ICT-INOV
MODERNIZING ICT EDUCATION FOR HARVESTING INNOVATION

D6.4

External Evaluation Final Report

618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

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Index

618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

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1. Introduction

The External Evaluation Final Report is drafted by Associazione ValIda, the entity responsible for the external evaluation of the ICT-INOV project.

The external evaluator's task is to support the project activities and provide opportunities for improvement of both project processes and the results generated.

This report reflects the outcomes of the external evaluation and is part of the Quality Plan (WP6) of ICT-INOV.

It is intended to provide a summary of the project's work with a view to future reflection and exploitation.

The objective of the external evaluation is to provide the coordinator and the partnership with analytical information about the project implementation by assessing project's relevance, impact, effectiveness, efficiency, sustainability, project management and partners' cooperation.

In addition, the project and its results and outcomes are being evaluated against the original work plan and the project's objectives.

This report addresses the key strengths of the project, but, at the same time, provides recommendations about weaknesses for further development and sustainability based on the general outcomes of the evaluation.

The activities related to drafting this report were conducted in November and December 2023, according to the Evaluation Plan provided by the project Coordinator.

Given that internal quality-related processes were involved in the project's management, the external evaluator's role in ICT-INOV was largely to complement this work, working in

618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

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collaboration, without prejudice to the need of providing an independent perspective on the work being carried out.

2. Project summary

ICT-INOV is funded by the Capacity Building in Higher Education Erasmus+ program and is implemented in Greece, Malaysia, Vietnam, Pakistan, Nepal, Portugal, Italy, and Estonia.

It aims to enrich ICT higher education in Asia, specifically Malaysia, Vietnam, Nepal, and Pakistan, to promote innovation. Implementation in South Asia is important due to the region's high growth. While educational objectives in these partner countries may differ, they all converge on the need to enrich higher education as a vehicle of innovation and growth.

ICT-INOV aims at introducing a technology-enhanced, design-thinking learning intervention for contributing to the development of an ICT workforce highly capable of innovation.

The project mainly targets educators, students and higher education institutions. Educators and students benefit from the added value of ICT-INOV methodologies and digital tools for building skills for employment. Higher education institutions also benefit from the holistic strategic approach towards promoting innovation in ICT education in a specific unit at partner universities.

3. Evaluation Plan

This evaluation is intended to provide useful information on the project's progress and achievements, revealing the most important characteristics of the project results and suggesting possible further development of the methodology and outputs in light of future exploitation on a larger scale and for the benefit of a wider audience of students and educators.

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According to the Quality Assurance Plan, this Final Report is focused on the assessment of the:

1. Effectiveness and impact of the project's tools and methodologies
2. Effectiveness of Project Results and Output, specifically investigating the quality and the future sustainability of the products.

4. Data gathering and analysis

The evaluator was admitted to the online project documentation found on the project website: http://ictinov-project.eu/, including the private area.

The Quality Assurance Plan and the results of the evaluation questionnaires issued by the partner responsible for the internal evaluation provided a good baseline for project activities, partnership, general progress and communication.

However, the external evaluator gathered further information through online surveys.

The surveys have been sent to the members of the Coordination Team. The feedback collected was compared to the project objectives and aims.

Finally, the recommendations were made based on the survey results and comparisons.

5. Evaluation Methodology

The surveys (Annex 1 and 2) issued to the partners aimed at collecting feedback on the following:

⇒ project learning methodology
⇒ project outputs

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The survey was anonymous to comply with the survey's confidentiality and the need to obtain sincere opinions.

The questions related to the evaluation of the Learning Methodology were designed with a mix of open questions and a ten-level linear scale, where the scale from 1 to 10 is meant to rate several statements on the learning/teaching methodology applied to different outputs and in general:

1. Learning Approach Effectiveness;
2. Retention and Long-Term Engagement;
3. Effectiveness to address educational needs;
4. Effectiveness to prepare Technological Changes and contribute to the enhancement of Human Capital and Community Growth
5. Quality of Learning and Teaching and Innovation in Educational Practice.

The questions related to the project outputs were designed with a five-level linear scale with the possibility of including comments and multiple choice. The survey was addressed to the following main aspects:

1. Overall Quality and Effectiveness
2. Overall Sustainability
3. Effectiveness, Acceptance, Usability and accessibility, deployment potential for future sustainability related to each output.

The table below shows the relevant criteria for the validation:

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Table - 1 – Validation criteria

Key external evaluation criteria	Focus of the Evaluation
Relevance	The consistency and validity of the project results against the initially proposed objectives
Effectiveness	The capability of methodologies/tools of producing a desired result or the ability to produce the desired output.
Efficiency	Measuring the resource used both from economic and time perspectives in the project activities to achieve the project results.
Impact	Examination of the changes produced by the project results. The changes could be positive or negative, direct or indirect, intended or unintended.
Sustainability	Whether or not project results can be adopted and implemented beyond the completion of the project – short/medium/long-term sustainability
Diversity	Involvement of different stakeholders from those originally foreseen

618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

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6. Findings and analysis – Project Learning Methodology

The questionnaire (Annex 1) consists of 15 questions in total, including both free text answers and ten-level linear scale questions.

The aim of the questionnaire was to gather the perceptions and experiences regarding the various components of the project ICT-INOV and especially about the Learning Methodology adopted and deployed during the implementation.

- The effectiveness and impact of the project's tools and methodologies.
- How well the project's activities align with the goals of enhancing economic growth, job development, and addressing educational needs in the ICT sector.
- The contribution of the project to preparing students and educators for the rapidly changing landscape of ICT.
- The overall improvement in learning, teaching, and innovation within the ICT education framework across our partner countries.

The questionnaire has been submitted to project partners and 24 answers have been provided by Managers and Researchers from each partner. All the participant countries are represented in the answers.

The analysis of the answers is reported in the following paragraphs.

6.1 Gamified Design Thinking Learning Approach Effectiveness

Th effectiveness of the gamified design thinking learning approach in enhancing the ability to apply design thinking principles in ICT obtained the highest rate for the 54% of the respondents, while the remaining respondents expressed a rate from 5 to 9 on the scale of effectiveness. None expressed a rate under 5. The graph shows, therefore an overall satisfaction of respondents on the gamified design thinking learning approach.

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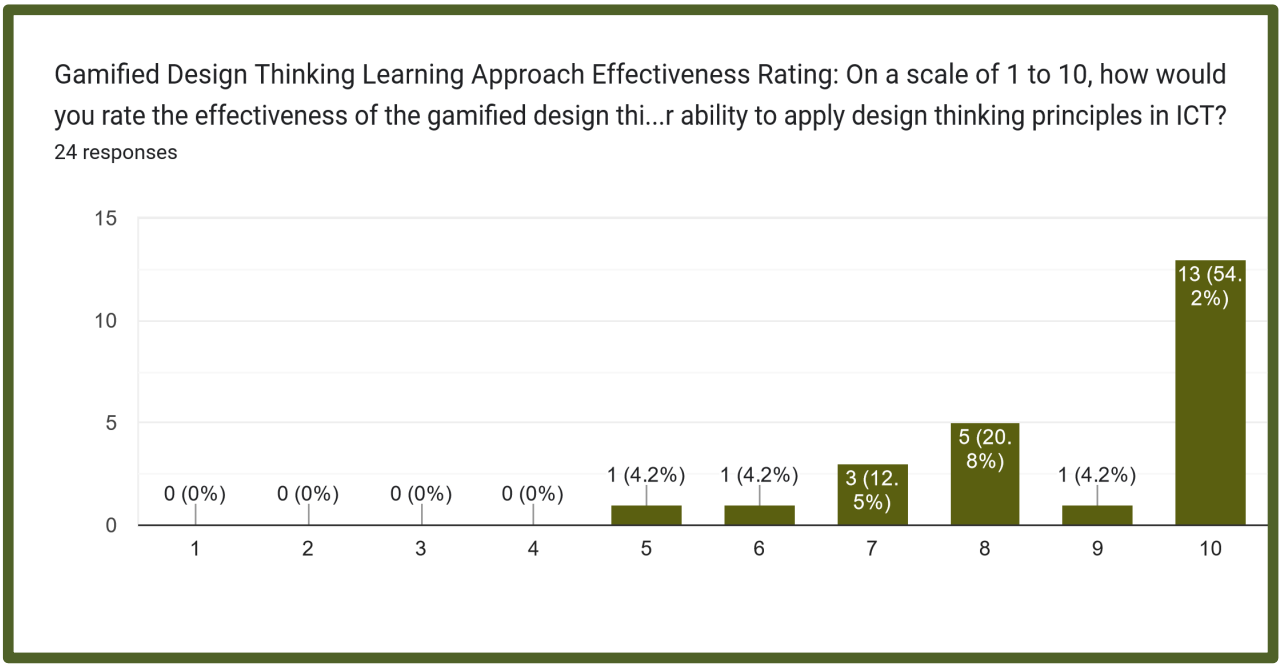

Impact on Innovation

> *The Question:*
>
> *Gamified Design Thinking Learning Approach Impact on Innovation: In what ways has the gamified learning approach impacted your or the beneficiaries' innovation thinking skills?*

The question was addressed to understand in which way the skills of thinking innovation were improved by the methodology implemented, namely the Gamified Design Thinking Learning Approach, and the respondents underlined the aspect related to the improvement of the collaborative approach and the creation of "a playful and interactive environment"

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beneficial for creativity, imagination and engagement. In general, the Gamified Design Thinking Learning Approach impacted the design process, encouraging learners to take risks, experiment, and collaborate, providing a safe space for creative thinking and an iterative problem-solving mindset.

Respondents also underlined that students were supported and encouraged in thinking differently and "beyond the usual scope of a subject/course". In general, the engagement of students and the quality of teamwork have been recognised as improved, and the level of engagement and motivation of the students was higher.

Some respondents also expressed his/her satisfaction with the use of the methodology in course design; therefore, the methodology impacted teaching style and effectiveness.

The approach of the gamified design thinking created a more relaxed class environment and a less "stressful learning atmosphere" supporting the creativity and the connection between context and problems, where students were more encouraged in expressing their opinions and contributing to the sessions.

Retention and Engagement

The retention rate was also considered very high by the majority of the respondents (45%), confirming the outcomes of the impressions provided in the previous question. As shown in the table below, none expressed a rate below a score 5, confirming a general satisfaction with the potential of the learning approach to engage learners and educators in the long term.

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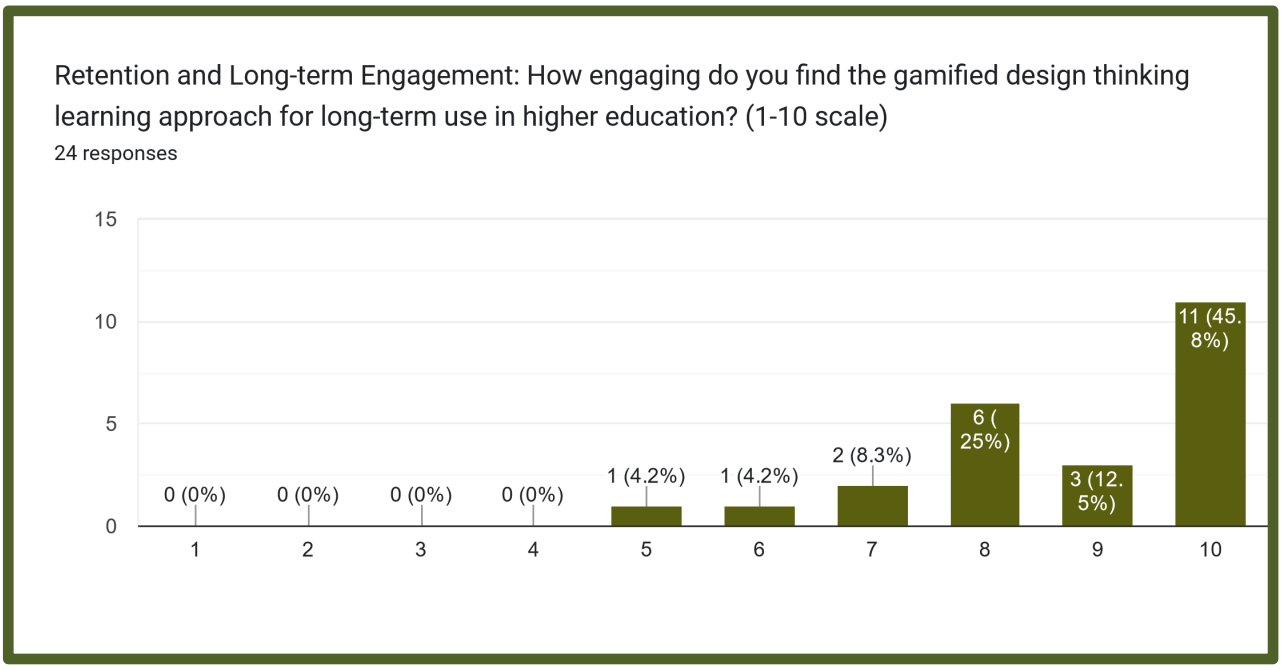

The free comments underlined the effectiveness of design thinking in engaging and involving students in the whole process due to the timing required for carrying out the assignment and for providing the opportunity to do query-based learning.

Comments also highlighted that students were able to identify progress using this approach, and communication and empathy among students and teachers have also improved.

Nonetheless, some critical voices also underline that the approach needs to be revised in order to preserve the positive aspect of engagement in the long term. On the other hand, gamification cannot be applied to any topic and at every stage of the learning process since, in some cases, it seems not effective for the students while learning main concepts, and the risk is to impart wrong information to students with a counter-productive effect in the learning path.

618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

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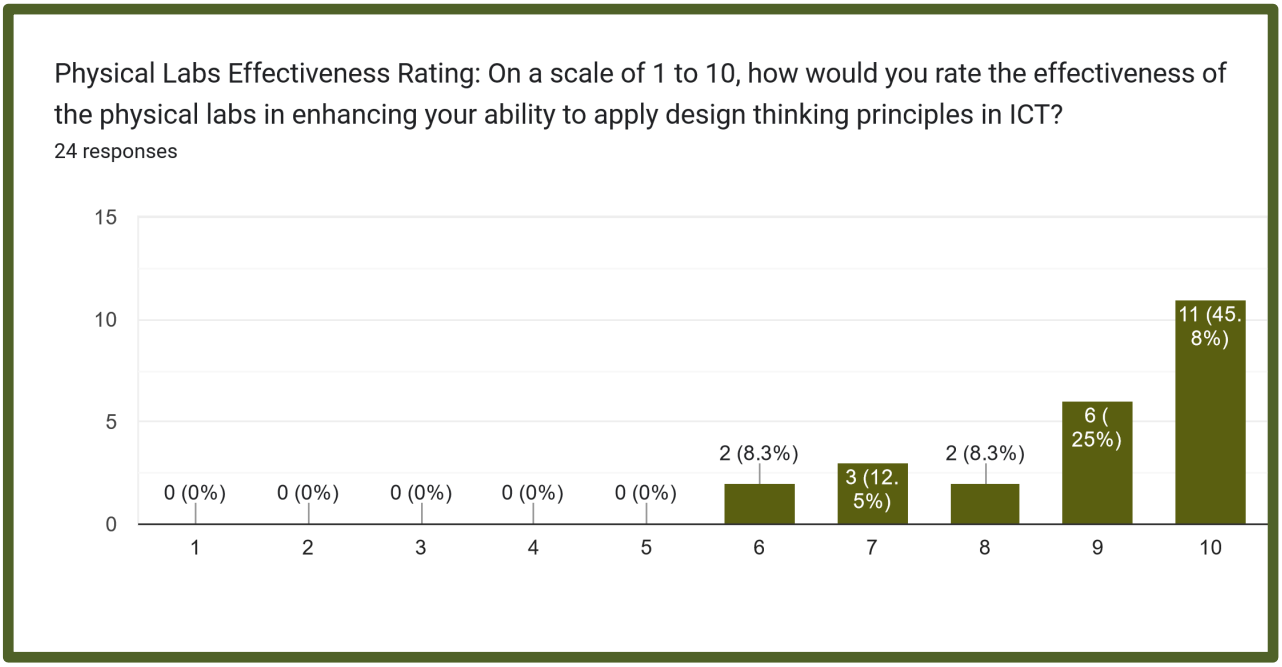
6.2 Physical Labs

Effectiveness

Project partners were asked to rate the effectiveness of the physical labs in supporting and enhancing the ability to apply design thinking principles. All the respondents rated the effectiveness in the range from 6 to 10, with 45% expressing the maximum satisfaction, as shown in the table below.



