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# ARIS

## VOOC Testing and evaluation report

### Output O3: (O3-T3)



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ARIS PROJECT

AI SKILLS FOR ICT PROFESSIONALS





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## 1 INTRODUCTION

The ARIS VOOC is a self-standing modular course for ICT professionals, who seek to improve their skills, knowledge and competencies in Artificial Intelligence methods and use cases. The ARIS online course, was developed in the context of the third Intellectual Output, with the aim to act as an open, wide-access delivery method for the ARIS curriculum and educational resources (O2). The ARIS VOOC, available in English, has been grounded on evidence-based learning outcomes (coming out from extended labour market and skill needs analysis and reflects the structure of the developed curriculum as organized around learning units and lessons. It also integrates additional pedagogical resources such as video units, infographics, working assignments, and collaboration mechanisms to provide an optimal learning experience with increased collaboration opportunities. Overall, the ARIS VOOC offers a modular, e-learning scheme, always available over the Internet that supports the attainment of learning outcomes and places the “learner” at the heart of the educational process. The learner is given the flexibility to establish individuals learning goals and a personal learning path based on available content and materials.

The third activity of the third Intellectual Output (O3-T3) included the pilot delivery (testing) of the ARIS online course and learning materials by actual trainers and learners. Pilot testing is a trial and evaluation method that involves trying an offering (e.g., product, service, system, application) in a natural usage context in order to identify shortcomings and flaws that could be experienced by end-users. The pilot testing process was conducted over a period of more than two months from 04 October to end of November 2021, in two different formats: (a) remotely via the ARIS VOOC, and b) in real conditions, as part of classroom-based activities in Business Training.

The overarching purpose of this process was to identify weaknesses, and opportunities for improvement and to evaluate the different aspects of the VOOC infrastructures such as course structure and clarity, learning effectiveness, technical operation and accessibility.

In total, 172 learners registered and attended the online course during the testing period, providing their comments and feedback on the VOOC, and contributing to the validation of the ARIS educational resources. Overall, the process recorded very positive attitudes and comments from testing participants on the educational value, usefulness, and technical operation of the online course, who among others expressed their interest to exploit the ARIS educational resources.



This report presents the results and main findings from the pilot testing process – as drawn from the online evaluation forms – and provides specific recommendations for the improvement and fine-tuning of the online course.

The report is organized as follows: Section 2 provides the main details from the pilot session including participation metrics and course analytics. Section 3 provides an overview of the methodology employed. Section 4 presents in details the evaluation results as drawn from the analysis of participants' responses and feedback. Finally, section 6 concludes with the key findings from the pilot testing process along with the next actions for the fine-tuning and final release of the online course.

## 2 THE ARIS VOOC

The ARIS VOOC is an up-to-date, self-standing, modular course for ICT professionals, who need to improve their skills, knowledge and competencies in AI technologies and practical applications. ICT professionals who follow this course will acquire and develop AI related skills - along with problem solving, managerial and customer related (transversal) skills - required to respond to modern workplace requirements and succeed in a competitive labour market.

The ARIS Vocational Open Online Course (VOOC) acts as the main delivery method for the ARIS curriculum. It reflects the structure of the developed curriculum, as organised around learning units and lessons, and comprises the project's training and assessment materials, contextualized, in an online form (text, presentations, multimedia files, interactive tools, and exercises). The ARIS VOOC integrates also additional pedagogical resources such as video units, infographics, working assignments, and collaboration mechanisms to provide an optimal learning experience with increased collaboration opportunities.

The ARIS Vocational Open Online Course is founded on the following **pedagogical principles**.

- **Learner-centeredness:** Learners are at the heart of the learning process, being able to establish individuals learning goals and a personal learning path based on available content and materials.
- **Flexibility:** Learners are able to arrange their learning schedule according to their resources within the lifecycle of the course and decide their level of engagement.
- **Interactivity:** The ARIS VOOC makes explicit mention of the value of interactivity and the multiplying effects it has on learning and capacity building. Learners are encouraged throughout the course to discuss with their peers, provide feedback on each other's work, and participate in joint activities, where possible.
- **Ubiquitous learning:** Learners are able to experience learning activities and content in any context and situation 24 hours 7 days per week through mobile devices such as laptops, tablets and smartphones.
- **Teacher as facilitator:** In MOOCs, trainers should abandon their traditional role which is to convey information to learners and now act as facilitators, motivating learners to engage in course activities and providing feedback and assistance with their tasks.
- **Blended evaluation scheme:** One of the greatest challenges for a Massive Open Online Course is to establish an assessment model that works at a much larger scale,



with potentially thousands of learners participating in the course. To respond to this challenge, the ARIS VOOC has employed a blended evaluation scheme that incorporates different methods & tools to evaluate learners' performance, including: a) auto-assessment, b) peer feedback, and c) self-checks.

The following table shows the structure of the ARIS curriculum and the breakdown of the **four learning units** into lessons.

Learning Units	Lessons	Duration
<b>Foundations of Artificial Intelligence</b>	Lesson 1 Scope of AI	Total: 22 hours Theory: 13,5 hours Practice: 8,5 hours
	Lesson 2 Problem Solving	
	Lesson 3 Knowledge Representation	
	Lesson 4 Machine Learning	
	Lesson 5 Applications	
	Lesson 6 Ethical Implications	
<b>Machine Learning</b>	Lesson 1 Introduction to ML	Total: 12 hours Theory: 9 hours Practice: 3 hours
	Lesson 2 Languages and Resources	
	Lesson 3 Data Transformation and Visualization	
	Lesson 4 Supervised Linear ML	
	Lesson 5 Supervised Non Linear ML	
	Lesson 6 Unsupervised ML	
<b>Neural Networks and Deep Learning</b>	Lesson 1 Brain origin and element of neural networks	Total: 12 hours Theory: 9 hours Practice: 3 hours
	Lesson 2 Simple perceptrons and supervised learning	
	Lesson 3 Multilayer perceptrons and Keras	
	Lesson 4 Deep learning for image classification: Convolutional neural networks	
	Lesson 5 Different CNNs for image classification	
	Lesson 6 Real-time object localization with YOLO models	
<b>AI for solving real-life problems</b>	Lesson 1 World embedding and Text classification	Total: 12 hours Theory: 9 hours Practice: 3 hours
	Lesson 2 Neural networks for NLP and libraries	
	Lesson 3 New approaches, applications, open problems	
	Lesson 4 Big Data: Problems, core techniques and introduction to Hadoop and Spark	
	Lesson 5 Spark Big Data Processing	
	Lesson 6 Cloud computing and machine learning With PySpark	
		Total: 58 hours Theory: 40,5 hours Practice: 17,5 hours

## 3 PILOT DELIVERY OF THE ARIS VOOC

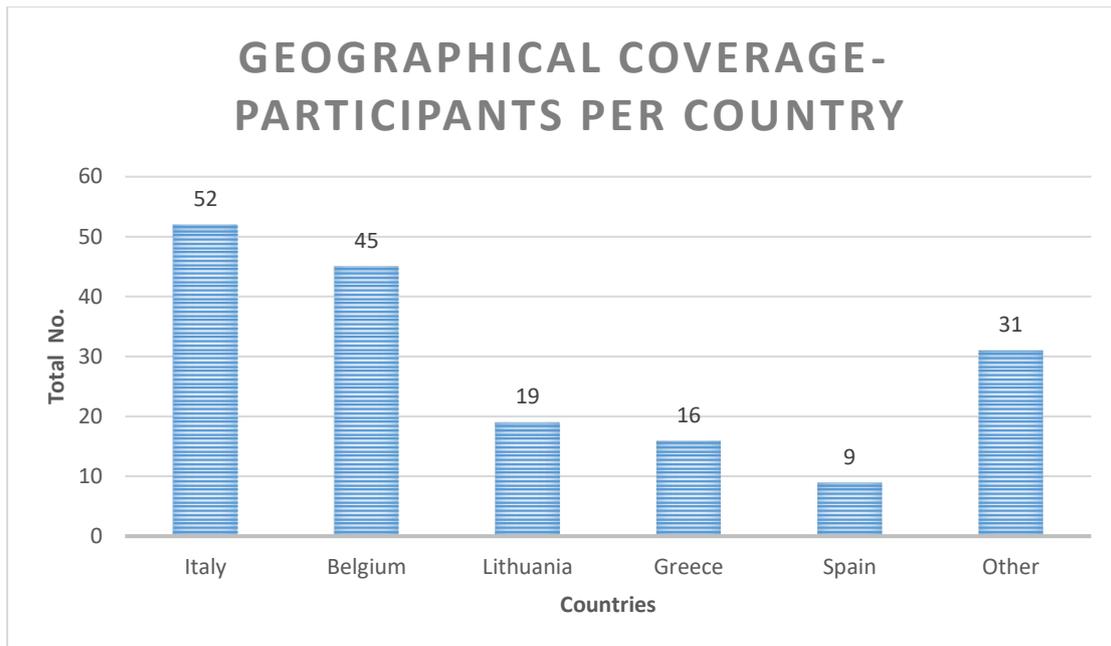
### 3.1 Pilot session details

The VOOC pilot online course took place in English and lasted about 2 months (from 4 October to 30 November 2021), making available to target groups learning materials of 120 -160 hours duration. The learners who evaluated the course spent roughly 5 – 7 hours per week, to study the materials and complete the assignments. The main details of the pilot delivery of the ARIS VOOC are presented as follows.

<b>Testing object</b>	ARIS Vocational Open Online Course (VOOC)
<b>Language</b>	English
<b>Delivery method</b>	Online / Offline
<b>Testing approach</b>	Moderated
<b>Facilitators</b>	Business Training, EXELIA
<b>Participants</b>	ICT professionals, ICT students, VET providers, ICT trainers, tech enthusiasts, tech savvies
<b>Start Date</b>	4 October 2021
<b>End Date</b>	30 November 2021
<b>Geographical scope</b>	International but with a particular focus on partnership countries (Belgium, Italy, Spain, Lithuania, Greece)
<b>Feedback gathering tool</b>	Online evaluation form
<b>Main Outputs</b>	1. VOOC testing and evaluation report 2. Finetuned online course

### 3.2 Participation

During the pilot period, 130 individuals from 25 countries registered and attended the ARIS online course on Artificial Intelligence. To the above number, we need to add the 42 trainees from Business Training, who also attended a considerable part of the ARIS VOOC in a classroom-based environment (without registering) as part of their training activities. Therefore, the total number of course attendees during the pilot session was 172 learners. The geographical distribution of course participants is as follows.



The actual participation numbers by target group are presented in the **annexed Table 1**. The majority of participants were from the ARIS consortium countries; however, a significant share of participants came from non-EU countries such as Malaysia, China, UAE and Pakistan, largely proving the international outlook of the project’s materials.

Country	Number of participants
Italy	52
Belgium	45
Lithuania	19
Greece	16
Spain	9
Other	31
<b>Total</b>	<b>172</b>

### 3.3 Course analytics

Course analytics offer valuable insights on what learners are doing in the course and how they are interacting with the available content and other participants including facilitators (when relevant). OpenLearning provides a series of metrics on learners’ engagement and course participation such as:

- Active time: Learners' activity on the course
- Page views: Learners' engagement at a page level
- Progress / Completion rate: Percentage of the course completed
- Comments over time: Comments made by learners in each session and the discussion forum

These metrics together with the information gathered from learners through the anonymized follow-up feedback survey have helped the ARIS partnership obtain a clear picture of the student learning experience, and improve the quality of the course, towards providing an optimal and comprehensive learning experience.

The metrics obtained are quite satisfactory, demonstrating a relatively high engagement rate. These can be summarized as follows.

<b>Comments</b>	88
<b>Page views</b>	9831
<b>Average page views per user</b>	75.6
<b>Highest course completion rate</b>	79.69%
<b>Average course completion rate</b>	7.2%
<b>Total active time on course</b>	173.3 hours
<b>Highest active time on course</b>	23.5 hours
<b>Average active time on course</b>	1 hour and 20 minutes

## 4 METHODOLOGICAL APPROACH TO EVALUATION AND FEEDBACK PROVISION

### 4.1 Purpose and testing objectives

The partnership run a pilot session of the online course with the participation of actual learners and trainers, seeking to evaluate the educational value of learning materials and test the VOOC's functionality. Testing results will be used to identify weaknesses, areas of strengths, opportunities for improvement. The partnership pursued the following research objectives:

- Understand learners' actual needs and expectations from the course, and discover opportunities to address them.
- Explore if learners are able to review materials and attend all course activities without any malfunctions.
- Collect quantitative and qualitative data on the educational value, structure usability and technical operation of the online course.
- Fine-tune the online course based on participants' feedback and comments as derived from actual VOOC usage and interaction with materials.

### 4.2 Evaluation areas

Performance evaluation refers to the process of collecting, analysing and interpreting information on the performance and effectiveness of a product or service. This process estimates and looks into the parameters under which a tool, framework, system under examination is working as intended and reaches the targeted results. These parameters are related to the components or elements of the testing object that need to be measured for assessing its performance, status and usability. The ARIS online course was evaluated against 5 parameters/criteria.

