R4.A2

[INVITE_Deliverable_4.2 final]

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Abstract:	The pilot studies provided valuable insights into the structure and execution of hackathons, particularly in the areas of education, technology, and sustainability. By applying structured methodologies, participants were able to engage in innovative problem-solving, collaborative teamwork, and impactful project development. The System Usability Scale (SUS) evaluation indicated that the platform's usability is generally adequate, with an overall score of 69.16. While users found the system easy to learn and effective, areas such as feature integration and complexity reduction require improvement. The feedback also highlighted the need for clear onboarding, structured evaluation criteria, and optimized team formation to enhance participant experience.
Keyword List:	Pilots, Usability, Platform, Hackathons, open-access material, Green Agenda, Education

Consortium

Name	Short Name	Country
1 **AALBORG UNIVERSITY**	AAU	**Denmark**
2 **HELLENIC MEDITERRANEAN UNIVERSITY**	HMU	**Greece**
3 **UNIVERSITA DEGLI STUDI DI TORINO**	UNITO	**Italy**
4 **COLUMBUS PARTNERS**	CP	**France**

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1	31/05/2024	ALL partners	Completion of Guidelines on hackathons and Hackathon Competition Event
2	31/01/2025	ALL partners	Final Submission

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List of Abbreviations

The following table presents the acronyms used in the deliverable in alphabetical order.

Abbreviations	Description
ADDIE	Analysis, Design, Development, Implementation, and Evaluation
SUS	System Usability Scale
SDGs	Sustainable Development Goals
STEAM	Science, Technology, Engineering, Arts, and Mathematics
BMC	Business Model Canvas
SWOT	Strengths, Weaknesses, Opportunities, Threats

Executive Summary

The pilot studies provided valuable insights into the structure and execution of hackathons, particularly in the areas of education, technology, and sustainability. By applying structured methodologies, participants were able to engage in innovative problem-solving, collaborative teamwork, and impactful project development.

The System Usability Scale (SUS) evaluation indicated that the platform's usability is generally adequate, with an overall score of 69.16. While users found the system easy to learn and effective, areas such as feature integration and complexity reduction require improvement. The feedback also highlighted the need for clear onboarding, structured evaluation criteria, and optimized team formation to enhance participant experience.

1   Introduction

Scope

R4 is designed to establish an **Open Interactive Digital Ecosystem** to support the development and implementation of international virtual and blended learning modalities. At its core, the initiative aims to foster collaboration and innovation by creating a repository of open-access materials. These resources will empower educators and learning designers to craft impactful educational experiences. Furthermore, R4 will host hackathons that bring together stakeholders to design solutions addressing pressing global challenges, such as the Sustainable Development Goals (SDGs) and the Green Agenda. By offering these resources under an open commons license, the platform ensures widespread accessibility and adaptability, enabling users to organize hackathons, training sessions, or other collaborative events.

The scope of R4.2 is to pilot study the structure and execution of hackathons, particularly in the areas of education, technology, and sustainability. By applying structured methodologies, participants were able to engage in innovative problem-solving, collaborative teamwork, and impactful project development.

Audience

R4 is tailored to a diverse audience, including teachers, learning designers, educational innovators, and students. The platform encourages active participation from these groups to either create new ideas or critically evaluate existing ones for international blended and virtual projects. By fostering a community of interdisciplinary thinkers, R4 supports the co-creation of projects that address real-world challenges while advancing educational innovation.

Structure

The structure of the document is as follows: Section 2 refers to Platform Pilot Study 1. Section 3 outlines the Platform Pilot Study 2 and Section 4 describes the conclusions of the pilots

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2   Platform Pilot Study

Pilot Study 1

Place and Date: Chania Crete, Greece 27 - 31 May 2024 (**During the 11th International Week and 3rd ATHENA International Week**)
Description: Design a course on Green Agenda using STEM Education and gamification techniques
Goals: Strengthen collaboration, creativity, and innovation. Participants are encouraged to think outside the box and leverage their skills and backgrounds to create impactful educational experiences.

Hackathon description:
This hackathon invites participants to create innovative material by combining education, technology, and sustainability. This collaborative event aims to develop engaging and interactive educational experiences that promote awareness and action on environmental issues. Participants will include gamification principles, and STEM (Science, Technology, Engineering, Arts, and Mathematics) education, to produce dynamic course designs focused on the green agenda that inspire learners to explore ecological concepts and solutions. Using gamification and STEM education, participants will explore creative approaches to engage learners, foster critical thinking, and empower them to become stewards of the environment. Join us in this hackathon to harness the power of education and technology for a greener, more sustainable future.

Hackathon Objectives:
● Alignment with Green Agenda (see attached file "Introduction to the Green Agenda.pptx"): *How effectively does the course design integrate topics related to sustainability and environmental awareness?*
● Innovation and Creativity: *Does the course design demonstrate innovative gamification strategies and creative approaches to engaging learners?*
● Educational Value: *Are the learning objectives clear, and does the course design effectively promote knowledge acquisition and skill development?*
● Feasibility and Scalability: *Can the course design be feasibly implemented and scaled to reach a broader audience?*
● Presentation Quality: *How well does the team communicate their course design, including visuals, storytelling, and overall presentation skills?*

Hackathon Outline:

Figure 1: Typical flow of a hackathon event

THE ADDIE MODEL embraced by the INVITE PROJECT:

Figure 2: THE ADDIE MODEL

Step One:

Hackathon Preparation Day(s) Before start - Until Sunday 26 May 2024

- Registration and Welcome: *Participants sign in, receive materials, and are briefed on the hackathon objectives and rules.*
- Guidance for the registration! (links, and specific course selection EVERY STEP screenshots)
- Training Module Evaluation: *Short questionnaire to assess knowledge on the topic.*

Registration: *https://invite.nile.hmu.gr/modules/auth/registration.php*

1. Follow the link above
2. Select "New Account Registration"
3. Fill the required fields
4. Log in the platform
5. Select OER - Hackathon List
6. Check the Checkbox for Hackathon Chania 27 - 31 2024
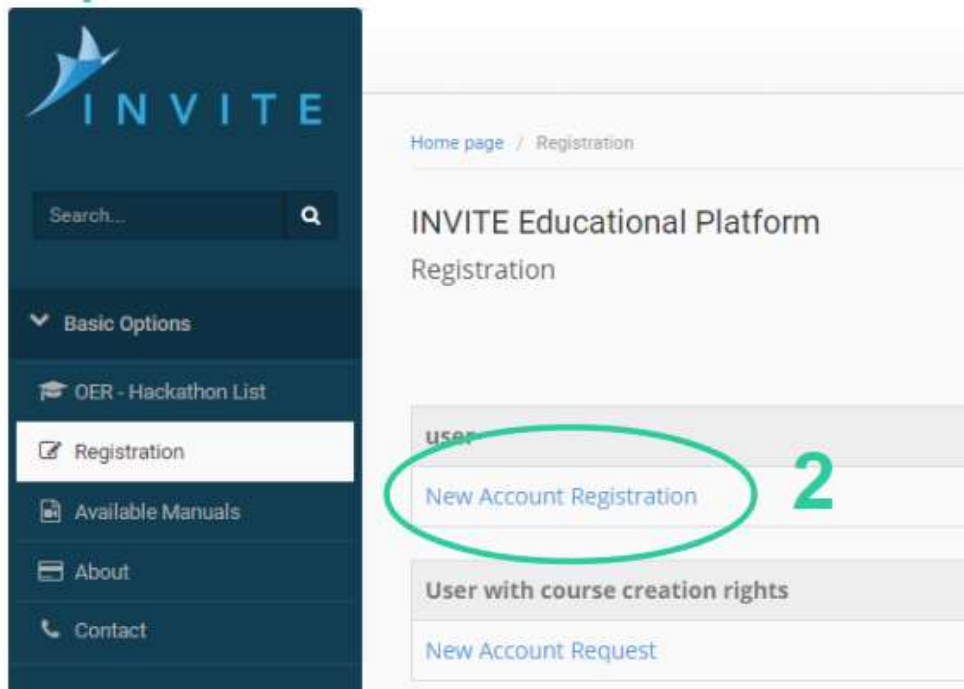7. Congratulations! You just joined the Hackathon!