618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

Impact on Innovation

The Question:

Physical Labs Impact on Innovation and Entrepreneurial Thinking: In what ways have the physical labs impacted your or the beneficiaries' innovation and entrepreneurial thinking skills? Please describe any specific instances or outcomes.

During the implementation of the ICT-INOV project, the physical labs were also designed in order to support learning spaces, approach and methodology.

The respondents were asked to express their impressions and satisfaction with the impact of lab facilities on the innovation and entrepreneurial skills of students. The physical labs have been welcomed as useful assets for accessing the most updated hardware that the universities can benefit from in the long term, and their "flexible design with moveable facilities and devices help to create more activities in class to engage students and foster innovation". The aspect of the Labs as an internal asset beneficial for other classes and departments emerged from several answers.

About the impact generated by the labs along the learning methodology on innovation and entrepreneurial thinking, respondents underlined that the lab facilitated the real-world application of theoretical concepts and created impact by providing "*hands-on experiences, encouraging prototyping and iteration, fostering collaboration and teamwork*" and interdisciplinary interaction.

The effective use of different media and content has also been mentioned as a result of increased activity in sharing ideas and, therefore, as a skills' improvement. Some respondents also underlined that participants in physical labs develop a mindset of "*continuous improvement and adaptation, gaining practical skills relevant to entrepreneurial endeavours*',

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such as adaptability and resilience, but also communication, team work, critical and creative thinking. The communication skills improvement also emerged in relation to the Labs.

While younger generations are very accustomed to communicating virtually, the labs improve interpersonal communication face-to-face while discussing developing innovative project. The possibility for students to build and test their prototypes concretely perform an iterative process on their ideas has been underlined as a benefit for students, enabling the organisation of hackathons, which are largely recognised as a very effective way to co-create and co-design "*leading to the development of creative and impactful solutions*.".

Retention and Engagement

The retention rate of labs was also considered very high by half of the respondents (50%), confirming the outcomes of the impressions provided in the previous question. Respondents underlined that labs can be used as open-ended environments that can also be interconnected among each other, as suggested in the answers. The potential of labs to connect students to real-world challenges and applications has also been expressed. Interesting inputs on the future development of the labs have been given by the partners: "*The physical labs should be developed continuously into a converging space. That supports lecturers and students from the idea creation to the product completion. It will be really good in demonstrating a journey from the beginning to the end of a prototyping process, not only design*".

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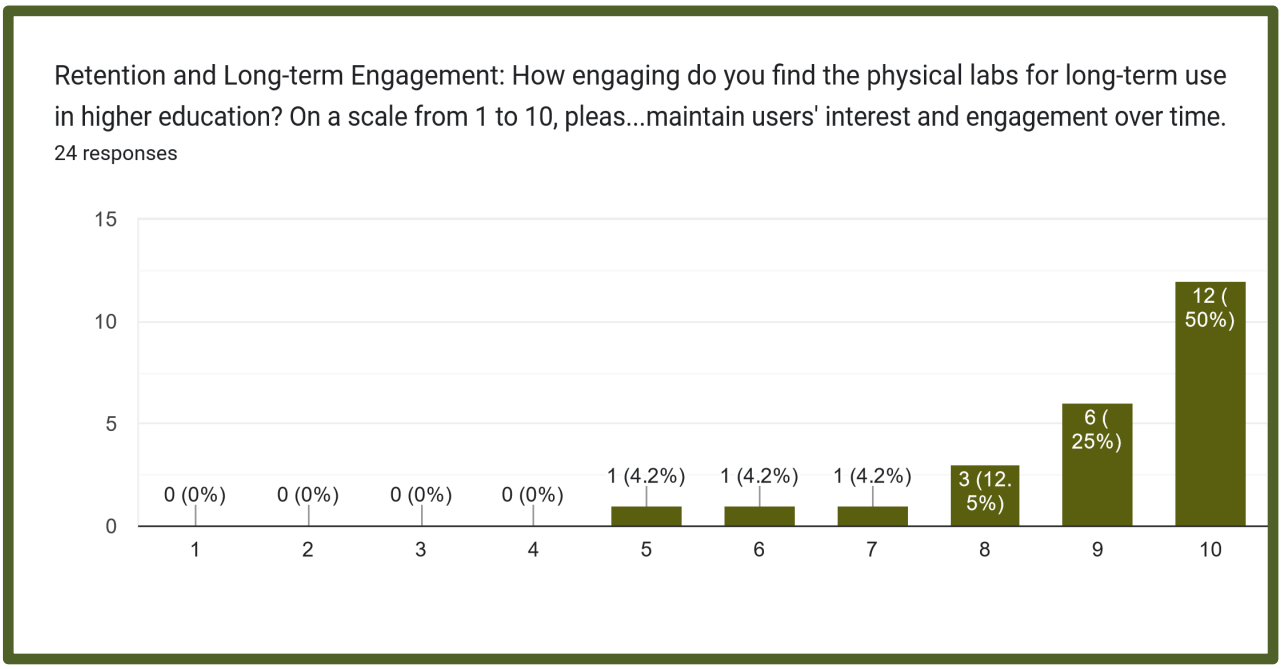


Some answers underlined critical aspects and improvement aspects, such as the upgrade of lab to "*maker's lab*" also should be explored. In addition, a need for software tools, especially prototyping tools, and the acquisition of suitable and adequate furniture can create and improve a better learning environment.

For the future implementation and use of the labs, the need for continuous maintenance and procurement processes by the university has been pointed out in order to keep the labs updated.

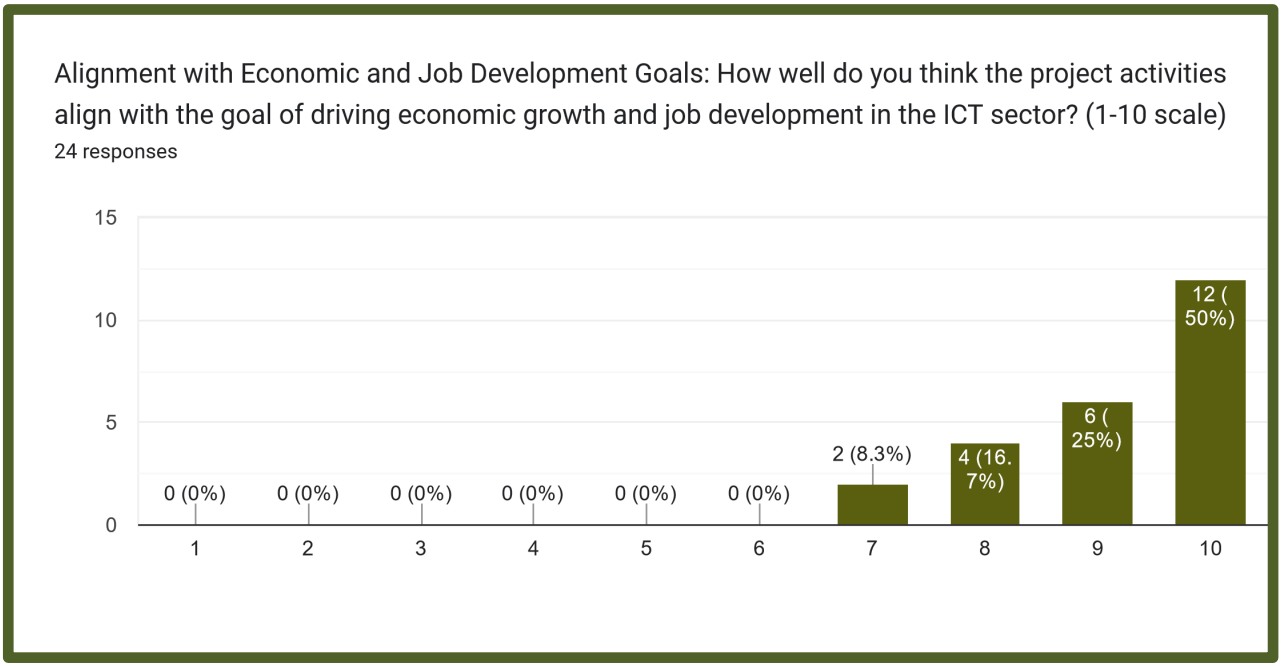
Labs can have continuous maintenance and procurement processes from the university budget to keep it updated.

The physical labs should be developed continuously into a converging space. That supports lecturers and students from the idea creation to the product completion. It will be really good in demonstrating a journey from the beginning to the end of a prototyping process, not only design.

618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

6.3 Alignment with Economic and Job Development Goals

The alignment with the economic and job development goals of the project in the IT sector was considered very high by the majority of the respondents (50%). As shown in the table below, none expressed a rate below a score 7, confirming a very high level on satisfaction of the partners with the achievements of the project for what concerns the impact on students and the expected results on the entrepreneurial skills.



6.4 Addressing Educational Needs

The Question:

Addressing Educational Needs: Please describe how the project has addressed the educational needs and challenges in your country, particularly in the ICT sector.

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Project partners have been asked to give their feedback on whether the project has addressed the educational needs in their own country.

Most of the answers are positive and emphasise different aspects. The majority of the answers agree that the project contributed to the improvement the teaching offers and in "*fostering a more inclusive and dynamic educational landscape*", including curriculum enhancement, teacher training, and professional development. Also, the application of the methodology in STEM education and entrepreneurship programs can contribute to the development of a comprehensive strategy. Concerning the educational offer, some answers underline the added value of the design thinking principles to the educational materials and curriculum design. The methodology and outputs may support the engagement and effectiveness of the learning experiences for students as well as the development of assessment tools and strategies which may improve their learning.

Project-based learning fosters entrepreneurial thinking and prepares students and graduates with the necessary skills to start their own ventures. This has been observed also in the increased interest of students for start-up ideas. Some students' ideas were selected for start-up pitches, and some others got chances to get a job in the industry directly.

Concerning the educational needs of students, some answers focus on the possibility of students benefiting from a real and virtual environment, helping them work and solve real-life problems that replicate the industry environment. One particular aspect has been pointed out in the answers: teachers recognised ICT students' lack of skills when it comes to taking into consideration customer satisfaction and market needs. This aspect can surely be improved by the teachers.

One partner confirmed that before ICT-INOV, the curriculum did not include any design course. As a result of the project implementation, two courses were added in the

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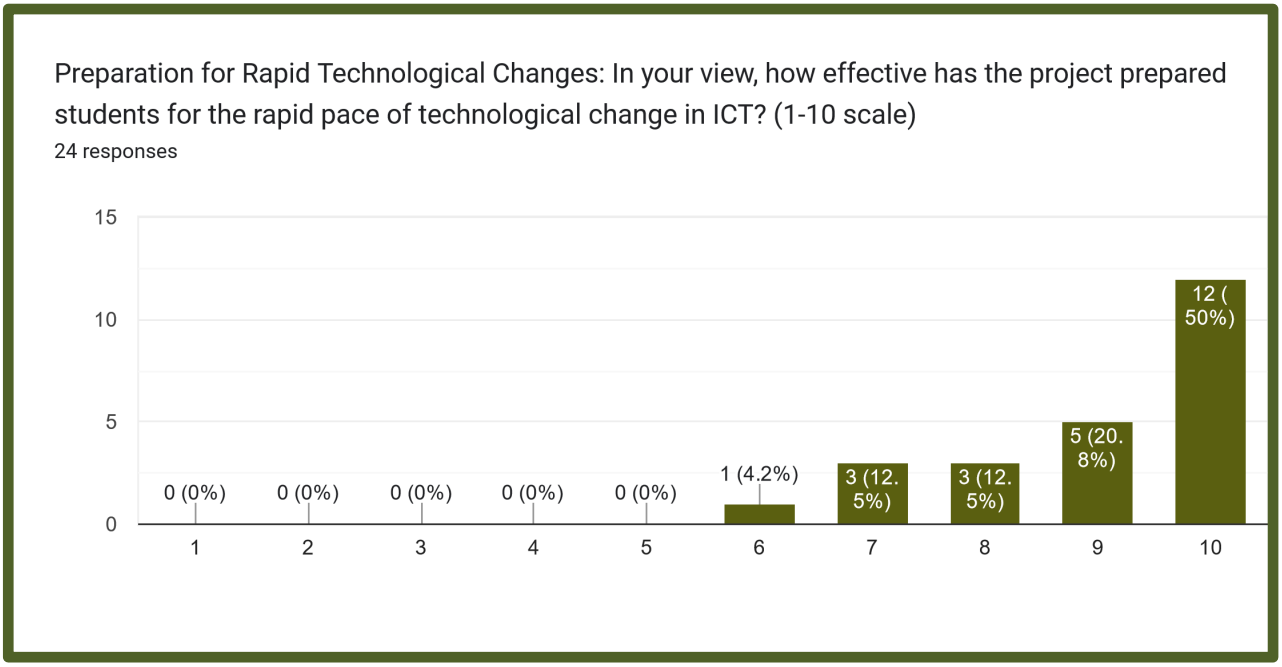
undergraduate and Master's programs and approximately 270 individuals attended the course over the past year.

6.5 Preparation for Rapid Technological Changes

The methodology adopted as a tool for preparation for rapid technological changes in the ICT sector was considered very high by the majority of the respondents (50%). As the table below shows, none expressed a rate below score 6, confirming good satisfaction of the partners with the achievements of the project for what concerns the impact on students and teachers in facing new and emerging technological challenges.



618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

6.6 Contribution to Community Growth and Well-being

The Question:

Contribution to Community Growth and Well-being: Can you provide examples of how the project has contributed to the growth and well-being of your community?

The ICT INOV project contribution to community growth and well-being is characterised by several aspects.

It contributed to the professional growth of the participants by addressing local challenges through learning scenarios and fostering sustainable solutions in several domains, such as education, climate change, robotics development, and other areas where technology and innovative thinking can be positively impacted. Students, in identifying the community issues that can be addressed with ICT, had the opportunity to work together with peers and in connection with DT advocators in order to learn and put Design Thinking into practice.

The tools and methodology of ICT-INOV have also been applied to youth programs such as Design Thinking Challenge and Robotic Workshops.

The project also fostered collaboration with organisations such as IEEE Women in Engineering (WIE) Malaysia and Malaysian Design Council and Malaysia Digital Economy Corporation (MDEC).

As already mentioned in the previous question, the project results have been implemented in the partner University of Thessaly and also used in two additional universities: the Hellenic Open University and the Aristotle University of Thessaloniki. Results have been used in 10 courses over the past 24 months.