1. Clarity and comprehensiveness of curriculum structure (the accuracy of the course, the effectiveness of the curriculum)
2. Relevance and quality of learning materials
3. The added value of the training offering (an increase of learning skills, the application of the theory into practice)
4. Usability and technical operation of content (registration process and the technical issues)

## 5. Connectivity, bandwidth and accessibility issues

### 4.3 Process

This sub-section depicts the procedure followed by the ARIS partnership to prepare and carry out the pilot delivery of the ARIS online course.

- [Step 1](#): Development and release of the ARIS online course on “OpenLearning” platform
- [Step 2](#): Promotion of the online course to target groups by partners
- [Step 3](#): Publication of the online course on the platform’s marketplace after successfully passing the quality reviewing process
- [Step 4](#): Start of the pilot session on the 4<sup>th</sup> of October 2021
- [Step 5](#): Registration of learners (continuous process)
- [Step 6](#): Facilitation of the online course and monitoring of learners’ activity
- [Step 7](#): Closure of the pilot session on 30 November 2021
- [Step 8](#): Distribution of the evaluation form to course participants
- [Step 9](#): Closure of the evaluation period on 17 December 2021

### 4.4 Feedback collection form

An online structured questionnaire was the main instrument for capturing course participants’ views and feedback on the educational value, usability and effectiveness of the ARIS online course and educational resources.

A web-based approach was employed for reasons of practicality, and to facilitate the data collection, coding, and analysis process. The questionnaire was structured in a clear and simple manner to encourage participation and facilitate communication with participants. As there was not be a physical interaction between participants and facilitators, all questions were designed to be clear and understandable, providing working definitions and clarifications for terms/procedures that participants may not be familiar with.

The survey questionnaire comprised mostly closed-ended questions (Likert scale multiple choice questions) as they are easier and quicker for respondents to answer; offer better coding, analysis and comparison possibilities. Likert scale questions were mostly used so that

the partnership can identify the degree to which users agree or disagree with a number of statements referring to the relevance, usefulness and effectiveness of the ARIS resources. Open questions were also included so that course participants can express their opinion and state anything they feel is relevant, clarify and justify their answers, provide more accurate information on the usability of the online course and make recommendations on how to further improve it.

The evaluation form consisted of the following sections:

1. Participant profile
2. Structure
3. Relevance and quality
4. Clarity
5. Added value
6. Technical operation
7. Comments and suggested improvements

The questionnaire was distributed to course participants via email after the conclusion of the pilot session of the online course. The evaluation form was also posted on the announcement section of the online course, to achieve increased visibility. The survey remained open for about 20 days, until 17 December 2021.

## 5 EVALUATION RESULTS

This section presents the main findings drawn from the feedback collection process and more especially from the statistical analysis (descriptive statistics) of the input provided by course participants. The process has recorded positive attitudes and comments on the educational value, usefulness, and technical operation of the online course. At the same time, participants provided valuable feedback that will be used by the partnership to improve learning materials and fine-tune the online course and develop its final version before making it available to final end-users and beneficiaries. The results of each (survey) question are presented using tables and charts (graphs). The structure of the analysis that follows is mostly based on the structure of the evaluation form in terms of evaluation/measurement parameters and the sequence of the questions included.

The main parameters that were assessed were a) course structure, b) relevance and quality of educational materials, c) clarity, d) added value, and e) technical operation. The questionnaire also included – apart from demographic questions – two screening questions; one on participants' previous experience and familiarization with online courses and one on the time spent on the online course, as a proxy on the validity of the responses provided. In total, the online evaluation form was completed by 65 out of 172 course participants (~38%), which is a relatively good response rate.

### 5.1 Participants' profile and previous experience with online courses

The questionnaire started with the so-called screening questions giving the chance to participants to state their country of origin, their professional role/capacity, previous experience with online courses and the time they spent on the ARIS VOOC. The results are reported below.

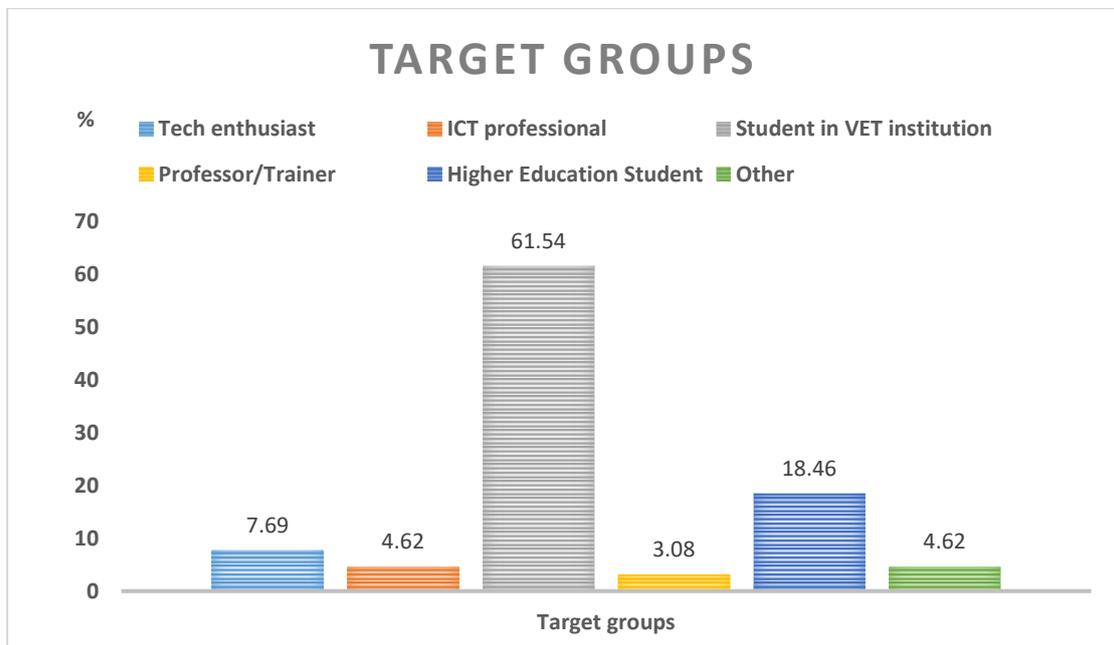
### Geographical distribution

The survey was completed by 65 course participants from 5 countries. The geographical distribution of these responses is as follows:

Country	Number of participants
Belgium	42
Lithuania	11
Greece	6
Italy	5
Latvia	1
<b>Total</b>	<b>65</b>

### Responses per target group

The participation numbers per target group is depicted below. More specifically, the partnership gathered 65 responses from VET students, ICR professionals, professor/trainer, higher education student, tech enthusiast and others.

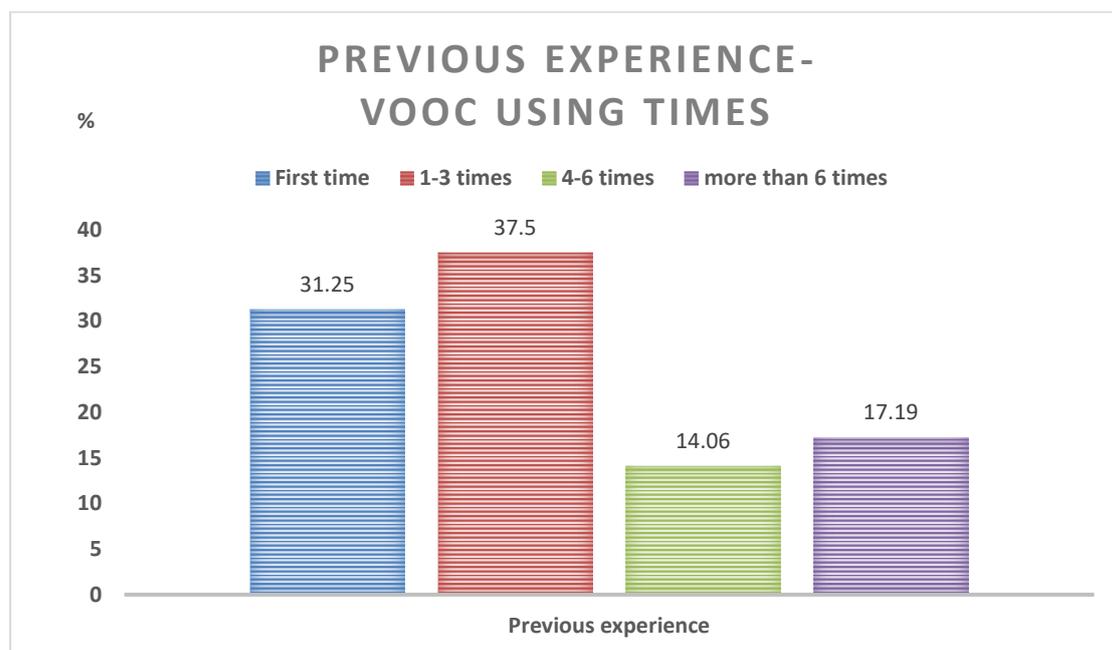


### Previous experience with online courses

One of the important criteria of the pilot-run survey was to take into account the previous experience of the respondents with similar courses, in order to assess how familiarity with the context affects the ability to collect feedback from different target groups. The options for the participants to state their previous experience were represented as showcased below:

- First time to take an Open Online Course
- From 1 to 3 times
- From 4 to 6 times
- More than 6 times

The results show that the great majority of survey participants had previous experience with online courses, demonstrating a high familiarity with online education. Only for one out of three participants, this is the first time taking an online course.



## 5.2 Evaluation Area A: Course Structure

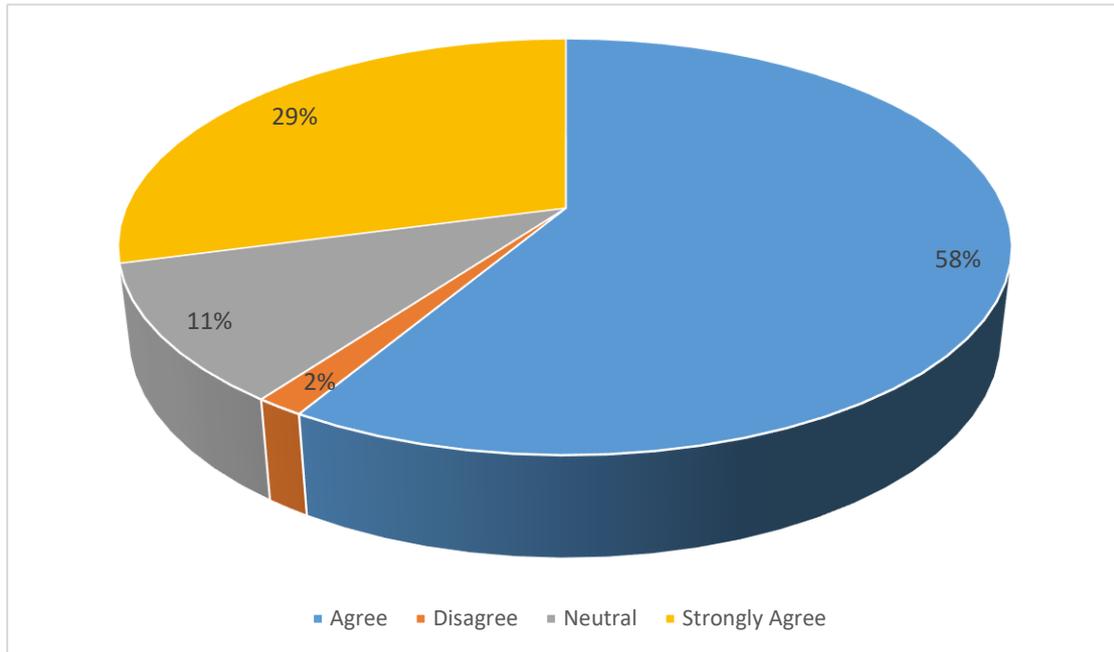
The first evaluation parameter includes variables that assess the structure of the ARIS curriculum and the flow of learning materials. Information provided by testing participants in this area will allow the partnership to assess content organisation, whether the ARIS online course is structured in a logical and flexible way, whether the desired balance between theory and practice has been achieved and whether its structure allows learners to choose to attend the modules and learning activities that better address their needs and personal learning objectives. Testing participants were asked to indicate their level of agreement with the following (structure-related) statements:

- The course is well-organized and flows in a logical progression.
- The learner can easily choose the parts of the course wishing to attend.
- The course features a wide variety of educational resources (materials) to support the learning process.
- The course provides a balanced approach between theory and practice.
- The content is presented in an appropriate language.
- The content is enriched with visual and auditory elements, which are well-integrated with other course materials.
- It is easy for the learner to follow the course at his/her own pace and time.

What can be easily extracted from the evaluation results, as presented below in the form of graphs, is that almost nine out of ten participants has a positive impression of the course structure (visual elements, flow, language, ease etc.).