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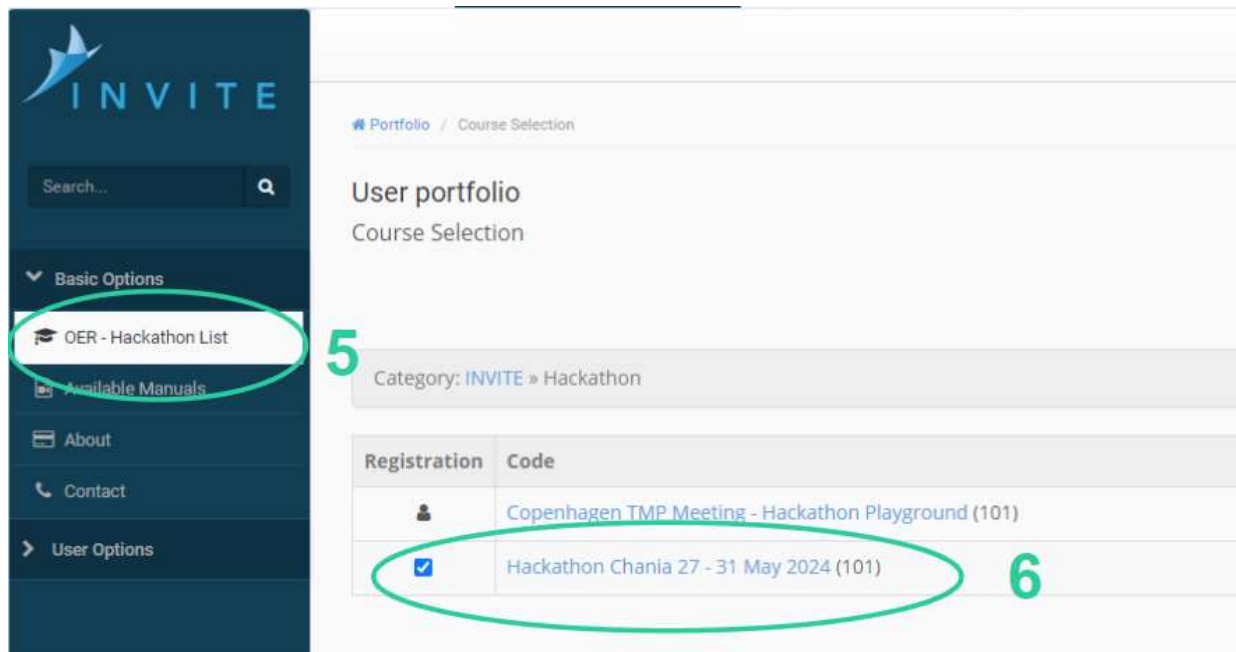of the European Union

Figure 3: User Registration

Figure 4: User Hackathon Choice

Step Two: Hackathon Day One - Monday 27th May 2024

- **Introduction to the Green Agenda:** *Keynote presentation or workshop providing an overview of the green agenda, its significance, and the importance of integrating it into education.*

- **Team Formation:** *Participants form teams based on shared interests, skills, and expertise, ensuring diverse perspectives are represented.*

Hackathon Steps and Period

ADDIE-Phases	Phase Description	Hackathon Steps	Hackathon Period
Registration Training	*Participants sign in, receive materials, and are briefed on the hackathon objectives and rules. Short questionnaire to assess knowledge on the topic.*	**Step One**	**Period: Monday 27.05.2024**
Team Formation	*Participants form teams based on shared interests, skills, and expertise, ensuring diverse perspectives are represented.*	**Step Two**	**Period: Monday 27.05.2024**
Analysis	*Teams conduct research and analysis to identify the target audience, learning objectives, and key topics related to the green agenda.*	**Step Three**	**Period: Tuesday 28.05.2024 to Thursday 30.05.2024**
Design	*Teams develop course outlines, curriculum structures, and gamification strategies, mapping out the sequence of topics, activities, and assessments.*	**Step Four**	**Period: Tuesday 28.05.2024 to Thursday 30.05.2024**
Development	*Teams create prototypes or storyboards for interactive elements, design gamification features, and develop course materials using appropriate tools and platforms.*	**Step Five**	**Period: Tuesday 28.05.2024 to Thursday 30.05.2024**
Implementation	*Teams prepare presentations or demonstrations of their gamified STEM course designs, highlighting key features, learning objectives, and gamification elements.*	**Step Six**	**Period: Tuesday 28.05.2024 to Thursday 30.05.2024**
Evaluation	*Each team presents their course design to the panel of judges and receives feedback on their concept, implementation, and potential impact.*	**Step Seven**	**Period: Tuesday 28.05.2024 to Thursday 30.05.2024**
Award Ceremony And Closing	*Winners of the hackathon are announced, and prizes are awarded. Closing remarks and reflections on the hackathon experience.*	**Step Eight**	**Period: Thursday 31.05.2024**

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Dear students and academics,

We are excited and pleased to **INVITE** you to participate in our

Hackathon event

entitled "Gamified STEM Course Design on Green Agenda"

held from 27/5/2024 - 30/5/2024

during the 11ᵗʰ International Week and 3ʳᵈ ATHENA International Week.

The event is hosted in an excellent platform for innovation, collaboration, and learning, providing a unique opportunity to engage with individuals and showcase ideas. The platform was developed for the Erasmus+ project "INVITE" that aims to inspire new modes of international virtual and blended methodologies in higher education.

If you wish to participate, follow the steps to complete your registration!

For more information contact us or follow us!

Website: https://invite-erasmus.eu/

LinkedIn: INVITE Erasmus+ Project

Email: invite.project.erasmus@gmail.com

AALBORG UNIVERSITET

Columbus ASSOCIATION

UNIVERSITÀ DI TORINO

Results

To test the usability of the platform we used the System Usability Scale (SUS) Questionnaire which contains 10 questions. The SUS Questionnaire is a widely used tool for assessing the usability of a system, based on 10 questions. Each question contributes to a score out of 100, which provides a quantitative measure of the system's usability.

The resulting score from the **X** participants was 69.16. This suggests that the usability of the platform is adequate but may require some improvements. The averages scores (**Table X**) of each question can further assist in understanding the features needing improvements.

Table 1. SUS Questionnaire with average scores, standard deviation, variance and coefficient of variation

Question	Average score	Standard Deviation	Variance	Coefficient of Variation (%)
1. I think that I would like to use this system frequently	3.67	1.53	2.33	41.7
2. I did not find the system unnecessarily complex	3.33	1.53	2.33	46.0
3. I thought the system was easy to use	3.67	1.53	2.33	41.7
4. I think that I would not need the support of a technical person to be able to use this system	4.0	1.15	1.32	28.8
5. I found the various functions in this system were well integrated	3.33	0.47	0.22	14.1
6. I did not think there was too much inconsistency in this system	3.67	0.47	0.22	12.8
7. I would imagine that most people would learn to use this system very quickly	4.00	1.00	1.00	25.0
8. I did not find the system very cumbersome to use	4.00	1.00	1.00	25.0
9. I felt very confident using the system	4.00	1.00	1.00	25.0
10. I did not need to learn a lot of things before I could get going with this system	4.00	1.00	1.00	25.0

- **Question 1 (3.67):** This question typically asks about how strongly users feel the system is easy to use. A score of 3.67 is above average, indicating that users find the system somewhat easy to use.
- **Question 2 (3.33):** This question often reflects users' confidence in the system. A score of 2.67 is lower, suggesting that users may not feel very confident when using the system or might find it somewhat cumbersome.
- **Question 3 (3.67):** This score mirrors the ease of learning or use of the system. A similar score to Question 1 suggests that while the system might be fairly easy to use, other factors may influence user satisfaction.
- **Question 4 (4.0):** This score is concerning and indicates a significant usability issue. This question might relate to the consistency of the system or how intuitive it is. Users might find certain features confusing or not straightforward.
- **Question 5 (3.33):** This question often pertains to whether the features in the system are well integrated. A score of 3.33 suggests that users feel the system's features are somewhat cohesive, though there is still room for improvement.
- **Question 6 (3.67):** The score here suggests that users might find the system unnecessarily complex or difficult to navigate. This question may be related to how cumbersome or frustrating users find the system.

- **Question 7 (4.0):** This is a high score, which usually reflects users' confidence in using the system or their belief that the system has a high degree of functionality. This is a positive indicator.
- **Question 8 (4.0):** This score could indicate light dissatisfaction with specific features or the overall user experience, perhaps relating to how difficult users find certain tasks within the system.
- **Question 9 (4.0):** Similar to Question 7, this score is positive, suggesting that users feel the system is effective and has a high level of functionality.
- **Question 10 (4.0):** This score might suggest that users are unhappy with some aspect of the system's functionality, possibly in relation to error handling or how much they need to learn to use the system effectively.