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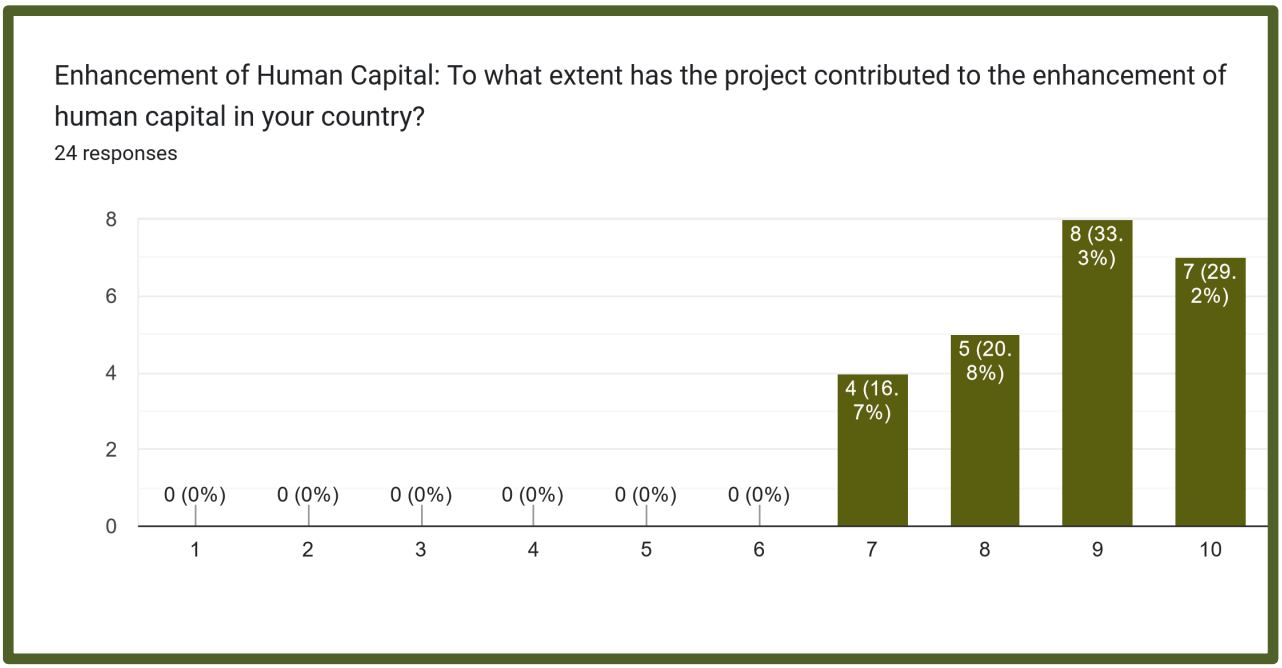
"*By equipping graduates with industry-relevant skills and fostering an entrepreneurial spirit, the project could contribute to creating new jobs and businesses in the Vietnamese ICT sector. Modernising ICT education curricula and enhancing teacher training through ICT-INOV can lead to higher-quality education for students*".

Furthermore, the training programme has been replicated and extended in other institutions, colleagues, an orphanage and also a rural community engaged in learning English.

One partner pointed out the interaction among class and university students, which collaborated in some activities such as computational thinking. The empathy and collaboration created among students motivated the whole community.

6.7 Enhancement of Human Capital

The project partners were asked to express their satisfaction about the achievements of the project in the enhancement of Human Capital. All the respondents declared their satisfaction by rating the question from minimum 7 to 10, as shown in the table below, none expressed a rate below score 7.



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6.8 Quality of Learning and Teaching

> *The Question:*
>
> *Quality of Learning and Teaching: How has the project improved the quality of learning and teaching in ICT education in your country?*

The question regarding the improvement of learning and teaching in ICT through the ICT-INOV methodology has been answered with positive feedback concerning the pro-active learning process, fostering the development of practical skills for identifying and facing real problems to discuss and solve with peers and stakeholders.

Concerning the actual improvement within the partner organisations, respondents include the curriculum enhancement, teachers and instructors' training and innovation in teaching methods and improvement of their skills by integrating emerging learning design in educational practices, enhancing the overall quality of ICT education.

One partner reported that faculty members received training in design thinking, gamified learning, and digital collaboration tools, improving their skills to deliver modern and effective teaching methods.

Another important aspect is the perception of the transformation of teaching/learning practice from the traditional passive learning method into a new active learning method where students have more chances to interact and generate ideas.

Generally, respondents agreed on the improved quality of content engaging in a higher level of students both in the classroom and in lab learning activities.

An interesting aspect of the platform emerged in the answer, and it relates to the feature of facilitating the group assignment. The platform helps lectures to identify the students not

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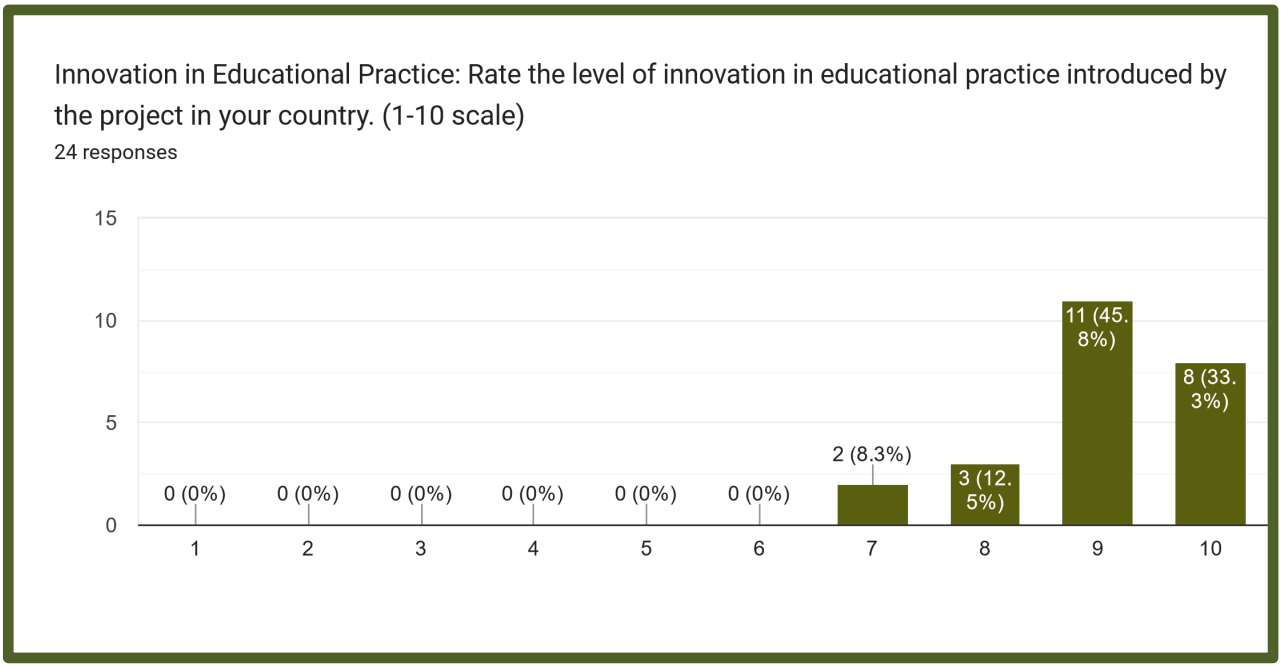
fully contributing to the assignment and then support the lecturer in giving fair marks to the students, especially in group projects.

Overall, the assessment is very positive: the project has greatly enriched the quality of ICT education, preparing students for the demands of the digital era.

6.9 Innovation in Educational Practice

The last question confirms the impression provided by respondents in the previous open questions. The innovation level perception in educational practices introduced by the project is very high, scored from 7 to 10, with the majority of respondents rating the level of satisfaction 9 and 10.



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7. Findings and analysis – Project Outputs

The second questionnaire was focused on the assessment of the quality and impact of the project outputs and their perception by project partners.

The second questionnaire (Annex 2) included 23 questions in total, including both free text answers and five-level linear scale questions.

The goal of the questionnaire was to gather the partners' perceptions of the quality and impact of the project outputs and their perceptions by project partners.

The survey focused on the effectiveness, accessibility and potential reuse and deployment of the realised outputs. The questionnaire is structured in the following sections.

- Overall Quality and Effectiveness
- Physical labs
- Platform
- Resources produced by Educational Activities
- Educators' training
- Pilot phase with students and educators
- Online Community and webinars
- ICT-INOV Web Site
- Overall Sustainability

The questionnaire has been submitted to project partners, and 23 answers have been provided by Managers and Researchers from each partner, therefore representing the whole consortium. The analysis of the answers is reported in the following paragraphs.

7.1 Overall Quality and Effectiveness

The first section of the questionnaire was addressed to understand the overall quality and effectiveness of the results achieved in the opinion of the partners.

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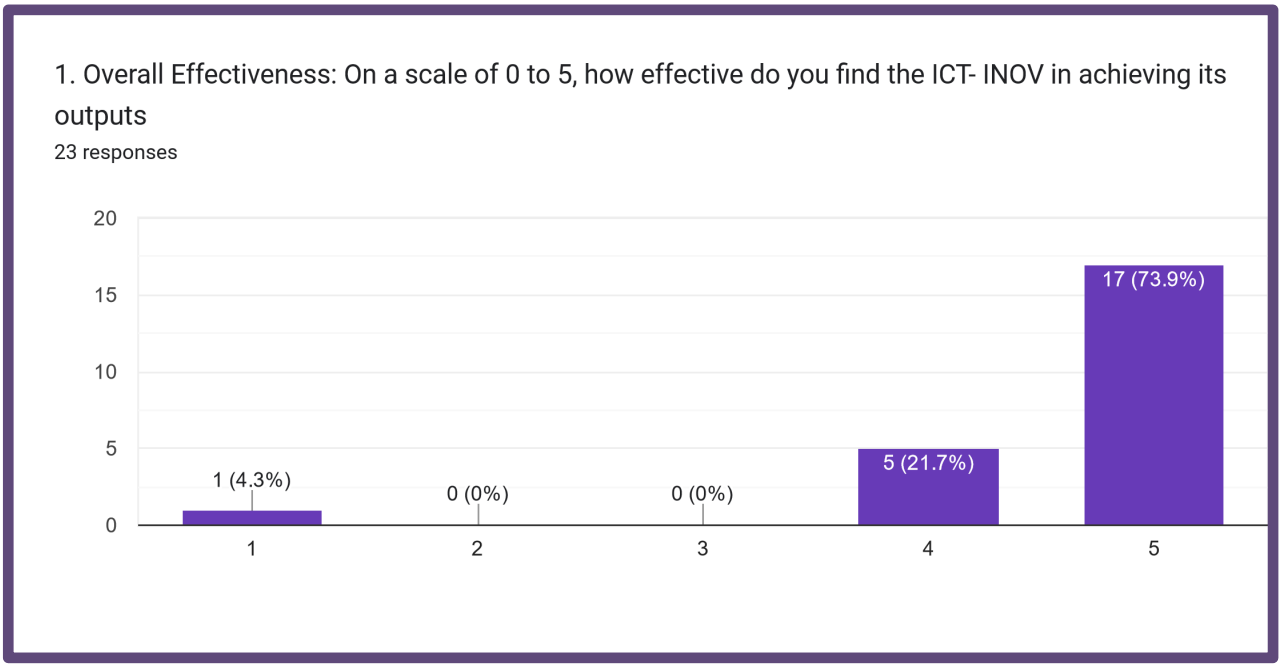

As for the overall effectiveness, the majority of the partners (73%) expressed a higher rate of satisfaction with the work done. The comments provided to the free text question underlined that overall, the training, workshops, and meetings were very effective, and the partners, as participants, learned ICT-INOV methodologies and trained the teachers to use these methodologies in their courses. The methodology used (gamified design thinking) fosters creativity and innovation to be enhanced, not only in the ICT sector but also in other areas.

Some answers confirmed the satisfaction with two main outputs, such as equipment (Labs) and platform, which ease the process of implementation and enable a visible student's involvement and seriousness towards work assignments and learning.

In general, the overall quality and effectiveness are satisfactory. Nonetheless, one partner reported that in his experience, some individuals found it difficult to have gamified design thinking in their courses.

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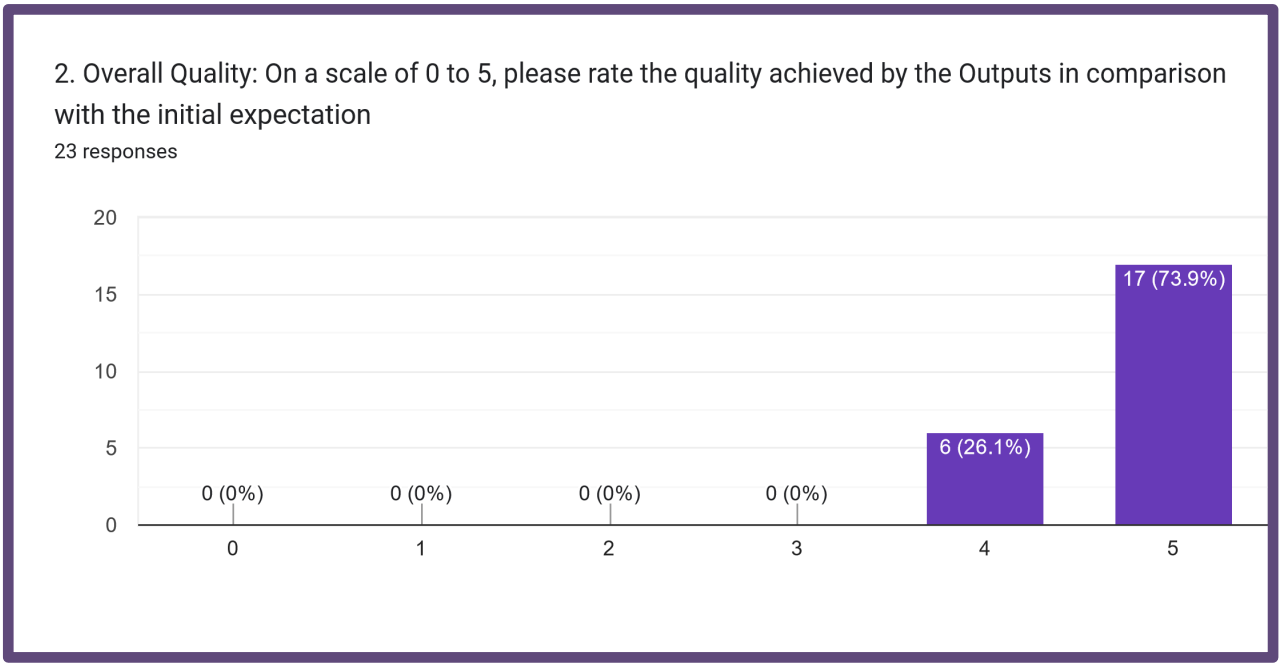
One answer underlined that the project fully accomplished the need of improving teaching quality at partner institutions.

