D7.14 ECF4CLIM Digital Interactive Learning Contents v1

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Contributing organizations	ENLITIA		
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Version	1		

WHO WE ARE

The ECF consortium consists of ten partners. The project is coordinated by Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas-CIEMAT.

Name	Country	Logo
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas CIEMAT	ES	
Instituto Superior Técnico. University of Lisbon. IST	PT	
Universidad de Sevilla **USE**	ES	
University of Jyväskylä **JYU**	FI	
Universitat Autònoma de Barcelona UAB	ES	
Meda Research Ltd **MedaResearch**	RO	
Instituto de Soldadura e Qualidade ISQ	PT	
Trebag Szellemi Tulajdon Es Projektmenedzser Korlatolt Felelossegu Tarsasag TREBAG	HU	
ENLITIA Energy Services SA **ENLITIA**	PT	
QUE Technologies Kefalaiouchiki Etaireia QUE	GR	

ACRONYMS

Term	Definition
ECF	European Competence Framework
SDG	Sustainable Development Goals
EQF	European Qualification Framework

ABOUT THE PROJECT

Through a multidisciplinary, transdisciplinary and participatory process, ECF4CLIM develops, tests and validates a European Competence Framework (ECF) for transformational change, which will empower the educational community to take action against climate change and towards sustainable development.

Applying a novel hybrid participatory approach, rooted in participatory action research and citizen science, ECF4CLIM co-designs the ECF in selected schools and universities, by: 1) elaborating an initial ECF, supported by crowdsourcing of ideas and analysis of existing ECFs; 2) establishing the baseline of individual and collective competences, as well as environmental performance indicators; 3) implementing practical, replicable and context adapted technical, behavioural, and organisational interventions that foster the acquisition of competences; 4) evaluating the ability of the interventions to strengthen sustainability competences and environmental performance; and 5) validating the ECF.

The proposed ECF is unique in that it encompasses the interacting STEM-related, digital and social competencies, and systematically explores individual, organisational and institutional factors that enable or constrain the desired change. The novel hybrid participatory approach provides the broad educational community with an ECF adaptable to a range of settings; new ways of collaboration between public, private and third-sector bodies; and innovative organisational models of engagement and action for sustainability (Sustainability Competence Teams and Committees).

To encourage learning by doing, several novel tools will be co-designed with and made available to citizens, including a digital platform for crowdsourcing, IoT solutions for real-time monitoring of selected parameters, and a digital learning space. Participation of various SMEs in the consortium maximises the broad adoption and applicability of the ECF for the required transformational change towards sustainability.

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EXECUTIVE SUMMARY

This product presents the Digital Learning Content developed as part of the ECF4CLIM project. These contents are included in the Learning Space, developed under task 7.5, to improve citizens' awareness and capacity to act against climate change and towards sustainable development.

Digital Learning Contents has been created for teachers, students and the educational community, in general.

The space for teachers has a list of 72 Digital Learning Contents, including lesson plans, activities, videos, games, TED talks, infographics, etc.

The students' space is organised into five modules with tailored content developed for three age groups: 6-9 years, 10-15 years and 16-25 years:

- Module 1: Sustainability Awareness;
- Module 2: Why and How to Promote Sustainability;
- Module 3: Complexity in Sustainability;
- Module 4: Expected, Preferred and Alternative Futures;
- Module 5: Acting for Sustainability.

The "educational community" space, has a tailored area for the sharing of "successful stories": a blog that will be enriched along the way, by all the actors involved in the promotion of sustainability practices within the educational communities.

To present the Digital Learning Content, we will begin by describing the steps taken to produce the content and the types of digital educational resources created. Next, we'll share the layout of the Digital Learning Content developed in the ECF4CLIM Learning Space, ending with the next steps to be taken concerning this subtask.

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1 INTRODUCTION

1.1 Scope and objectives of the Deliverable

The aim of this deliverable is to provide educational contents to improve citizens' awareness and capacity to act against climate change and towards sustainable development. These learning contents are included in the Learning Space, developed in subtask 6.5.

The main objectives of the deliverable are:

- Provide an overview of the project's requirements that the Digital Learning Contents addresses.
- Describe the steps taken to produce the Digital Learning Contents, as well as other relevant information about the creation of these contents.
- Present the layout of the Digital Learning Contents in the Learning Space.
- Present the next steps related to the subtask.

1.2 Structure of the deliverable

The deliverable is divided into 3 sections:

- The first section presents the project's requirements that the Digital Learning Contents addresses, as well as the steps taken to produce the contents and the types of digital educational resources created.

- The second chapter presents the layout of Digital Learning Content developed in the learning space.

- Finally, the last section describes the next steps related to the subtask.

1.3 Relation to Other Tasks and Deliverables

The task has direct and indirect links with the following tasks and deliverables of the ECF4CLIM project:

- Link with task 6.5 – Learning Space /Educational Ressources for Responsible Citizenship in Climate Change Prevention and Sustainable Development
- Link with D. 2.3 An initial ECF, elaborated based on the results from D2.1 and D2.2
- Link with D. 7.13 ECF4CLIM Learning Game
- Link with D.15 Digital Platform Integration/Validated

2   DIGITAL LEARNING CONTENTS

2.1   Introduction

The ECF4CLIM Interactive Learning Contents are displayed in the Digital Platform (D.15)[1]. These contents were developed taking into account the different ECF4CLIM actors:

1. Students from 6 to 25 years old;
2. Teachers, trainers and educators;
3. Wider educational Community: educational staff, parents, civil society.

The learning space includes several educational resources designed to improve all these actors' awareness and capacity to act against climate change and towards sustainable development.