Areas of Strength:
- **Questions 4, 7, 8, 9, and 10 (4.00):** These high scores indicate that users generally find the system intuitive, easy to learn, and effective. They do not perceive the system as cumbersome or requiring extensive learning, which is a significant strength.
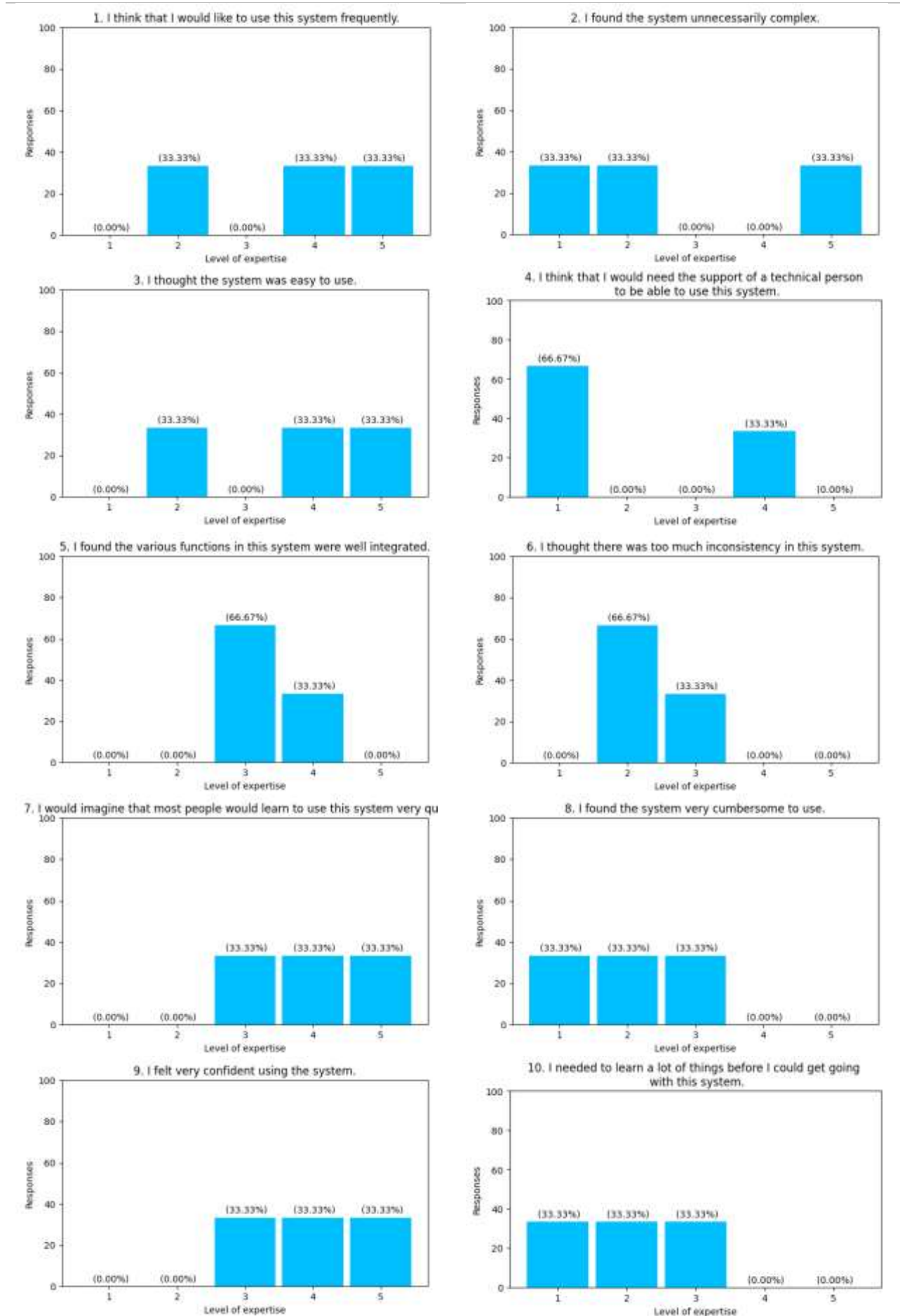
Areas for Improvement:
- **Questions 2 and 5 (3.33):** These scores suggest that while users do not find the system excessively complex or poorly integrated, there are aspects that could be improved. Addressing these areas could enhance overall user satisfaction.
- **Questions 1 and 3 (3.67):** Users find the system fairly easy to use and are generally positive about using it frequently. This suggests that while the system is user-friendly, there is room to enhance its appeal and ease of use further.
- **Question 6 (3.67):** This indicates that users perceive the system as relatively consistent, but further refinements could be made to reduce any remaining inconsistencies.

The standard deviation, variance, and coefficient of variation from Table 1 are reflected in the responses in Table 2, providing insight into user feedback. Notably, Questions 5 and 6, which have the lowest average scores, also exhibit the most consistent responses, as indicated by their low standard deviation, variance, and coefficient of variation. This consistency contrasts with the higher variability observed in the other questions, where standard deviations and coefficients of variation are significantly higher, reflecting more diverse user experiences across those areas. Questions 1 to 3 had the higher standard deviations meaning the responses were widely varied.

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Table 1: SUS Questionnaire Answer

1. I think that I would like to use this system frequently.

2. I found the system unnecessarily complex.

3. I thought the system was easy to use.

4. I think that I would need the support of a technical person to be able to use this system.

5. I found the various functions in this system were well integrated.

6. I thought there was too much inconsistency in this system.

7. I would imagine that most people would learn to use this system very qu

8. I found the system very cumbersome to use.

9. I felt very confident using the system.

10. I needed to learn a lot of things before I could get going with this system.

In the SUS framework, the questions can be further grouped into **subcategories** that address specific aspects of usability:

1. Learnability:

This subcategory focuses on how easy it is for new users to learn to use the system.

- **Strengths:** The high score in Question 7 (4.0) suggests that users believe the system has the potential to be learned quickly by most people, indicating a positive perception of learnability.
- **Weaknesses:** However, the low scores in Questions 4 (4.0) and 10 (4.0) indicate that users feel they need significant support or that the system has a steep learning curve. These contradictory insights suggest that while the system might be straightforward for some users, others find it challenging, likely due to the need for better onboarding or user support.

2. Efficiency:

This subcategory measures how efficient users find the system once they have learned it.

Analysis:

- **Strengths:** The relatively high scores in Questions 1 (3.67), 5 (3.33), and 9 (4.0) suggest that users find the system efficient once they understand it. Users feel confident in their ability to use the system effectively and believe the system functions are fairly well integrated.
- **Weaknesses:** The score in Question 5 (3.33) is slightly lower, indicating that there might be some integration issues between different system functions that could impact efficiency. This suggests a need for improvements in how different features work together to create a smoother, more cohesive experience.

3. Effectiveness:

This subcategory assesses how effectively users can complete their tasks using the system.

Analysis:

- **Strengths:** The score in Question 3 (3.67) indicates that users generally find the system easy to use, which is a positive indicator of effectiveness.
- **Weaknesses:** However, the lower scores in Questions 2 (3.33), 6 (3.67), and 8 (4.0) point to significant issues with complexity, inconsistency, and cumbersome usage. These factors are likely hindering the system's effectiveness, making it difficult for users to accomplish tasks smoothly. Addressing these issues could lead to a significant improvement in the system's overall effectiveness.

4. Design Quality:

This subcategory evaluates how well the system's design supports user interaction and overall usability.

Analysis:

  Strengths:

  - **Question 8 (4.00):** This score is relatively high, indicating that users generally do not find the system very cumbersome to use. This suggests that, overall, the system's design supports user interaction well and does not introduce significant complexity or difficulty.

  Weaknesses:

  - **Question 5 (3.33):** The score here is lower compared to Question 8, indicating that while the system's features are integrated, there is still room for improvement. Users may perceive some issues with how well the different features work together, which could impact the overall cohesion of the design.
  - **Question 6 (3.67):** This score indicates that there may be some inconsistency in the system, which could affect the overall user experience. Users might find certain aspects of the design less intuitive, suggesting a need for improvements to enhance design consistency and usability.

Summary of Subcategory Analysis

1. **Learnability:**
   - **Overall Positive:** High scores in Questions 4, 7, and 10 suggest that the system is perceived as easy to learn and use, with users feeling that minimal support is needed.
2. **Efficiency:**
   - **Positive with Room for Improvement:** While users feel confident in using the system (Q9: 4.00) and can use it frequently (Q1: 3.67), the slightly lower score for integration (Q5: 3.33) indicates that improvements in how features work together could enhance efficiency.
3. **Effectiveness:**
   - **Areas for Improvement:** Users find the system generally easy to use (Q3: 3.67) but face challenges with complexity (Q2: 3.33), inconsistencies (Q6: 3.67), and potential cumbersome aspects (Q8: 4.00). Simplifying the system and improving consistency could enhance its effectiveness.
4. **Design Quality:**
   - **Mixed Results:** While Question 8 (4.00) indicates that users do not find the system very cumbersome, suggesting a positive aspect of the design, Questions 5 (3.33) and 6 (3.67) reveal areas where the system's design could be improved. Specifically, the lower score for Question 5 suggests that feature integration could be better, while the lower score for Question 6 points to potential issues with design consistency.