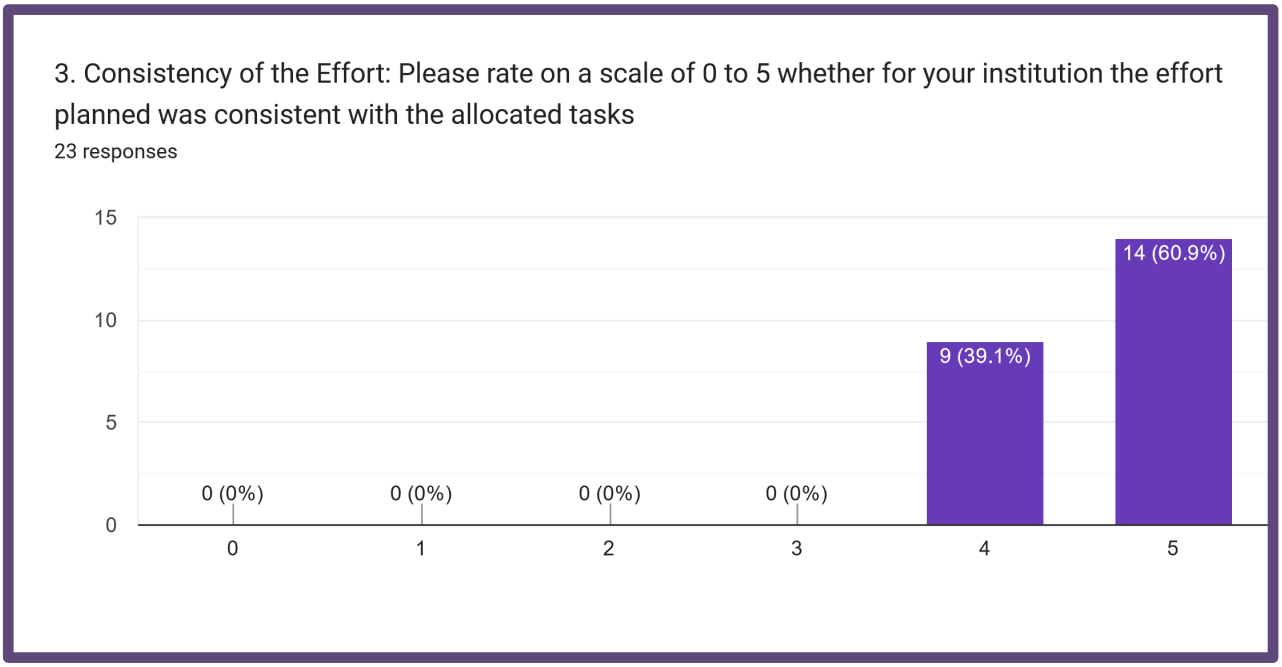


The overall quality of the realised outputs has also been rated by the majority (73%) with the highest score. The comments provided in the free text question underlined a wide satisfaction among the partners. Some partners underlined that the students showed more interest in their subjects with the new methodology compared to other conventional courses. Other partners underlined the dynamicity and professionality of the partners and their effort in completing the project successfully.

The quality of the outputs has also been rated as excellent compared to initial expectations, and the implementation of the project granted new skills to the partners as well. Also, the role of the coordinator has been mentioned, and full satisfaction has been expressed on how the procedures set up by the leading organisation supported the implementation by giving helpful instruction, sound document management, and quality check activities, delivering feedback to all partners in order to improve the upcoming tasks.

618768-EPP-1-2020-1-EL-EPPKA2-CBHE-JP

As for the quality check activities, it is mentioned that an amount of 600 questionnaires on quality perception have been collected during the project implementation, and they resulted positive (with no further specification). In general, respondents underline the improvement in the overall quality of teaching and learning. Nonetheless, some limitations have been reported, such as the difficulties some teachers experienced when introducing design thinking methodology in their courses. In fact, this aspect was also recognised by other respondents, who underlined that the instructors' understanding of DT could be improved. This shortcoming can be overcome by the continuous support provided through workshops, training, and webinars.



In general, the majority of the partners (80%) expressed their satisfaction concerning the consistency of the initially planned effort and the effort deployed during the project

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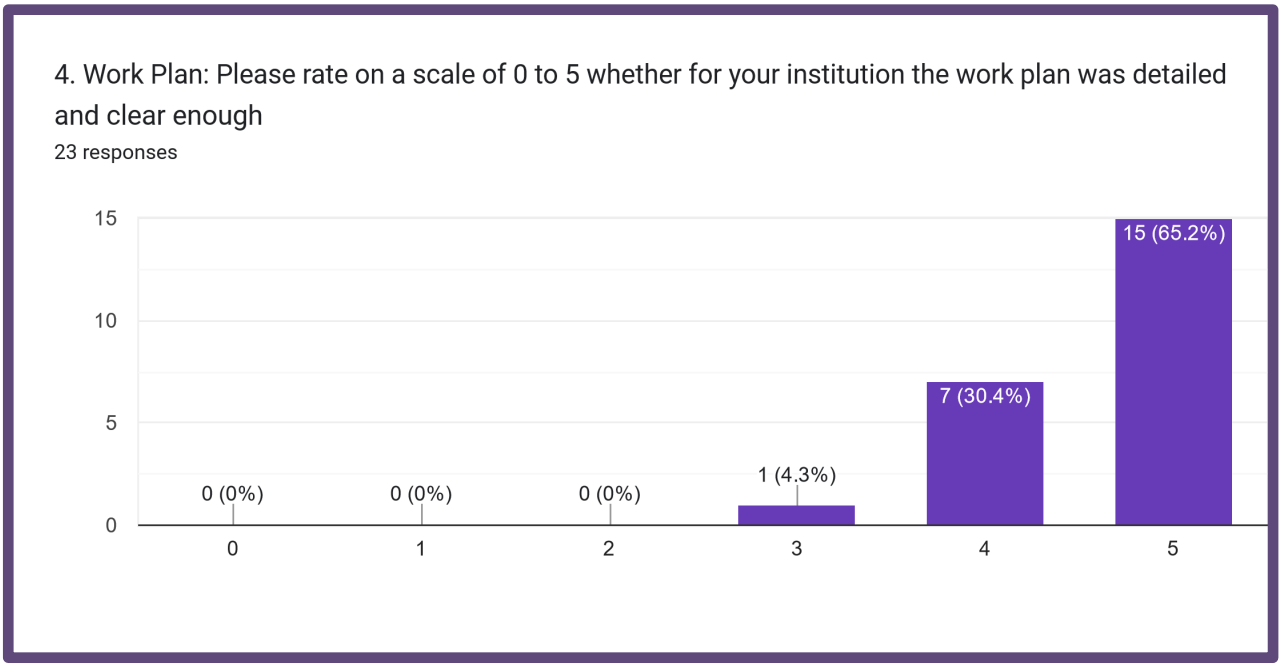
implementation. None expressed a rate under 4 (range from 0 to 5), meaning that all the partners obtained the right number of resources to implement and achieve the planned goals.



The question was addressed to understand whether the work plan has been clear enough for the project partners since the beginning of the activities, and the majority (65%) answered positively with the highest rate.

7.2 Physical Labs

ICT- INOV foresaw the implementation of physical labs suitable to the project needs and goals built on the ICT facilities already existing at the partners' universities. The questions below were addressed in understanding whether the final output was achieved in line with the

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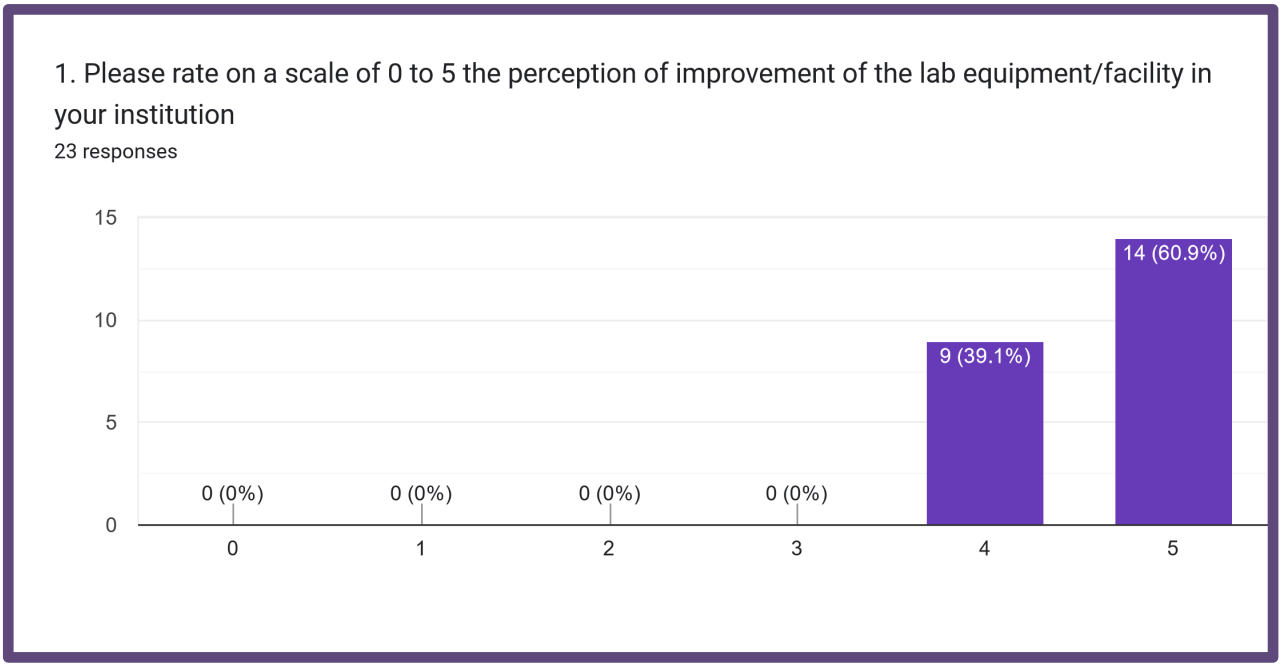
quality and effectiveness expectation of the partners. The majority of the partners (60%) expressed the highest rate for this improvement.



The second question in this output aimed to understand how the newly improved facility was perceived by the students and educators. The acceptance rate on the Labs output was basically captured by observation of the activities in there and perceived by the partners. The majority of the partners (73%) expressed the highest rate for this output.

This information finds confirmation in the free-text answers provided by the partners in the previous questions when expressing satisfaction with the overall quality and effectiveness of the output and the effectiveness of the provided methodology as well.

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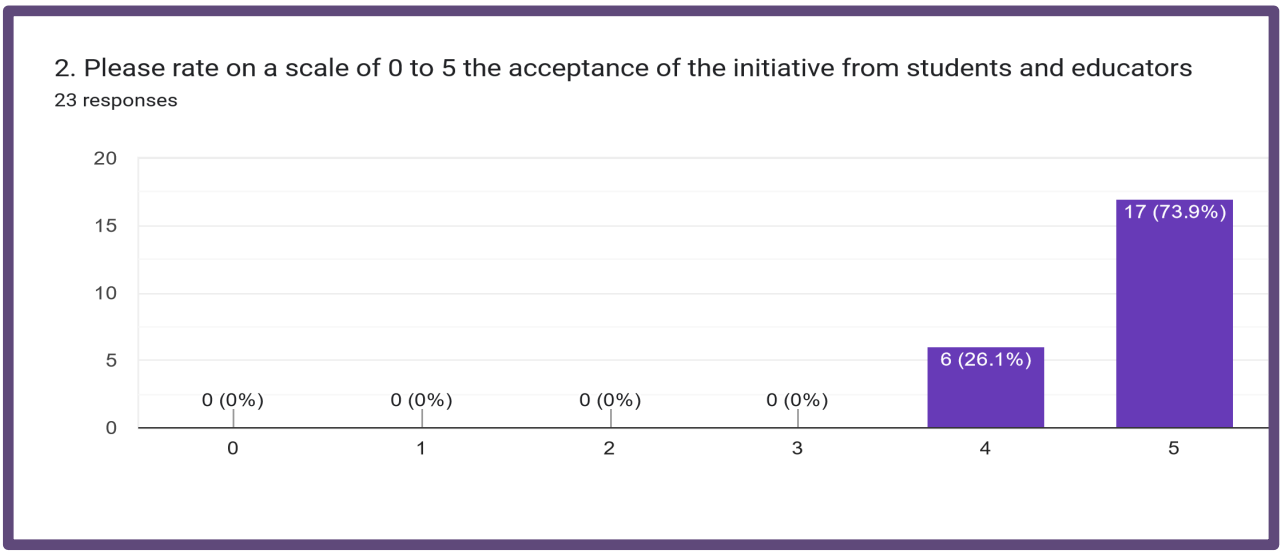

The third question wants to investigate the perception of the exploitation potential of this specific output. All the partners expressed the highest rates (4 and 5), confirming, therefore the possibility that the improved labs are a useful and suitable output supporting also the other departments' activities, expanding in this way the impact of this achievement to the whole institution.

The majority of respondents (47%) also expressed the highest rate of exploitation potential of Labs.

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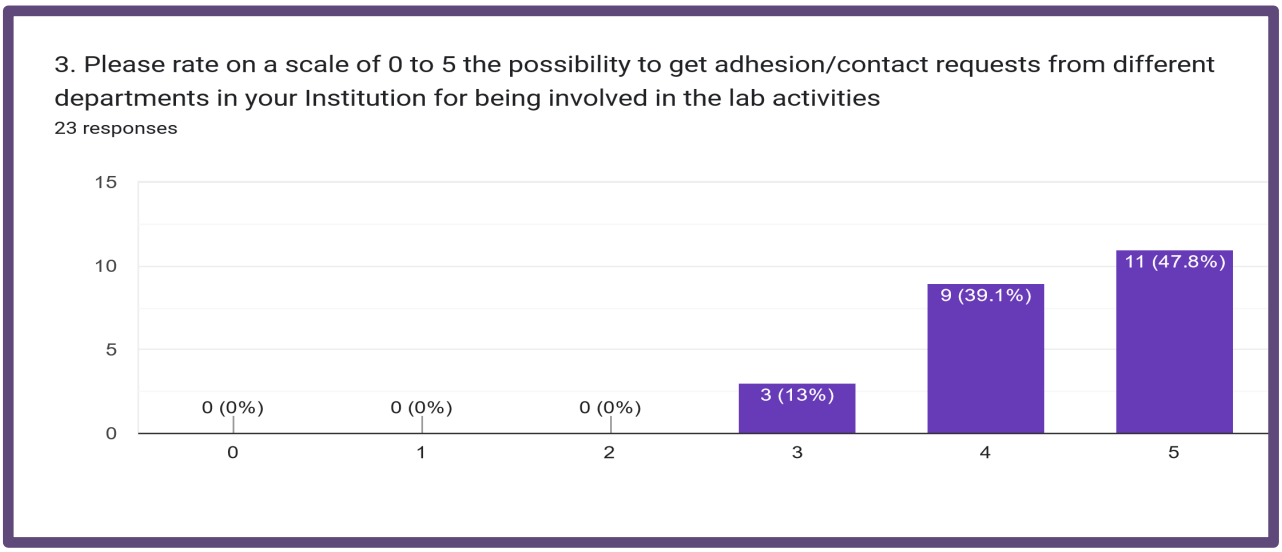

7.3 ICT-INOV Platform

The main output of ICT-INOV is the creation of a platform supporting the design thinking methodology from remote and allowing content and media sharing. The question below aimed to understand whether the final output was achieved and how its effectiveness has been perceived by the partners. The majority of the partners (47%) expressed the highest rate for this output. The lowest rate has been a score of 3. This low rate, in comparison with all the other opinions, could be linked to a comment provided in the previous free text answers concerning the Overall Quality and Effectiveness.

One respondent included in his/her comment that, in some way, the *"... ICT-INOV platform needs to have a more user-friendly interface"*.

