a solid understanding of fundamental concepts before moving on to more advanced topics. The training program structure is as follows:

2.4.1 Block 1: Introduction to Patent Analysis

- **Overview of Patents:** Understand what patents are, their importance, and their role in innovation and intellectual property.
- **Patent Search Fundamentals:** Learn the basic concepts and processes involved in conducting patent searches.

The first block of the course serves as a crucial foundation, providing students with the theoretical background necessary to comprehend the subsequent modules. It focuses on imparting the fundamental knowledge required for creating queries, utilizing patent analysis tools, managing datasets, and interpreting data obtained from patent analysis. This block consists of two sections aimed at introducing students to the complexities of patent searches and understanding the structure of patents.

The initial session provides an overview of patent searches, explaining the significance of patents and the essential processes involved in conducting searches. Students will gain insights into the purpose of patent searches and the methodologies employed in retrieving relevant patent information. Following this, the second session explores the structure of a patent and the metadata it encompasses, namely bibliographic data. Understanding the composition of a patent and its bibliographic data is pivotal as it forms the basis for formulating accurate queries, interpreting patent data, and grasping concepts such



as patent families. By the end of this block, students will possess a firm understanding of the pivotal role of bibliographic data in patent searches, laying the groundwork for their exploration into more advanced topics covered in subsequent modules.

2.4.2 Block 2: Designing and Refining Search Queries and Tools for Patent Analysis

- Query Design Techniques: Develop skills to design effective search queries for patent databases.
- Advanced Query Refinement: Learn methods to refine and optimize search queries to yield precise and relevant results.
- Patent Databases and Software: Introduction to various patent databases and analysis tools.
- Hands-On Tool Training: Practical sessions on how to use these tools for effective patent analysis.

Block number two delves into the theoretical foundations of query creation for patent analysis, focusing on distinguishing between Boolean and semantic logic. Through a series of examples, students are equipped with the foundational knowledge necessary to formulate effective queries for patent analysis tools. The block comprises three distinct sessions tailored to provide students with a comprehensive understanding of query construction and practical application using free open access tools.

The first session presents the theory behind query construction, revealing the principles of Boolean logic and semantic logic. Students learn key concepts such as stemming, keywords, and the use of synonyms, which are essential for crafting precise and targeted search queries. The second session introduces students to a range of free open access tools commonly used in patent analysis, providing insights into their main features and functionalities. Finally, the third session is dedicated to a hands-on workshop where participants have the opportunity to apply their newfound knowledge by using the free open access tools to query databases and retrieve patent sets.

The primary objective of this block is to equip students with the skills necessary to construct effective Boolean queries, enabling them to obtain more accurate results in patent searches. By understanding the main features of each tool and how they build queries, students will be able to select the most suitable tool based on their research objectives. This comprehensive understanding of query construction and tool selection will enable students to optimize their patent search strategies effectively, leveraging a variety of tools to achieve their research goals.

2.4.3 Block 3: Data Management and Visualization

- Data Organization: Learn techniques for managing large sets of patent data.
- Visualization Techniques: Explore methods for visualizing patent data to identify trends, patterns, and insights.

Block number three of the training program, dedicated to managing the substantial volumes of data extracted from patent databases, emphasizes the criticality of ensuring a clean and reliable dataset. Beyond merely handling large quantities of data, individuals engaged in data analysis must also address challenges such as term disambiguation and merging patent sets obtained from various tools. Comprising four sessions, this block guides students through the difficulties of data management and visualization, each session targeting a specific aspect essential for refining and comprehending the dataset.



The initial session focuses on gaining a comprehensive understanding of the dataset, enabling students to grasp its characteristics and complexities. Subsequent sessions delve into crucial techniques for enhancing dataset quality: disambiguation, which aids in eliminating duplicate or ambiguous results, and merging, which facilitates the integration of results from disparate sources. By mastering these techniques, students can achieve a dataset that is both complete and accurate. The final session introduces students to data visualization solutions, empowering them to explore and present their findings effectively. Ultimately, the main objective of this block is to equip students with the skills necessary to clean and refine datasets obtained from querying patent databases, thereby enabling them to derive meaningful insights and make informed decisions based on their research objectives.

2.4.4 Block 4: Interpreting Patent Analysis Results

- Analytical Techniques: Develop the ability to interpret patent data and analysis results.
- Strategic Decision Making: Learn how to use patent analysis to support strategic business decisions.

The final block of training material serves as a culmination of the course, focusing on the interpretation of data gathered from patent analysis tools. Through a presentation of a real case study, this block showcases the potential insights derived from data analysis and their strategic value for companies. Participants are guided through an examination of strategic questions that arise during a company's growth, particularly when pivotal decisions must be made. Block number four consists of a single session that spans two distinct periods in the real company's history: pre-2002 and post-2002 to 2012. By studying these periods, participants gain a comprehensive understanding of how patent analytics can inform strategic investigatory processes.

The main objective of this block is to equip students with the skills to understand and leverage patent analytics for strategic investigations. By the end of the session, participants are expected to grasp the utility of patent analytics in guiding strategic decision-making processes. They will also recognize the importance of selecting appropriate data visualization techniques to aid in information generation and interpretation. Understanding that the quality of the results depends on both the chosen visualization type and the questions asked, participants will be well-prepared to apply their newfound knowledge in real-world scenarios, making informed strategic decisions based on patent analysis insights.

2.4.5 Additional training materials

- Introductory Block for Beginners: Extra support materials for students with no prior knowledge of patent analysis, covering basic introductory topics.
- Add-On Materials: Advanced content for those wishing to delve deeper into specific, detailed aspects of patent analysis.

Each block combines theoretical learning with practical, hands-on exercises to ensure participants can apply their knowledge in real-world scenarios. This structured yet flexible approach allows participants to build a solid foundation in patent analysis and progressively advance to more complex topics, equipping them with the skills necessary to excel in the field.

2.5 Materials and Resources

This paragraph provides an overview of the comprehensive set of materials and resources created to support the delivery of the training course. Each block of the course has been meticulously developed to align with the structured sessions, offering both core training materials and supplementary content that enhance learning and retention.

The provided resources include detailed presentations, workshop guides, conceptual maps, and video tutorials tailored to meet the objectives of each session. These assets have been crafted to reinforce the participants' understanding of complex topics, such as patent searches, data management, and the patenting process. Furthermore, add-on materials provide additional insights and practical examples to deepen knowledge.

The following bullet point outlines the complete list of training documents for each block:

- Block 0
 - Training materials
 - Session 1: Understanding the IP framework
 - Session 2: The patenting process and patent lifecycle
 - Supplementary material for Block 0
 - Session 1: Patents (conceptual map)
 - Session 2: Examination process (conceptual map)
 - Block 0: Supplementary material
- Block 1
 - Training materials
 - Session 0: Introduction to the course
 - Session 1: Overview of patent searches
 - Session 2: Bibliographic data
 - Supplementary material for Block 1
 - Session 1: Patent searches (conceptual map)
 - Session 1: Supplementary material
 - Session 2: Bibliographic data (conceptual map)
 - Session 2: Supplementary material
 - Add on material for Block 1
 - Block 1 add-on number 1: Types of patent searches
 - Block 1 add-on number 2: Patent searches timeline
 - Block 1 add-on number 3: Application processes (conceptual map)
- Block 2
 - Training materials
 - Session 1: Search queries
 - Session 2: Patent search tools
 - Session 3: Workshop
 - Supplementary material for Block 2
 - Session 1: Supplementary material
 - Session 2: Supplementary material
 - Add on material for Block 2
 - Block 2 add-on number 1
 - Video tutorials
 - Espacenet video tutorial (document)
 - Espacenet video tutorial (video)
 - Google patents video tutorial (document)
 - Google patents video tutorial (video)
 - Lens video tutorial (document)

- Lens video tutorial (video)
- PQAI video tutorial (document)
- PQAI video tutorial (video)
- Block 3
 - Training materials
 - Session 1: Understanding your data
 - Session 2: Dataset cleaning and entity disambiguation
 - Session 3: Merging IP data
 - Session 4: Visualizing Conclusions from the data
 - Session 5: Data management
 - Session 6: Data Cleaning (research view)
 - Supplementary material for Block 3
 - Block 3 supplementary material number 1
 - Block 3 supplementary material number 2
 - Add-on videos
 - Add-on video number 1
 - Add-on video number 2
- Block 4
 - Training materials
 - Session 1: Method products case study
 - Supplementary material for Block 4
 - Block 4 supplementary material

2.6 Learners' evaluation and certification

At the end of each module, participants underwent an evaluation process designed to assess their understanding of the covered content. This was achieved through proficiency surveys (see Appendix A), which tested their acquired knowledge over the key topics, and gained competencies deriving from the IPR4Data course. These assessments were crafted to measure both theoretical understanding and practical application, ensuring that participants could demonstrate a thorough grasp of the material.

Participants were required to attend at least 60% of the lectures and fulfil all course requirements to qualify for a Certificate of Completion. This certificate validated their understanding of the fundamentals of patent analysis, their proficiency in navigating patent analysis tools, and their ability to apply analytical techniques to support strategic decision-making. The certificate served as an official acknowledgment of their efforts and achievements, enhancing their credibility in academic and professional contexts.

In addition to the standard evaluation, participants were offered the opportunity to further validate their learning by completing a final test in the form of a small essay (see Appendix B). This essay allowed participants to delve deeper into a specific topic, applying the knowledge and techniques they had acquired during the course. Successful completion of this optional test granted participants 3 European Credit Transfer and Accumulation System (ECTS) credits. These served as a formal recognition of the advanced knowledge and skills gained in patent analytics and could be integrated into their academic records or listed on professional resumes and profiles.



This dual evaluation approach, combining standard questionnaires with the option for a final essay, was designed to accommodate varying levels of engagement and ambition among participants. While the Certificate of Completion provided a tangible acknowledgment of their achievements, the ECTS credits offered a more formal academic validation, potentially opening doors to further educational opportunities. By providing these two avenues for assessment and recognition, the course aimed to motivate participants to engage with the material, and to reward their efforts with credentials that could support their future endeavours.

3 Trainer Preparation

3.1 Trainer Qualifications and Selection Criteria

Both the summer and the autumn sessions of the IPR4Data course have been delivered by professionals from diverse backgrounds, demonstrating the versatility and adaptability of the training materials. While there are guidelines that can be followed for course delivery, the positive feedback received from participants indicates that the materials can be effective regardless of the trainer's specific expertise or professional background, provided that a preliminary training session for trainers is delivered (see next paragraph for more details).

That being said, a set of preferred skills for trainers can be defined.

- **Educational Background:**
 - A degree in intellectual property (IP), or IP law.
 - Certifications or specializations in IP analytics, or data analysis are highly desirable.
- **Technical Expertise:**
 - Proficiency in using patent databases (e.g. Espacenet) and other IP tools.
 - Experience in designing and conducting patent searches, including formulating effective search queries.
 - Competence in data management and analysis tools, such as Excel, Python, R, or specialized IP analytics software.
 - Familiarity with data visualization platforms (e.g., Tableau, Power BI) and techniques.
- **Practical Experience:**
 - Hands-on experience in IP analytics, including patent landscaping, freedom-to-operate analysis, or competitive intelligence.
 - Previous work in IP consulting, technology transfer, R&D management, or innovation strategy.
- **Pedagogical Skills:**
 - Proven experience in teaching or training, ideally in IP-related subjects.
 - Strong ability to translate complex technical concepts into accessible, practical lessons.
- **Soft Skills:**
 - Strong communication and presentation abilities.
 - Capacity to engage with a diverse audience, from beginners to experienced professionals.
 - Problem-solving skills and adaptability during interactive sessions.
 - Willingness to adapt content to meet the course's objectives and learner needs.
 - Availability to dedicate time for preparation and delivery during the course schedule.

3.2 Training the trainers: the Simulation Lab

In May 2024, a Simulation Lab was conducted in Pisa as part of the project's internal training activities. In fact, many project partners were not familiar with the necessary concepts and methodologies covered by the IPR4Data course. Hence, the Simulation Lab aimed at equipping partners with the necessary training and confidence over the course material for enabling its effective delivery by every partner. This in-person event served as a learning and teaching activity, where not only a comprehensive training on the developed contents was provided but also an exchange of ideas and best practices among the partners was fostered, to enhance the upcoming summer and autumn training sessions.



The event strengthened partners' knowledge on IP analytics, contributing to the overall quality and effectiveness of the training program. In the context of the Simulation Lab, training sessions were delivered by senior patent analysts from Erre Quadro, who provided competence and expert guidance. These activities emphasized practical application, encouraging interaction and hands-on learning. By incorporating such interactive elements, the lab effectively prepared participants to address the training material and deliver the IPR4Data learning blocks while ensuring their readiness to adapt innovative approaches in their teaching.

The Simulation Lab has proven to be an effective method for training trainers on the contents of the IPR4Data course. By offering an immersive, hands-on learning experience, it successfully equipped participants (i.e. future trainers) with the sufficient knowledge and confidence needed to deliver the course effectively, even for those with limited prior expertise in IP analytics. This approach could be particularly valuable for enabling trainers with a low initial knowledge base to master the complexities of the course material. In addition to in-person Simulation Labs, other potential solutions to prepare trainers include offering online workshops, as well as self-paced learning by exploiting the online material of the IPR4Data course. Additionally, one-on-one mentoring sessions with experienced patent analysts could be beneficial for those trainers that want to dive deeper into the contents for a comprehensive delivery.