Table 2: Hackathon Event Questions

7. Were the Hackathon evaluation criteria clear?
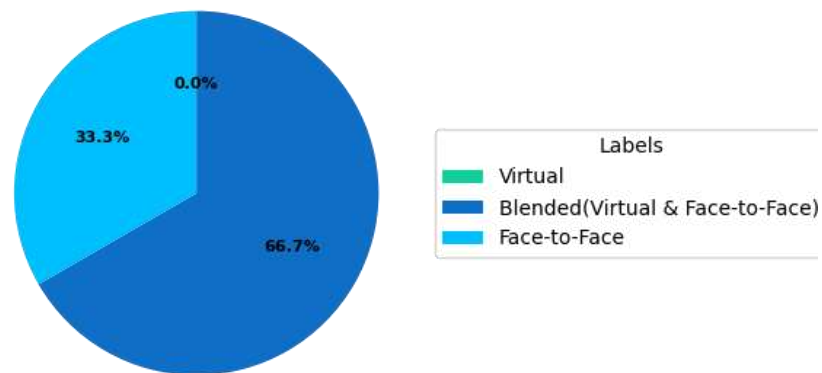
8. How did you find the duration of the hackathon?
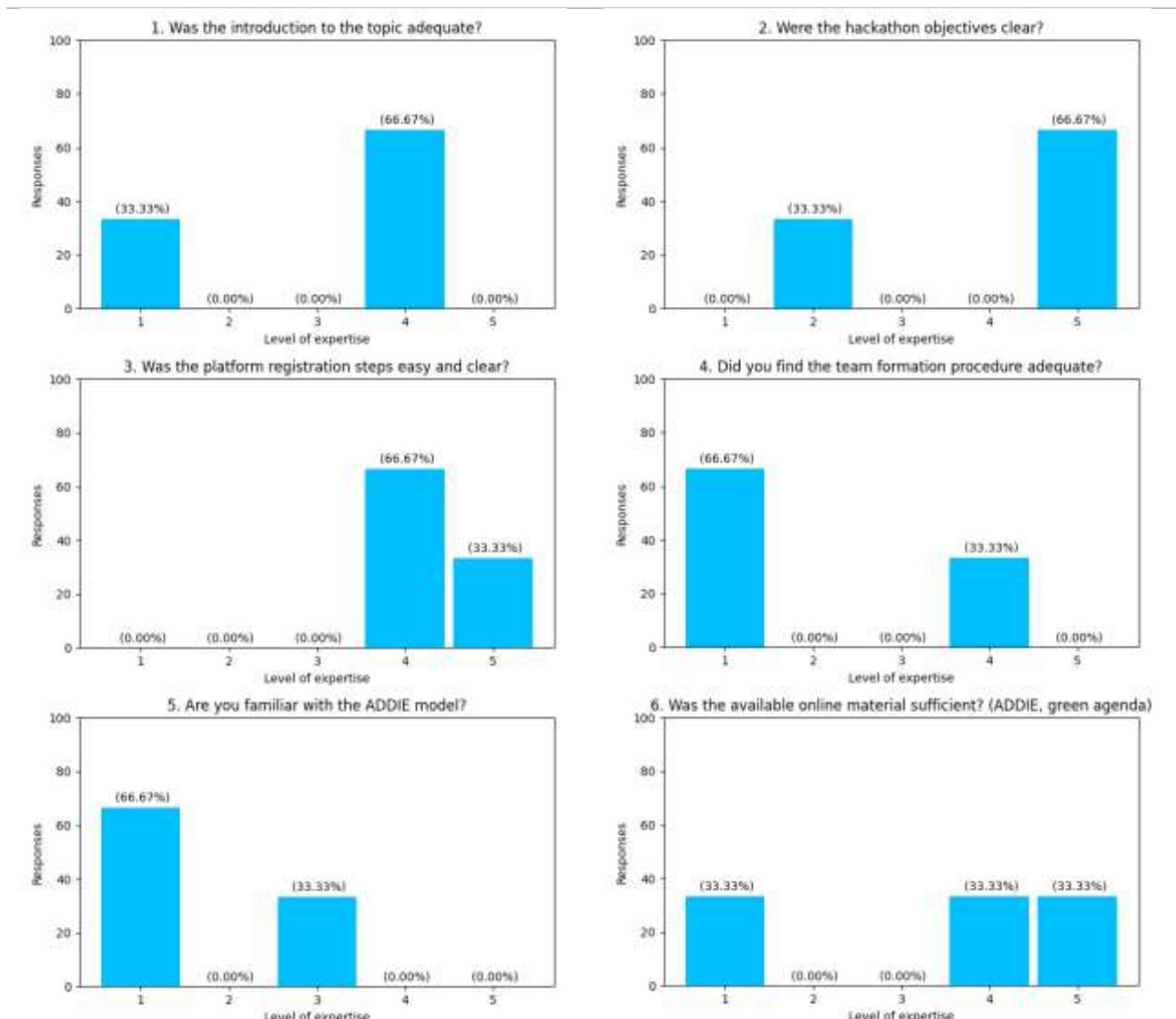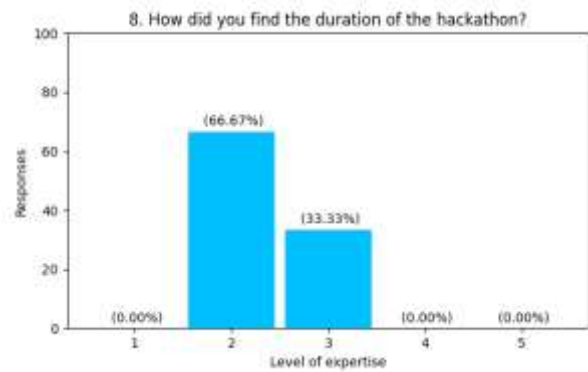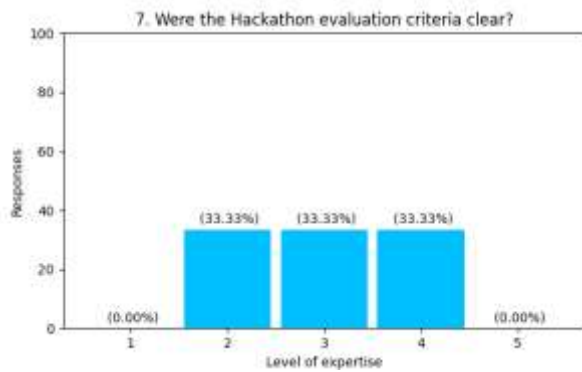
9. Would you prefer the Hackathon event to be:

Labels
- Virtual
- Blended(Virtual & Face-to-Face)
- Face-to-Face

Table 3: Pilot Hackathon Results Summary

Hackathon Stage	Hackathon Action	Conclusions	Future Proposed upgrades	Issue Type
PRE-Event	Promotion	More intensive promotion plan/actions are needed to attract a greater number of participants	Constant reminders to the target audience via emails and posts on social media. Also if it is applicable, during the event have a booth with 1-2 staff members	**Procedural**
	Registration process	Registration menu in the platform was hard to find	Add registration button under login	**Technical (Platform)**
		Category selection can be very confusing	We should remove this mandatory selection from the registration form	**Technical (Platform)**
		"Course Options" title should be renamed	Find a different name	**Technical (Platform)**
	Hackathon Topic	They got discouraged because they did not know the topic very good (STEM or gamification or green	Make sure to match participants profile with hackathon theme **Provide prior registration**	**Hackathon Topic**

		agenda) and they felt anxious to participate	**enough relevant material and literature references**	
	Joining Course-Hackathon	When they confirm their email sometimes the checkbox options aren't available	We should check why this happens	**Technical (Platform)**
EVENT	Roles	What does the mentor's role mean? What do they do?	Provide a clear explanation of the mentor role prior to the event. *Mentors can be either guiding the participants actively (expressing opinions and providing guidance) or can have a more passive role (answering questions and solve technical problems)*	**Procedures / Organising**
		Mentors during event	Maybe the mentors should not be in a specific group, and rotate in every group. This way they will act better as assistants minimizing possible over-assisting or influencing participants.	**Procedures / Organising**
	Workshops & presentations	Not enough open sessions during the hackathon	We should have presentations on the opening day, and some open sessions - workshops on the next days.	**Procedures / Organising**
	Login process	Username with email can be confusing	Make them the same, or better highlight the username and email.	**Technical (Platform)**
	Groups	Participants wanted to see the group members before registration The way of joining the group should change. We can state that many users in Chania requested to be randomly assigned as this should promote international collaboration.	We should rethink how to organize the groups. Probably we should register the participants into groups, and not let them on their own. Both solutions must be provided. Some participants may be discouraged if the cannot form a team with friends/colleagues	**Procedures / Organising**
	Deadline	They thought it was too short	Make sure that the desired project can be produced during the given timeframe	**Procedures / Organising**
	Submissions	Participants wanted to work with other persons to	This should be discussed because some people	**Procedures /**

Post-Event		complete the task. When they did not find anyone else they just did not submit something.	wanted to be alone (or didn't care) but others really wanted to work with others.	**Organising**
	Rewards	Rewards were not announced before the Hackathon. A selection of local wines was decided as a reward during the event which did not work.	Rewards **MUST** be clear. Rewards **MUST** be announced at the promotion stage. Rewards **MUST** tempt more people to participate.	**Procedures / Organising**

One of the most important suggestions from participants was about team formation. One participant said that "*team formation should be improved to be more transparent and enhanced*".

3   Platform Pilot Study 2

Pilot Study 2

Place and Date: Digital Hackathon 13 & 14 November 2024 (DigiEduHack 2024)
Description: Green Campus Hackathon: Building Digital Solutions for SDG and Green Agenda Integration in University Life
Goals: Enhancing problem-solving components, focusing on Sustainable Development Goals and Green Agenda-related topics, including an international and intercultural dimension.

Hackathon description:
Participating in this hackathon will be a transformative experience, designed to broaden horizons, cultivate essential skills, and build lifelong connections with like-minded individuals from around the world. By fostering international collaboration, creativity, and innovation, participants will make a real impact on campus life, shaping a more sustainable and inclusive future.

This event encourages participants to think outside the box, utilizing their unique skills and backgrounds to create meaningful and impactful solutions. Through a dynamic and immersive experience, participants will enhance their creativity, expand their knowledge on key topics, and sharpen their problem-solving and critical thinking abilities—all while developing competencies vital for sustainable development.

Hackathon Objectives:

- By enhancing international collaboration, creativity, and innovation participants will make a real impact in campus life.

- Participants are encouraged to think outside the box and leverage their skills and backgrounds to create impactful experiences.

- Hackathon participation fosters creativity and topic knowledge, encourages creative problem-solving and critical thinking while at the same time attending key competencies for sustainable development.

Hackathon Outline:

Hackathon Description in a Nutshell

Green Campus Hackathon: Building Digital Solutions for SDG and Green Agenda Integration in University Life

Participants separated into teams will have to produce solutions that could be implemented into Universities' strategic planning to enhance sustainable and green development according to the 2030 Agenda for Sustainable Development Goals (SDGs) or other Green Agenda policies and measures.

Solutions should address an environmental problem within universities according to local, national, European, or international Green Agenda policies and measures or/and the environmental-related SDGs goals:

Team projects could address one or more environmental SDGs or Green Agenda objectives.