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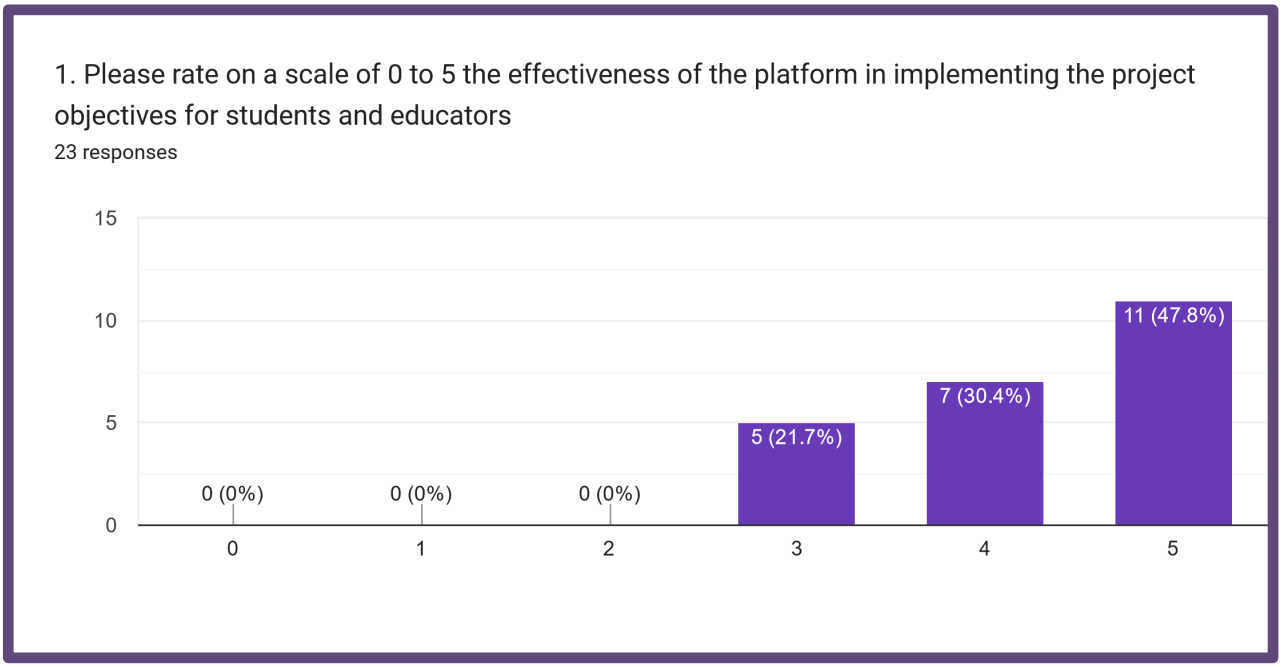

The second question is intended to investigate the perception of the exploitation potential of this specific output. All the partners expressed the highest rates (4 and 5), confirming, therefore, the possibility that the platform can be useful and an effective tool supporting also the other departments' activities, expanding in this way the impact of this achievement on the whole institution's performance in terms of educational offer.

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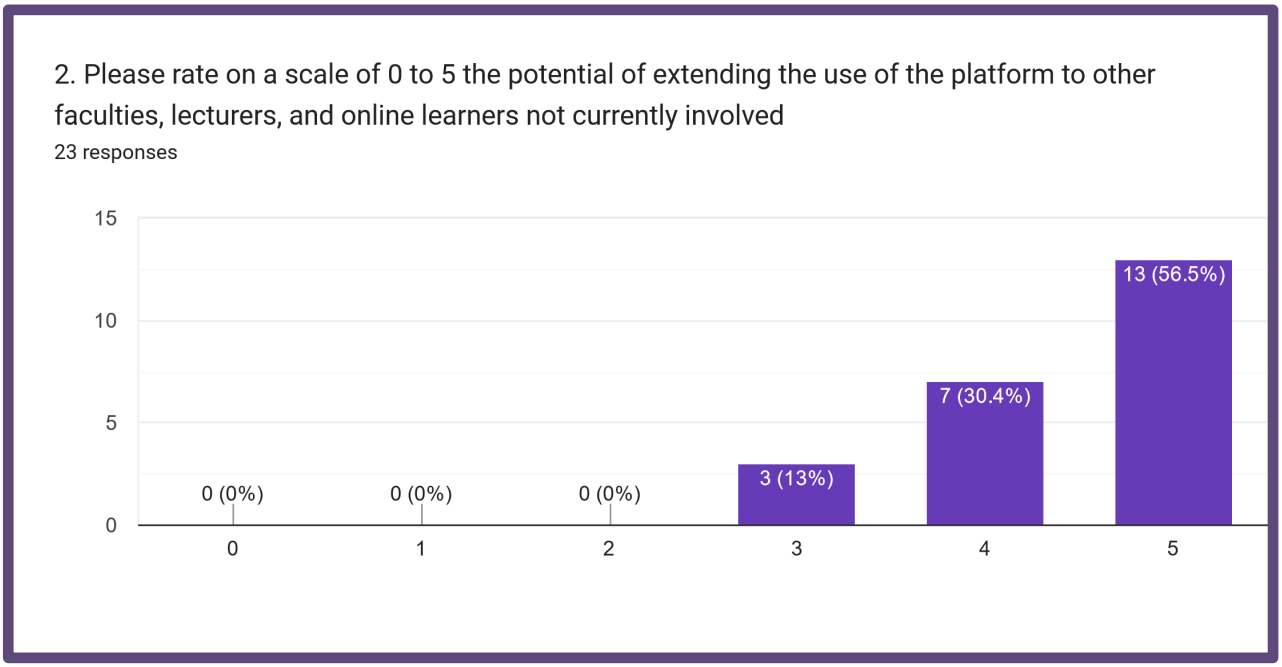

The third question aimed at understanding how the students and educators perceived the new output in terms of accessibility and user-friendliness. The partners' rates vary in the range from 2 to 5. It is possible that the perception of problems related to user-friendliness mentioned above affected the evaluation of this question.

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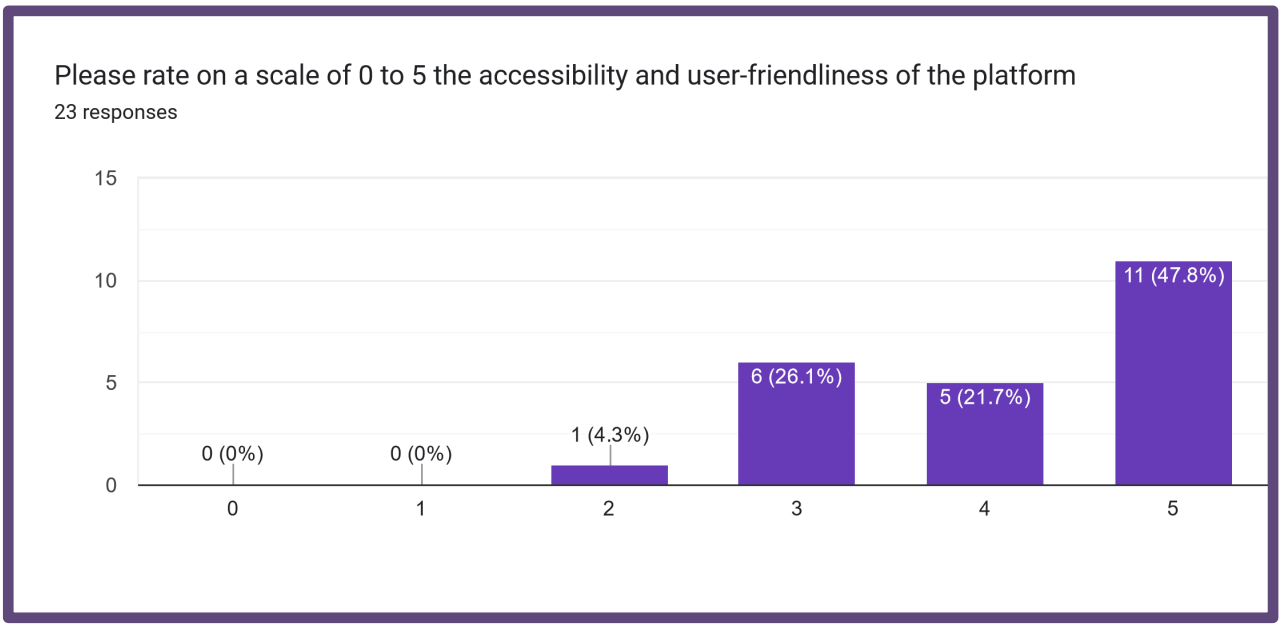

7.4 Resources produced by Educational Activities

The educational resources produced by the educational activities have been evaluated positively, with the 70% of respondents rating the effectiveness at the highest level. The satisfaction level is very high, as well as the perception of the exploitation potential (re-use).

The second table below shows that the partners expressed a high rate concerning the possibility of extending the use of the output in different faculties, lectures and online courses.

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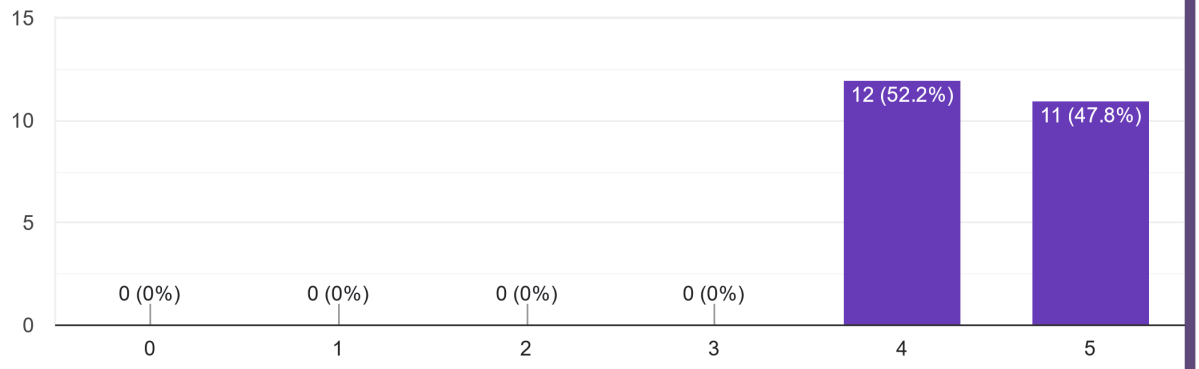
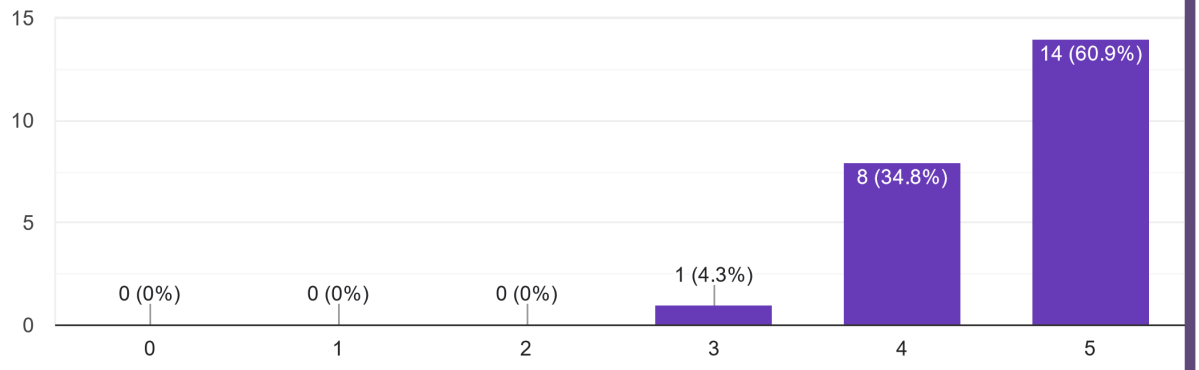
1. Please rate on a scale of 0 to 5 the effectiveness of the Resources produced by Educational Activities in achieving the project objectives

23 responses



2. Please rate on a scale of 0 to 5 the possibility of extending the use of the Educational Resources to other faculties, lecturers, and online learners not currently involved

23 responses



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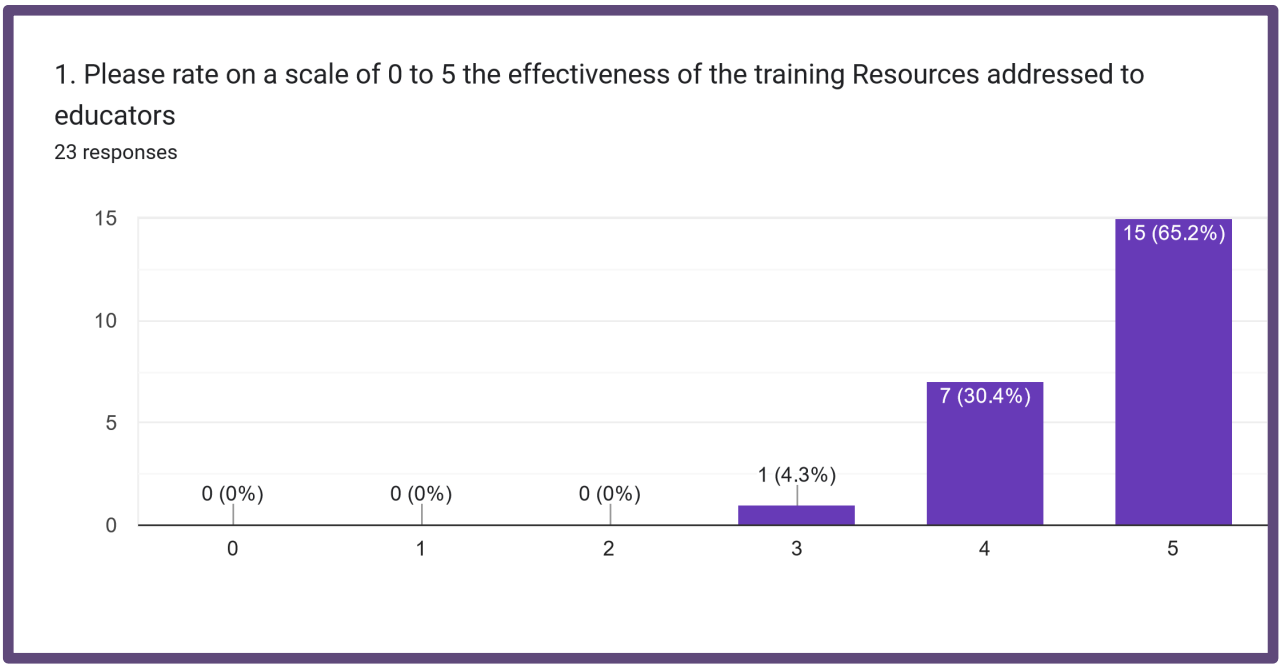
7.5 Educators training

The effectiveness of the educators' training was evaluated positively, with 90% of respondents rating the effectiveness at the highest level. The satisfaction level is very high and the perception of the exploitation potential (re-use), as well. In the second table below, the partners expressed a high rate concerning the possibility of extending the use of the output in different faculties, lectures and online courses.

This information is also confirmed by the free text answers provided in the first section, "Overall Quality and Effectiveness" where some respondents also commented that their skills were actually improved by the project.