Overall, the Simulation Lab demonstrated the importance of interactive and practical methodologies in building trainer competence, while also highlighting the potential usability of the training material, which could be exploited by a varied range of professionals.

4 Monitoring and Evaluation

4.1 Defining Key Performance Indicators (KPIs) and results achieved

In the context of the project, specific Key Performance Indicators (KPIs) were established to evaluate the effectiveness and impact of the IPR4Data course and associated training activities. These KPIs include:

- **Number of HE students/VET learners attending the IPR4Data course:** The target value (TV) was set at a minimum of 140 participants, including 100 Higher Education (HE) students and 40 Vocational Education and Training (VET) learners.
- **Number of participants' tests:** A minimum of 140 completed tests was targeted to assess the knowledge and skills acquired during the training sessions.
- **Number of feedback responses collected:** At least 140 pieces of feedback were expected from students/learners participating in the training activities to evaluate their satisfaction and the quality of the sessions.

4.1.1 Participants

A total of 108 students registered for the courses, divided between two sessions: 24 for the summer course and 84 for the autumn course. Attendance data reveals a total of 222 participations, distributed as follows:

- **Summer Course:**
 - Block 1: 24 participants
 - Block 2: 24 participants
- **Autumn Course:**
 - Block 1: 47 participants
 - Block 2: 43 participants
 - Block 3: 41 participants
 - Block 4: 43 participants

4.1.2 Evaluation Tests

The proficiency and feedback evaluations were intended to assess learning outcomes and participant satisfaction.

A total of 208 unique **feedback responses** were collected across the blocks (280 responses in total):

- Block 1: 65 unique responses (95 in total)
- Block 2: 65 unique responses (85 in total)
- Block 3: 40 unique responses (50 in total)
- Block 4: 38 unique responses (50 in total)

Student learning was assessed through **proficiency tests**, with a total of 181 unique tests completed (237 in total):

- Block 1: 65 unique tests (95 in total)
- Block 2: 65 unique tests (85 in total)
- Block 3: 40 unique tests (50 in total)
- Block 4: 38 unique tests (50 in total)

4.1.3 Results achieved

The project successfully met and, in several areas, exceeded the KPI targets:

- The total number of participations (222) significantly surpassed the target value of 140.
- The collection of feedback responses (208 unique) also exceeded expectations, providing comprehensive insights into participant satisfaction and areas for improvement.
- The proficiency tests conducted (208 unique) demonstrate the project's commitment to assessing learning outcomes effectively.

In summary, the outcomes underscore the project's success in engaging participants, fostering learning, and gathering actionable feedback. These achievements provide a robust foundation for future initiatives, demonstrating the value of the IPR4Data course in enhancing educational outcomes for HE students and VET learners.

4.2 Participant Feedback Collection Methods

The IPR4Data IPR Data Analysis & Interpretation courses were organised as follows:

- Algebra University (AU) organised a summer course including Block 1 and Block 2;
- Hellenic Open University (HOU) organised an autumn course including Block 1, Block 2, Block 3 and Block 4.

All 4 blocks of the course and the overall course were assessed by both the learners and the trainers in form of a survey via Google Forms to which both groups were given online access to after the completion of each block. Learners also did a self-assessment test on the general understanding of the course content.

An overview of the structure of the surveys (questionnaires, proficiency tests, evaluation forms and/or self-assessments) for both groups is presented in the following sections.

4.2.1 Questionnaire for trainers

The **questionnaire for trainers** represented an evaluation form which was completed at the end of the whole course by the trainer individually. This questionnaire included an introduction section, a question about the trainer's organisation and 5 evaluation questions. For the detailed structure, refer to Appendix A.

4.2.2 Questionnaire for learners

The **questionnaire for learners** was completed at end of each block by the learners and was divided into 2 parts:

- 1) a proficiency test of 5 questions related to the specific block to assess the level of acquired competencies and knowledge during the course block;
- 2) an evaluation form about the course and each block including 2 general questions about the learners and 5 evaluation questions.

For the detailed structure, refer to Appendix A.

4.2.3 Privacy policy

Both types of questionnaires included a paragraph on **privacy policy and consent**, as follows:



“Your responses to this questionnaire are confidential and will be used solely in the context of the IPR4SC project. To ensure your confidentiality, the questionnaire does not ask for personal information such as your name, address, date of birth, or email address. The results of this study will be used exclusively for research purposes and to improve the course training materials.

By submitting your completed questionnaire, you understand and acknowledge that this constitutes your informed consent to participate in this research.”

4.3 Feedback analysis

The analysis of the evaluations will be used by the authors of the training materials for revising the contents.

4.3.1 Results of questionnaire for trainers

In total, 7 questionnaires were completed, which represents the 100% of the organisations involved in the delivery and the 78% of trainers involved in the course¹.

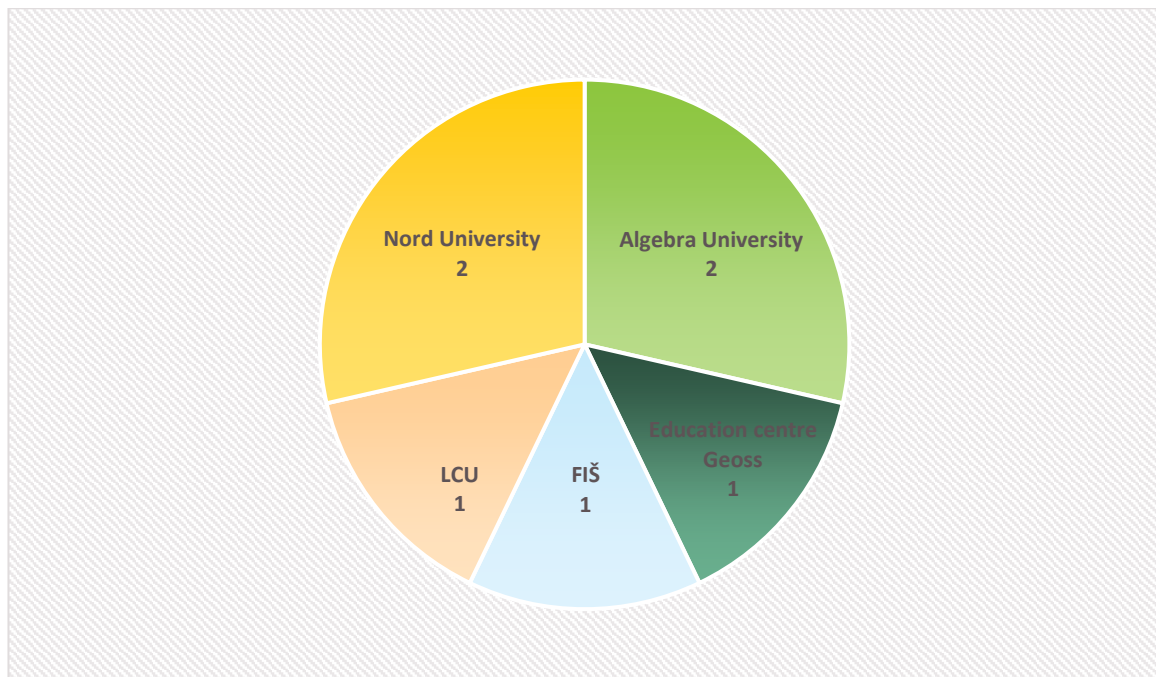


FIGURE 3– OVERVIEW OF ORGANISATIONS INVOLVED

¹ The values indicated do not include the organization Erre Quadro, which delivered two sessions of the course but did not participate in the evaluation questionnaire as it is the same organization that created the training material.

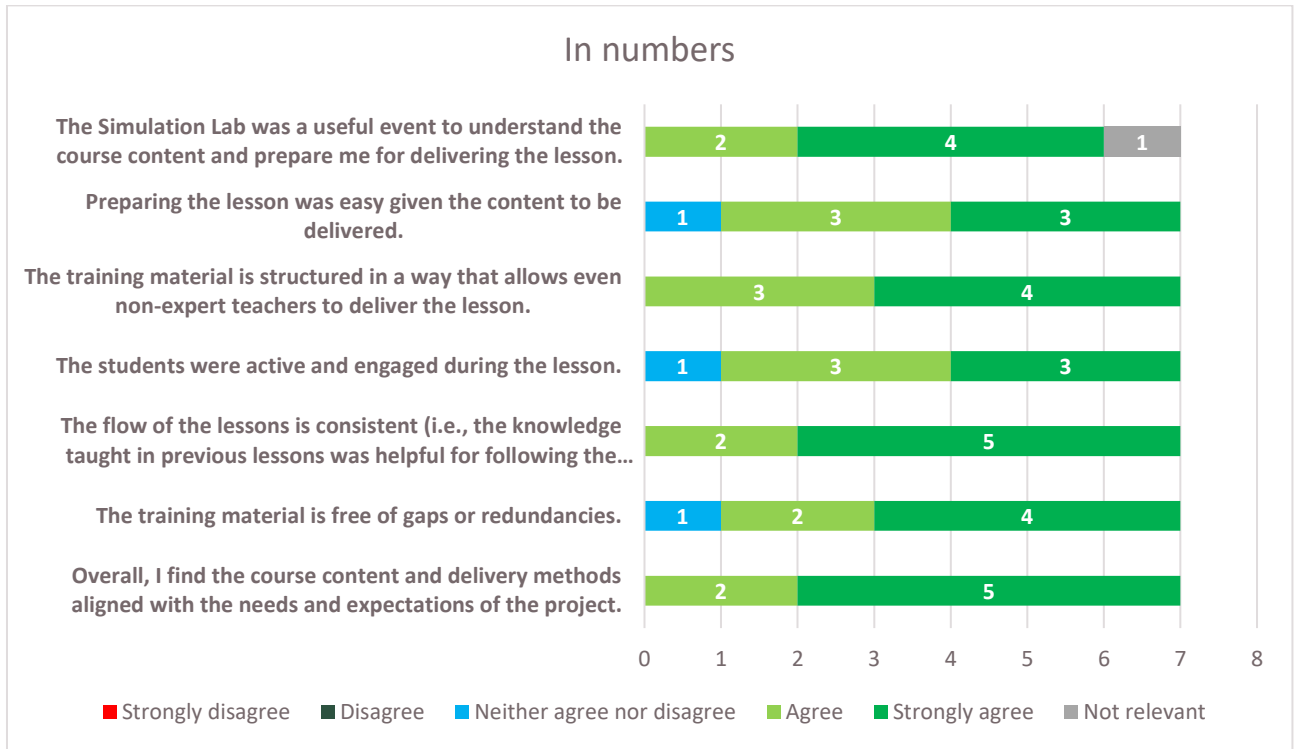


FIGURE 4- RESULTS ON THE LEVEL OF SATISFACTION WITH THE IPR4DATA COURSE (IN NUMBERS)

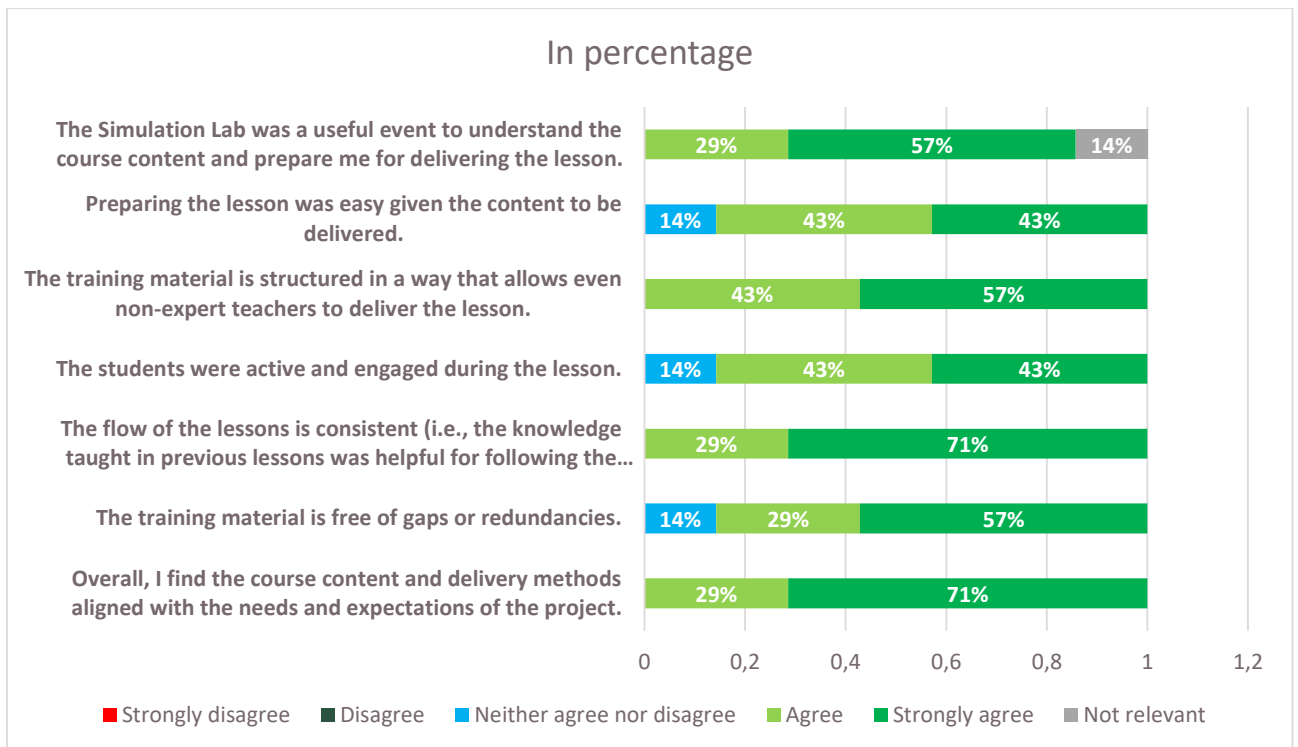


FIGURE 5 - RESULTS ON THE LEVEL OF SATISFACTION WITH THE IPR4DATA COURSE (IN PERCENTAGE)

The two charts in Figure 4 and 5 evaluate various aspects of the course experience, presented in percentages and absolute numbers. They show strong satisfaction from trainers across all categories.