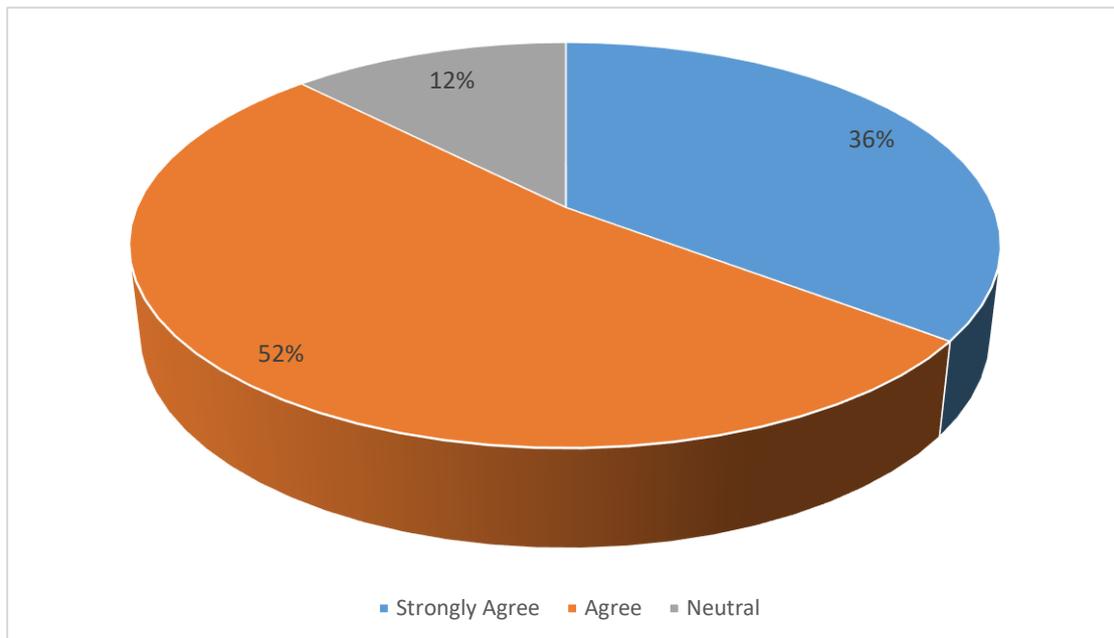
**Statement 2:**

**The course is well-organized and flows in a logical progression.**



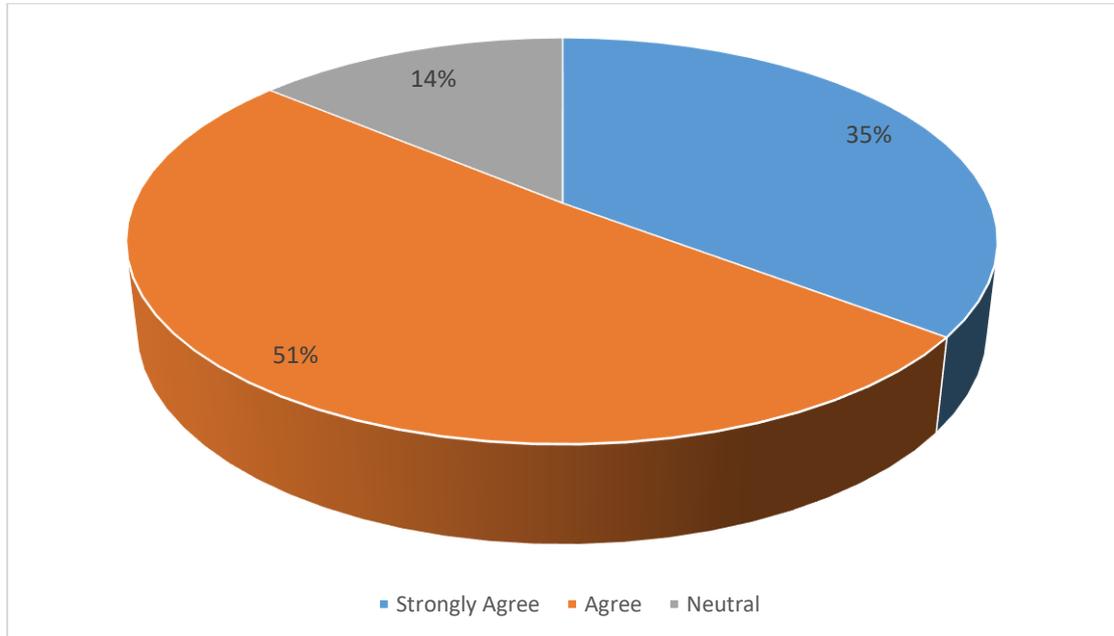
**Statement 3:**

**The learner is able to easily choose the parts of the course wishing to attend.**



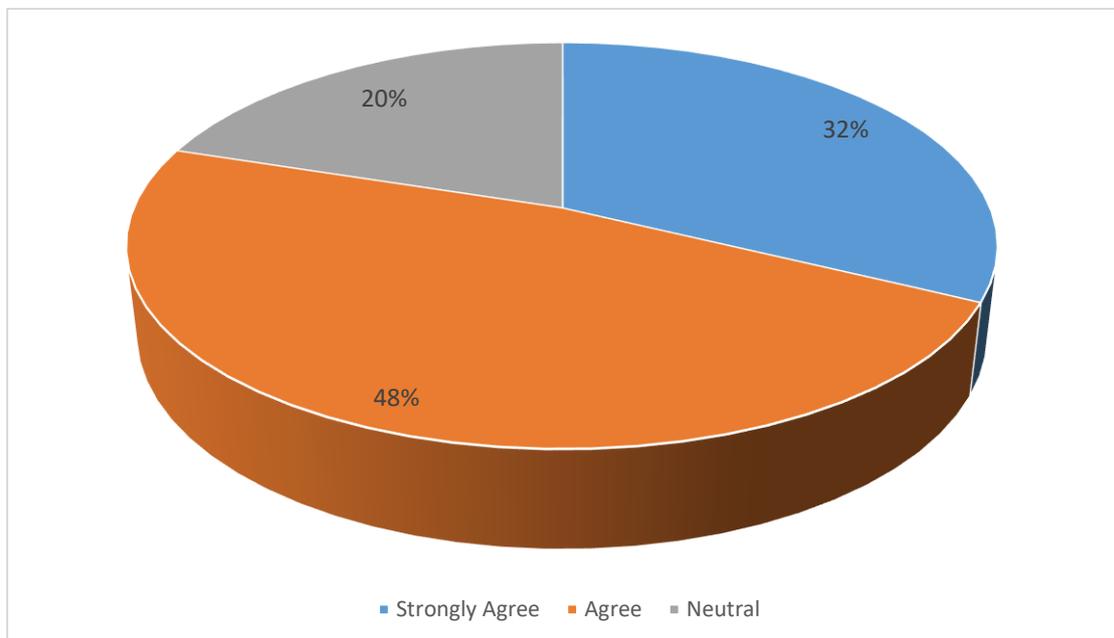
**Statement 4:**

The course features a wide variety of educational resources (materials) to support the learning process.



**Statement 5:**

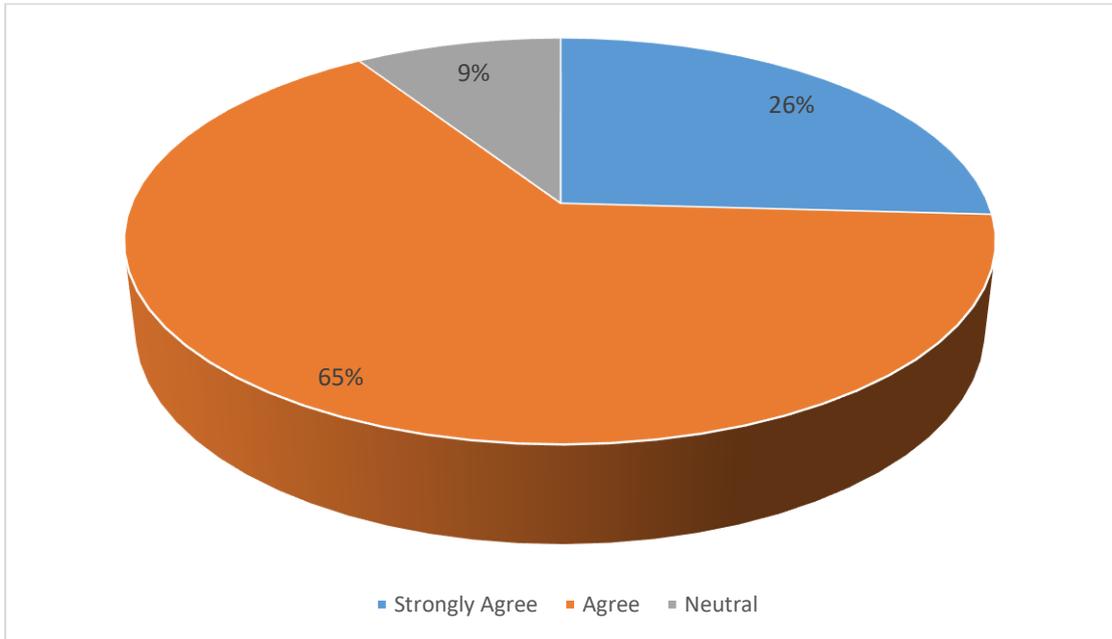
The course provides a balanced approach between theory and practice.





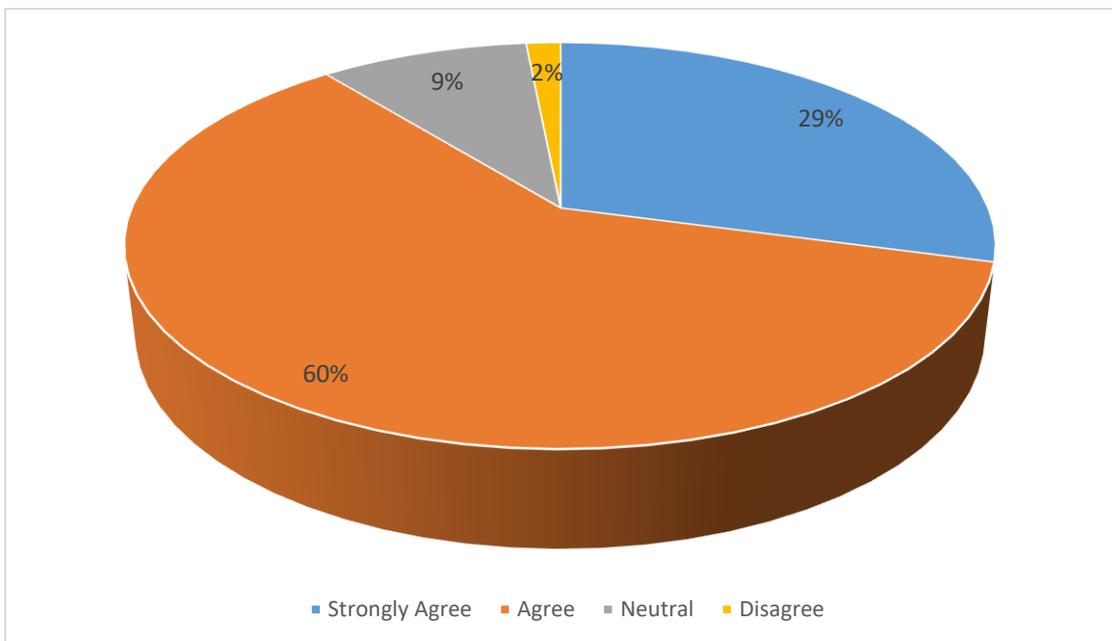
**Statement 6:**

The content is presented in appropriate language.



**Statement 7:**

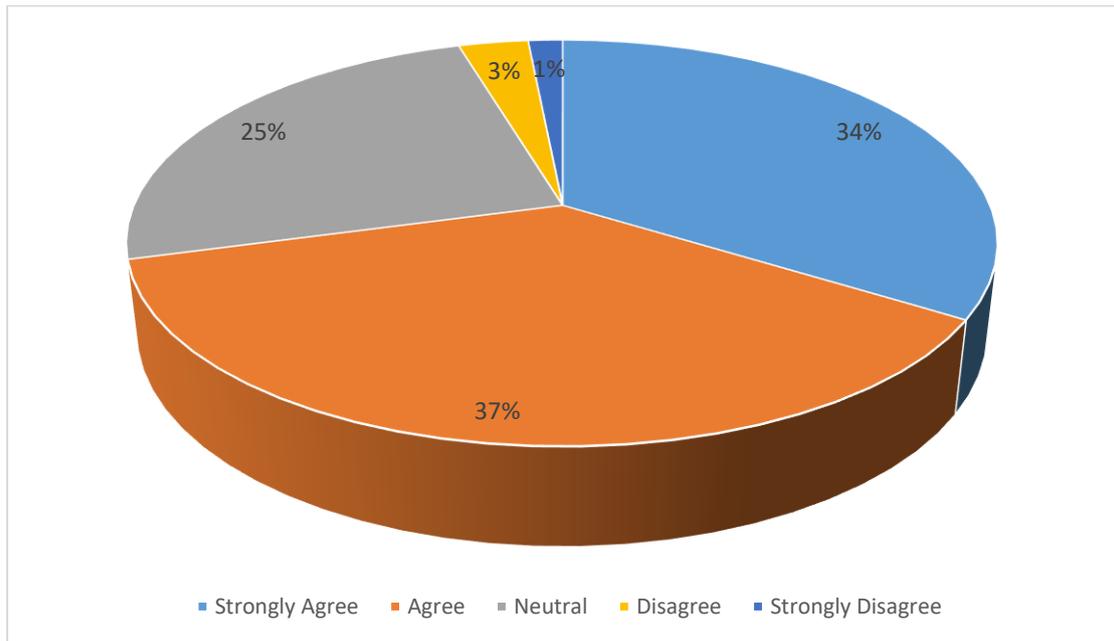
The content is enriched with visual and auditory elements, which are well-integrated with other course materials.