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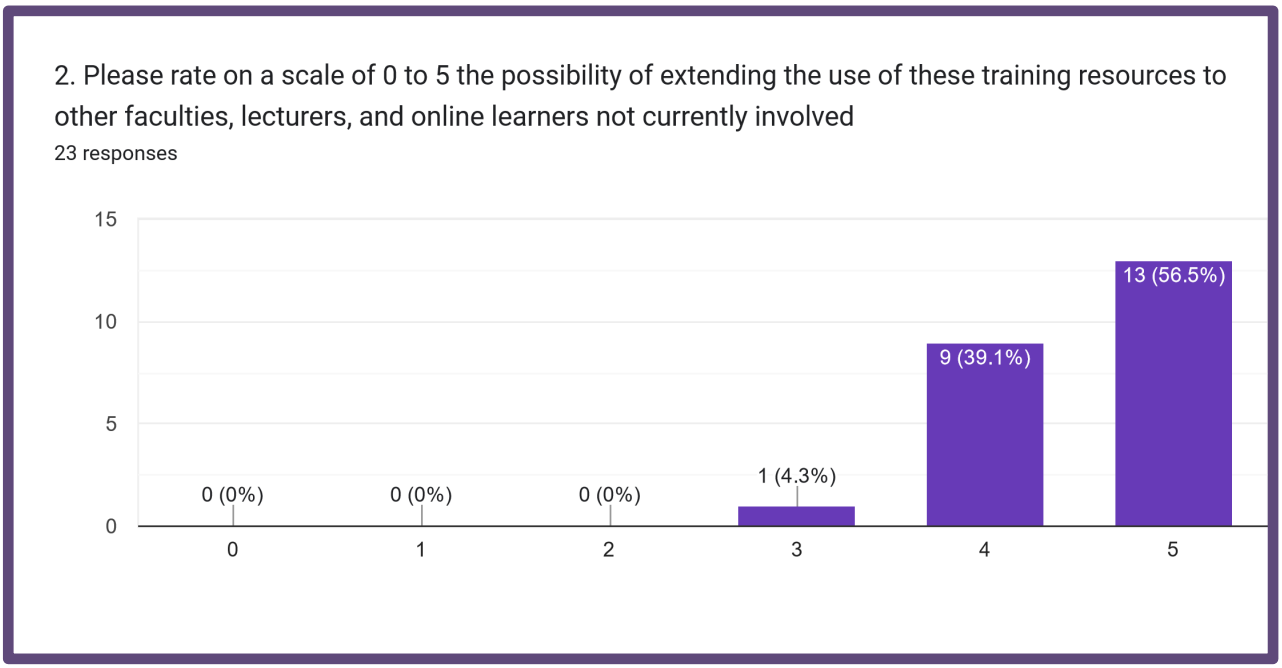

7.6 Pilot phase with students and educators

The effectiveness of the Pilot phase has been evaluated positively, with 70% of respondents rating the effectiveness at the highest level. The satisfaction level is very high and the perception of the exploitation potential (re-use), as well. In the second graph below, the partners expressed a high rate concerning the possibility of extending the use of the output in different faculties, lectures and online courses.

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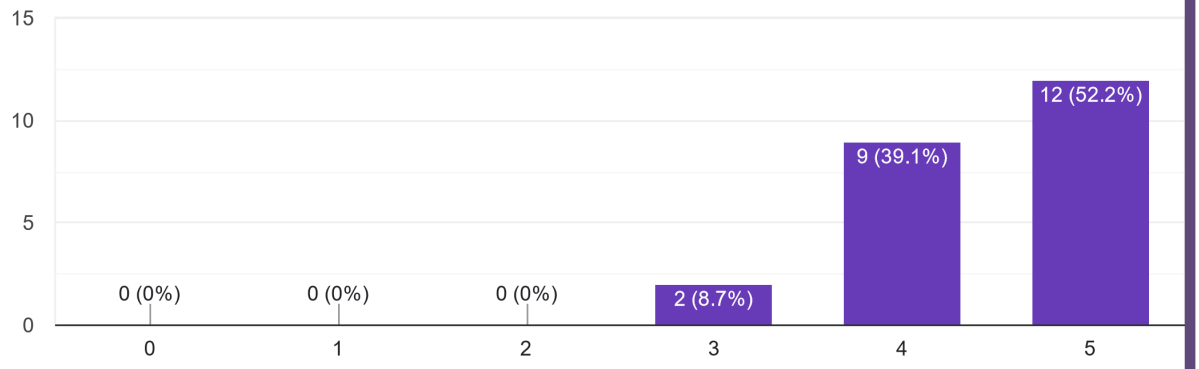
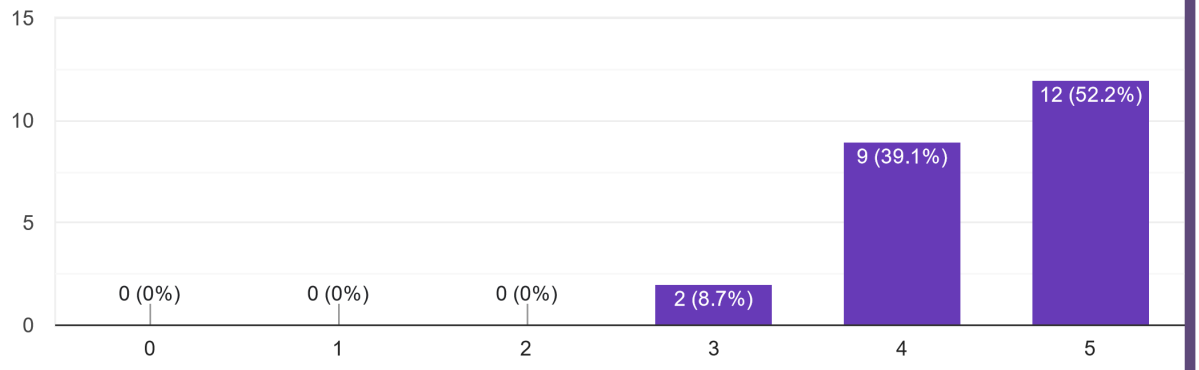
1. Please rate on a scale of 0 to 5 the engagement rate of students in attending and completing the pilot activities

23 responses



2. Please rate on a scale of 0 to 5 the effectiveness of the platform and lab equipment in supporting the co-creative tasks

23 responses



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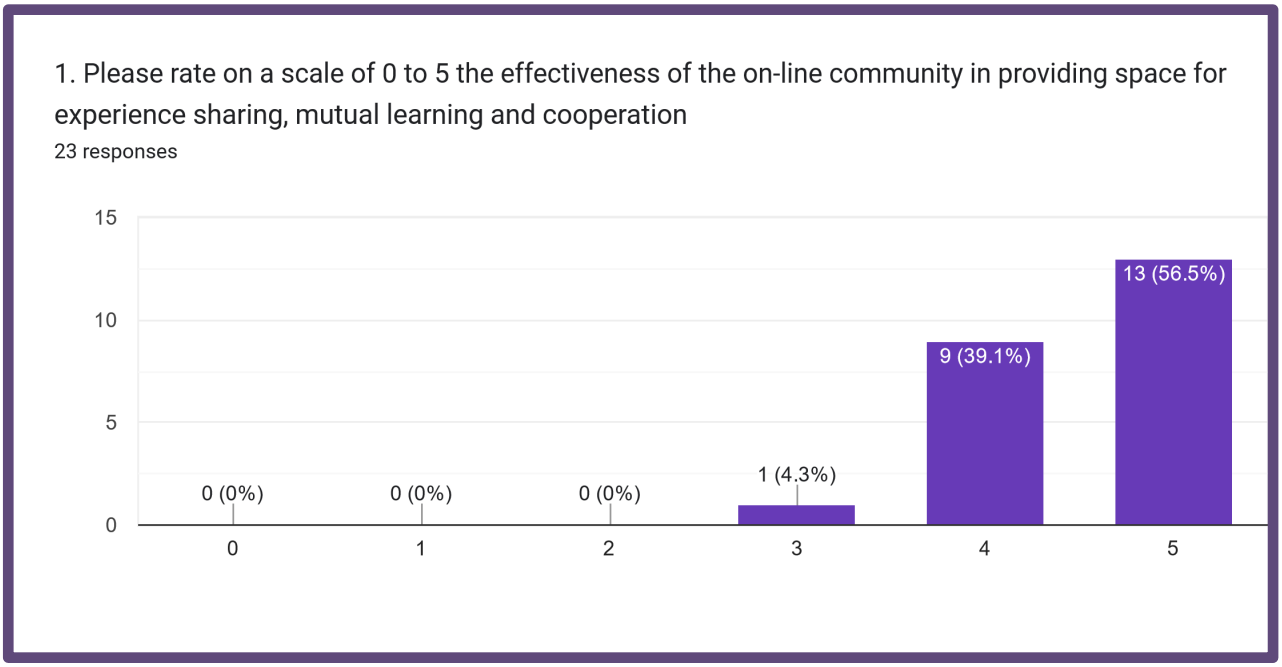
7.7 Online Community and webinars

The online community was planned for the benefit of the partners and the implementation of the project. Its effectiveness has been evaluated positively, with 80% of respondents rating its effectiveness at the highest level. The satisfaction level is very high, and the perception of the exploitation potential (re-use), as well.

In the second table below, the partners expressed a high rate concerning the possibility of extending the use of the output in the future development and deployment of new training activities. The majority of the partners (56%) rated the highest rate for this output.



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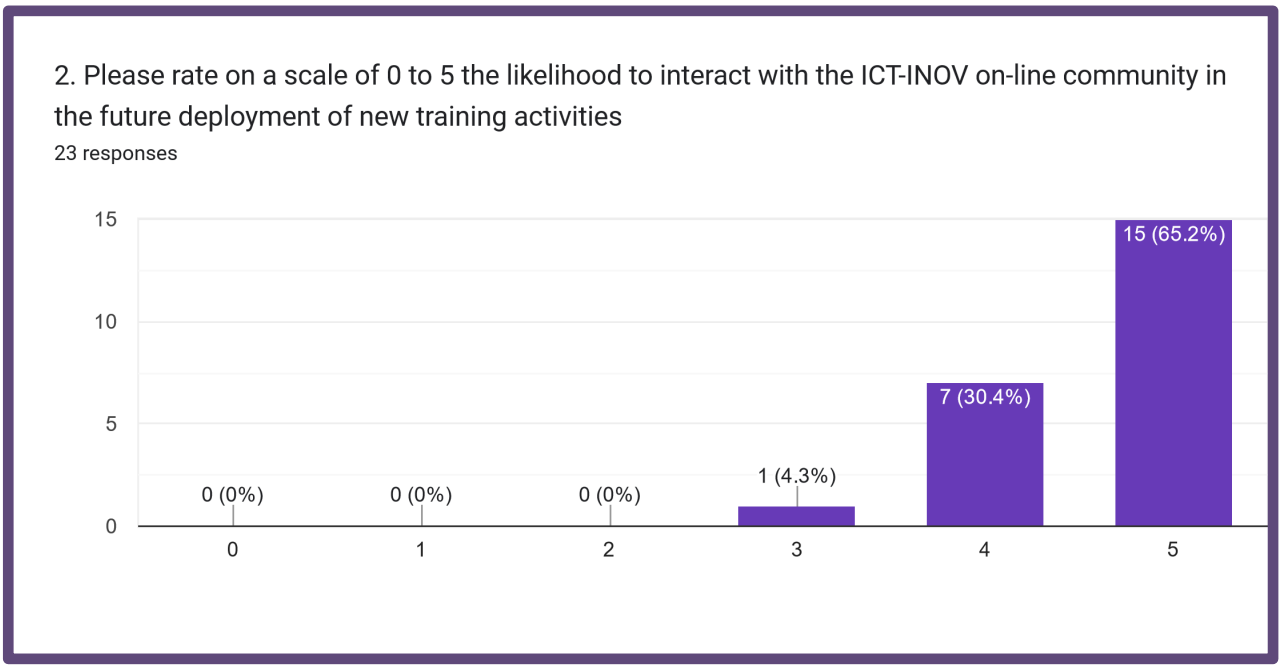

7.8 ICT-INOV Web Site

The ICT-INOV website is the major showcase of the project, and the majority of the partners expressed their satisfaction with the accessibility and user-friendliness of the web pages (60%) and the completeness and effectiveness of the contents as well (65%).

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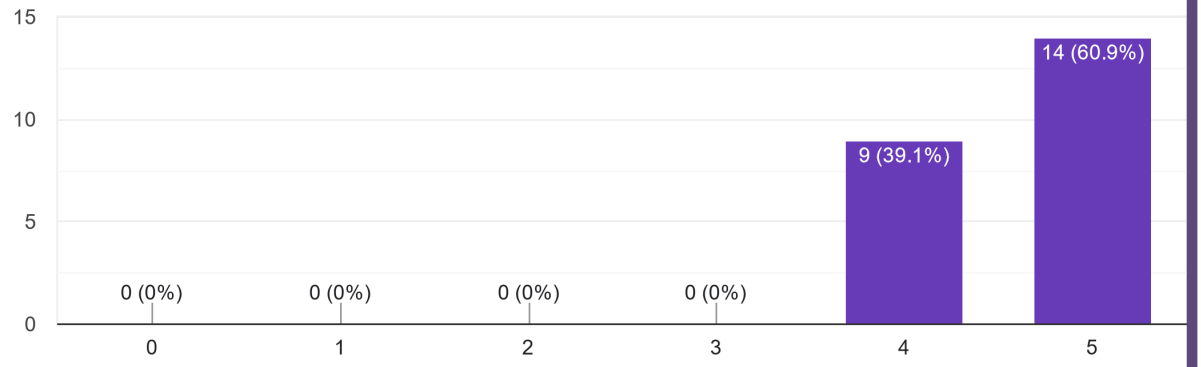
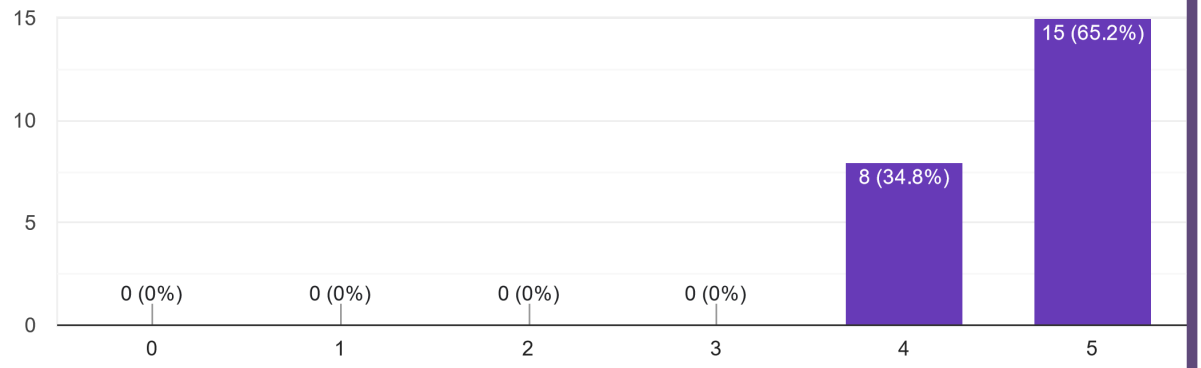
1. Please rate on a scale of 0 to 5 the accessibility and user-friendliness of the website