A significant majority of participants either “agree” or “strongly agree” that the Simulation Lab was useful (86%), the training material is well-structured (100%), and aligned with the project’s needs (100%). Similarly, lesson preparation and flow are rated positively, with no major gaps or redundancies in the materials. Overall, the charts reflect positive feedback on the course content and delivery.

4.3.2 Comments and suggestions from trainers

The **open questions** gave the trainers the opportunity to provide individual comments and suggestions. They were not completed by all trainers and/or not all trainers completed all open questions.

An overview of all responses is given below:

What did you like the most about the IPR4Data course?

- “Usefulness, logical structure.”
- “The way it presents important topics is designed for easy understanding and a quick onboarding process.”
- “I believe the content is very relevant.”
- “Clear connection with IPR datasets and information.”
- “Topics.”

What did you like the most about the training material?

- “Quite simple and user friendly.”
- “Focus on key topics and way how material flow follows complexity of the IPR process.”
- “Clear content.”
- “Use of actual examples and clear step-for-step instructions for students to develop their own data queries and analysis.”
- “The materials.”

What did you like the least about the IPR4Data course?

- “Trainers need to pay attention not to overextend discussion in order to efficiently deliver content (this is more remark than a dislike).”
- “Long sessions - better next time to cut them into more sections.”
- “The order of lessons could be reevaluated.”

What did you like the least about the training material?

- “A bit of it was filled with details later not picked up, but overall I thought it was well done.”

Imagining a second edition of the course, what would you do to improve the course overall? What would you do to improve lesson delivery and the training material?

- “Maybe even more time for simulation lab to also test the materials in advance by the lecturers - through mentoring of the material developers.”
- “It is important to understand background of participant group and aim why someone is attending this course - by understanding those facts, future editions can focus on specific types of IPR registration process, estimated length and impact.”
- “More interaction, cut down to shorter sessions.”
- “The course can be very beneficial if taught synchronously. Some lectures can be expanded to focus on particular topics with more attention. The bottom line is that it makes a good starting point for curricula and can be upgraded a bit to fit the full 5-6 ECTs.”



4.3.3 Results of questionnaire for learners

A first overview shows the number of enrolments for all courses and completed proficiency tests and evaluation forms after both courses:

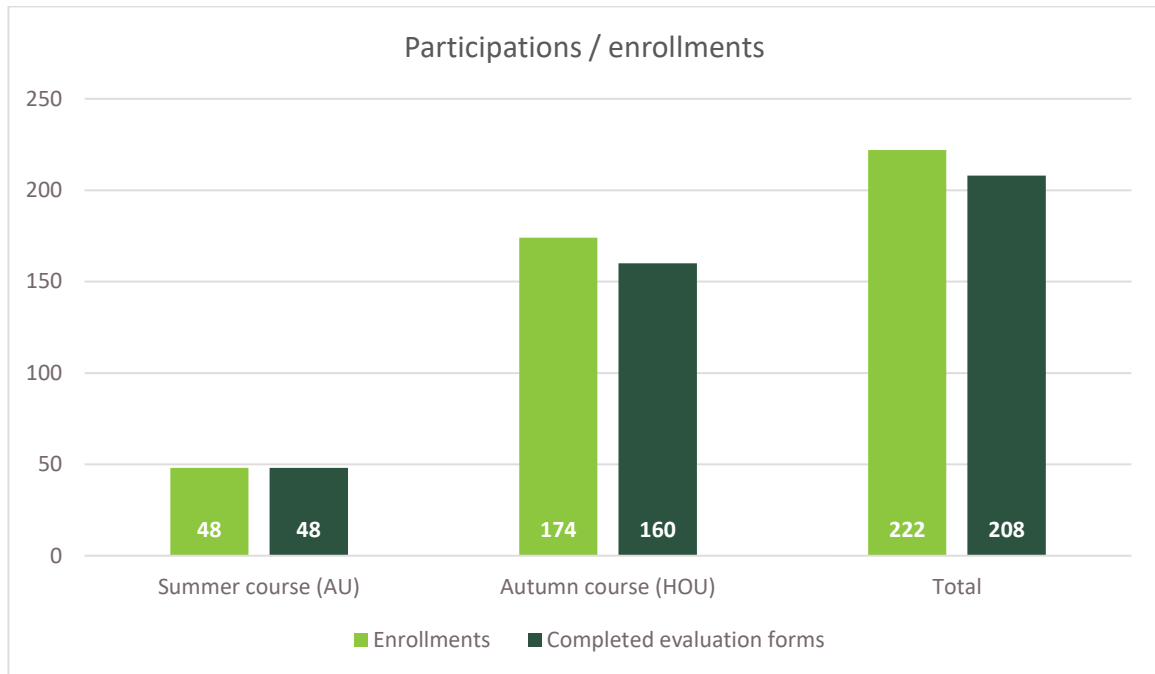


FIGURE 6 - NUMBER OF PARTICIPANTS AND ENROLLED STUDENTS

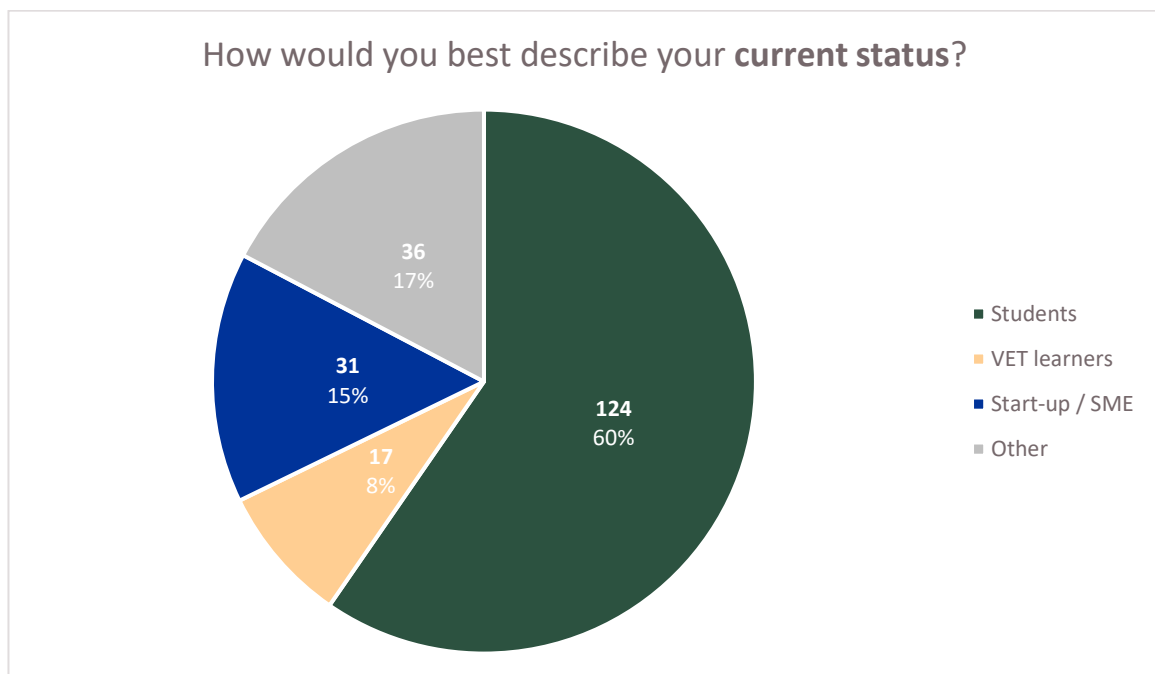


FIGURE 7 - INFORMATION ABOUT PARTICIPANTS (CURRENT STATUS)

Other categories include freelancers, self-employed persons and lecturers.

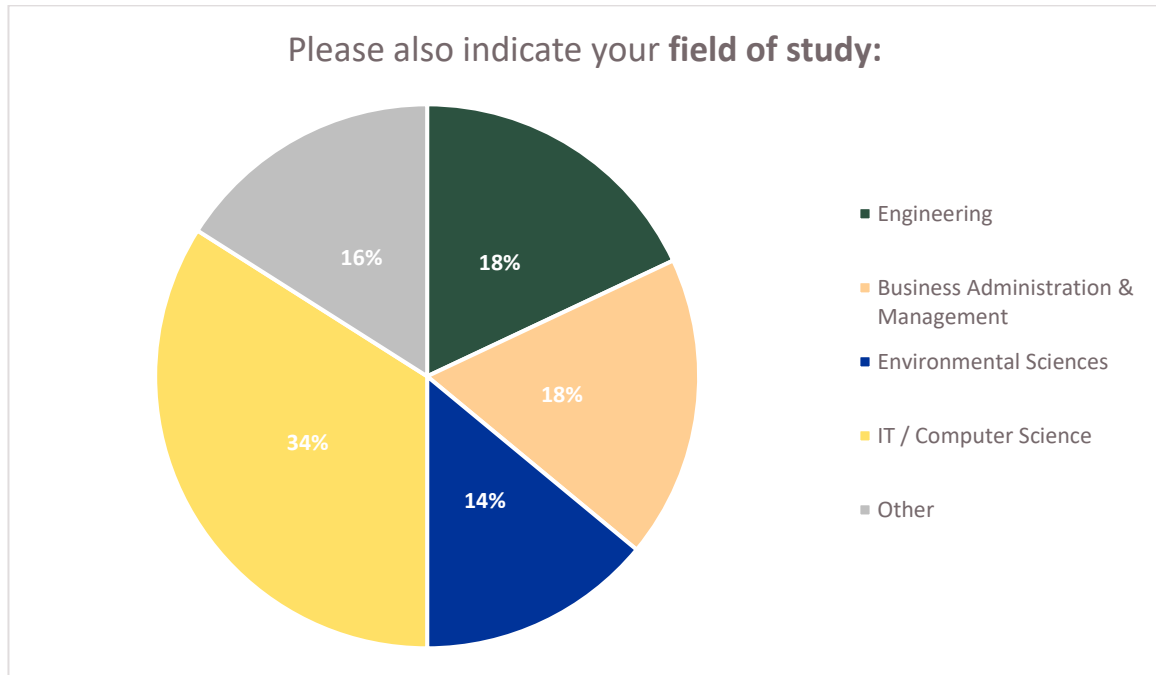


FIGURE 8- INFORMATION ABOUT PARTICIPANTS (FIELD OF STUDY)

Other categories include e.g. defence and security, education, history.

The results on proficiency for each learning block are shown below. All participants who scored 6 or more points received a positive evaluation.

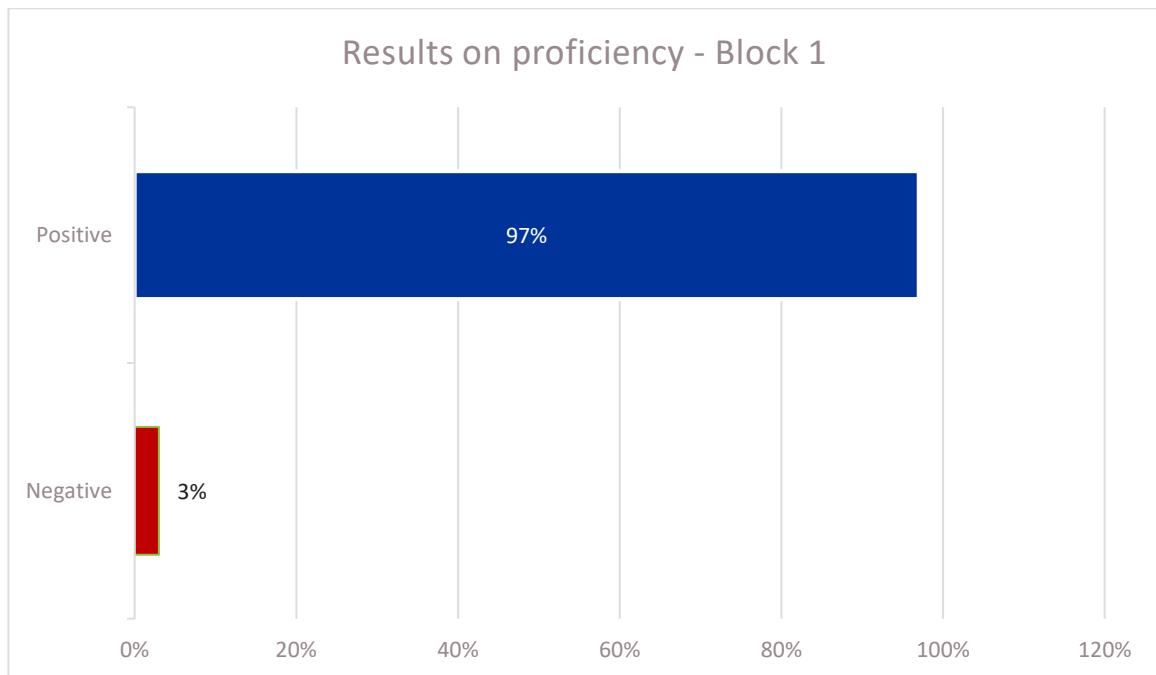


FIGURE 9 - RESULTS ON PROFICIENCY (BLOCK 1)