**Statement 8:**

**It is easy for the learner to follow the course at his/her own pace and time.**



### 5.3 Evaluation Area B: Relevance and quality

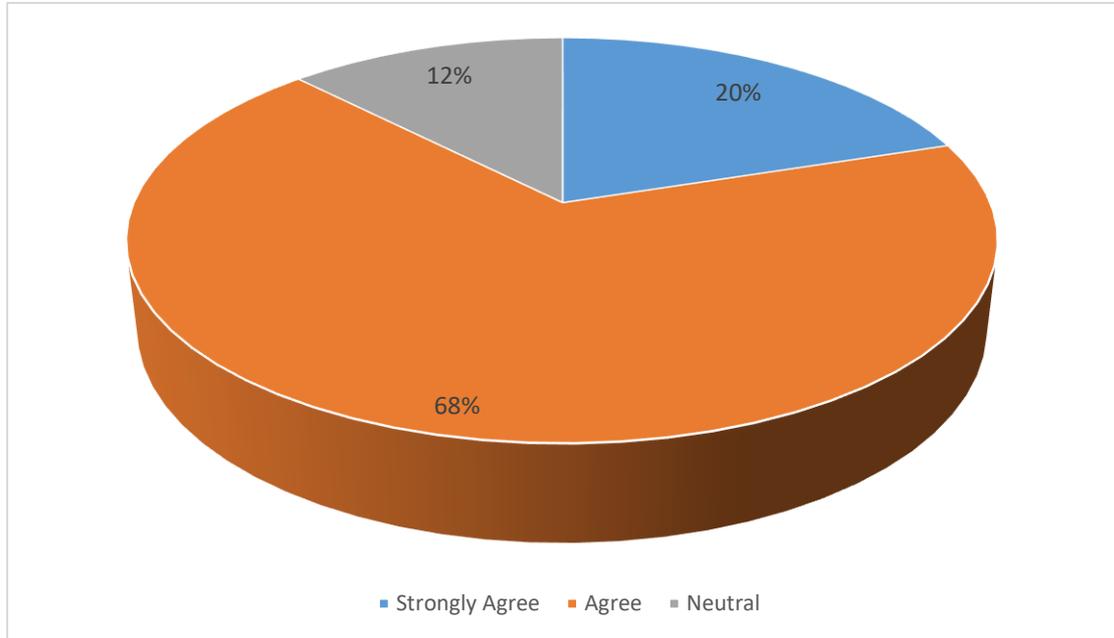
The second evaluation parameter includes variables that assess the relevance and quality of the ARIS curriculum and its learning materials. Information provided by testing participants in this area will allow the partnership to assess the content's quality, whether the ARIS online course has an impact on learners and if materials are close to target groups' expertise. Testing participants were asked to indicate their level of agreement with the following (relevance/quality-related) statements:

- The materials focus on skills, knowledge, and/or behaviours relevant to learners' expertise and profile
- The curriculum reflects and corresponds to the actual AI related skills and workplace requirements for ICT professionals
- The materials correspond and complement the topics addressed by the course
- The materials help learners comprehend the theoretical foundations of Artificial Intelligence
- The materials help learners comprehend the practical applications and the innovative possibilities that Artificial Intelligence offers.

What can be easily extracted from the evaluation results, is that almost nine out of ten participants have a positive impression on the course quality and the relevance of materials with actual learners' capacity building needs.

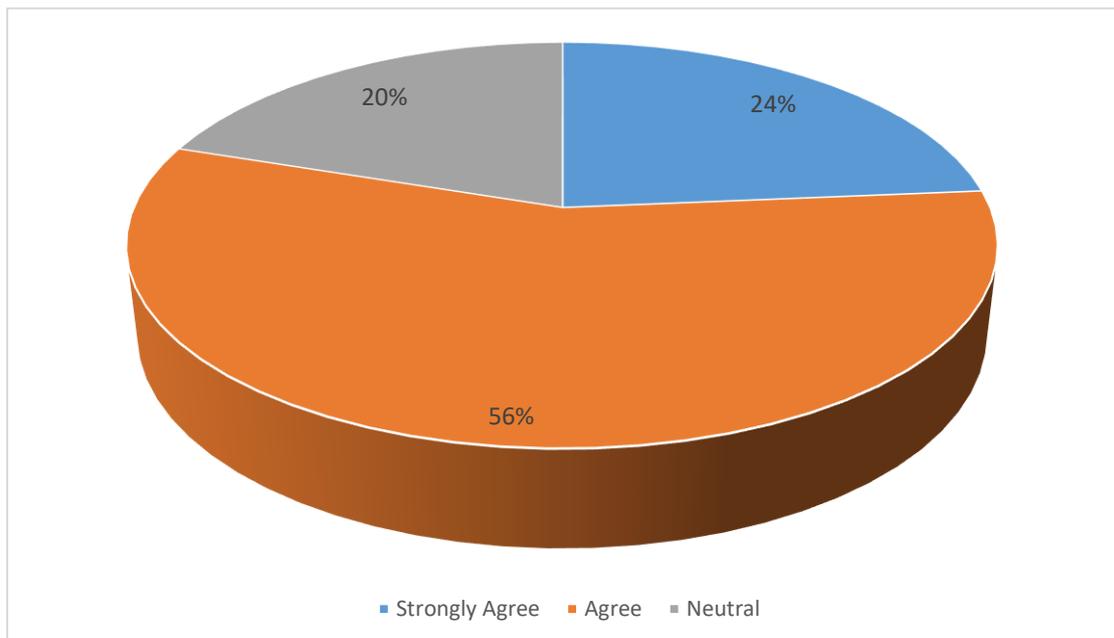
**Statement 9:**

**The materials focus on skills, knowledge, and/or behaviours relevant to learners' expertise and profile.**



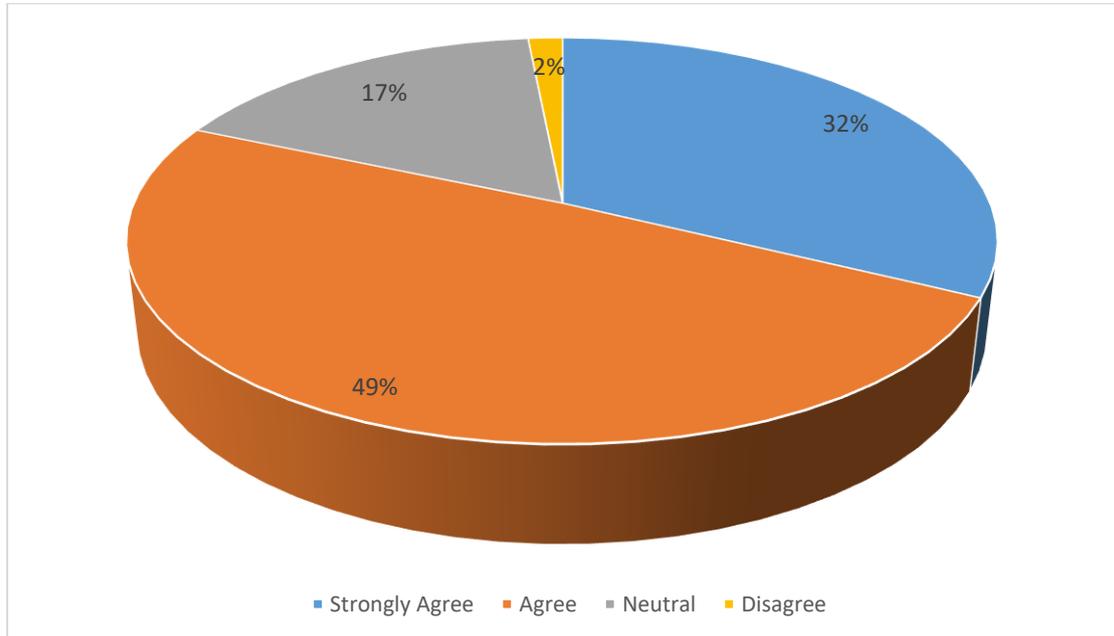
**Statement 10:**

**The curriculum reflects and corresponds to the actual AI related skills and workplace requirements for ICT professionals.**



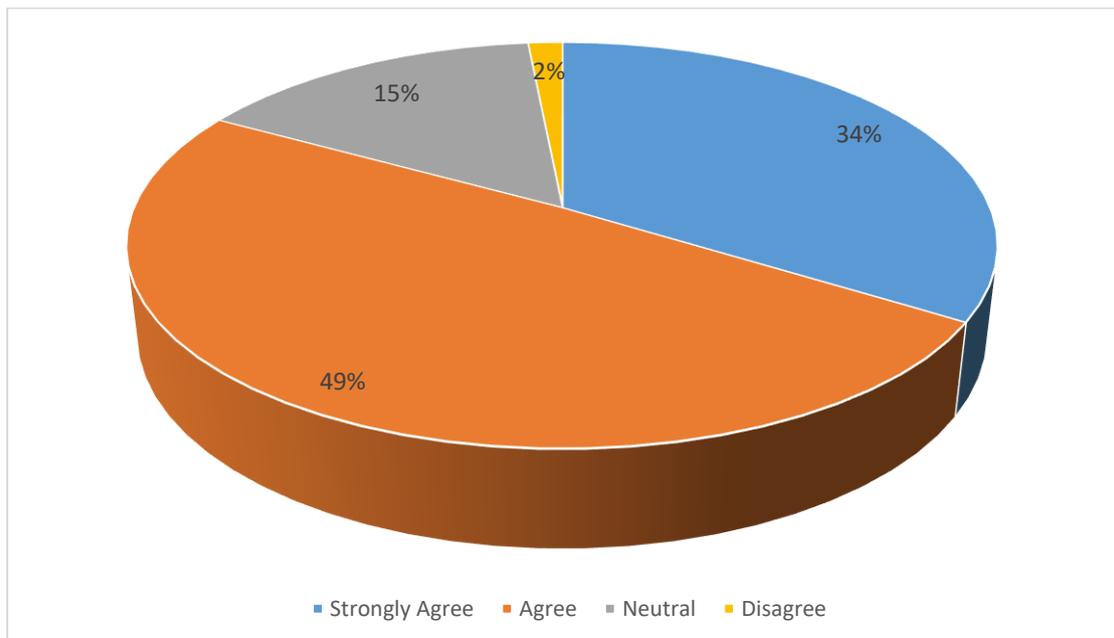
**Statement 11:**

**The materials correspond and complement the topics addressed by the course.**



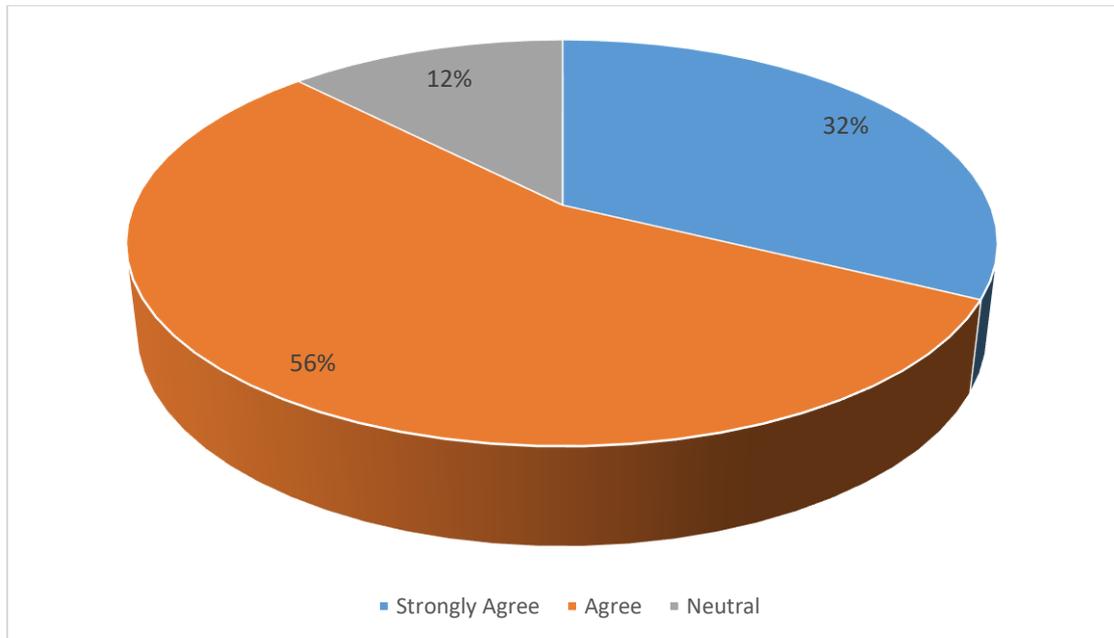
**Statement 12:**

**The materials help learners comprehend the theoretical foundations of Artificial Intelligence.**



**Statement 13:**

**The materials help learners comprehend the practical applications and the innovative possibilities that Artificial Intelligence offers.**