Teams will present their idea by uploading only a short pitching video (3 minutes max duration) describing their solution and its impact which will be evaluated by both a jury and co-teams to appoint the winning team.

Hence, this hackathon challenge invites participants to co-create innovative, sustainable environmental solutions applicable to international settings. Solutions should be presented attractively by combining the following features:

- **Battling a problem** and **providing a solution** related to SDGs and Green Agenda objectives
- **Creating a strong impact** that could be reaped by many Universities around the globe (universality)
- **Validating the idea** in terms of sustainability and feasibility
- **Including a clear plan** with financial viability

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Hackathon Duration

The total duration of the hackathon was **24 hours splitted in 2x12 hours sessions** (Day 1 & Day 2).

This format was chosen to accommodate the majority of the participants (considering the time difference among countries). For this reason, we hosted a **pre-hackathon session** the afternoon prior of the hackathon event where kick-off meeting, team building activities & the meet the mentors session took place.

A detailed schedule of each day (Day -1, Day 1 and Day 2) was provided within the next pages along with important information regarding each session's structure and requirements.

Agenda Day - 1 (pre - hackathon session)

DATE: Tuesday, 12 November 2024				
When?	**What?**	**How?**	**For whom is it intended?**	**Mandatory to attend?**
16:00 - 17:00 CET	Kick-off session	Online	Everyone	Advisable
17:00 - 17:30 CET	Team building activities	Online	Participants	Advisable
17:30 - 18:00 CET	Meet the mentors	Online	Participants, Mentors	Advisable

Agenda Day 1 (hackathon event)

DATE: Wednesday, 13 November 2024				
When?	**What?**	**How?**	**For whom is it intended?**	**Mandatory to attend?**
09:00 - 09:30 CET	Welcome session & questions/clarifications	Online	Everyone	Advisable
09:30 - 21:00 CET	Project ideation	Online or/and in-person	Participants, Mentors	No

Agenda Day 2 (hackathon)

DATE: Thursday, 14 November 2024				
When?	**What?**	**How?**	**For whom is it intended?**	**Mandatory to attend?**
09:00 - 09:30 CET	Welcome back session & questions/clarifications	Online	Everyone	Advisable
09:30 - 17:00 CET	Project finalization & pitch deck preparation	Online or/and in-person	Participants, Mentors	No
17:00 - 18:00 CET	Project submission	Online	Participants	Yes
18:00 - 20:00 CET	Project evaluation	Online, voting on a platform's wall	Participants, Jury	Yes
20:00 - 21:00 CET	Award nomination	Online	Everyone	Advisable

Participants Registration

Participants were able to register from **7/10/2024 to 10/11/2024**.

Upon registration, participants completed the **"Profile completion"** field. They registered individually on the hackathon platform but had the option to mention the names of other participants with whom they wanted to form a team in the **"Team request"** field.

It was important to note that at least **one member from each team** also had to register for the event within **DigiEduHack 2024**

For communication and collaboration, participants joined the **DigiEduHack Discord Server**

Participants Toolbox

Participants were advised to carefully read the supportive material and documents provided within the platform.

This material included three short presentations covering the following topics:

- Green Agenda Policies
- Sustainable Development Goals (SDGs)
- Project Ideation and Pitch Deck Presentation

These resources were essential in helping participants understand key sustainability concepts, refine their project ideas, and effectively communicate their solutions.

Team formation

As mentioned prior, participants were registered individually in the platform. In the case of an already formed group, registered participants had to fill the "Team request" form, providing their co-team members' names.

Each team had a minimum of 3 members and a maximum of 5 members.

Individual registration was possible for participants who were looking for a team. In such cases, organizers formed the teams by taking into account participants' profiles (shared interests, skills, expertise) to ensure diverse perspectives were represented. Pre-formed teams with 2 members were assigned at least 1 extra member.

Team formation was performed by organizers upon registration completion (11 November 2024).

During the pre-hackathon event (12 November 2024), a team-building session took place, and breakout rooms were created to foster participants' engagement and collaboration through ice-breaking activities.

Hackathon event rules

- Teams had to consist of 3 to 5 members. Smaller or larger teams were not allowed.

- All pitch deck videos had to be submitted prior to 18:00 CET on November 14, 2024, to be evaluated. Late submissions resulted in disqualification.

- The duration of pitch deck videos was limited to a maximum of 3 minutes. Videos exceeding this duration resulted in disqualification.

- Every project solution submitted had to be original work created by the team members specifically for this hackathon. The use of previous work, plagiarism, or extensive use of AI led to disqualification.

- Participants were required to adhere to a code of conduct that promoted inclusivity, respect, and professionalism. Any form of harassment, discrimination, or inappropriate behavior was strictly prohibited.

- Participants had to comply with ethical standards and rules set by the organizers. Any form of cheating or unfair practices resulted in immediate disqualification.

- Participants retained full ownership of the intellectual property rights to their projects. However, organizers and the INVITE consortium were permitted to share the projects with the wider community after the Hackathon to disseminate the results and fulfill INVITE project requirements.

- The intellectual property guidelines of the DigiEduHack 2024 competition were available at: DigiEduHack IP Guidelines 2024

- Participants consented to the use of their photographs, videos, or project details by the organizers and the INVITE consortium for project outputs, promotional, or media purposes.

- The Hackathon awarded winning teams based on the judging criteria and evaluation scores.

- Organizers reserved the right to make changes to the Hackathon rules, format, or awards at any time. Any modifications were communicated to participants in a clear and timely manner.

Project brainstorming

For the purposes of this hackathon, all ideation tools were valid, and none was considered wrong! Participants had the freedom to choose from a wide variety of tools found in the literature to enhance their brainstorming activities, including SWOT analysis, Business Model Canvas (BMC), lean startup methods, mind mapping, and more.

To clarify, the project ideation methodology used by participants was neither evaluated nor submitted as part of their final solution. These tools served as guides to help teams define the goals and objectives of their proposed solution, identify strengths and weaknesses, and explore the feasibility and sustainability of their project idea. More details were available in the "Project Ideation and Pitch Deck Presentation" section.

Selecting the right ideation/brainstorming tool depended on multiple factors, including team size, project goals, and team members' work or study preferences.

For those seeking a simplified approach, the BMC template was slightly modified to better suit the hackathon's purpose. This customized template could be found in the "Project Ideation and Pitch Deck Presentation" section of the Participants' Toolbox.

Pitch deck video presentation

Independently of how teams proceeded with their brainstorming activities, the final project had to be submitted ONLY in the form of a pitch deck video presentation. No other documents were required or submitted for the evaluation phase.

The pitch deck presentation had to be a video of up to 3 minutes, uploaded on the INVITE platform's wall and on DigiEduHack. Judges and other teams were able to watch the videos on the platform's wall and evaluate each team's idea, creativity, and presentation skills.

A pitch deck presentation served as a quick teaser of an idea, designed to grab the listener's attention and spark curiosity. Unlike live pitch presentations, a video pitch conveyed more information per second and allowed teams to rehearse, record, modify, and optimize their presentation for maximum impact.

A detailed explanation of what a pitch deck presentation entails, along with useful tips, was provided in the "Project Ideation and Pitch Deck Presentation" document, available in the Participants' Toolbox.

Mentorship

Teams were assigned to specific mentors throughout the hackathon event.

Each hackathon participant received an email one day prior to the event, which included details about their team number, co-team members, and assigned mentor.

During the "Meet the Mentors" session (Day -1), teams had the opportunity to connect with their mentors and discuss communication channels as well as schedule mentoring session slots, depending on the mentor's availability.

Tip: During the event, before reaching out to their mentor, teams were highly advised to prepare a quick pitch of their early project idea. This allowed mentors to provide focused feedback and constructive comments, helping teams refine their solutions more effectively.

Judging criteria

The hackathon projects were evaluated based on the following criteria, with a maximum score of 100 points:

Relevance (0-20 points)
- How effectively did the proposed solution align with Green Agenda and SDGs objectives?
- Did it provide a solution to a universal environmental problem?

Originality (0-20 points)
- To what extent was the solution an original idea?
- Did it incorporate innovative elements?

Feasibility (0-20 points)
- Could the solution be feasibly implemented?
- Was it practically possible and economically efficient?

Sustainability (0-20 points)
- To what extent did the team address the sustainability of the solution in the short, medium, and long term?

Presentation Quality (0-20 points)
- How well did the team communicate their idea, design, and necessity?
- Did the presentation effectively utilize visuals, storytelling, and overall pitch deck video performance?

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Evaluation process

Pitch Deck Video Submission & Voting Process

Teams were required to upload their pitching videos on the hackathon's wall on November 14th, between 17:00-18:00 CET, allowing other teams and jury members to watch and vote. Additionally, participants had to upload their final video solutions on the DigiEduHack platform within the same time frame for their submissions to be considered valid.

Jury Evaluation Process
● The jury members, consisting of guest experts invited by the consortium, individually evaluated the pitch deck videos.
● They submitted an evaluation sheet to the organizers, assigning scores from 1 to 20 based on the judging criteria.
● Organizers calculated the final jury score per team by summing up and averaging the scores from the judging committee.

Participant Voting System
● Participants were able to watch the pitch deck videos on the platform wall and vote for their favorite projects using the like button.
● The video with the most likes received 100 points, the 2nd most liked video received 90 points, the 3rd most liked video received 80 points, and so on, up to the top 10 teams being ranked accordingly.
● In the case of equal likes, both teams received the same number of points.