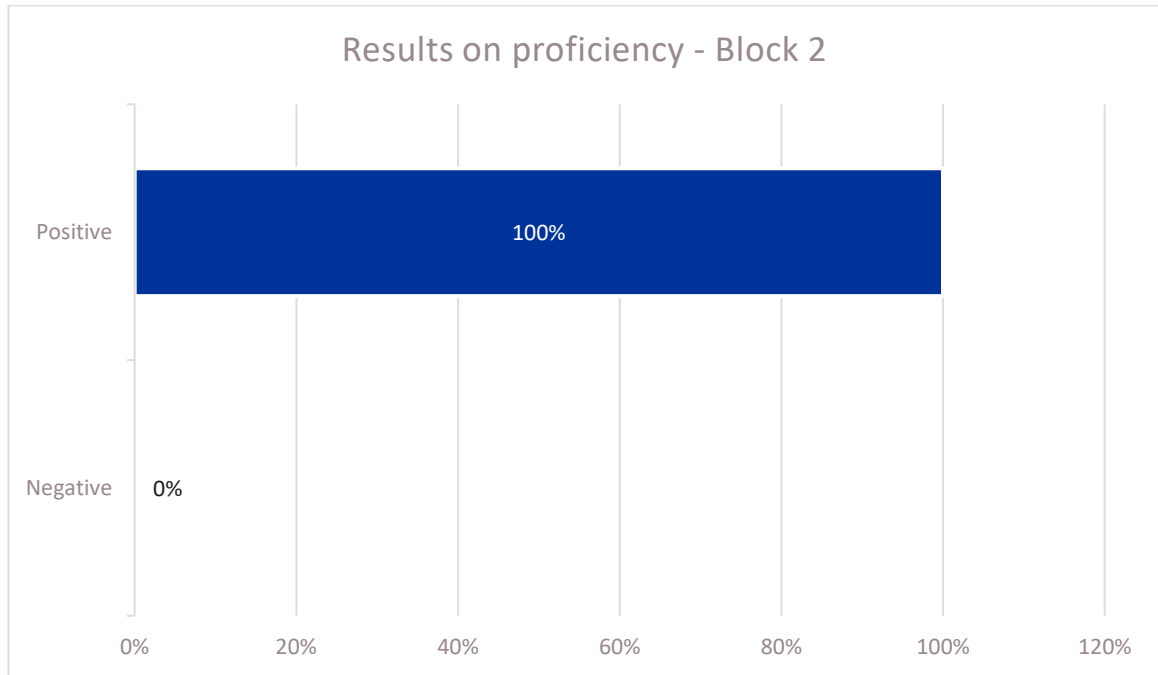


FIGURE 10 - RESULTS ON PROFICIENCY (BLOCK 2)

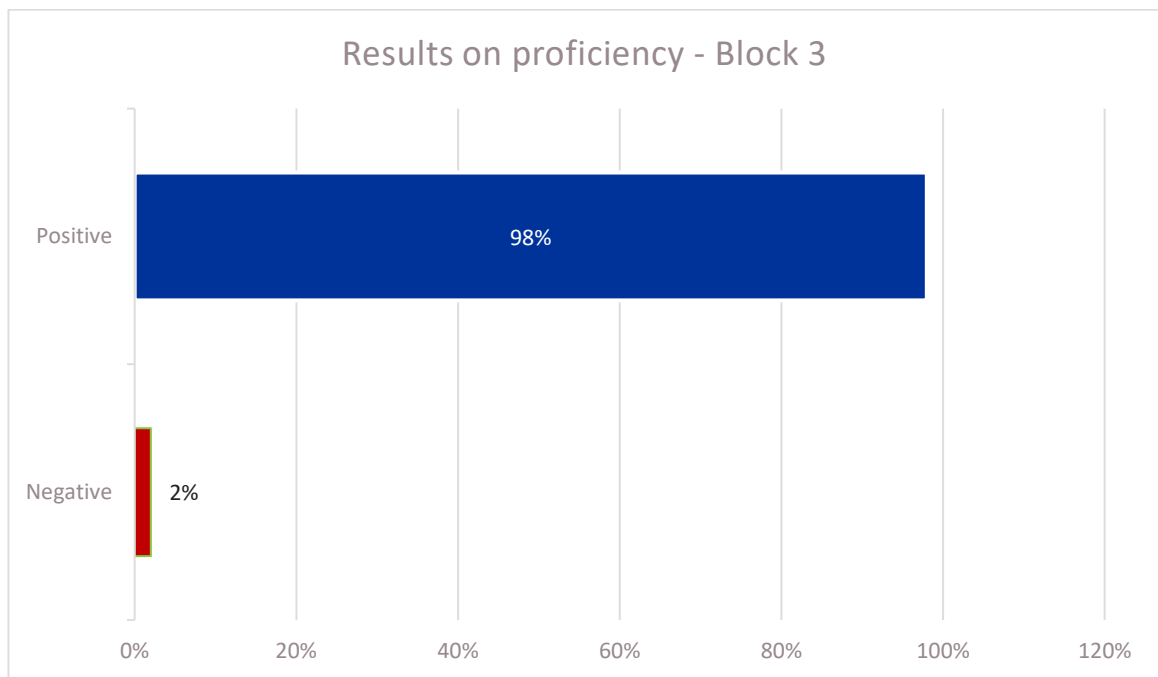


FIGURE 11- RESULTS ON PROFICIENCY (BLOCK 3)

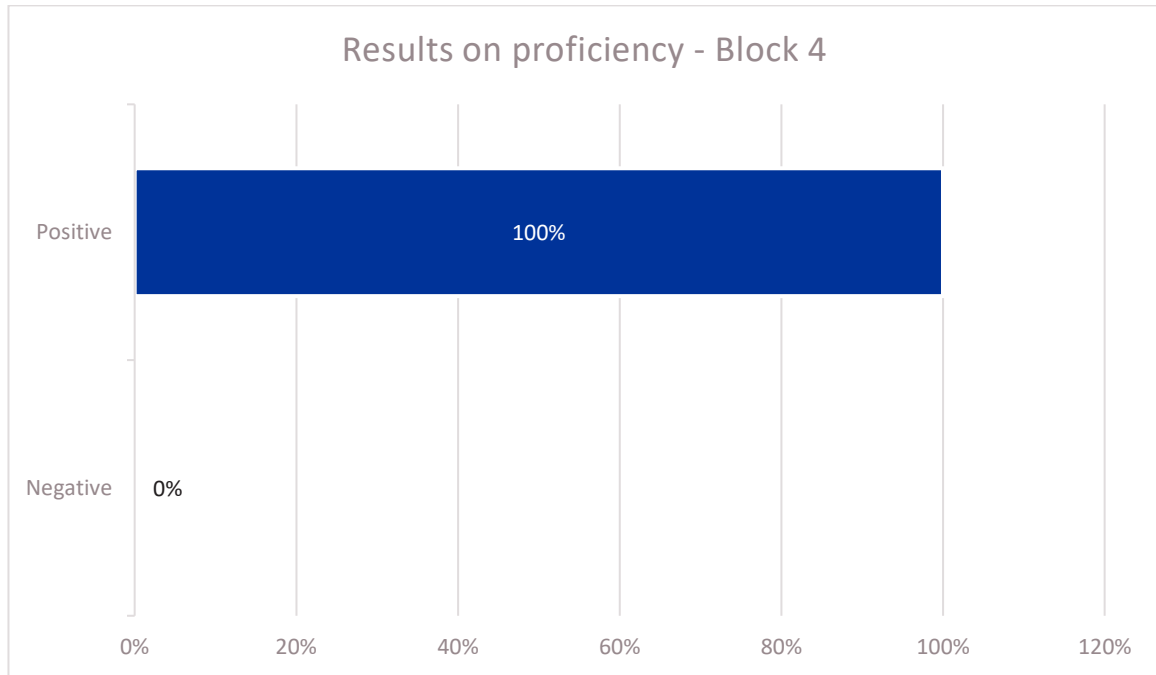


FIGURE 12 - RESULTS ON PROFICIENCY (BLOCK 4)

The different categories of “Level of Satisfaction with the Learning Block” are shown below.

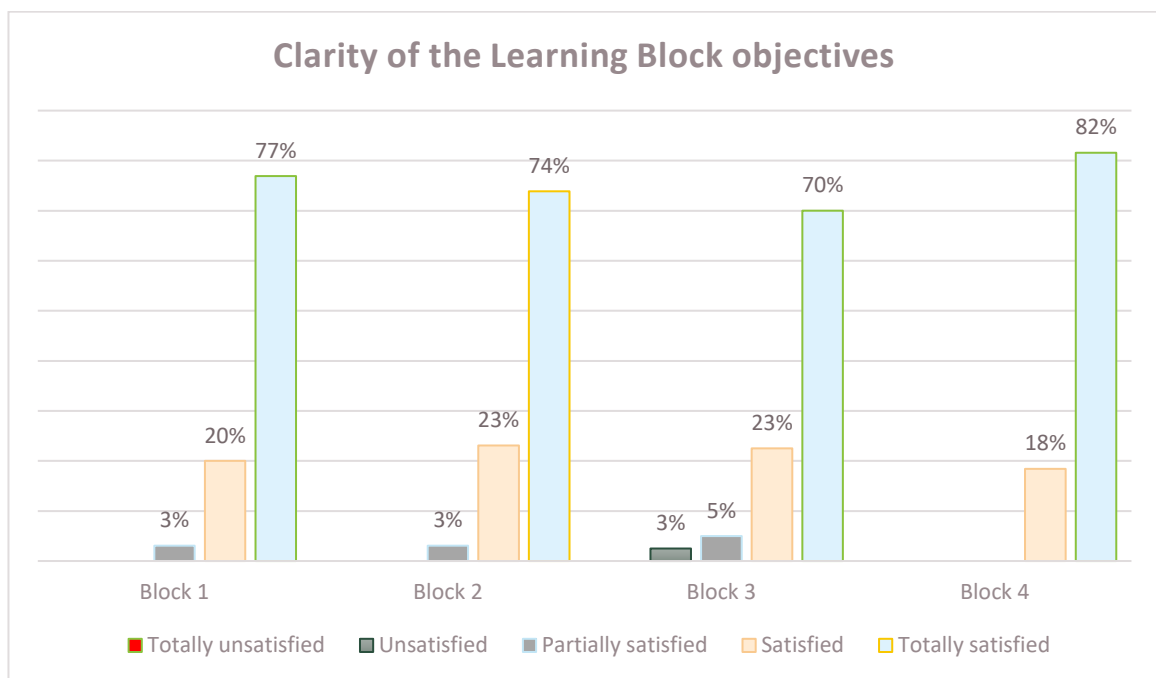


FIGURE 13 - SATISFACTION WITH THE CLARITY OF THE OBJECTIVES

The bar chart in Figure 13 illustrates the clarity of learning block objectives across four blocks, categorized into satisfaction levels: totally unsatisfied, unsatisfied, partially satisfied, satisfied, and totally satisfied. Block 4 received the highest "Totally satisfied" rating at 82%, while Block 3 had the

lowest at 70%. "Totally unsatisfied" and "unsatisfied" responses remained null or minimal across all blocks. Overall, satisfaction trends are high, with most participants favoring the clarity of the objectives.

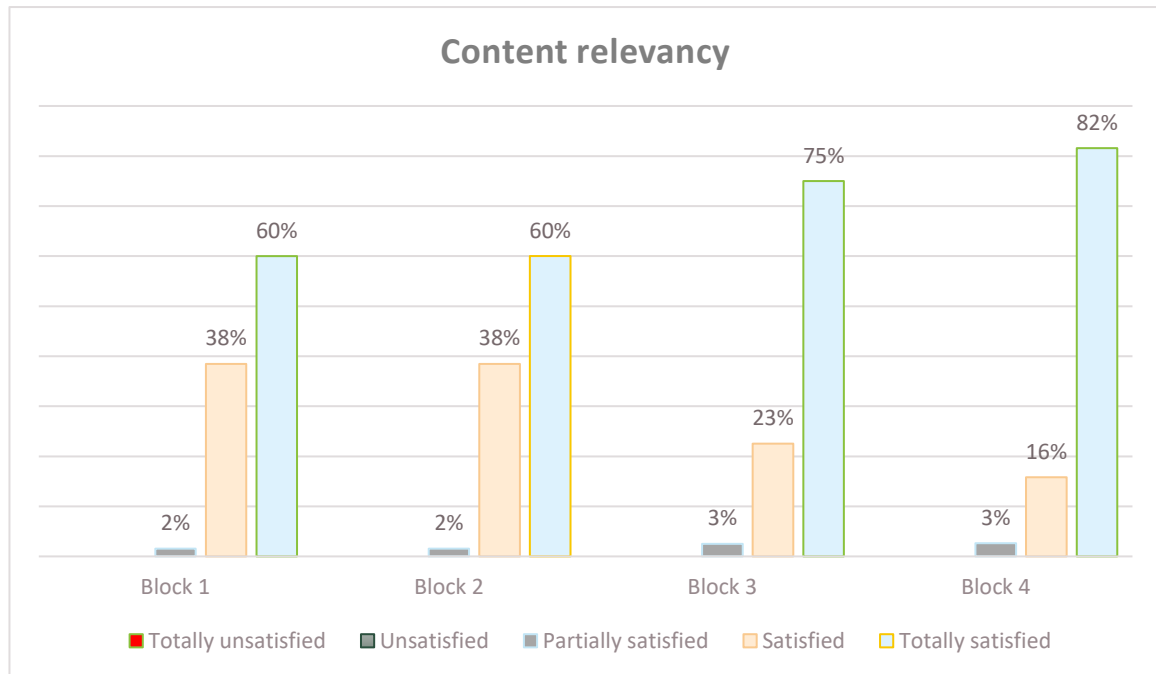


FIGURE 14 - SATISFACTION WITH THE CONTENT RELEVANCY

The bar chart in Figure 14 shows the relevancy of content for four learning blocks, divided into satisfaction levels. Block 4 achieved the highest "Totally satisfied" rating at 82%, while Blocks 1 and 2 both had 60%. Blocks 1 and 2 also shared a high "Satisfied" response of 38%. Block 3 saw significant improvement with 75% totally satisfied and 23% satisfied. Overall, satisfaction levels increase as blocks progress.