## 5.4 Evaluation Area C: Clarity

The third evaluation parameter includes variables that assess the clarity of the ARIS curriculum and learning materials. Information provided by testing participants in this area will allow the partnership to assess how user friendly and eye-pleasant features the course has, the connection between materials and learning objectives and the clarity of the course's concepts and objectives. Testing participants were asked to indicate their level of agreement with the following (clarity-related) statements:

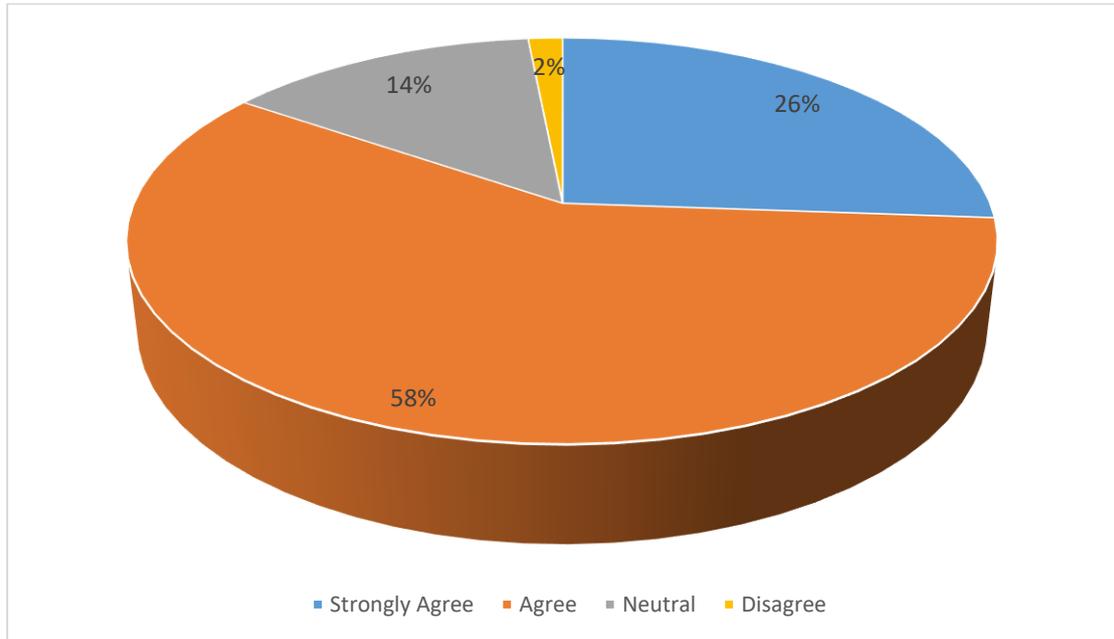
- The course objectives are clear
- The connection between learning objectives and materials is clear
- The materials include comprehensive examples and explanations
- The course delivers complex concepts in a clear and precise manner

What can be easily extracted from the evaluation results, is that 98% of participants agreed about the clear objectives of the course, as presented below in the form of graphs (clarity, examples, explanations etc.).



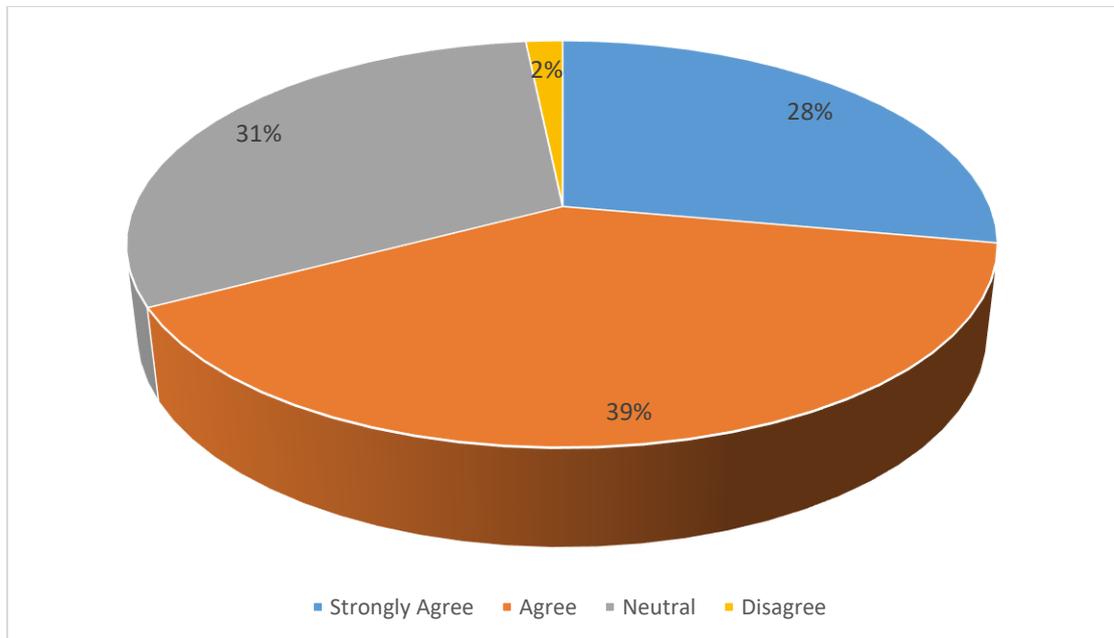
**Statement 14:**

**The course objectives are clear.**



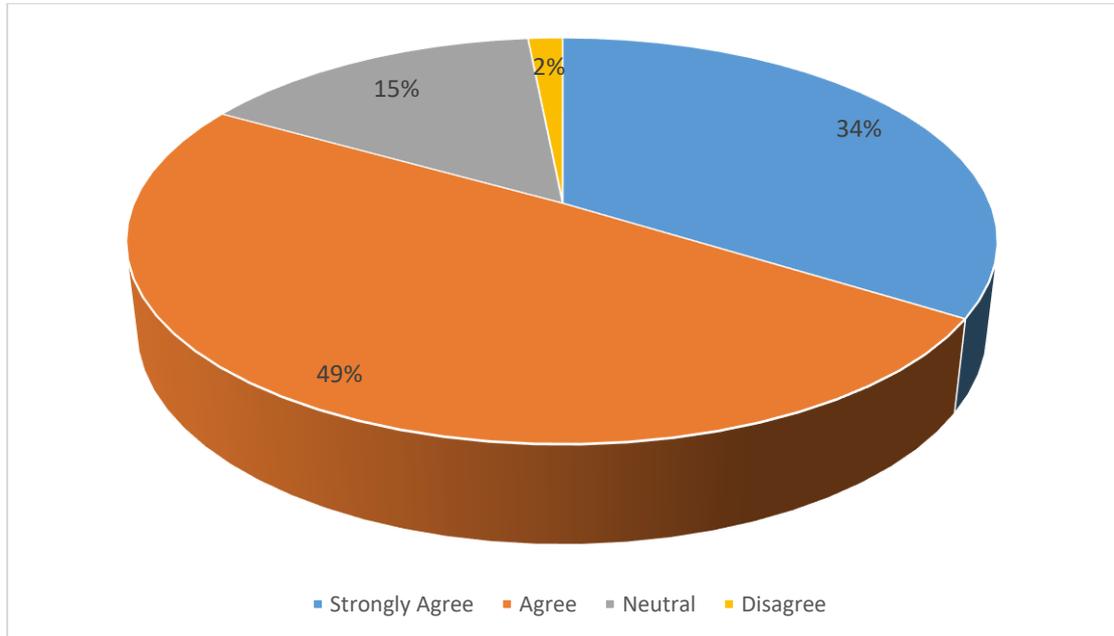
**Statement 15:**

**The connection between learning objectives and materials is clear.**



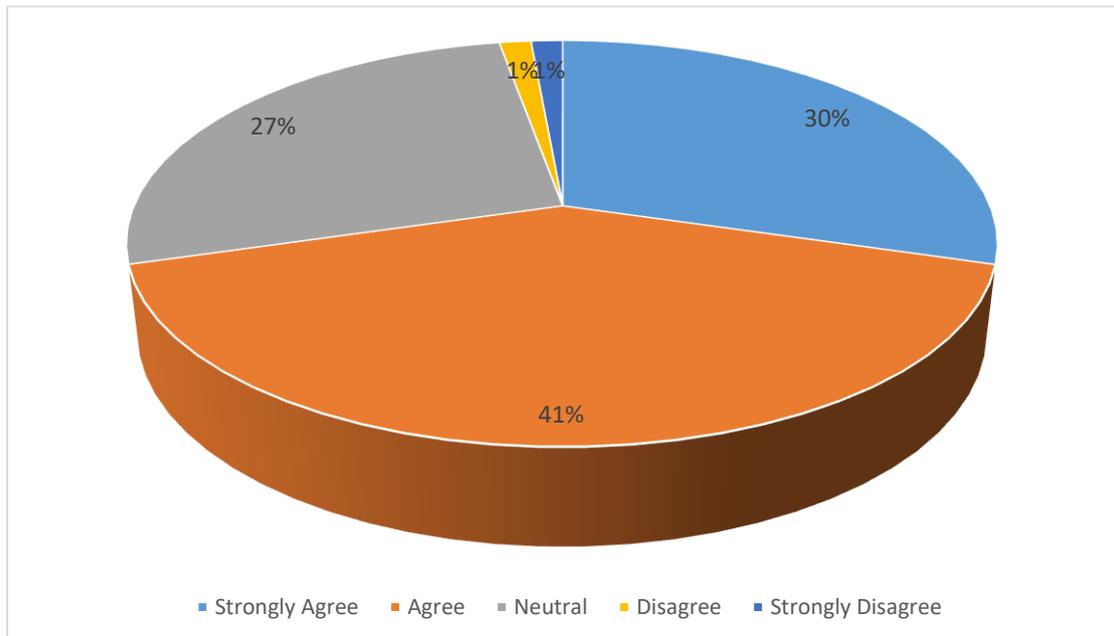
**Statement 16:**

**The materials include comprehensive examples and explanations**



**Statement 17:**

**The course delivers complex concepts in a clear and precise manner.**



## 5.5 Evaluation Area D: Added value

The fourth evaluation parameter includes variables that assess the added value of the ARIS course to learners' experience and knowledge building. Information provided by testing participants in this area will allow the partnership to assess the degree to which the defined learning objectives are achieved, and to which extent the project's learning approach – after the use of the ARIS VOOC - translates into new knowledge and skills acquisition for learners in the subject matter. Testing participants were asked to indicate their level of agreement with the following (added value-related) statements:

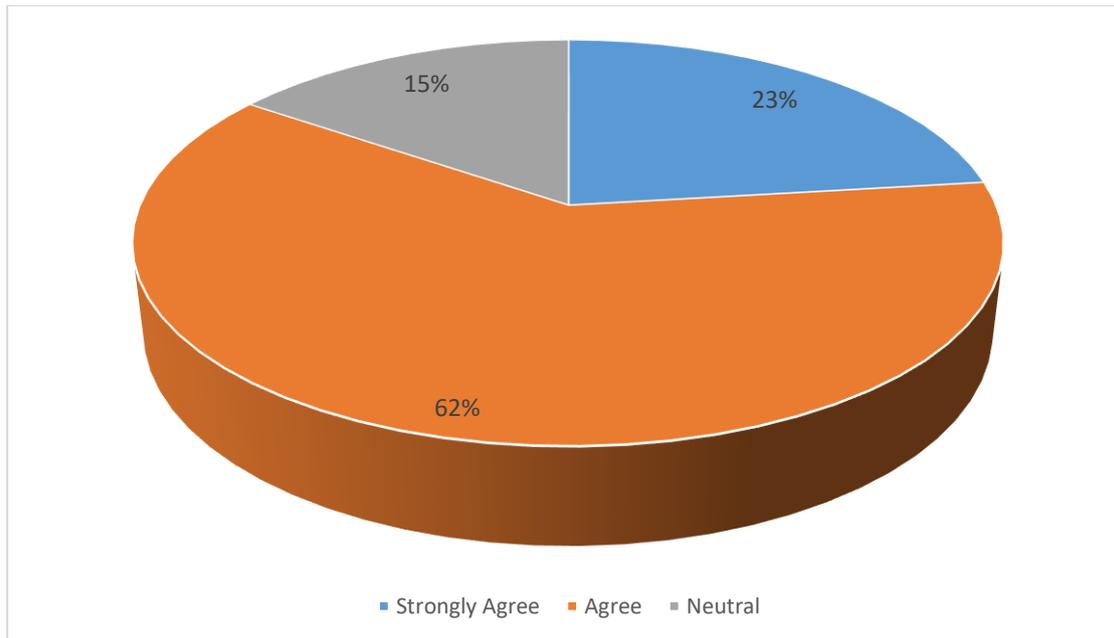
- The materials can increase learners' skills and interests in the subject matter.
- The materials introduce the learners to new knowledge.
- The course can motivate learners to pursue more advanced work on the subject in the future.
- The course enables learners to put theory into practice.
- The course can increase learners' employability.