23 responses



2. Please rate on a scale of 0 to 5 the completeness and the effectiveness of the contents.

23 responses



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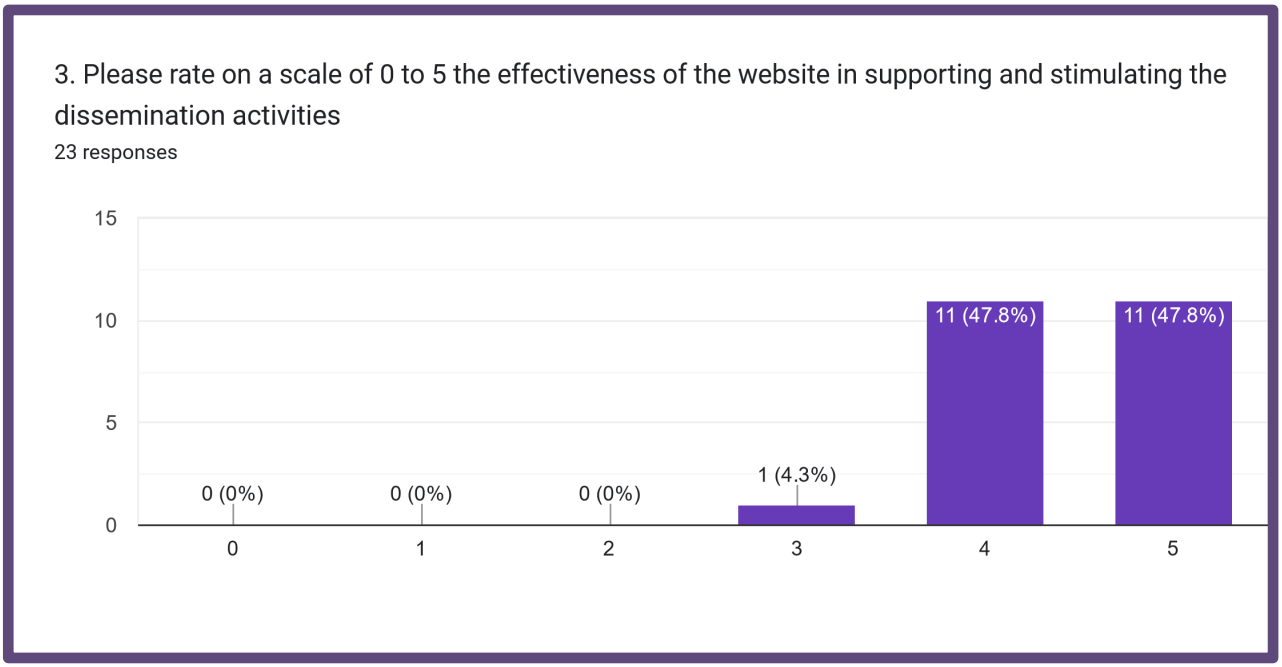
Also, the appropriateness of the website to support dissemination activities and stimulate the interaction with the project from the outside stakeholders has been considered in a positive manner by the majority of the partners. The evaluation of this aspect has been rated from 4 to 5 by all the respondents, as shown in the table below.



Overall Sustainability

The last section of the questionnaire focuses on the overall evaluation of the sustainability and future deployment of the outputs.

All the respondents confirmed their intention and likelihood that the activities on the ICT-INOV outputs and achievements will continue after the project conclusion. This result gives us the impression of the overall satisfaction of the partners which are willing to continue the path taken on methodology and output realised in future activities.

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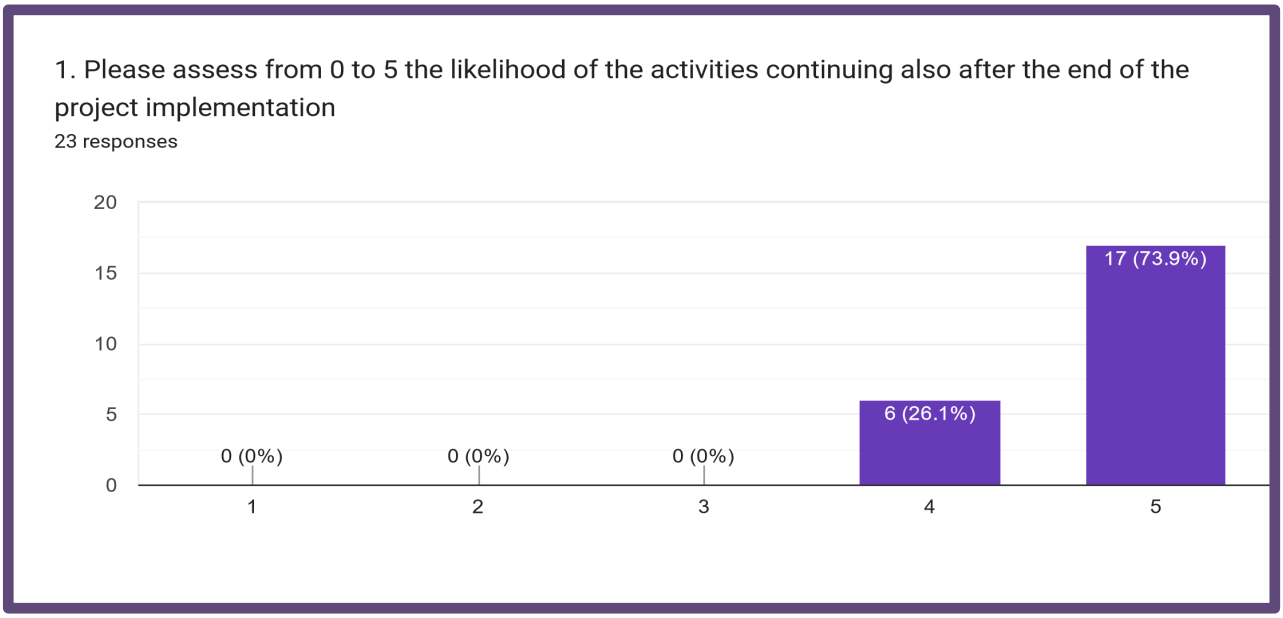
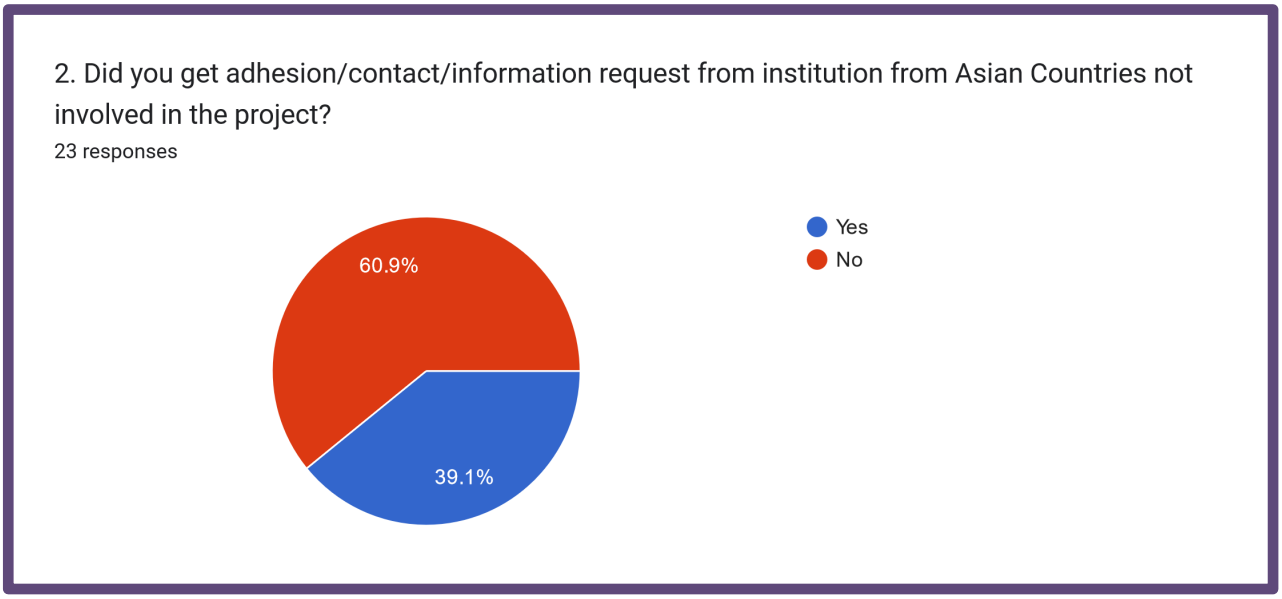


The second question was addressed to understand whether any institution already gets interactions with external stakeholders in order to use the realised outputs. 40% of the partners received requests for information, collaboration and/or re-use of the outputs and achievements.



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The information provided by the above table has been confirmed by the free-text answers where the partners provided more details on the typology of interaction with external stakeholders:

- As for European partners, Estonian and Greek partners received an invitation to participate in another project proposal from Fiji and information/collaboration requests from universities in Cambodia, respectively.
- From Nepal, the National College of Engineering contacted the partner for the involvement of their students in the gamification system developed by ICT-INOV.
- The Taiwan University and Binus University (Indonesia) invited the Malaysian partner to conduct a Design Thinking Workshop.
- The National Cheng Kung University (NCKU) in Taiwan hosted a short training conducted by Assoc. Prof. Dr Azah Anir Norman
- The Malaysian partner also reports the ongoing arrangement for a possible training session with Suncheon National University (SA) in Korea during the summer holiday
- The John Von Neumann Institute in Vietnam reports the interaction with the following universities:
    - Hutech University, Vietnam
    - Hoa Sen University, Vietnam
    - Van Lang University, Vietnam
    - Ho Chi Minh City University of Education, Vietnam
    - FPT University, Vietnam
    - Sai Gon University, Vietnam
    - Hue University, Vietnam"
- The Vietnamese partner Hanoi University, received requests from a company and a college to train their instructors in Design thinking and innovative teaching methods.

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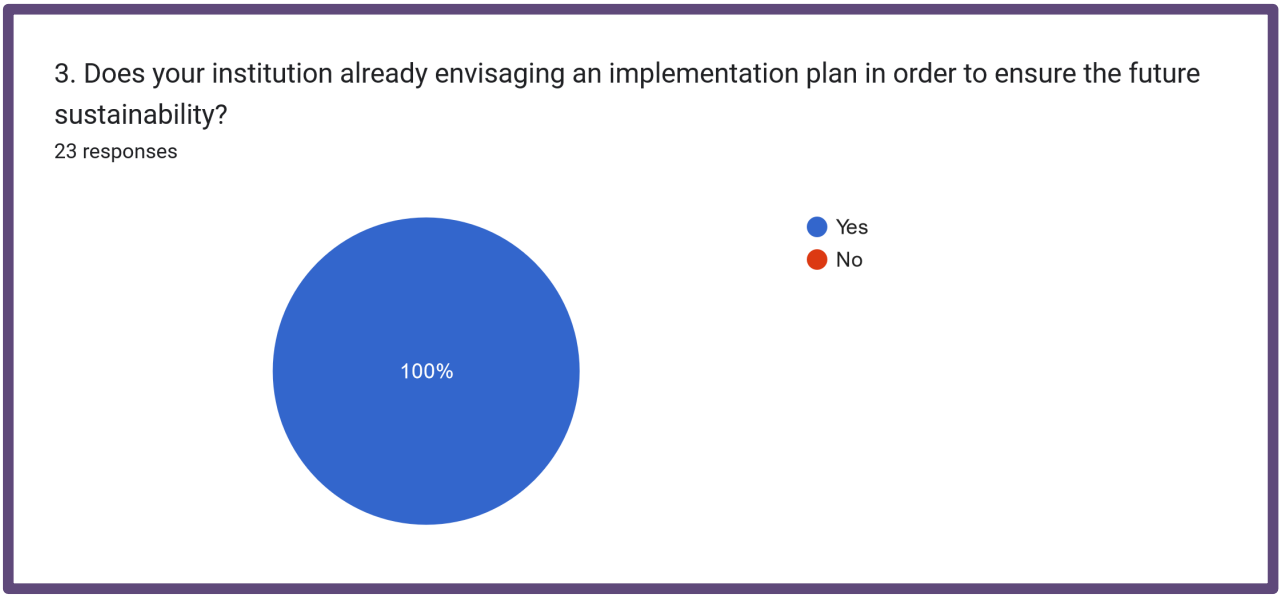
The answers provided confirm the positive impact of communication activities and, on the other hand, the rising interest of companies and institutions in innovative training methods that can stimulate creativity and human potential, such as design thinking.

Concerning future sustainability, all the partners are already working on an implementation plan for future exploitation and continuation of the path they have undertaken.



The question aimed at investigating in which way the partners were working to ensure the future sustainability of the activities and output. Despite the project Sustainability plan being a deliverable published on the project portal, the aim was addressed to depict what is currently happening at the partner institutions.

All the respondents confirm that the project output (the platform, materials, educational resources and results) is available for re-use and is actually used in their organisations.

At the Tribhuvan University (Nepal), the ICT-INOV has been piloted in various M.Sc. and bachelor's level courses. Students use the ICT-INOV digital learning platform to share ideas

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and collaborate towards building software solutions based on theoretical concepts related to each course. The piloted courses will be taken as regular courses in the future.

At Isra University (Pakistan), Department of Computer Science, ICT-INOV Design Thinking methodology is now part of teaching activities. The ICT-INOV Lab, equipment, and training will be consistent parts of learning methodologies, and a start-up lab will also be implemented to encourage students to come up with start-up ideas where the ICT-INOV lab can be engaged and used. Overall plan is to develop design thinking-based learning content in every subject.

At University Malaya (Malaysia) the Lab has already been improved by moving the equipment from a room only suitable to be used by students to a new maker's lab and under the umbrella of the faculty's business section (FSKTM Tec novation) so that the equipment can help generate income for the faculty. Furthermore, the informal discussion has been initiated to implement the usage of the platform for enterprising activities with the research clusters, and the DT has been included in the new master's degree programme.

At Hanoi University (Vietnam) the lab will continue to be used under the management of the Faculty of Information Technology. The work of maintaining the lab is assigned to 2 full-time technicians who are currently technical support staff at FIT-Hanu. All expenses to maintain the lab will be deducted from the tuition fee paid by students to Hanoi University.

In addition, a part of the budget will be deducted from the sponsorship packages of companies that cooperate with the Faculty of Information Technology. Furthermore, the university is planning to organise instructor training annually at the beginning of the academic year to ensure that all lecturers can use the lab and the platform effectively.

At the Universitiy Tenaga Nasional (Malaysia), preliminary suggestions and discussions have been initiated to assign the project's assets to more permanent entities e.g. to entrust the DT lab under the care of ICT college and the framework to Teaching and Learning Centre for top down implementation. Continuity at the international level is also important for stronger

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motivation to sustain its implementation. Also, a collaboration with the Faculty's Business Pod for possible training events using the equipment of the labs is under discussion.

At Kathmandu University (Nepal), the Design Thinking Lab is owned by the Computer Science and Engineering department, and the activities have already been used. The department will assign one faculty member to looking after the labs.

At John Von Neumann Institute (Vietnam) the lecturers have been instructed on how to apply the design thinking methods and techniques in their courses. Also, the assessment methods for evaluating students' final results have been changed. The Institute plans to collect and share the lessons learned to the ICT educational community in HCMC for the first step and all over Vietnam for the next.

ICT-INOV principles are embedded into curriculum development. The Institute is integrating the project's innovative teaching methods and learning outcomes into the core curriculum, ensuring long-term adoption beyond individual courses. Also, they provide ongoing training and resources for educators to implement ICT-INOV methods effectively.

The last question of the survey was addressed to understand which one of the outputs was more likely to be exploited in the future. As the table below shows, the educational resources for educators are the output that all the partners plan to exploit and deploy in future activities (91%)

Another output with the majority of positive feedback is the Educational Resources for students (82%) as well as the Platform (82%), followed by the Labs (73%).

The last is the On-line Community since it is perceived as an internal tool of the consortium.