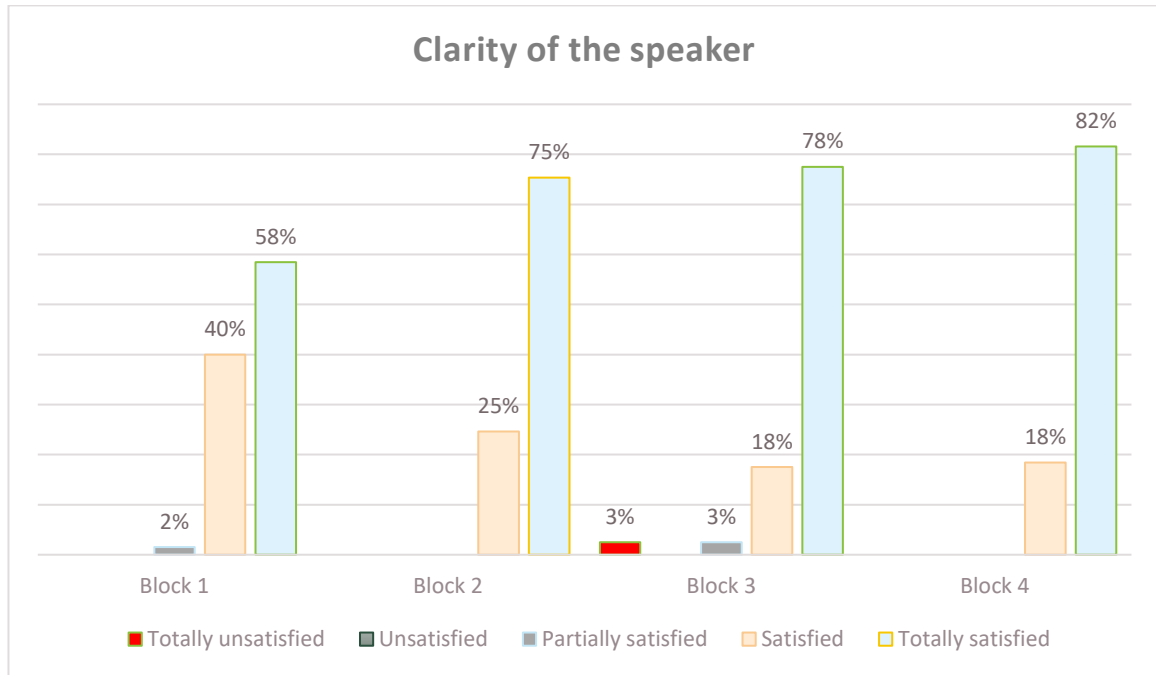


FIGURE 15- SATISFACTION WITH THE CLARITY OF THE SPEAKER

The bar chart in Figure 15 displays the clarity of the speaker across four learning blocks, divided into satisfaction levels. Block 4 shows the highest satisfaction, with 82% "Totally satisfied." Block 3 follows with 78%, while Block 2 has 75%. Block 1 records lower clarity ratings, with 58% "Totally satisfied" and 40% "Satisfied."

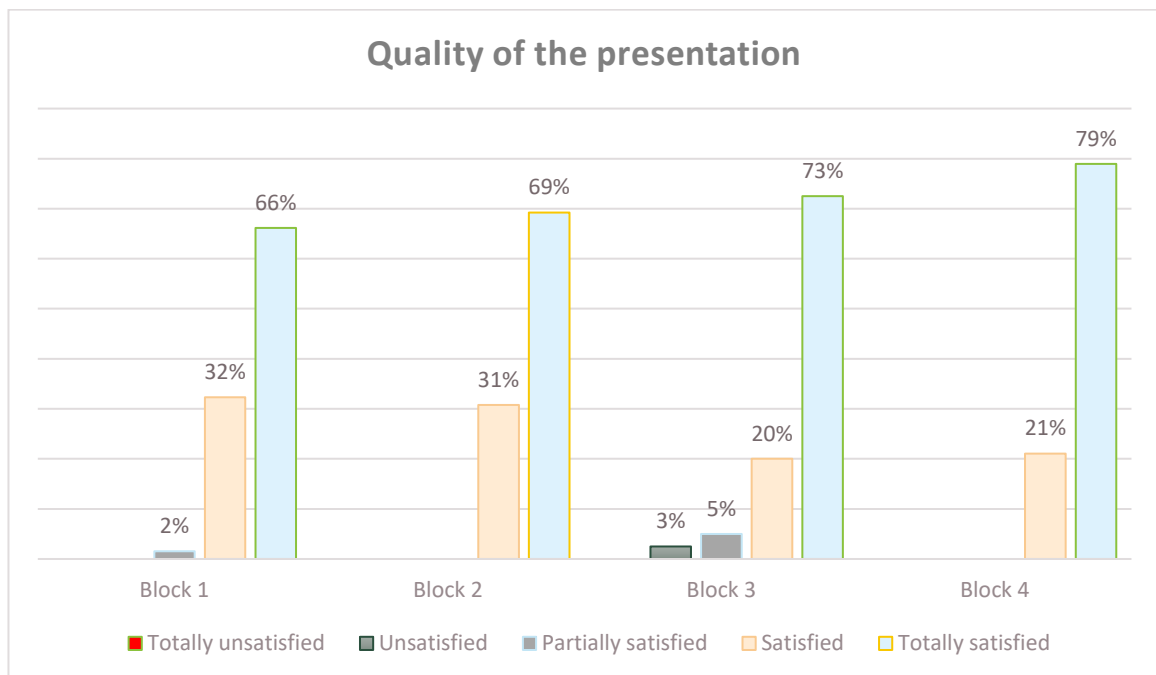


FIGURE 16 - SATISFACTION WITH THE QUALITY OF THE PRESENTATION

Figure 16 evaluates the quality of presentations across the four blocks of the IPR4Data course. Block 4 leads with the highest satisfaction, as 79% of participants rated it as "totally satisfied." Blocks 2 and 3 follow with similarly strong ratings of 73% and 69%, respectively. Block 1 shows slightly lower satisfaction, with 66% "totally satisfied." Overall, the quality of presentations received consistently positive feedback.

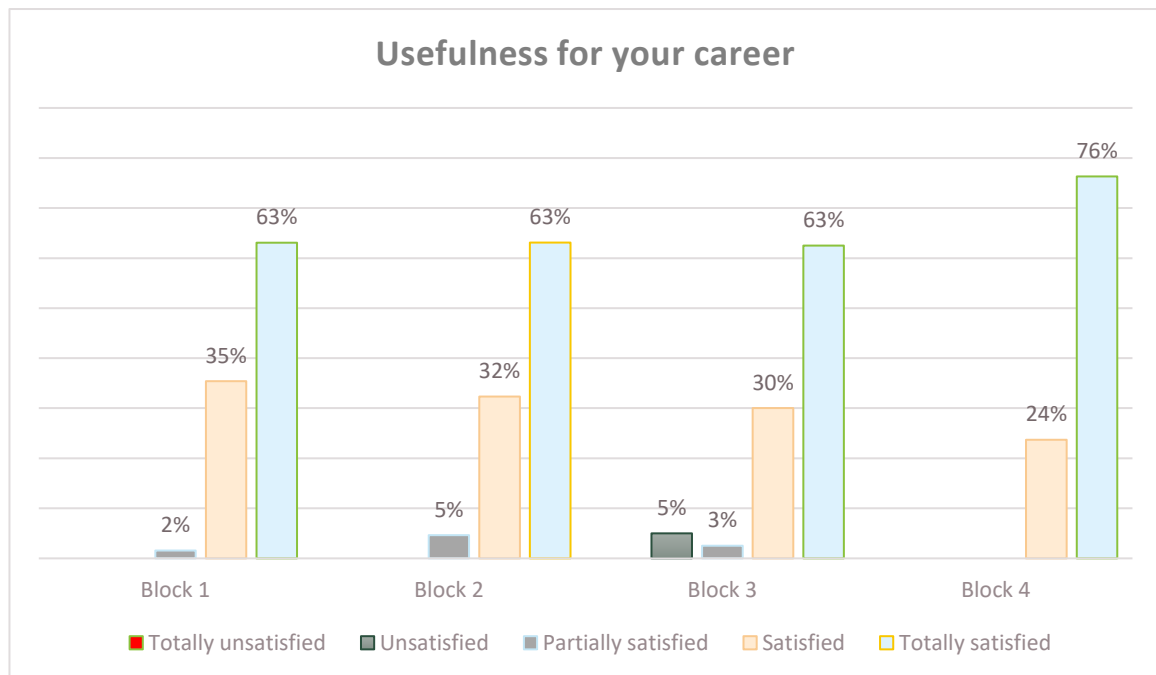


FIGURE 17 - SATISFACTION WITH THE USEFULNESS FOR THE CAREER

Figure 17 assesses how participants perceived the course's usefulness for their careers. Block 4 again stands out, with 76% of participants "totally satisfied." All the other Blocks received the same score with 63% participants "totally satisfied". Among those Block 3 received a small percentage of "unsatisfied" attendees. Even though results are lower compared to previous ones, they overall indicate the course's relevance in supporting professional growth.

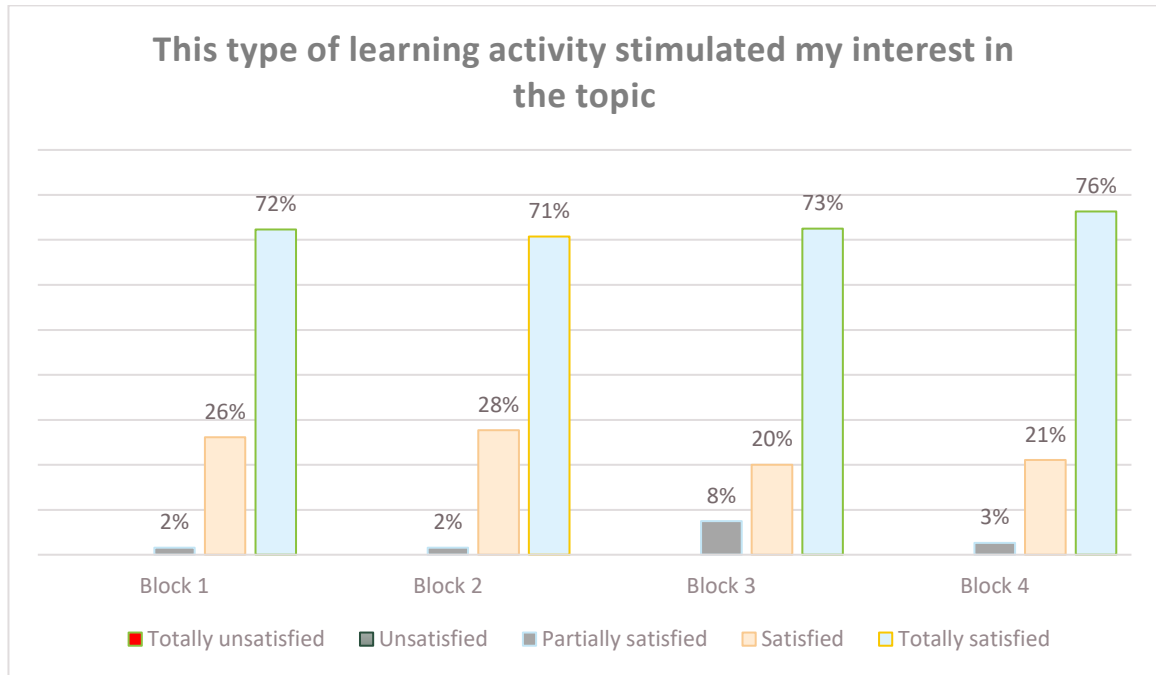


FIGURE 18 - SATISFACTION WITH THE STIMULATION OF INTEREST IN THE TOPIC

Figure 18 examines participants' interest levels stimulated by the course. Block 4 achieves the highest "totally satisfied" rating at 76%, with Blocks 3, 1 and 2 following at 73%, 72% and 71% respectively. The results suggest high engagement and interest in the topics, particularly in advanced blocks.