The charts below testify that over 85% of the participants consider that the ARIS VOOC can significantly ameliorate learners' skills, knowledge and work.



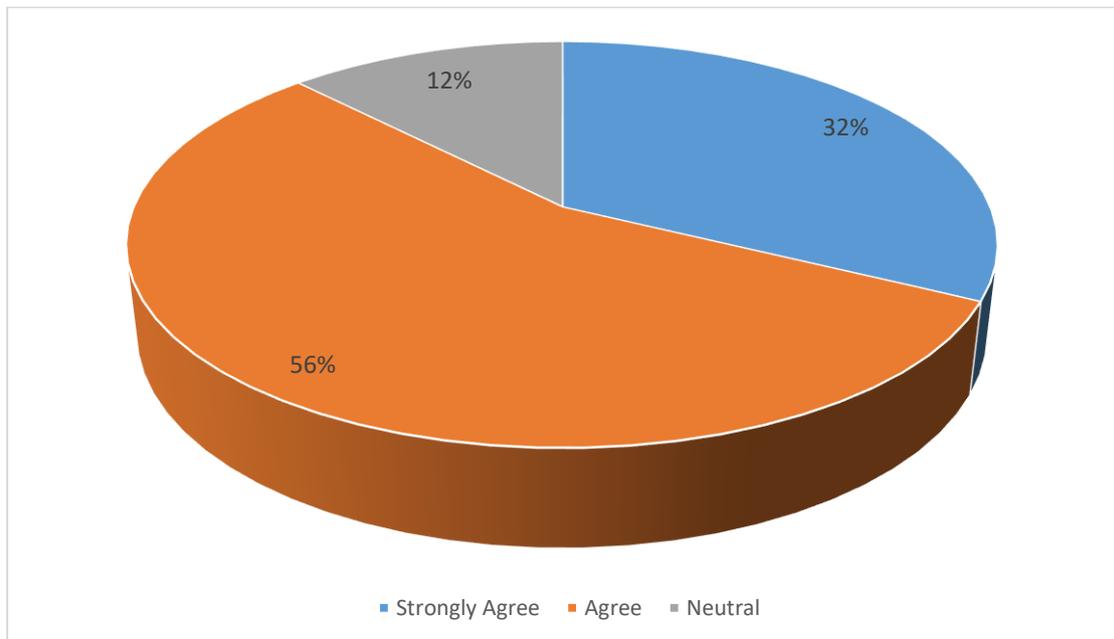
**Statement 18:**

**The materials can increase learners' skills and interests in the subject matter.**



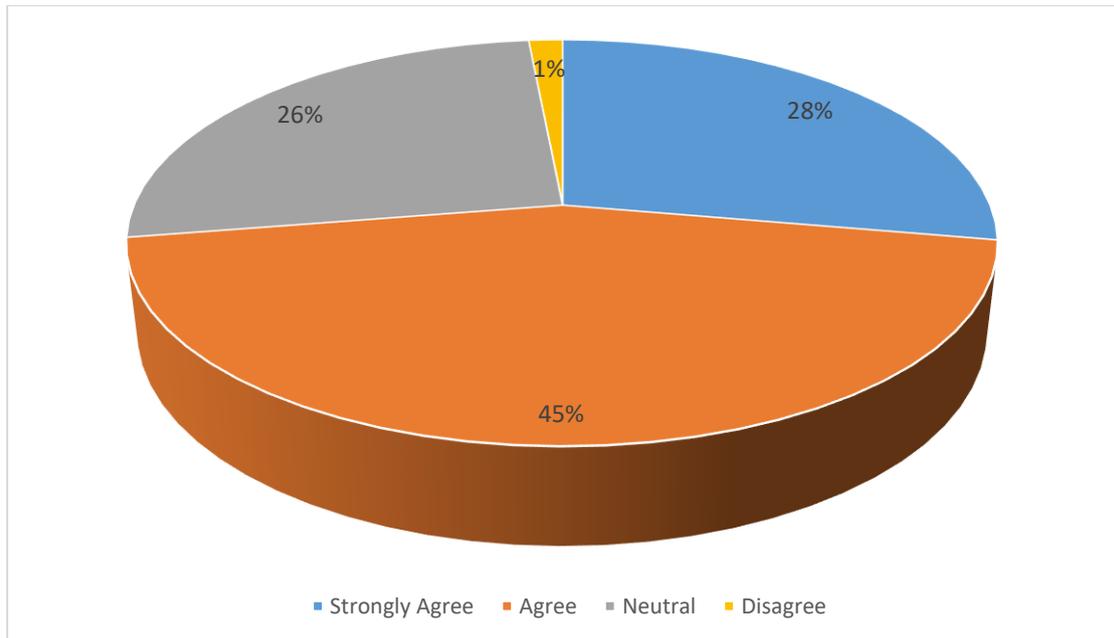
**Statement 19:**

**The materials introduce the learners to new knowledge.**



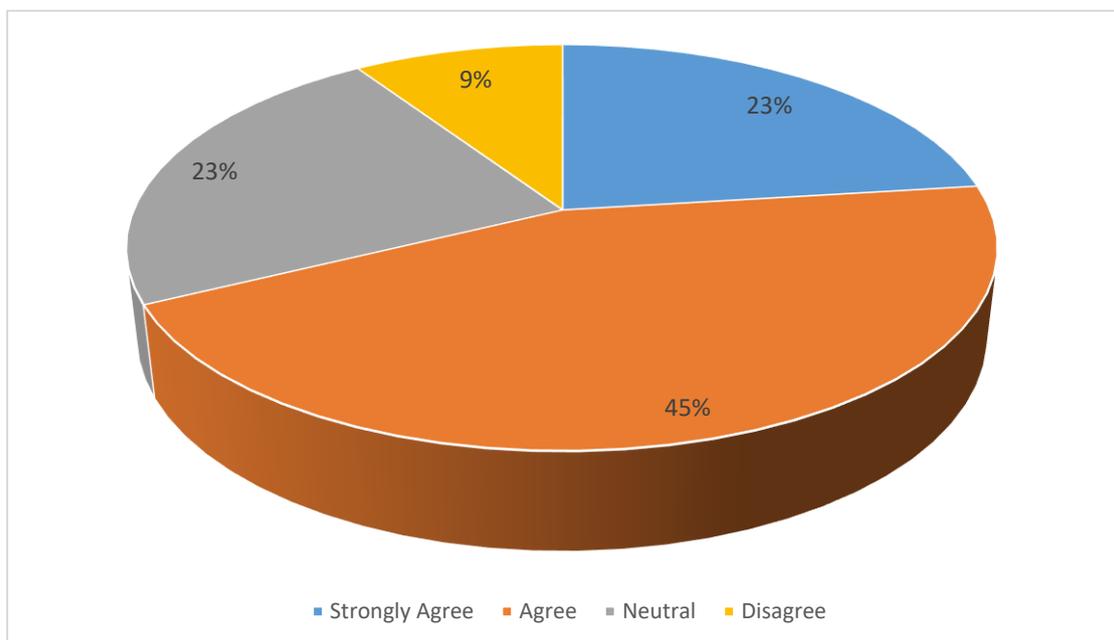
**Statement 20:**

The course can motivate learners to pursue more advanced work on the subject in the future.



**Statement 21:**

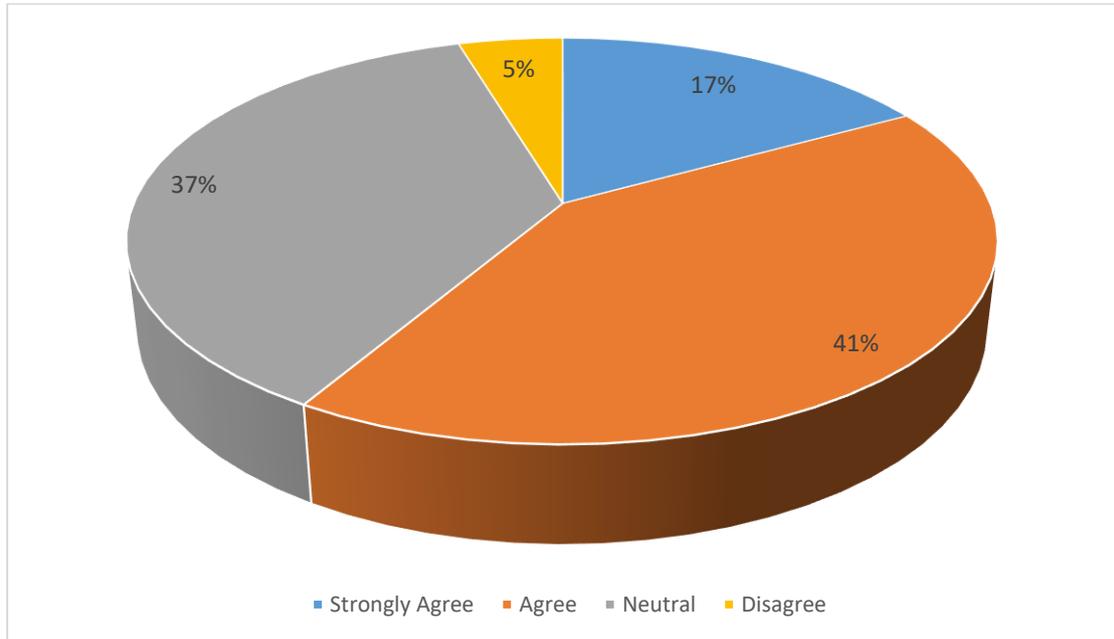
The course enables learners to put theory into practice.





**Statement 22:**

**The course can increase learners' employability.**



## 5.6 Evaluation Area E: Technical operation

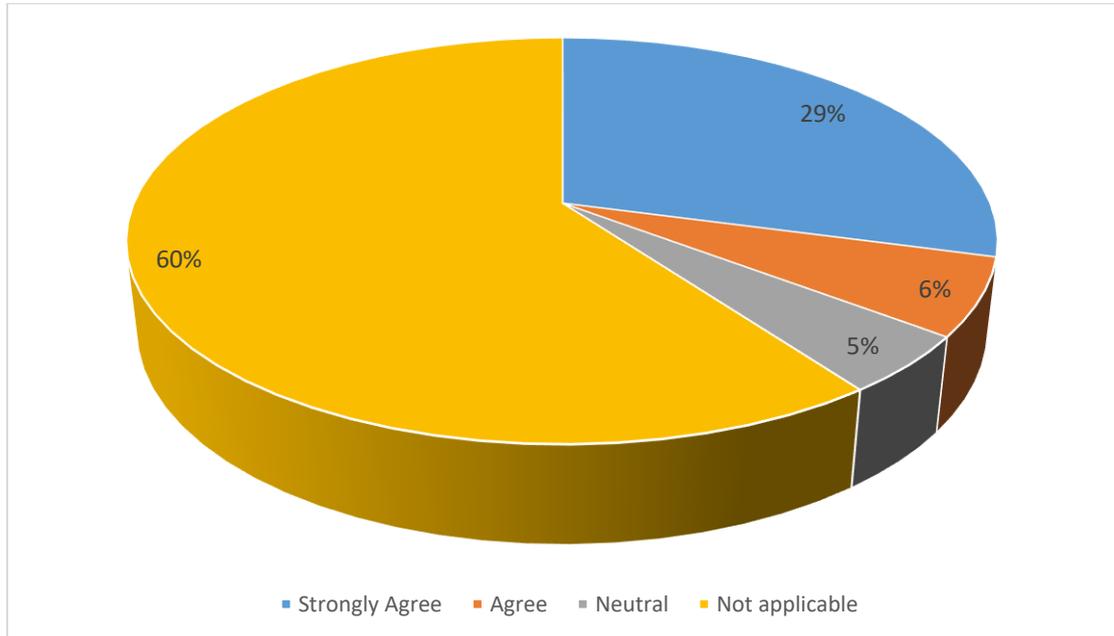
This section aims to rate how operational and easy to understand and use these features are. The fifth evaluation parameter includes variables that assess the technical aspects of the ARIS VOOC. Information provided by testing participants in this area will allow the partnership to assess whether the online course behaves according to the technical specifications without any substantial lag or technical errors. Pilot participants were asked to indicate their level of agreement with the following (technical-related) statements:

- Registering for the course was quick and easy
- Pages were loading fast External links were always working
- Embedded, external content (e.g. YouTube videos) was working flawlessly
- Access through mobile devices was easy and convenient

The results of the graphs below testify that the majority of the participants did not find any technical obstacles while registering and attending the ARIS VOOC.