Final Scoring Calculation
● Jury points accounted for 70% of the overall score.
● Participant votes accounted for 30% of the overall score.
● Organizers developed an algorithm to calculate the final score per team based on these weightings.

Awards

Hackathon Awards & Prizes

1st Place Award:
● €250 cash prize
● 3 mentorship sessions with the INVITE consortium to enhance the development of the winning idea, including guidance on applying for external funding
● Certificate of Winner
● Opportunity to compete for the DigiEduHack global prizes in the "Beginner Award: Social Impact" category

2nd Place Award:
● €150 cash prize
● Certificate of Runner-up

For All Participants:
● Certificate of Participation

Awards nomination

Prizes were awarded in a synchronous meeting on the 14th of November from 20:00-21:00 CET.
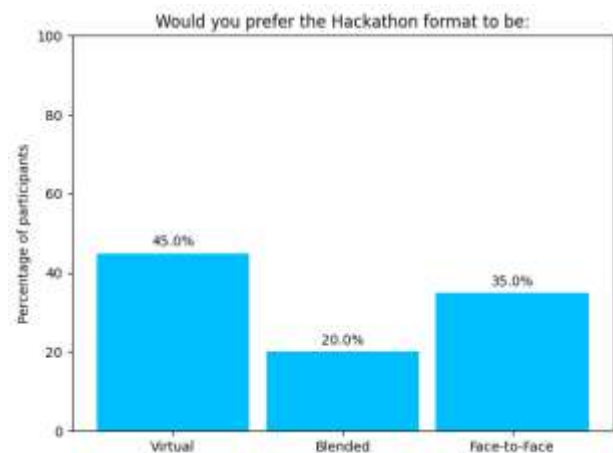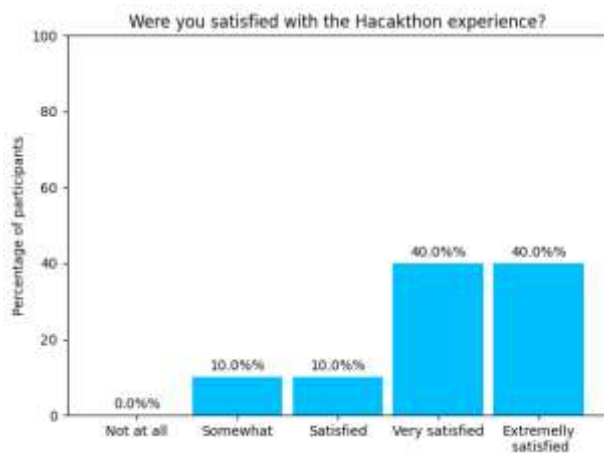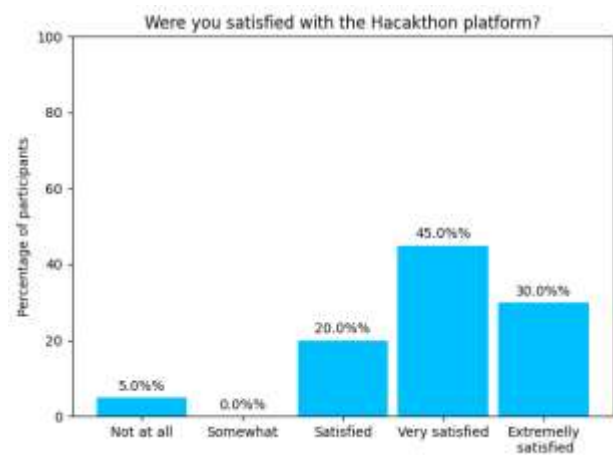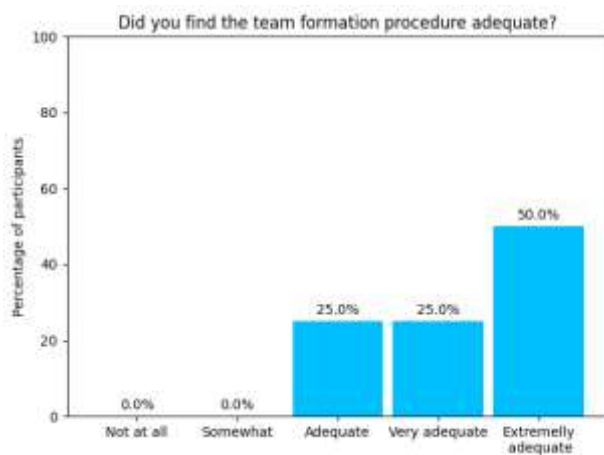
Winning teams had the opportunity to present and discuss their projects/solutions with the audience.
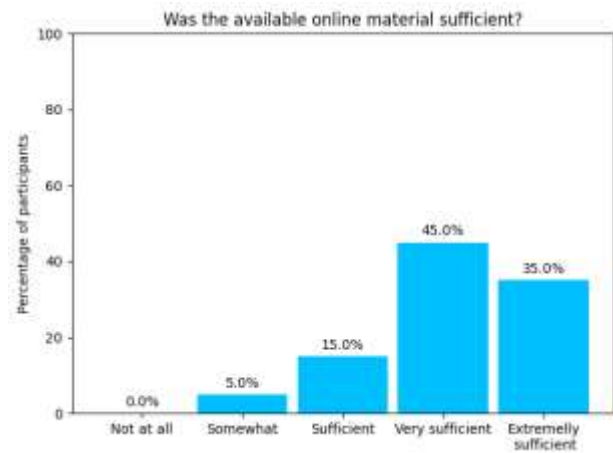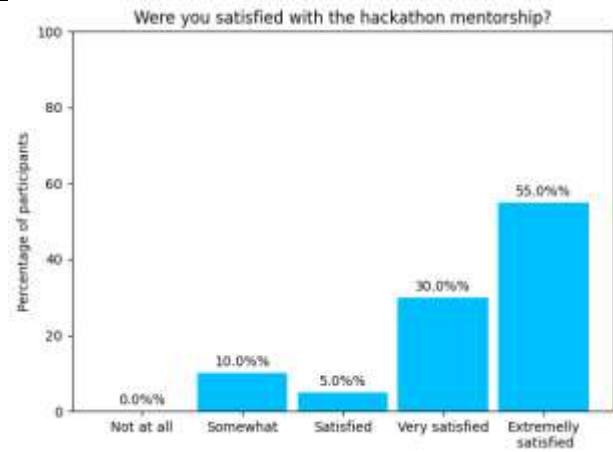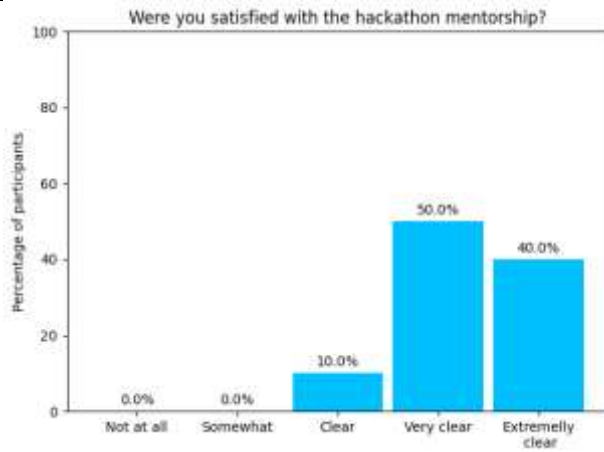
Also, the winning team's project solution was announced in DigiEduHack immediately after the event. A DigiEduHack judging committee reviewed all DigiEduHack local hackathon winners to identify finalists to be voted upon by the general public. The winning team had to fill in further information about their solution for the Steering Group evaluation (within 10 days) in order to compete with the other teams of the DigiEduHack Challenge for the global award contest.

The global awards included prizes such as a series of interactive seminars/tailor-made learning paths, DigiEduHack hoodies, the DigiEduHack ambassador title, and many more.

More details were available at: DigiEduHack Beginner Award: Social Impact.

Results

Were you satisfied with the hackathon mentorship? / Were you satisfied with the hackathon mentorship? / Was the available online material sufficient?

Do you have any further comments or suggestions for the Hackathon?	
Answers	**Number of answers**
I think it would be a good idea to add a little demo of the idea into an application or website	**2**
Not a big fan of the likes system. It creates conflict of interest where you reward the other team at the expense of your own	**1**
No	**8**
Maybe the Canva should be taken also into consideration or to give some points during the hackathon for submitting different stages of the project?	**1**
It would be good to give more time	**1**

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Do you have any further comments or suggestions for the Hackathon?	
Not at all	**1**
The hackathon went smooth. My only remark is that i couldn't join the award ceremony so i had one of my colleagues share their screen from me on another app	**1**
Was really good!	**1**

1. Online Material Sufficiency

Analysis:
- Strengths: A majority of participants found the online materials to be highly sufficient, with 45% rating them as "Very sufficient" and 35% as "Extremely sufficient." This indicates that the provided materials were generally well-received and met user needs.
- Weaknesses: A small percentage (5%) rated the materials as only "Somewhat sufficient," indicating that some users may have felt that more resources or clarity were needed. There were no participants who found the materials completely insufficient.