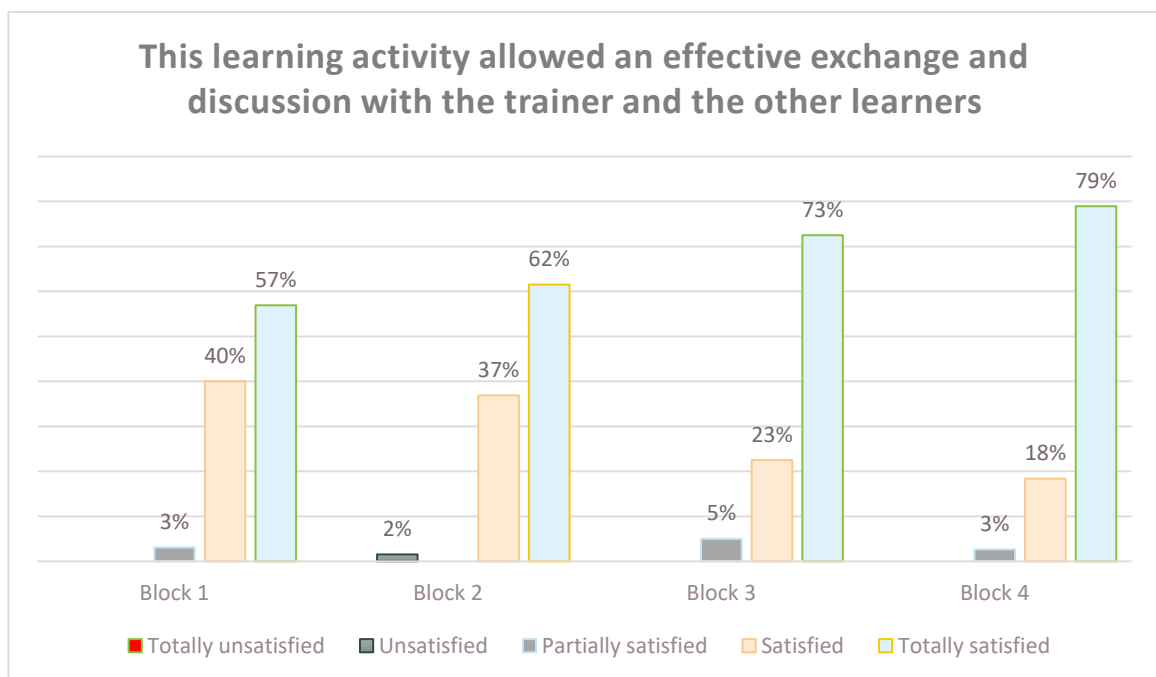


FIGURE 19 - SATISFACTION WITH THE DISCUSSION WITH TRAINER AND LEARNERS

The figure highlights satisfaction with discussions between trainers and learners. Block 4 leads with 79% "totally satisfied," followed by Blocks 3 and 2 at 73% and 62%, respectively. Block 1 records only

57% "totally satisfied." But considering the 40% "satisfied" it is possible to state that the vast majority of attendees gave a positive feedback to this aspect related to Block 1. These findings emphasize the importance of interactive discussions in enhancing the learning experience.

The different categories of "Level of Satisfaction with the IPR Data Analysis & Interpretation - IPR4Data course" are shown below.

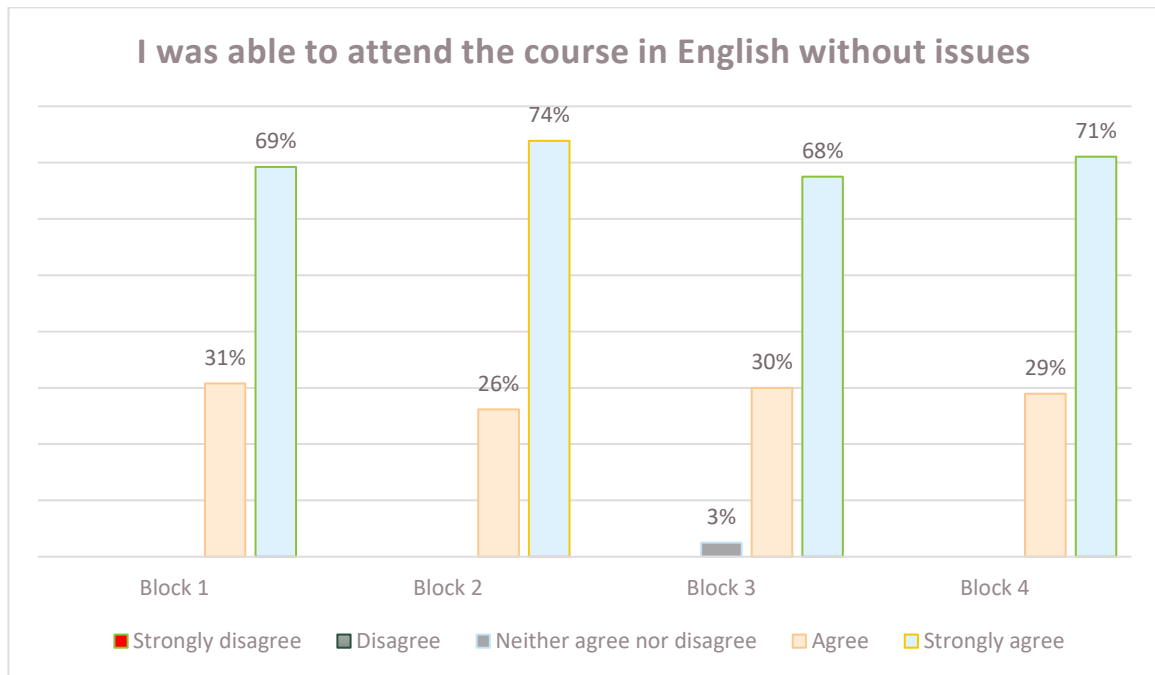


FIGURE 20 - SATISFACTION WITH THE ENGLISH LANGUAGE

Participants evaluated the clarity and accessibility of the English language used in the course. Block 2 receives the highest satisfaction, with 74% "totally satisfied," followed by Block 4 at 71%. Block 3 shows lower ratings, with 68% "totally satisfied." Overall, the course maintains high standards in language clarity.

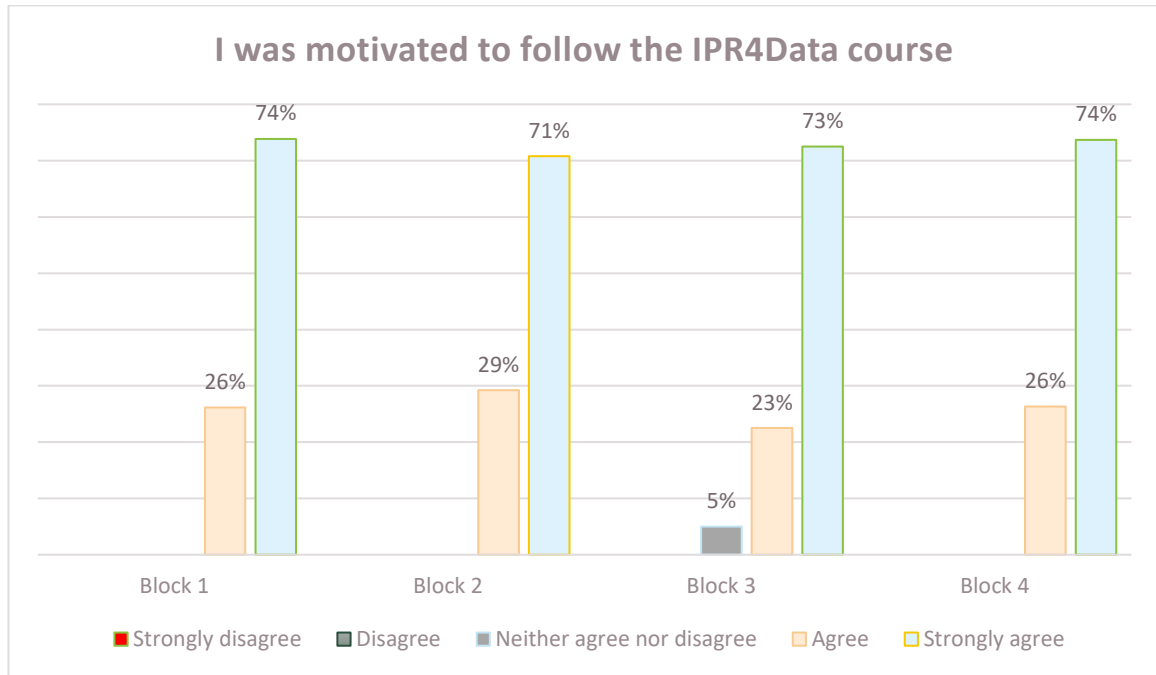


FIGURE 21 - SATISFACTION WITH THE LEVEL OF MOTIVATION

Figure 21 assesses how motivated participants felt throughout the course. Blocks 4 and 1 record the highest "totally satisfied" rating at 74% each, followed by Blocks 3 and 2 at 73% and 71%, respectively. High motivation levels are consistent, throughout all the blocks.

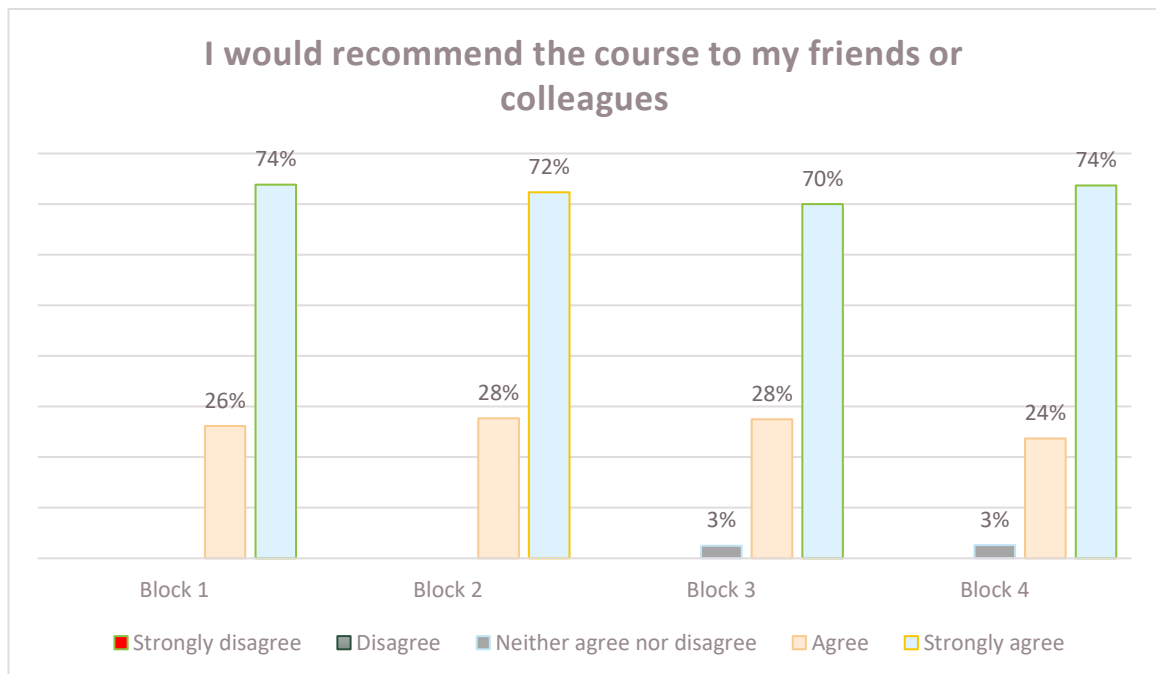


FIGURE 22 - SATISFACTION FOR RECOMMENDING TO FRIENDS AND COLLEAGUES

Figure 22 measures participants' likelihood of recommending the course. Blocks 4 and 1 rank highest, with 74% "totally satisfied." Blocks 2 and 3 follow closely at 72% and 70%, respectively. These results reflect participants' strong overall endorsement of the course.