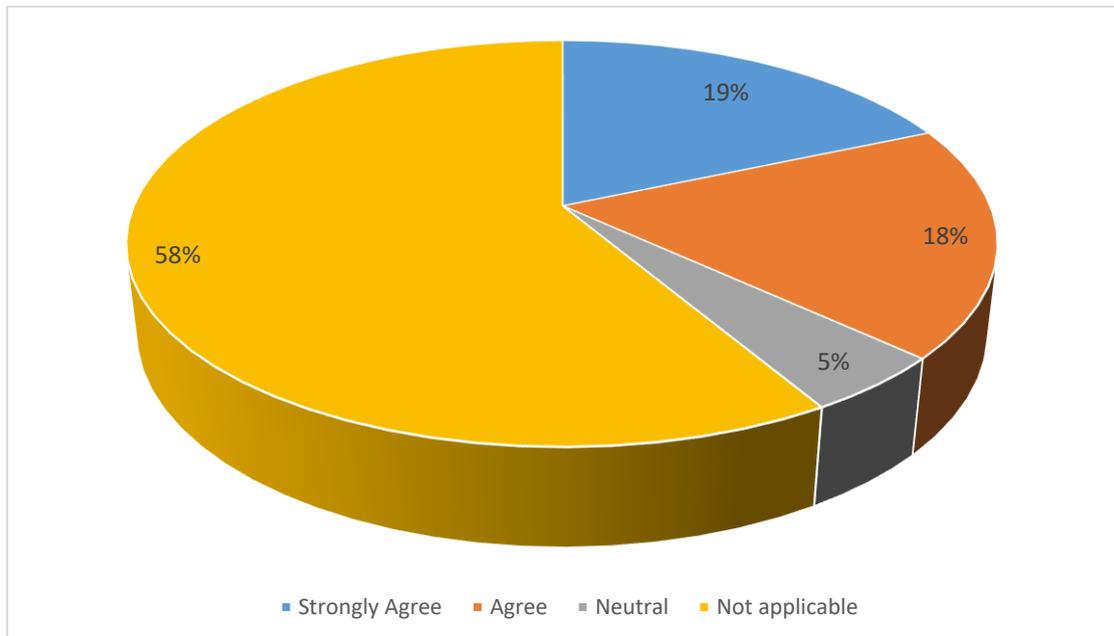
**Statement 23:**

**Registering for the course is quick and easy.**



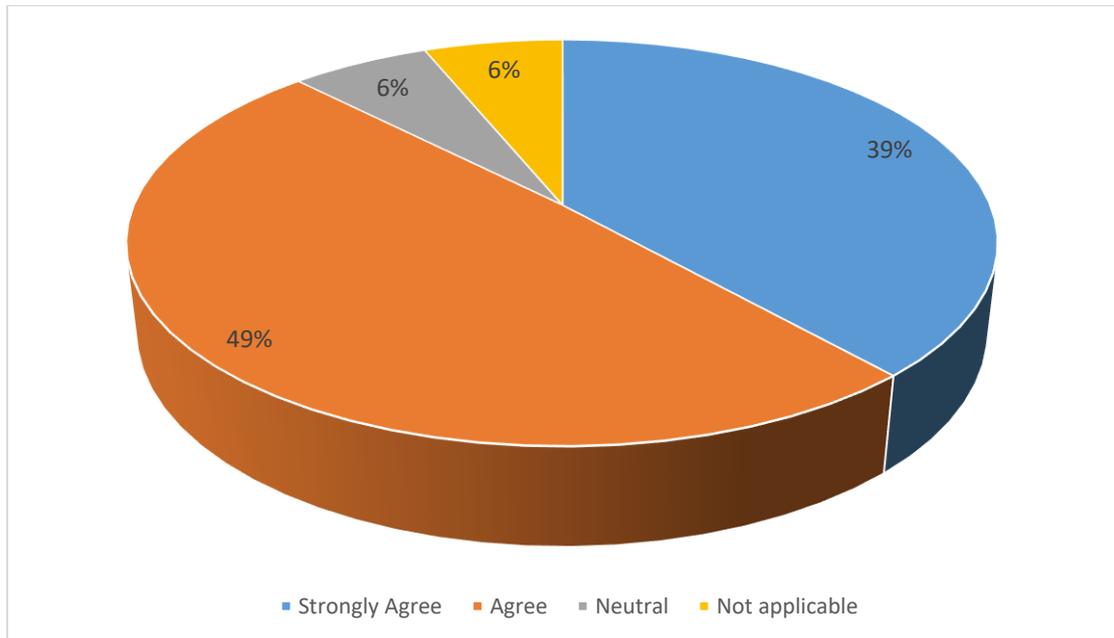
**Statement 24:**

**Pages are loading fast.**



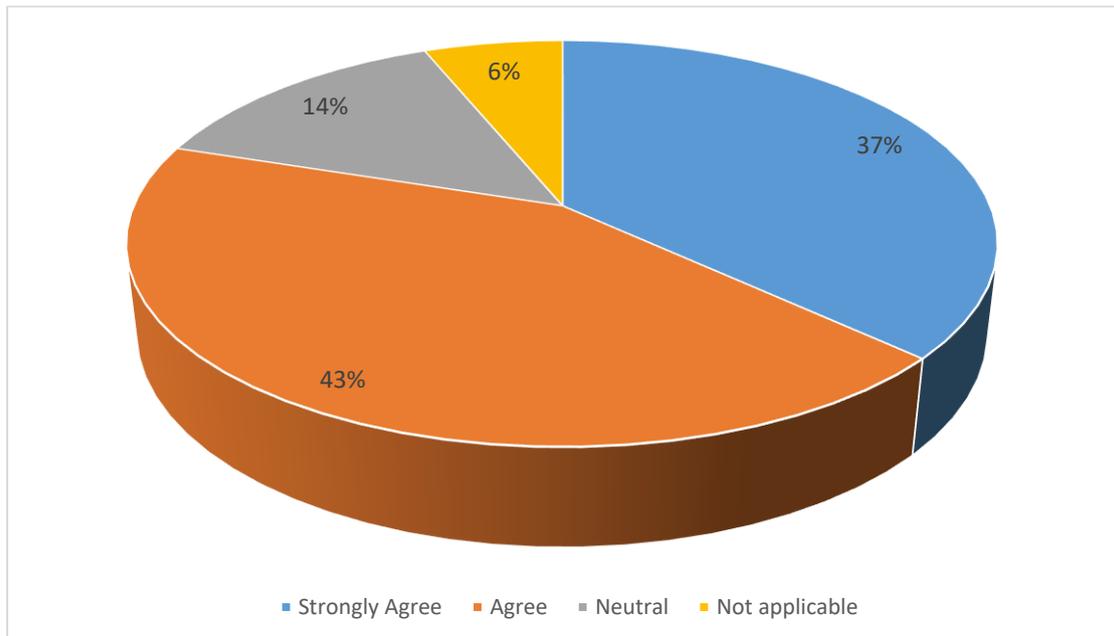
**Statement 25:**

**External links are always working.**



**Statement 26:**

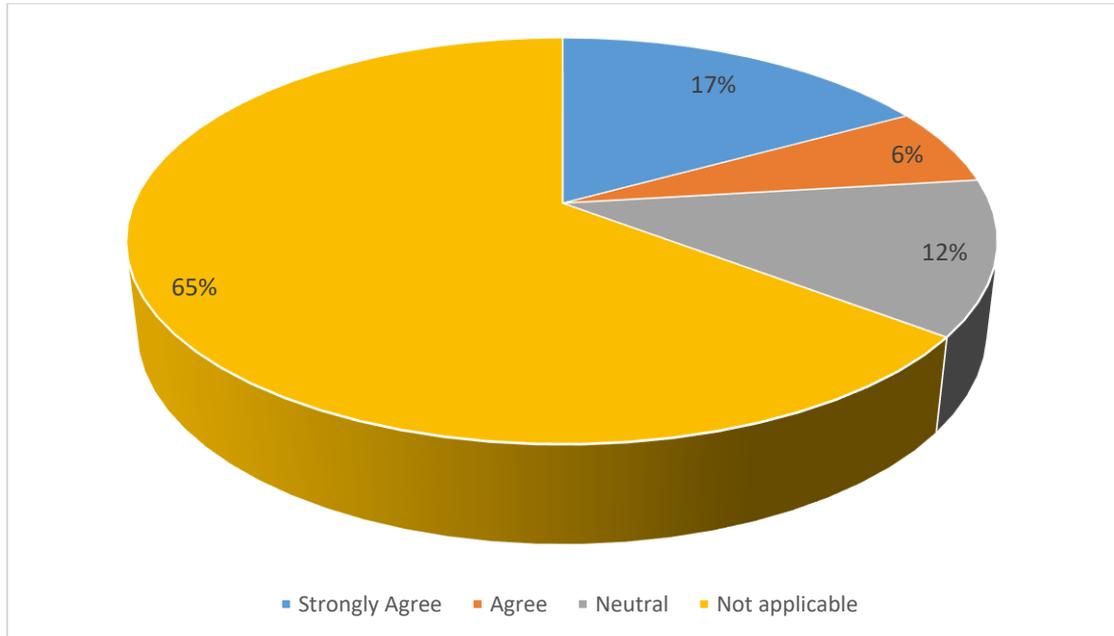
**Embedded, external content (e.g., YouTube videos) is working flawlessly.**





**Statement 27:**

**Access through mobile devices is easy and convenient.**



## 5.7 Evaluation Area F: Recommendations for improvements

Respondents were also asked about the aspects of the online course that could be potentially improved and were called upon to give specific examples. Approximately 15% of the respondents had at least one suggestion on how to increase the quality of the ARIS online course. Some of them stated the incorporation of more interactive content and videos, the decrease of textual description and the inclusion of more detailed instructions for coding exercises. It seems that almost all agree about the need for increased course facilitation, even though the course will be made available as a self-guided offering. This section presents in detail the comments and suggestions made by course participants

- *“Code examples in practical part have better presentation with eg. colored text (for function names and etc.) or a more contrasted with the text in the page“.*
- *“Reducing the time necessary to end one part (studying and test) because is more difficult to remain for so much time on the computer and sometimes it can be a negative experience when it is necessary to start it again.”*
- *“The Questionnaire submission button sometimes does not work or allows to submit an answer more than two times”.*
- *“It could be done more detailed homework assignments, instead of submitting a full paper, provide some intermediate and final results.*
- *“The wording of questions in questionnaires should be clearer. Also, I think that there might be a mistake in a questionnaire L2.4 (question 5, on Lasso regression) as well as in L2.3 (question 8)”.*

Notably, approximately 15% of the respondents were absolutely happy with the way ARIS VOOC is and would not change anything.

**Statement 28:**

**What aspects of the online course and learning materials shall be improved? Please give examples.**

This question aims to reveal reasoning behind the VOOC trial, therefore to assess the needs that the online course covers, as well as their expectations from taking the course. This question is deliberately used in the form of an open question, to provide the participants to use their words while giving feedback, to reveal the strength of their opinions, phrase their comments and feedback in a way that we cannot anticipate, and give accurate representations of personal views.

The majority of respondents participated in the VOOC course following the suggestion of a colleague or out of suggestion or curiosity. Most of them are ICT professionals or ICT students who wish to get employed in related jobs and sectors. Some of respondents stated they wanted to “Yes, I learned many things I was not aware of, even though I am an ICT professional!” or “Yes, it increased my knowledge on AI and it was easy to follow even if I’m not an ICT expert“. A smaller percentage of respondents have participated in the survey in order to try an online course and to have an instructor/professor to help and guide them saying “too complicated and mathematical, not enough examples”.

Regarding their expectations from the course, **all respondents declared satisfied** with the experience and found it interesting and useful, explaining how they are thinking of using the material in their own network.

The answers are recorded in the **annexed table 3** presenting data regarding the reasoning of participation per respondent and their expectations and **Statement 29** provides data regarding their expectations being met.