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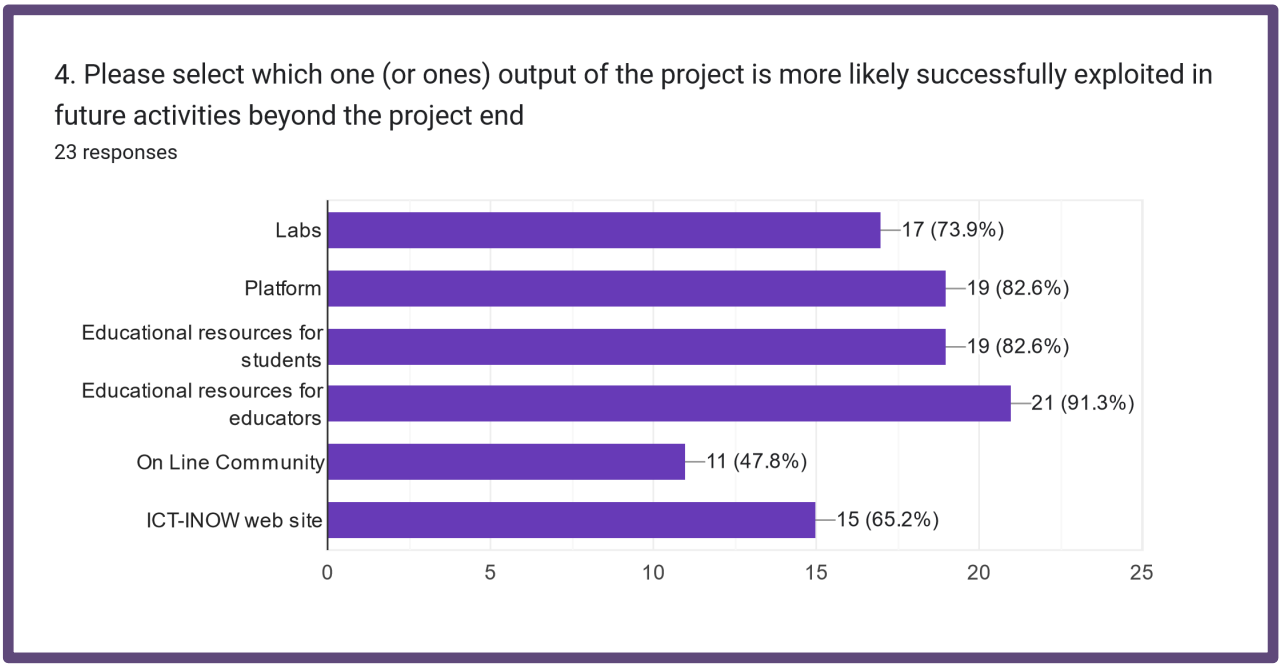

8. SWOT Analysis

SWOT analysis presents the strengths, weaknesses, opportunities and threats of the ICT-INOV project as results of the survey described above.

Table 2 – Strengths and Weakness revealed by the survey's results

Strengths	Weakness
• Effective Methodology • Quality of the output • Results sharing within the organisations and with other departments • Enhancement of Human capital • Innovation in educational practice • International network	• Communication between partners after the project ends. • Availability of partners to follow up the collaboration. • Lack of engagement on the methodology on the long term. • Web Site not appealing enough.

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• Collaboration with companies • Collaboration with educational institutions.	

Table 3 – Opportunities and Threats revealed by the survey's results

Opportunities	Threats
• International collaboration among partners for further projects • Use of ITC-INOV outputs for collaboration purposes (companies and universities) • Research and work with other institutions • Establishment of a strong partnership for future cooperation • Learning new things	• Collaboration between partners will not continue after the project. • Partners' engagement with the project. achievements ends. • Limited funding and resources. • Misdirection of physical labs for different purposes.

9. Conclusions

On the basis of the results reported in the Interim Evaluation Report and in this current document, the ICT-INOV project confirms its success in achieving the planned goals and a good quality level for its products and outcomes.

The main reason lies in the correct identification of the needs of the target groups and their relevance, the definition of the project's scope, the clear objectives, effective management and coordination, and continuous monitoring throughout the implementation phase.

The project has delivered all the planned outcomes and outputs which have been validated through an internal evaluation process.

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According to the feedback from the partners, the quality level of all the aspects of this evaluation is very high. Partners expressed their satisfaction with the outcomes, methodologies and approaches implemented within the project, in detail:

- the effectiveness and impact of the methodologies;
- the alignment of the project objectives and results to the enhancement of the economic growth, job development, and
- the correspondence with the educational needs in the ICT sector;
- The contribution to preparing students and educators for the rapid change in the ICT sector so that they can face the related challenges.

A very high satisfaction rate emerged also from the analysis of the output's evaluation.

All the partners are satisfied with the outputs produced and the achievements reached at the end of the project.

The ICT-INOV platform and Physical labs resulted to be the two outputs that the partners intend to improve and exploit in the future. Several initiatives promoted mainly by the Asian partners are already put in place to create new collaborations and new training offers. The partners are convinced that the project brought a significant improvement in learning/teaching activities, and the outputs represent a concrete innovation in the ICT education framework.

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10. Recommendations

The ICT-INOV consortium has achieved a good level of satisfaction concerning the methodology and outputs achieved. In addition, interesting initiatives have been undertaken in order to guarantee a take up of the results. During the project implementation, the methodology and the outputs allowed the deployment of new courses/methodology to students and educators, creating an immediate impact on the learning/teaching activities and approaches.

The quality level of the materials and outputs is very high, and their future accessibility and availability should be guaranteed in order to expand the project audiences and target groups. The Project produced innovative educational resources addressing both students and educators dealing with the ICT sector. As a result, it is expected, in the medium-long term an extension of the audience being extremely dynamic and innovation-driven.

Despite the high satisfaction of the partners with the quality and effectiveness of the outputs and methodology, for their future deployment, it is recommended to secure additional resources and continuous upgrade of the platform in order to preserve its innovative approach in the light of continuously evolving web services and interactive features.

In the same light, the ICT-INOV website may also require a restyling in order to be more appealing for collaboration, although it is already very complete and full of information and resources. A landing page more focused on the establishment of new collaborations may be beneficial for future sustainability.

The ICT-INOV potential is far to be exploited despite very good initial steps have been undertaken. Several initiatives opened the way to further collaborations between the educational sector and industrial sector and among educational institutions. The collaboration with IEEE associations established in Asian countries is very beneficial, as well as the extension of the ICT-INOV concepts to other universities in the same countries, such

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as Greece, Vietnam and Malaysia. This exploitation strand should be emphasised in all the partners' development plans.

More in detail, it is recommended to keep the project alive even after the end of the funding period, building on top of the achieved objectives and results by involving new educational institutions and stakeholder organisations in new research and educational projects, by exploring the available follow up funding opportunities given at different levels and in different frameworks by the European Commission.

The cooperation experience among the ICT-INOV partners may result in a good practice example of a capacity-building project which should be deepened and further exploited for the benefit of all the partner organisations.

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Annex 1 – ICT_INOV Learning Methodology Survey

This form has been created by Associazione ValIda of Rome, responsible for the ICT-INOV external evaluation.

Data collected will be used for the drafting of the External FINAL Report.

ICT-INOV Final Questionnaire (1)

Dear Participant,

The primary goal of this questionnaire is to gather your perceptions and experiences regarding the various components of the project ICT-INOV. Your responses will help us evaluate:

- The effectiveness and impact of the project's tools and methodologies.
- How well the project's activities align with the goals of enhancing economic growth, job development, and addressing educational needs in the ICT sector.
- The contribution of the project to preparing students and educators for the rapidly changing landscape of ICT.
- The overall improvement in learning, teaching, and innovation within the ICT education framework across our partner countries.

Please be assured that your responses will be treated with the utmost confidentiality and used solely for the purpose of project evaluation.

Role in the Project (Not shared)

Length of Involvement with the Project (Not shared)

Country (Not shared)

Gamified Design Thinking Learning Approach Effectiveness Rating: On a scale of 1 to 10, how would you rate the effectiveness of the gamified design thinking learning approach in enhancing your ability to apply design thinking principles in ICT? (1-10 scale) Not effective at all 1 – 10 Extremely effective

Gamified Design Thinking Learning Approach Impact on Innovation: In what ways has the gamified learning approach impacted your or the beneficiaries' innovation thinking skills? (Open-ended)

Retention and Long-term Engagement: How engaging do you find the gamified design thinking learning approach for long-term use in higher education? (1-10 scale) Not engaging at all 1 – 10 Highly engaging for long-term

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Free-text Field for additional comments: please provide any additional feedback on the gamified design thinking learning approach. (open-ended)

Physical Labs Effectiveness Rating: On a scale of 1 to 10, how would you rate the effectiveness of the physical labs in enhancing your ability to apply design thinking principles in ICT? (1-10 scale) Not effective at all 1 – 10 Extremely effective

Physical Labs Impact on Innovation and Entrepreneurial Thinking: In what ways have the physical labs impacted your or the beneficiaries' innovation and entrepreneurial thinking skills? Please describe any specific instances or outcomes. (Open-ended)

Retention and Long-term Engagement: How engaging do you find the physical labs for long-term use in higher education? On a scale from 1 to 10, please rate their potential to maintain users' interest and engagement over time. (1-10 scale) Not effective at all 1 – 10 Extremely effective

Free-text Field for Additional Comments: Please provide any additional feedback on the physical labs, including suggestions for improvements or particular strengths that they have. (Open-ended)

Alignment with Economic and Job Development Goals: How well do you think the project activities align with the goal of driving economic growth and job development in the ICT sector? (1-10 scale) No Alignment 1 – 10 Perfect Alignment

Addressing Educational Needs: Please describe how the project has addressed the educational needs and challenges in your country, particularly in the ICT sector. (Open-ended).

Preparation for Rapid Technological Changes: In your view, how effective has the project prepared students for the rapid pace of technological change in ICT? (1-10 scale) Not effective at all 1 – 10 Extremely effective

Contribution to Community Growth and Well-being: Can you provide examples of how the project has contributed to the growth and well-being of your community? (Open-ended)

Enhancement of Human Capital: To what extent has the project contributed to the enhancement of human capital in your country? (1-10 scale) No contribution 1 – 10 Significant contributions

Quality of Learning and Teaching: How has the project improved the quality of learning and teaching in ICT education in your country? (Open-ended)

Innovation in Educational Practice: Rate the level of innovation in educational practice introduced by the project in your country. (1-10 scale) No Innovation 1 – 10 Highly Innovative

Annex 2 – ICT_INOV Project Outputs Survey

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This form has been created by Associazione ValIda of Rome, responsible for the ICT-INOV external evaluation.

Data collected will be used for the drafting of the External FINAL Report.

ICT-INOV Final Questionnaire (2) - Project Outputs Assessment

This questionnaire is designed to provide a detailed assessment of the quality and impact of the project outputs.

Role in the Project (Not shared)

Country (Not shared)

Name of the Organisation (Not shared)

Overall Quality and Effectiveness 4 questions

1. Overall Effectiveness: On a scale of 0 to 5, how effective do you find the ICT- INOV in achieving its outputs. (0-5 scale) Completely Ineffective 0 - 5 Excellent Effectiveness

1.a) Briefly elaborate on your answer above regarding the overall effectiveness (use max 250 words)

2. Overall Quality: On a scale of 0 to 5, please rate the quality achieved by the Outputs in comparison with the initial expectation. Poor Quality 0 – 5 Excellent Quality

2.a) Briefly elaborate on your answer above regarding the overall quality (use max 250 words)

3. Consistency of the Effort: Please rate on a scale of 0 to 5 whether for your institution the effort planned was consistent with the allocated tasks. No consistency 0 – 5 Full consistencies

4. Work Plan: Please rate on a scale of 0 to 5 whether for your institution the work plan was detailed and clear enough. Totally Unclear 0 – 5 Perfectly Clear

Physical labs 3 questions

1. Please rate on a scale of 0 to 5 the perception of improvement of the lab equipment/facility in your institution. Poor improvement 0 – 5 Significant improvements

2. Please rate on a scale of 0 to 5 the acceptance of the initiative from students and educators. No acceptance 0 – 5 Perfect acceptance

3. Please rate on a scale of 0 to 5 the possibility to get adhesion/contact requests from different departments in your Institution for being involved in the lab activities. No possibility 0 – 5 Already agreed

Platform 3 questions

1. Please rate on a scale of 0 to 5 the effectiveness of the platform in implementing the project objectives for students and educators. Completely Ineffective 0 – 5 Excellent Effectiveness

2. Please rate on a scale of 0 to 5 the potential of extending the use of the platform to other faculties, lecturers, and online learners not currently involved. No possibility 0 -5 Already agreed

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3. Please rate on a scale of 0 to 5 the accessibility and user-friendliness of the platform. Poor 0 – 5 Excellent

Resources produced by Educational Activities 2 questions

1. Please rate on a scale of 0 to 5 the effectiveness of the Resources produced by Educational Activities in achieving the project objectives. Completely Ineffective 0 – 5 Excellent Effectiveness

2. Please rate on a scale of 0 to 5 the possibility of extending the use of the Educational Resources to other faculties, lecturers, and online learners not currently involved. No possibility 0 – 5 Already agreed

Educators' training 2 questions

1. Please rate on a scale of 0 to 5 the effectiveness of the training Resources addressed to educators. Completely Ineffective 0 – 5 Excellent Effectiveness

2. Please rate on a scale of 0 to 5 the possibility of extending the use of these training resources to other faculties, lecturers, and online learners not currently involved. No possibility 0 – 5 Already agreed

Pilot phase with students and educators 2 questions

1. Please rate on a scale of 0 to 5 the engagement rate of students in attending and completing the pilot activities. Poor Engagement 0 – 5 Excellent Engagement

2. Please rate on a scale of 0 to 5 the effectiveness of the platform and lab equipment in supporting the co-creative tasks. Completely Ineffective 0 – 5 Excellent Effectiveness

On line Community and webinars 2 questions

1. Please rate on a scale of 0 to 5 the effectiveness of the on-line community in providing space for experience sharing, mutual learning and cooperation. Completely Ineffective 0 – 5 Excellent Effectiveness

2. Please rate on a scale of 0 to 5 the likelihood to interact with the ICT-INOV on-line community in the future deployment of new training activities. No possibility 0 – 5 Very high probability

ICT-INOV Web Site 3 questions

1. Please rate on a scale of 0 to 5 the accessibility and user-friendliness of the website. Poor 0 – 5 Excellent

2. Please rate on a scale of 0 to 5 the completeness and the effectiveness of the contents. Poor 0 - Highly engaging

3. Please rate on a scale of 0 to 5 the effectiveness of the website in supporting and stimulating the dissemination activities. Completely Ineffective 0 – 5 Excellent Effectiveness

Overall Sustainability 4 questions

1. Please assess from 0 to 5 the likelihood of the activities continuing also after the end of the project implementation. No possibility 0 – 5 Very high probability

2. Did you get adhesion/contact/information request from institution from Asian Countries not involved in the project? Yes/No

2.a) If **yes,** please provide some detail

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3. Does your institution already envisaging an implementation plan in order to ensure the future sustainability? Yes/No

3.a) Briefly elaborate on your answer above regarding the future sustainability (use max 250 words)

4. Please select which one (or ones) output of the project is more likely successfully exploited in future activities beyond the project end.

- Labs
- Platform
- Educational resources for students
- Educational resources for educators
- On Line Community
- ICT-INOW web site

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