The different results of the "Self-assessment" section are shown below:

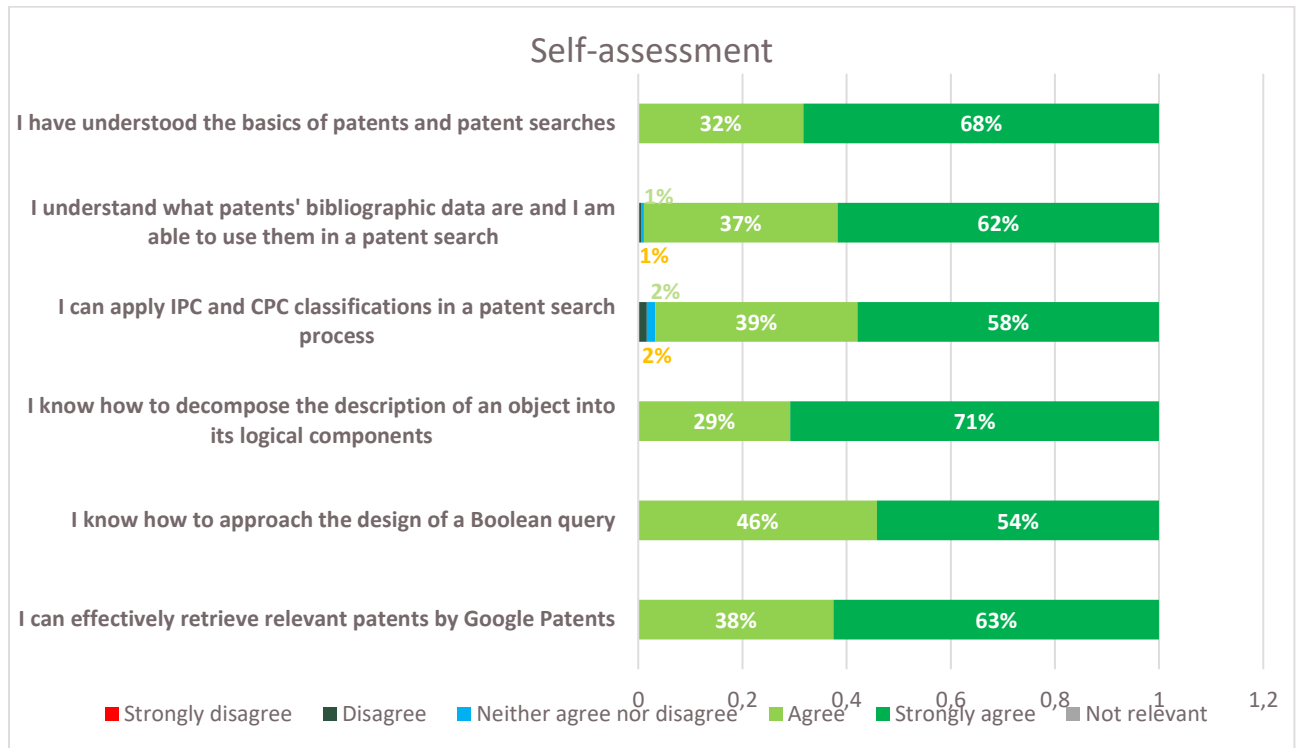


FIGURE 23 - SELF-ASSESSMENT

The self-assessment chart summarizes participants' understanding and skills related to patent searches. A majority strongly agree that they understand the basics of patents (68%) and can use bibliographic data effectively (62%). Most feel confident in applying IPC/CPC classifications (58%) and decomposing object descriptions into logical components (71%). A significant portion demonstrates proficiency in Boolean query design (54%) and retrieving relevant patents using Google Patents (63%). If we include participants who agree (in addition to those who strongly agree) in the statistics, the percentages in some areas reach 100% of respondents. Disagreement and neutrality are minimal across all areas, highlighting overall positive outcomes. These results collectively contributed to achieving the course objectives successfully.

In conclusion, across all analysed dimensions in previous graphs, Block 4 consistently emerges as the highest-performing learning block, achieving top ratings in clarity of objectives, relevancy of content, speaker clarity, presentation quality, career usefulness, engagement, discussion effectiveness, and participant motivation. A notable trend is the steady increase in participant satisfaction as the course progresses, suggesting an effective learning curve and increasing alignment with participants' expectations and needs. The overall results underscore the course's success in delivering high-quality, relevant, and engaging content, highlighting Block 4 as a standout in consolidating the course's impact and achieving its objectives.



4.3.4 Comments and suggestions from learners

25 participants provided comments and/or suggestions in form of an **open question**. Out of these 25 questions, 19 (76%) were purely positive feedback.

Suggestions for improvements, recommendations and more negative feedback are listed below:

- "Upload the recordings of the lectures." – Autumn course Block 1
- "Would like to have more interaction with the rest of the team." – Autumn course Block 1
- "I would like to see a more technical view on the topic." – Autumn course Block 1
- "I would like to see a more technical view especially on the query structure". – Autumn course Block 2
- "I am not satisfied with the logic of managing 20K rows of data in Excel. I would prefer an implementation with Python or R." – Autumn course Block 3
- "I hope all students will receive basic and supplementary materials from all block sessions." – Autumn course Block 4

4.4 Lessons Learned from Past Implementations

This section synthesizes the key lessons learned by the Research Team from delivering the IPR4Data course during its Summer and Autumn sessions. Feedback was collected to supplement the insights from evaluation surveys distributed to both lecturers and learners. These combined perspectives provided a comprehensive understanding of the course's strengths and areas for improvement.

The lessons learned (**Hiba! A hivatkozási forrás nem található.**) were collected and discussed during a guided brainstorming session held at the Consortium's fifth in-person meeting in Zagreb, which took place from December 2nd to December 5th 2024. The session allowed project partners to reflect on their experiences, identify challenges, and share best practices. By documenting these lessons, the Consortium aims to inform future course iterations, enhance the learning experience for participants, and refine the course delivery process to better meet the needs of diverse learners.

Lessons learned	Recommendations for future implementations
<p>Clear Foundational Concepts Are Essential for Complex Topics. Introducing foundational ideas, such as IPR, sustainability, and circularity, ensures all participants, including those with limited prior knowledge, have the necessary baseline to engage with more advanced content effectively.</p>	<p>Provide foundational materials for learners with no or weak background on IPR and data analytics.</p>
<p>Strong Planning Enhances Course Delivery. The IPR4Data course structure resulted well-planned, with logically sequenced sessions and clearly defined learning outcomes, ensures coherence and alignment of activities.</p>	<p>Keep the overall structure and high-level logical flow between the course's Blocks.</p>
<p>Flexibility in Teaching Modes. Combining synchronous and asynchronous teaching methods has enhanced accessibility and flexibility for learners. This approach supports independent study while maintaining opportunities for real-time interaction and feedback.</p>	<p>The IPR4Data training material can be used for both synchronous and asynchronous delivery. We recommend keeping an hybrid format, to let learners digest the acquired notions in between two consecutive sessions.</p>



Lessons learned	Recommendations for future implementations
<p>Lecturers Redundancy Improves Session Delivery. Mitigating the risks associated to technical failures or personal emergencies is crucial. Online courses depend heavily on reliable platforms, but technical issues are inevitable. A well designed course shall be resilient to all sorts of impeding factors.</p>	<p>Having at least two qualified presenters for each session to ensure that courses can continue in case of technical failures or unforeseen emergencies.</p>
<p>The Strategic Value of IP Data for Business Must Be Highlighted. It is essential to emphasize how businesses can effectively leverage the large datasets behind IPR. Teaching practical strategies, such as using Boolean and semantic queries for strategic IP research, equips participants with valuable, applicable skills.</p>	<p>Highlight the relationship between IP analytics and business. Enrich the training material with even more case studies, examples and clear success stories.</p>
<p>Wide target audience. The wide range of target groups (i.e. HEI and VET student, SMEs entrepreneurs etc.) for this course posed challenges. Future iterations would benefit from segmenting audiences in advance, designing tailored versions of the course to meet the specific needs of each group.</p>	<p>For future iterations, foresee a segmenting operation on target groups beforehand as well as a tailored delivery for specific audiences.</p>
<p>Balancing Expertise and Lecture Delivery Is Crucial. When lecturers lack deep expertise in the subject matter, it can diminish the effectiveness of the course, especially if some students are highly knowledgeable.</p>	<p>Carefully select lecturers and provide them with thorough preparation and support.</p>
<p>Language Proficiency Impacts Learning. Both lecturers' and students' levels of English proficiency need to be carefully considered in international courses. Clear communication and effective pronunciation are critical to ensuring that all participants can fully engage with the content.</p>	<p>Be sure of the level of the lecturers' proficiency in English.</p>
<p>Students Engagement in Voluntary Courses Demands Proactive Efforts. Engaging students in a free, voluntary course is challenging, particularly when they perceive the topic as unrelated to their major. Personal contact, tailored outreach, and persuasive communication are essential and should be planned well in advance.</p>	<p>Define the learner you will be delivering the course to. Different learner archetypes have different needs and interests. This will help you define targeted and effective marketing strategies.</p>
<p>Flexibility in Course and Lecture Scheduling Enhances Accessibility. Adjusting course schedules to accommodate working students can significantly improve participation. Similarly, adhering to planned lecture durations is important to maintain a consistent learning experience.</p>	<p>Define the agenda to best accommodate learners' needs and then respect the planned agenda.</p>

TABLE 1- LESSONS LEARNED FROM THE CONSORTIUM AFTER THE TWO DELIVERIES OF THE IPR4DATA COURSE, AND DERIVING RECOMMENDATIONS FOR FUTURE IMPLEMENTATIONS.

5 Course recommendations for next delivery

The deliverable for the IPR4Data course represents a significant milestone in our project, summarizing key lessons learned and offering insights for future iterations of similar training programs. By analysing the outcomes of the work package, we have identified areas of strength, opportunities for improvement, and actionable recommendations to optimize both course content and delivery. This conclusion chapter reflects on the broader implications of these findings, both for the current project and for the design of future educational initiatives targeting diverse audiences across Europe.

The **importance of foundational concepts** emerged as a recurring theme throughout the course. Participants benefitted significantly from early sessions that introduced core ideas such as intellectual property rights (IPR), sustainability, and circularity. By establishing a clear baseline, we ensured that learners with varied levels of prior knowledge could effectively engage with more advanced topics later in the course. For future implementations, we recommend providing foundational materials tailored to learners with limited or no background in these areas.

The course also demonstrated the value of **strong planning and structured delivery**. The logically sequenced sessions and clearly defined learning outcomes contributed to a coherent and streamlined learning experience. This structure ensured alignment between course content and participant expectations, enhancing the overall effectiveness of the program. Maintaining this logical flow and high-level structure will be essential for future iterations.

A notable success of the course was the **flexibility of teaching modes**, combining synchronous and asynchronous methods. This hybrid approach enabled participants to independently explore content while benefiting from real-time interaction and feedback during live sessions. This flexibility enhanced accessibility, particularly for working students and those from different time zones. We recommend retaining this format to maximize participation and learner engagement.

The inclusion of **lecturer redundancy** proved invaluable in mitigating risks associated with technical issues or unforeseen emergencies. By ensuring that at least two qualified presenters were available for each session, the program was resilient to disruptions. This approach should be institutionalized for future courses, particularly those delivered online.

Another critical insight was the need to emphasize the **strategic value of IP data for business**. Equipping participants with practical tools and strategies for leveraging IP data, such as Boolean and semantic queries, proved highly impactful. Case studies and success stories further reinforced the applicability of the content to real-world scenarios. Expanding these elements will strengthen future iterations of the course and increase its relevance to participants' professional contexts.

Despite these strengths, certain challenges emerged, particularly related to the course's **wide target audience**. Catering to a diverse group of learners—including higher education students, VET students, and SME entrepreneurs—posed significant challenges in terms of content relevance and delivery. Segmenting the audience in advance and tailoring course materials to the specific needs of each group will enhance engagement and learning outcomes in future implementations.

Finally, the course underscored the importance of **language proficiency** for both lecturers and learners in international settings. Clear communication and effective pronunciation were critical to ensuring that all participants could fully grasp the content. Future programs should carefully assess the English proficiency of lecturers and provide them with appropriate preparation and support.



Based on the lessons learned, the following recommendations are proposed:

1. **Foundational Materials:** Develop and provide foundational resources for learners with weak or no background in IPR and data analytics to ensure they can engage effectively with advanced content.
2. **Tailored Course Delivery:** Segment the target audience in advance and design tailored versions of the course to meet the specific needs of each group, ensuring relevance and alignment with their career goals.
3. **Hybrid Learning Model:** Maintain the hybrid delivery format, combining synchronous and asynchronous methods, to accommodate diverse learner preferences and schedules.
4. **Lecturer Preparation and Redundancy:** Carefully select lecturers with deep expertise in the subject matter, and ensure that at least two qualified presenters are assigned to each session to mitigate risks.
5. **Practical Applications:** Enrich course materials with more case studies, success stories, and technical applications (e.g., Python and R instead of Excel) to enhance learners' understanding of IP analytics and its strategic business value.
6. **Language and Communication:** Ensure that lecturers possess a high level of English proficiency and provide clear, well-structured presentations to maximize accessibility for all participants.
7. **Interactive Elements:** Increase opportunities for interaction, both between teachers and learners and among participants, to foster a more dynamic and engaging learning environment.
8. **Streamlined Course Schedule:** Design a course agenda that accommodates learners' needs and adheres to planned durations, avoiding overly lengthy sessions. Shorter sessions or additional blocks could further improve learning retention.

Feedback from both teachers and learners highlighted several areas for improvement.

Teachers provided diverse responses to the evaluation, with positive feedback overall, though few inputs were given to open-ended questions as they were optional. Teachers suggested refining the order of lessons, shortening sessions or dividing the course into more sections, and ensuring trainers deliver content efficiently without overextending discussions. They emphasized the importance of picking up on all details during sessions and allocating more time for practical simulations. Additionally, they recommended tailoring content to the specific backgrounds of participant groups to focus on relevant IPR registration processes, their estimated duration, and impact. Teachers also highlighted the need for more interaction, suggested delivering the course synchronously for better engagement, and proposed expanding certain lectures to cover particular topics in greater depth. Finally, they viewed the course as a strong foundation for curricula, with the potential to be upgraded to fit the full 5-6 ECTS framework.

Learners demonstrated strong results in proficiency tests, with only a few not achieving a passing score, and provided mostly positive feedback on each learning block and the overall course. Self-assessments indicated a general understanding of the course topics. However, learners expressed a desire for more technical content, particularly regarding query structures, and suggested incorporating alternative applications such as Python or R instead of Excel. Particularly, such integrations should be considered for more advanced students. Some of them highlighted the need for improving speaker clarity, and higher-quality presentations in Block 3, as well as better alignment of the course content with their career needs. The latter comment explicitly recall the tailored course delivery already recommended.