2. Hackathon Mentorship Satisfaction

Analysis:
- Strengths: The majority of participants were satisfied with the mentorship, with 30% rating it as "Very satisfied" and 55% as "Extremely satisfied." This suggests that the mentorship experience was effective and well-received.
- Weaknesses: A small number of participants (10%) felt that the mentorship was only "Somewhat" satisfactory, and 5% were simply "Satisfied." While the dissatisfaction is minimal, it could indicate that a few participants expected more personalized or in-depth guidance.

3. Hackathon Mentorship Clarity

Analysis:
- Strengths: A large percentage of respondents (50%) rated the mentorship as "Very clear," and 40% found it "Extremely clear." This indicates that most participants found the guidance provided during the hackathon to be easy to understand and helpful.
- Weaknesses: 10% of participants rated the mentorship as only "Clear," which could suggest that certain explanations or instructions were not entirely intuitive for everyone. No participants rated it as "Not at all clear," which is a positive outcome.

4. Hackathon Format Preference

Analysis:
- Strengths: The preferred format among participants is "Virtual" (45%), followed by "Face-to-Face" (35%). This suggests that most participants appreciate the flexibility of an online format while still valuing in-person interactions.

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- Weaknesses: The "Blended" format was the least preferred (20%), which might indicate that participants either prefer a fully virtual or fully in-person experience rather than a mixed approach. Understanding the reasons behind this preference could help in future event planning.

5. Hackathon Experience Satisfaction

Analysis:
- Strengths: Overall, the experience was well-received, with 40% rating it as "Very satisfied" and another 40% as "Extremely satisfied." This suggests that most participants had a positive experience.
- Weaknesses: A small group (10%) rated their experience as "Somewhat" satisfying, and another 10% were just "Satisfied." While these numbers are low, they indicate that there may be room for improvement in certain aspects of the hackathon, such as organization, engagement, or support.

6. Hackathon Platform Satisfaction

Analysis:
- Strengths: The platform used for the hackathon was well-received, with 45% rating it as "Very satisfied" and 30% as "Extremely satisfied." This suggests that most users found the platform functional and effective.
- Weaknesses: While only 5% rated their experience as "Not at all" satisfactory, 20% rated it as just "Satisfied." This could indicate that some users encountered minor usability or accessibility issues with the platform that could be improved.

7. Team Formation Procedure Adequacy

Analysis:
- Strengths: Half of the participants (50%) found the team formation process "Extremely adequate," while 25% rated it as "Very adequate." This suggests that most participants were satisfied with how teams were formed and assigned.
- Weaknesses: 25% of participants rated the process as only "Adequate," which may indicate that some had challenges in team matching, communication, or collaboration. There were no participants who found it "Not at all adequate" or "Somewhat adequate," which is a strong indicator of overall success.

8. Do you have any further comments or suggestions for the Hackathon?

The open-ended responses provide qualitative insights into participants' experiences, highlighting what went well and potential areas for improvement. Below is a categorized summary of the feedback:

1. Positive Feedback
- "The hackathon went smooth. My only remark is that I couldn't join the award ceremony, so I had one of my colleagues share their screen for me on another app." (Repeated twice)
- "Was really good!"

Strengths Identified:
- Participants generally had a smooth and positive experience.

- No major technical or organizational disruptions were mentioned.
- The structure of the event was appreciated.

Potential Improvement:
- Some participants faced difficulties joining the award ceremony, which may indicate a need for clearer communication or alternative access options.

2. Suggested Improvements
- "I think it would be a good idea to add a little demo of the idea into an application or website."
- "Maybe the Canva should be taken also into consideration or to give some points during the hackathon for submitting different stages of the project?"
- "It would be good to give more time."

Key Takeaways for Improvement:
- Prototype/Demo Addition: Participants suggested incorporating a demo phase into an application or website, which could enhance the evaluation process and make ideas more tangible.
- Evaluation Enhancements: A proposal was made to include additional criteria, such as Canva-based submissions or staged project assessments, which could lead to a more structured evaluation system.
- Extended Time: Some participants felt more time could improve project quality and reduce pressure.

3. Concerns About Voting System
- "Not a big fan of the likes system. It creates a conflict of interest where you reward the other team at the expense of your own."

Key Concern:
- The voting system based on "likes" may be problematic, as it can lead to strategic voting rather than genuine evaluation. This suggests that the organizers should consider alternative scoring mechanisms to ensure fairness.

4. Neutral/Non-Actionable Responses
- "No" (8 participants)
- "Not at all" (1 participant)

Observation:
- A significant number of participants did not have additional feedback, suggesting that many were satisfied with the overall experience.

Summary of Key Takeaways

Positive Aspects:
- The event was generally well-received and smooth.
- Most participants did not face major difficulties.
- The structure was appreciated.

Areas for Improvement:

1. Enhance Accessibility for the Award Ceremony: Consider alternative options for participants who cannot join live.
2. Improve Project Evaluation Methods: Introduce a prototype/demo phase and consider a more structured scoring system beyond the "likes" method.
3. Adjust Time Allocation: Providing more time could allow teams to refine their projects further.
4. Fairer Voting System: Address potential biases in the current voting system to avoid conflicts of interest.

Summary of Subcategory Analysis

- Online Material Sufficiency: Strongly positive; however, minor improvements could be made to ensure clarity for all users.
- Hackathon Mentorship Satisfaction: Generally well-received, but some users might require more personalized or detailed guidance.
- Hackathon Mentorship Clarity: High clarity, though a small percentage may need additional explanations or support.
- Hackathon Format Preference: Virtual was the most preferred format, while blended received the lowest preference, indicating potential concerns about hybrid participation.
- Hackathon Experience Satisfaction: Mostly positive, though minor improvements in organization or engagement could enhance satisfaction further.
- Hackathon Platform Satisfaction: Generally good, though some users encountered usability issues that could be refined.
- Team Formation Procedure Adequacy: Highly successful, with some users indicating minor challenges in the process.

4 Conclusion

The pilot studies provided valuable insights into the structure and execution of hackathons, particularly in the areas of education, technology, and sustainability. By applying structured methodologies, participants were able to engage in innovative problem-solving, collaborative teamwork, and impactful project development.

The System Usability Scale (SUS) evaluation indicated that the platform's usability is generally adequate, with an overall score of 69.16. While users found the system easy to learn and effective, areas such as feature integration and complexity reduction require improvement. The feedback also highlighted the need for clear onboarding, structured evaluation criteria, and optimized team formation to enhance participant experience.

Key Takeaways:

1. Overall Positive Experience: Participants rated the event highly in terms of organization, mentorship, and platform usability, though minor refinements could enhance satisfaction further.

2. Team Formation & Engagement: Transparency and efficiency in team formation were identified as crucial elements, with recommendations for structured participant matching based on skills and interests.

3. Event Format & Structure: Most participants preferred virtual formats, but face-to-face interactions also had strong support. Suggestions included more structured workshops, checkpoints, and additional mentorship sessions to maximize engagement.

4. Evaluation & Voting System: Concerns were raised about the fairness of the voting system, with recommendations for a more balanced and transparent evaluation process.

5. Time Allocation & Prototype Development: Some participants felt that time constraints limited project development, advocating for staged submissions, prototype demonstrations, and additional development time to improve project quality.

Future Considerations:

To further optimize the hackathon model, the following enhancements are recommended:

• Enhancing registration & onboarding by providing clearer instructions and reducing confusion during early stages.

• Refining the voting system to ensure fair evaluation and minimize potential biases.

• Implementing structured team formation through an optimized matching system to encourage diversity and interdisciplinary collaboration.

• Expanding mentorship opportunities to offer more personalized guidance and technical support.

• Improving platform usability by refining navigation, reducing complexity, and ensuring seamless feature integration.

These findings reinforce the value of hackathons as dynamic learning experiences that promote collaboration, innovation, and problem-solving. By implementing these refinements, future events can maximize their impact, ensuring a fair, engaging, and outcome-driven experience for all participants.

Through an in-depth analysis of case studies and our accumulated experience in organizing hackathons, we have identified key elements that contribute to a well-structured, engaging, and efficient event. Our findings emphasize the importance of strategic planning, clear communication, and a well-defined participant journey to ensure a seamless experience for all stakeholders.