In the pilot-run the given replies are 47 Blanks and as follow:

1. Perhaps there could be more video material to explain the general operation of the theory - just a suggestion.
2. The Questionnaire submission button sometimes does not work or allows to submit an answer more than 2 times
3. Code examples in practical part have better presentation with (eg.) coloured text (for function names and etc.) or a more contrasted with the text in the page.
4. Reducing the time necessary to end one part (studying and test) because is more difficult to remain for so many time on the computer and sometime it can be a negative experience when it is necessary to start it again. (Example of different organization of learning material that are great are <a href="https://www.interaction-design.org/">https://www.interaction-design.org/</a> <a href="https://www.busuu.com/it/course/impara-inglese-online">https://www.busuu.com/it/course/impara-inglese-online</a> ). I think that should be increased also the quality of the web page interface.
5. The wording of questions in questionnaires should be clearer. Also, I think that there might be a mistake in a questionnaire L2.4 (question 5, on Lasso regression) as well as in L2.3 (question 8).
6. everything for me was fine
7. Can't tell much, as I have completed only a few of questionnaires :)
8. It could be done more detailed homework assignments, instead of submitting a full paper, provide some intermediate and final results
9. Final assessment.
10. less mathematics
11. More videos
12. Syllabus
13. more case studies
14. more videos
15. Add more application examples
16. Providing more detailed instructions for performing practical exercises.
17. None, everything was perfect
18. I think that would be better if there was the solutions for the exercises proposed

**Statement 29:**

**Did the course meet your expectations? Please explain your answer.**

In the pilot-run the given replies are 33 Yes and as follow:

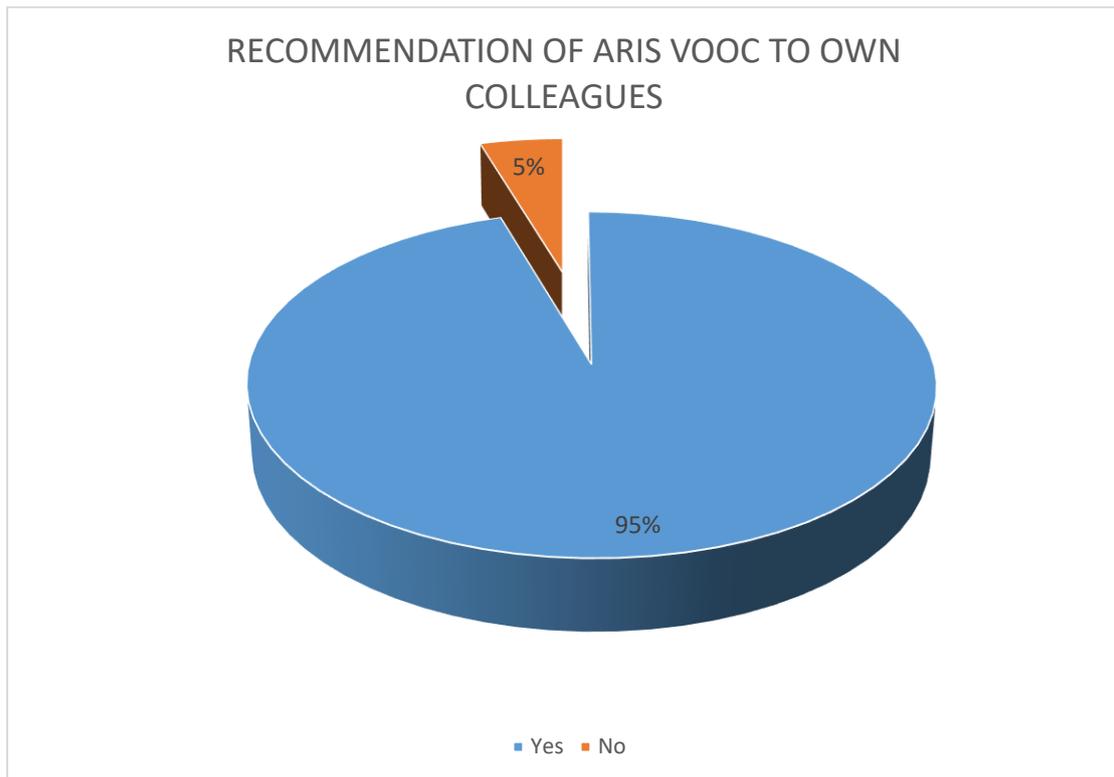
1. Yes, the courses are really helpful. You can easily choose a topic of interest. Concepts and explanations are clearly described before the practical tasks are presented.
2. Yes. Easy and clear navigation, great structure of the whole page
3. Yes, as a person working with ML day to day the material was easy to understand, and structured in an intuitive way. It was easy to refresh the knowledge of ML and learn new thing at the same time.
4. It did meet the expectations. I feel like I learned new things, especially in the area of dimensionality reduction and data visualization.
5. came just for one chapter, but read more than one
6. The material is nicely presented
7. Yes. I increase my theoretical and practical knowledge.
8. Could have had some examples.
9. I don't know
10. Yes. I'll try to complete the course
11. difficult to say
12. Good intro but complicated
13. yes but not enough time
14. I'm not interested in IA
15. yes, very good presentation and quality of VOOC
16. I have not chosen the course
17. This was my first VOOC, very good
18. I had no expectation but course interesting
19. theory very complicated
20. impossible for me to follow the course without a teacher
21. it was short and impossible for me to follow it without teacher
22. too complicated and mathematical, not enough examples
23. yes good introduction by the teacher
24. first time I follow a Ai training
25. first time I follow a VOOC interesting
26. yes but AI is complicated
27. Yes, it increased my knowledge on AI and it was easy to follow even if I'm not an ICT expert
28. Yes, I learned many things I was not aware of, even though I am an ICT professional!
29. Yes, it was interesting but a bit long I must admit
30. Yes it was organized with lots of examples, exercises and easy to understand the content even if you are beginner
31. Probably to give in more detailed arguments it will give more detailed information that I haven't met. The part the I have studied is more general so to give an overall idea it is perfect
32. Yes it is very well structured and the content is well organized

## 5.8 Evaluation Area G: Recommendation of the course

The respondents were asked whether they would recommend the online course to their colleagues and friends. Unanimously, all respondents (95%) declared that they would recommend the course to their colleagues and friends.

### **Statement 30:**

**Would you recommend the ARIS online course to your colleagues and friends?**





## 6 FEEDBACK FROM THE EUROPEAN DIGITAL SME ALLIANCE

During the pilot delivery of the course, an AI researcher from the European Digital SME Alliance reviewed the ARIS curriculum and all the available materials and provided its feedback, validating the high quality, comprehensiveness and added value of the project's training offering.

*"This is a complete curriculum which covers the key aspects of the most used AI technologies currently. The curriculum contains a lot of examples, especially in the application of these technologies (concrete use cases, business applications), and a concrete approach with exercises that allow students to go into detail and apply certain techniques if they wish. People undertaking the class should be aware that it is quite an advanced curriculum. It goes really into details (for example in building a ML model), hence students would need to have good basics in maths and sometimes programming so as to be able to take this course. From a content perspective, we could support and recommend this course for advanced professionals who really want to go into detail in the technology."*

## 7 KEY FINDINGS AND FINETUNING

The main objective of the pilot was to a) test the whole set of MOOC's technical aspects against specific criteria of usability and user experience, and b) assess the educational value of the ARIS curriculum and the educational resources. The rationale behind this process was to validate the technical operation and added value of the curriculum, and proceed to fine-tuning before its final release to the general public. Additionally, the pilot run survey asked the participants to make suggestions on how to further improve the course.

The key findings and suggestions made by participants could be summarized as follows:

- Improving the presentation of code examples
- Enhancing VOOC with more audiovisual content
- Incorporating more theoretical video material and provision of detailed instructions for practical exercises
- Reducing the time necessary to end the first learning unit
- Clearer wording of questions in MCQs.
- Correcting the mistakes in questionnaire L2.4 (question 5, on Lasso regression) and in L2.3 (question 8)
- Inclusion of more case studies

The pilot's findings, as shown in more detail in Section 5, confirmed the usability of the online course, verifying that both ICT professionals and potential ones can be enrolled on the course and acquire a complete set of knowledge and skills by following the sequence of the course. Overall, very positive feedback was received from respondents. It was observed that both the technical aspects of the course were easy and fun to use, while the users felt comfortable enough to make a few suggestions on how to improve the visual and contextual aspects of the course. This was particularly useful, allowing for some relevant observations and considerations to be made. It is also, of great importance to state that all participants declared themselves willing to suggest this course to their contacts. Based on the expectations outlined in the ARIS Application Form, the ARIS VOOC will reach its final stage, when the suggestions and recommendations received during the pilot run, will be adapted to the final English version of the course.

## 8 ANNEXES

### 8.1 Tables

*Table 1: Target groups of the survey*

A.	Target groups	No. of respondents	Percentage
a	Professors/trainers	2	3,08%
b	ICT professional	3	4,62%
c	Student in VET institution	40	61,5%
d	Higher educational students	12	18,46%
e	Tech enthusiast	5	7,69%
f	Other (please specify)	(3)	4,62%
	Business Development director	1	
	Project manager	1	
	neuroscientist and research assistant	1	
1	Not completed (% in total)	65	37,79%
2	Total number of registered participants	172	100%

*Table 2: Previous participation in an Open Online Course*

B.	In how many Open Online Courses have you participated?	No. of respondents	Percentage
a	This is the first time I attend/take an Open Online Course	20	31,25%
b	1–3 times	24	37,50%
c	3-6 times	9	14,06%
d	More than 6 times	11	17,19%
e	Blank	1	-

*Table 3: Recommendation*

C.	Would you recommend the ARIS online course to your colleagues and friends?	No. of respondents	Percentage
	Answer	65	100%
a	Yes	62	95,0%
b	No	3	5,0%

## 8.2 Evaluation Form

Congratulations, you have successfully completed a significant part of the [ARIS Vocational Open Online Course!](#)

The ARIS online course, hosted on OpenLearning platform, acts as a wide access delivery method for the ARIS curriculum. It is offered as a self-guided modular course for ICT professionals, students in ICT programmes, and tech enthusiasts, who desire to understand better the theoretical concepts and practical applications of Artificial Intelligence (AI) and develop relevant skills.

This evaluation form is addressed to the participants of the pilot delivery of the ARIS online course, held between 4 October and 12 November 2021, and aims to gather feedback from actual users on the educational value of the developed curriculum and materials, and guidance on how to further improve the online course before its final release.

The form is divided into clear subsections. It will not take more than 10-15 minutes to complete the questionnaire. Your input and data will be treated and remain strictly confidential and will be only used for internal research purposes.

Thank you very much in advance for your participation and valuable contribution!

Should you have any questions, please contact the ARIS partnership at: [solomos@exelia.gr](mailto:solomos@exelia.gr)

THE ARIS PARTNERSHIP

[www.aris-project.eu/](http://www.aris-project.eu/)



## A. PARTICIPANT PROFILE

### 1. Name

### 2. Country

### 3. Organisation / Affiliation

### 4. Email (optional)

### 5. Which of the following best describes you? (Choose the most relevant)

- ICT professional
- Student in a Higher Education (HE) institution
- Student in a Vocational Education and Training (VET) institution
- Professor / Trainer
- Tech enthusiast
- Other

### 6. In how many Online Courses had you participated before the ARIS VOOC?

- This is the first time I attend/take an Online Course

- 1-3
- 4-6
- More than 6

**7. What is your (perceived) completion rate of the ARIS VOOC?**

- < 15%
- 15% - 30%
- 30% - 50%
- 50% - 70%
- 70% - 90%
- 90% - 100%



## B. STRUCTURE

	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>	<b>Not applicable</b>
8. The course is well-organized and flows in a logical progression.	<input type="radio"/>	<input type="radio"/>				
9. The learner is able to easily choose the parts of the course wishing to attend.	<input type="radio"/>	<input type="radio"/>				
10. The course features a wide variety of educational resources (materials) to support the learning process.	<input type="radio"/>	<input type="radio"/>				
11. The course provides a balanced approach between theory and practice.	<input type="radio"/>	<input type="radio"/>				
12. The content is presented in appropriate language.	<input type="radio"/>	<input type="radio"/>				
13. The content is enriched with visual and auditory elements, which are well-integrated with other course materials.	<input type="radio"/>	<input type="radio"/>				



	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
14. It is easy for the learner to follow the course at his/her own pace and time.	<input type="radio"/>					

## C. RELEVANCE AND QUALITY

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
15. The materials focus on skills, knowledge, and/or behaviours relevant to learners' expertise and profile.	<input type="radio"/>					
16. The curriculum reflects and corresponds to the actual AI related skills and workplace requirements for ICT professionals.	<input type="radio"/>					
17. The materials correspond and complement the topics addressed by the course.	<input type="radio"/>					
18. The materials help learners comprehend the theoretical foundations of Artificial Intelligence.	<input type="radio"/>					



	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
19. The materials help learners comprehend the practical applications and the innovative possibilities that Artificial Intelligence offers.	<input type="radio"/>					

## D. CLARITY

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
20. The course objectives are clear.	<input type="radio"/>					
21. The connection between learning objectives and materials is clear.	<input type="radio"/>					
22. The materials include comprehensive examples and explanations.	<input type="radio"/>					
23. The course delivers complex concepts in a clear and precise manner.	<input type="radio"/>					



## E. ADDED VALUE

	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>	<b>Not applicable</b>
24. The materials can increase learners' skills and interests in the subject matter.	<input type="radio"/>	<input type="radio"/>				
25. The materials introduce the learners to new knowledge.	<input type="radio"/>	<input type="radio"/>				
26. The course can motivate learners to pursue more advanced work on the subject in the future.	<input type="radio"/>	<input type="radio"/>				
27. The course enables learners to put theory into practice.	<input type="radio"/>	<input type="radio"/>				
28. The course can increase learners' employability.	<input type="radio"/>	<input type="radio"/>				



## F. TECHNICAL OPERATION

	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly disagree</b>	<b>Not applicable</b>
29. Registering for the course is quick and easy.	<input type="radio"/>	<input type="radio"/>				
30. Pages are loading fast.	<input type="radio"/>	<input type="radio"/>				
31. External links are always working.	<input type="radio"/>	<input type="radio"/>				
32. Embedded, external content (e.g., YouTube videos) is working flawlessly.	<input type="radio"/>	<input type="radio"/>				
33. Access through mobile devices is easy and convenient.	<input type="radio"/>	<input type="radio"/>				

## G. COMMENTS AND SUGGESTED IMPROVEMENTS

**34. What aspects of the online course and learning materials shall be improved? Please give examples.**

**35. Did the course meet your expectations? Please explain your answer.**

**36. Would you recommend the ARIS online course to your colleagues and friends?**

- Yes
- No

Thank you for your participation!