Additionally, they called for enhanced interaction among participants and instructors, especially in Block 2. These recommendations provide valuable guidance for improving future course iterations to better meet participants' expectations and professional requirements.

In conclusion, the IPR4Data course represents a strong foundation for future training programs on intellectual property and data analytics. By addressing the lessons learned and implementing the recommendations outlined above, we can enhance the course's impact, accessibility, and relevance. The outcomes of this work package demonstrate the potential for well-designed educational initiatives to empower diverse audiences with valuable, applicable skills, ultimately contributing to the broader goals of sustainability, innovation, and economic growth.



Appendices

Appendix A – Questionnaires

Questionnaires for trainers

Introduction section:

“The present questionnaire is part of the international project IPR4SC - Developing Skills in Intellectual Property Rights Open Data for Sustainability and Circularity, supported by the EU Erasmus+ Alliances for Innovation Programme (Project ID: 101056129-ERASMUS-EDU-2021-PI-ALL-INNO).

This questionnaire aims to collect feedback and information on the quality of the IPR Data Analysis & Interpretation - IPR4Data course (WP5).”

General question:

Please indicate your organisation	Open question (short answer)
-----------------------------------	------------------------------

Evaluation questions:

Question	Type of answer
Level of Satisfaction with the IPR Data Analysis & Interpretation - IPR4Data course	<p>Trainers evaluated the following 7 different aspects:</p> <ol style="list-style-type: none"> 1. The Simulation Lab was a useful event to understand the course content and prepare me for delivering the lesson. 2. Preparing the lesson was easy given the content to be delivered. 3. The training material is structured in a way that allows even non-expert teachers to deliver the lesson. 4. The students were active and engaged during the lesson. 5. The flow of the lessons is consistent (i.e., the knowledge taught in previous lessons was helpful for following the subsequent lessons). 6. The training material is free of gaps or redundancies. 7. Overall, I find the course content and delivery methods aligned with the needs and expectations of the project. <p>With the following options:</p> <ul style="list-style-type: none"> - Strongly disagree - Disagree - Neither agree nor disagree - Agree - Strongly agree - Not relevant



What did you like the most about the IPR4Data course?	Open question
What did you like the most about the training material?	Open question
What did you like the least about the IPR4Data course?	Open question
What did you like the least about the training material?	Open question
Imagining a second edition of the course, what would you do to improve the course overall? What would you do to improve lesson delivery and the training material?	Open question

Questionnaires for learners

The introduction part of the questionnaire for learners for each block was as follows:

“The present questionnaire is part of the international project IPR4SC - Developing Skills in Intellectual Property Rights Open Data for Sustainability and Circularity, supported by the EU Erasmus+ Alliances for Innovation Programme (Project ID: 101056129-ERASMUS-EDU-2021-PI-ALL-INNO).

The purpose of this questionnaire is to gather feedback and information on the quality of Block 1 of the course IPR4Data.”



Proficiency test – Block 1: Introduction to patent searches

Question	Type of answer	Possible answers
What is a patent?	Multiple-choice	<ul style="list-style-type: none"> - A patent is a legal right granted by a government that allows the owner to exclude others from making use of an invention for a limited period of time in exchange for publicly disclosing the invention. - A patent is a legal right granted by a government that allows the owner to exclude others from making use of an invention for an unlimited period of time in exchange for publicly disclosing the invention. - A patent is a legal document that grants the inventor exclusive rights to sell their invention for a limited time period. - A patent is a type of intellectual property that that can be granted for any idea and that gives its owner the legal right to make and sell an invention for a limited period of time.
In which section is the legal value of a patent reported?	Multiple-choice	<ul style="list-style-type: none"> - Title and Abstract - Drawings - Description - Claims
What are the main patent classification?	Multiple-choice	<ul style="list-style-type: none"> - International Patent Classification (IPC) and European Patent Classification (EPC) - International Patent Classification (IPC) and Cooperative Patent Classification (CPC) - Cooperative Patent Classification (CPC) and European Patent Classification (EPC) - Intelligent Patent Classification (IPC) and Correct Patent Classification (CPC)
From the following list, select those that represent patents' bibliographic data (the correct answers are 6 in total, you can select more than one answer from the list):	Tick boxes (multiple answers possible)	<ul style="list-style-type: none"> - Publication number - Filing Date - Title - Abstract - Inventor name - Applicant name - Assignee - IPC class



		<ul style="list-style-type: none"> - Claims - Description - Drawings
Which of the following is NOT a section of a patent?	Multiple-choice	<ul style="list-style-type: none"> - Drawings - Title - Abstract - Litigations

Proficiency test – Block 2: Practical introduction to search queries

Question	Type of answer	Possible answers
What are the main Boolean operators?	Multiple-choice	<ul style="list-style-type: none"> - AND, OR, NOT - AND, IF, ELSE - IF, OR, NOT - AND, NOR, NEITHER
What does stemming mean?	Multiple-choice	<ul style="list-style-type: none"> - The process of extracting the root form of words by removing suffixes. - The method of identifying synonyms in a text. - The technique of counting the frequency of words in a document. - The practice of creating complex sentences from simple ones.
Imagine you want to find patents about 'Ergonomic containers for liquid detergents'. Which of the following query structures will lead to the most precise results?	Multiple-choice	<ul style="list-style-type: none"> - (ergonomics) OR (containers) OR ("liquid detergents") - (ergonomics) AND (containers) AND (detergents) - ("ergonomic containers") AND ("liquid detergents") - (containers") AND ("liquid detergents") NOT (ergonomics)
You know that Keyword-based and a Semantic searches are both valid and you can trust their results, but neither gives you a sufficient/definitive answer. How would you proceed? Will you consider these two query results:	Multiple-choice	<ul style="list-style-type: none"> - Identical - Mutually exclusive - Complementing each other - Not possible to compare the results due to methodological differences
Which of the following patent analytics tools feature semantic searching algorithms?	Multiple-choice	<ul style="list-style-type: none"> - Google Patents - Espacenet - PQAI - The Lens

Proficiency test – Block 3: Patent dataset management

Question	Type of answer	Possible answers
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Which step is crucial for combining patent data with other datasets, such as financial data or firm-level data?	Multiple-choice	<ul style="list-style-type: none"> - Normalisation of values - Merging datasets using a unique identifier - Using only patent numbers to identify firms - Sorting data based on patent filing dates
What is the main purpose of disambiguation in patent data?	Multiple-choice	<ul style="list-style-type: none"> - To sort patent data by application date - To resolve inconsistencies in inventor or company names - To remove duplicate patent records - To standardise patent classification codes
What is a key strategy to ensure that the cleaning process of patent data is traceable and can be controlled?	Multiple-choice	<ul style="list-style-type: none"> - Automatically remove records with missing values - Document every cleaning step and create a cleaning log - Only focus on cleaning high-value patents - Modify all entries to fit a standardised template
When merging patent data with geographic data, which field is most likely to provide a reliable connection between the two datasets?	Multiple-choice	<ul style="list-style-type: none"> - Patent title - Applicant's country code, city or address information - Patent abstract keywords - Number of patent claims
Why are descriptive statistics important in the early stages of analysing patent datasets?	Multiple-choice	<ul style="list-style-type: none"> - They help infer causal relationships between variables - They provide an overview and summary of the data, highlighting key patterns - They automatically clean and organise patent records - They are used to predict future patent trends

Proficiency test – Block 4: Patent data interpretation

Question	Type of answer	Possible answers
Throughout the course we have seen how patent analytics can be valuable in supporting companies' strategic processes. What do you think will happen if you apply the same analytical steps to different situations?	Multiple-choice	<ul style="list-style-type: none"> - The outcomes will always be identical because the analytical steps are designed to produce the same results regardless of the situation. - The outcomes will vary depending on the specific context and details of each situation, as different variables and conditions can influence the results.



		<ul style="list-style-type: none"> - The outcomes will be completely random and unpredictable since the analytical steps do not account for different situations. - The outcomes will be universally applicable because the analytical steps are standardized and can be applied to any situation without modification.
The Method Products case showed that:	Multiple-choice	<ul style="list-style-type: none"> - Companies can rely on patent analytics only to investigate prior art and evaluate an innovation's patentability. - Through patent analytics companies can predict future economic trends with high accuracy. - Through patent analytics, companies can clearly determine the market value of their own products. - Through patent analytics companies can assess the level of affinity of their R&D strategies with others, as well as investigate what competitors are focusing on.
A correct scoping:	Multiple-choice	<ul style="list-style-type: none"> - can be postponed. The first thing to do in patent analysis is the design of an effective search query. - is not mandatory, as patent analytics methodologies can lead to valuable results regardless of the scope. - is not mandatory because the new Artificial Intelligence functionalities, that most of the IP tools feature, can guess the scope on their own. - is necessary in order to obtain valuable results.
Think of the Method Products case. The focus on the niche about ergonomic/aesthetic containers for liquid detergents has shown that:	Multiple-choice	<ul style="list-style-type: none"> - Method Products' fears were justified. Big multinational companies were leading the niche and a start-up like Method Products could hardly hope to compete. - Method Products' fears were mitigated. Big multinational companies were leading the niche but also SMEs and other start-ups were producing innovation. Method Products had the right elements to compete.



		<ul style="list-style-type: none"> - Method Products' fears were justified. The volumes of innovation production in the addressed market niche were lowering year by year. This showed that Method Product's business was destined to fail. - Method Products' fears were mitigated. Only SMEs and start-ups were producing innovation in the addressed niche. Worldwide, Method Products was the second company in terms of owned patents.
Which of the following patent analytics tools feature semantic searching algorithms?	Multiple-choice	<ul style="list-style-type: none"> - Google Patents - Espacenet - PQAI - The Lens

Evaluation form – same for all 4 blocks

General questions:

Question	Type of answer	Possible answers
How would you best describe your current status?	Multiple-choice	<ul style="list-style-type: none"> - I'm currently enrolled in a university program as a student - I'm currently enrolled in a non-University educational program (e.g. Vocational Education and Training) - I work for a start-up / SME
Please also indicate your field of study	Tick boxes (multiple answers possible)	<ul style="list-style-type: none"> - Engineering - Business Administration & Management - Environmental Sciences - IT / Computer Science - Other

Evaluation questions:

Question	Type of answer	Possible answers
Level of Satisfaction with the Learning Block X	Check box pattern	<p>Learners evaluated the following 7 different aspects.</p> <ol style="list-style-type: none"> 1. Clarity of the Learning Block objectives 2. Content relevancy 3. Clarity of the speaker 4. Quality of the presentation 5. Usefulness for your career 6. This type of learning activity stimulated my interest in the topic



		<p>7. This learning activity allowed an effective exchange and discussion with the trainer and the other learners</p> <p>With the following options:</p> <ul style="list-style-type: none"> - Totally unsatisfied - Unsatisfied - Partially satisfied - Satisfied - Totally satisfied
Level of Satisfaction with the course IPR Data Analysis & Interpretation	Check box pattern	<p>Learners evaluated the following 3 different aspects:</p> <ol style="list-style-type: none"> 1. I was able to attend the course in English without issues 2. I was motivated to follow the IPR4Data course 3. I would recommend the course to my friends or colleagues <p>With the following options:</p> <ul style="list-style-type: none"> - Strongly disagree - Disagree - Neither agree nor disagree - Agree - Strongly agree
Self-assessment of skills acquired through the course - Block X	Check box pattern	<p>Learners evaluated different questions about their general understanding and knowledge with the following options:</p> <ul style="list-style-type: none"> - Strongly disagree - Disagree - Neither agree nor disagree - Agree - Strongly agree
Do you have anything else (suggestions, improvements) to add?	Open question	

Appendix B – Final Essay

In this final test you will apply your knowledge of patent analytics, acquired throughout the IPR4Data course.

The following are three definitions of three ‘objects’ of search.

- a) A moka (a coffee maker traditionally used to brew espresso-like coffee) featuring a thermal sensor alarm function, that activates based on temperature. When the Moka pot reaches a specific temperature indicating the coffee has finished brewing (typically when most of the water has moved to the upper chamber), the thermal sensor triggers an alarm. This feature alerts the user to remove the Moka from heat, preventing over-extraction and fire-related risks.
- b) A schoolbag with retractable wheels, designed to offer students an easy way to carry heavy books and supplies, reducing the strain on their backs and shoulders. The schoolbag includes wheels embedded at the bottom. When the load is too heavy or when the student needs to travel longer distances, they can pull out a sturdy handle from the top of the bag, which simultaneously engages the retractable wheels at the bottom. This enables the bag to function similarly to a trolley, allowing it to be rolled along the ground.
- c) A wheeled autonomous vineyard-harvesting robot is a self-driving machine designed to operate within vineyards, specifically to harvest grapes. Equipped with wheels and advanced sensors, the robot navigates through rows of grapevines, using algorithms to identify ripe fruit and harvest it precisely without damaging the vines or grapes. The robot is programmed to recognize the optimal ripeness of grapes through visual or spectral sensors and uses mechanical arms or specialized cutters to carefully detach clusters from the vine.

Select the ‘object’ that most aligns with your interests and expertise and answer the five questions listed below. These are designed to assess your understanding of patent analytics principles, methods, and tools.

- 1) Break down the 'object' into its logical components and establish logical relationships.
- 2) Write a Boolean query and a query for semantic search.
- 3) Identify at least two patents that meet the search parameters.
- 4) List the top 5 assignees.
- 5) Specify which IP tools did you use and why.