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To facilitate the successful execution of a hackathon, we have outlined a set of structured guidelines covering critical aspects such as participant onboarding, platform functionality, mentorship, project evaluation, and post-event follow-up. These guidelines serve as a comprehensive framework to optimize participant engagement, enhance collaboration, and ensure a fair and transparent competition.
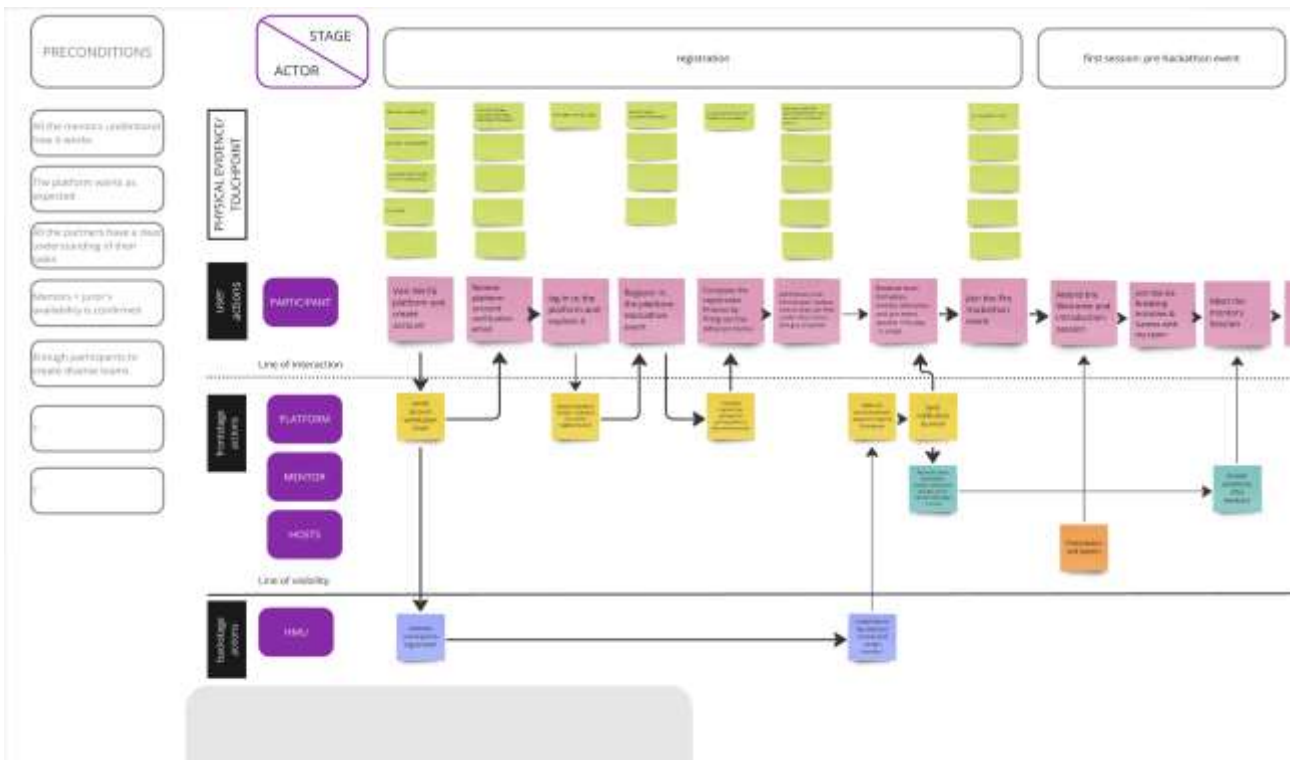

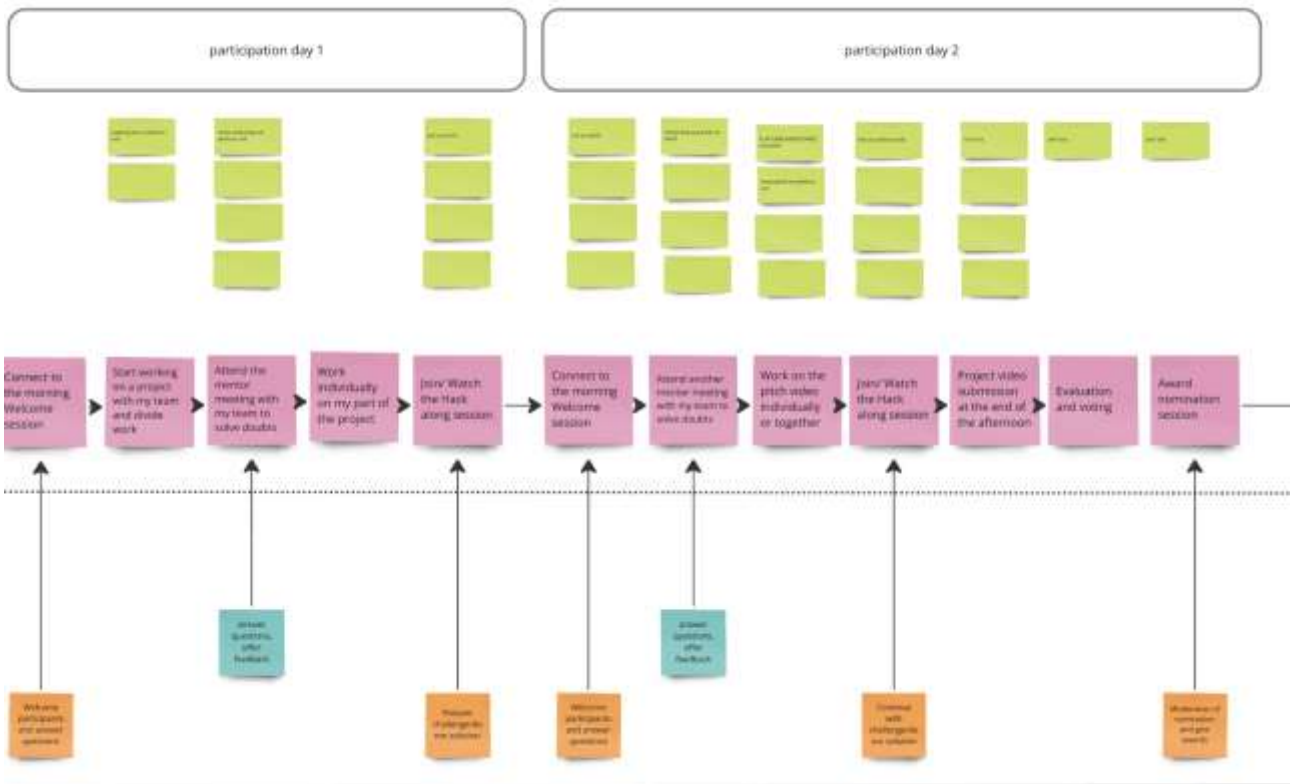*Figure 5: Structured guidelines for Registration*
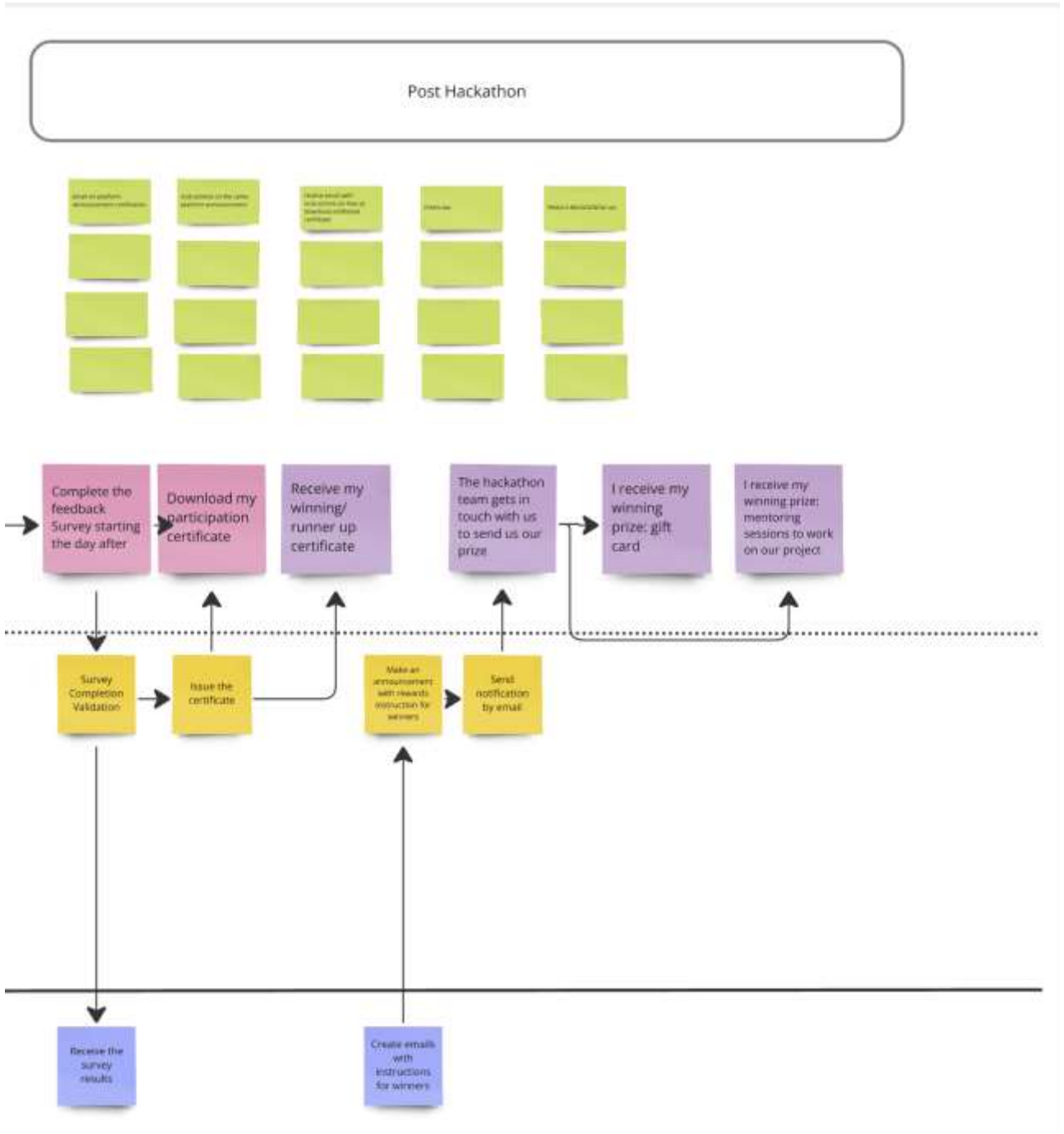

Figure 6: Structured guidelines for participation

Figure 7: Structured guidelines for post-event follow-up.