These diverse educational resources in the learning space include Digital Learning Content, and a section with links to related educational resources, specially selected for teachers and educators.

Plus, a digital game is made available and users are engaged in a story. Is expected for them to use their knowledge – acquired through an interactive knowledge base - to progress into the game and escape victorious. This motivates users to play the game and study the materials developed.

Last but not least, civil society has not been forgotten, since they can share their successful stories on a tailored blog, specially made for this purpose.

In conclusion, the ECF4CLIM "Digital Learning contents", developed under WP7, fosters a holistic approach to climate education by providing Interactive educational resources made for students, educators, and the wider educational community. These resources, including Digital Learning Content and a curated section for teachers, aim to enhance awareness and empower action against climate change. The incorporation of a captivating digital game, intertwined with an interactive knowledge base, not only engages users but also encourages them to apply acquired knowledge for success in the game, fostering both play and study. Additionally, the initiative acknowledges the importance of civil society, offering a dedicated blog for sharing success stories and ensuring inclusivity in the pursuit of sustainable development.

2.2   Project Requirements

ISQ, under its responsibility for Task 6.5, developed the learning space in cooperation with ENLITIA (ENLINTIA), encompassing educational resources (D. 7.14) to enhance citizens' awareness and capacity to combat climate change and foster sustainable development. The

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[1] At https://ecf4clim.smartwatt.net/ - last access 19.12.2022.

learning space featured the Digital Learning Contents, including a section with links to related educational resources.

A digital game is also provided to users – developed by TREBAG (D. 7.13) - aiming to reach a diverse range of students from all educational leveles. The game also incorporates digital learning content in the form of "Knowledge Bases" – linked to D. 2.3 - and various types of minigames. So, all these developments are connected and coherent, so users can have a meaningful experience and consolidate knowledge acquired along the project resources.

The content development caters to different users within educational communities, offering engaging online delivery.

2.3 Steps taken to develop the Digital Interactive Learning Contents

Starting from the project requirements, several internal meetings were implemented along the deliverable development, involving project partners, demonstration sites and Advisory Board members sharing the action plan, next steps, peer-testing phases and ongoing assessment moments.

From the beginning, it was quite clear to all the project partners and deliverable leader that the Digital Learning Contents should answer to the different project end-users: not only the Learning Content should be displayed in tailored sections – at the ECFCLIM Digital Platform -, but also, each learning content should be developed taking into account the user age, EQF (European Qualification Framework) level and final purpose.

On 22nd and 23rd November 2022, on the occasion of the General Assembly and Steering Committee ECF4CLIM Meetings the first proposal of the action plan for the Digital Platform and, related Digital Learning Contents, was presented.

Learning Contents, address three age groups, related to three different EQF Levels:
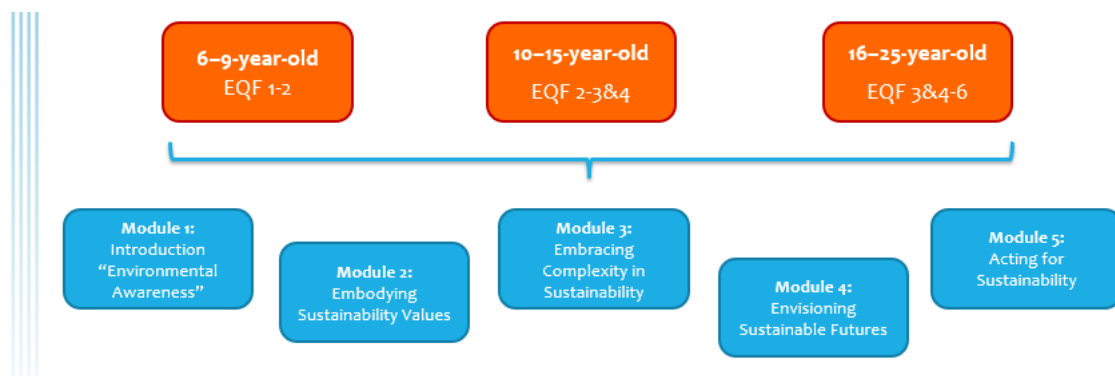
Figure 1 Scheme of the different EQF levels addressed on Digital Interactive Learning Contents vs Modules

Five modules were developed in direct relation to the ECF4CLIM roadmap, written under "D. 2.3 An initial ECF, elaborated based on the results from D2.1 and D2.2"[2]. Each module transversal to all age groups, despite the same learning objectives, was developed attending the EQF students level, from 1 to 6[3].

During the design phase, demonstration sites and project partners were involved in accessing and validating the developments and fine-tuning the contents.

On 16th January 2023 a questionnaire was launched to assess future developments regarding the Knowlegde Bases and educational game[4]. Partners, and teachers from all the demonstration sites were aked to give their feedback regarding the most meaningful subjects under each roadmap area and what would be the most priority concepts and topics to be included in a module that introduces students to "Sustainability Awareness". Twenty-nine valid answers were collected. The most significant questions can be viewed on the next pages and, in more detail, the complete questionnaire in the annexes:

Through a multidisciplinary, transdisciplinary and participatory process, ECF4CLIM develops, tests and validates a European Competence Framework (for transformational change, which will

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[2] At https://mappa.fi/en/greencomp-roadmap/ last access, 20.12.2023.
[3] At https://europa.eu/europass/en/description-eight-eqf-levels , last access, 20.12.2023.
[4] Please consult the Annexes to access the full report.

empower the educational community to take action against climate change and towards sustainable development. To encourage learning by doing, several novel tools will be co-designed with and made available to citizens, including, among others a Digital Learning Space which comprehends an Educational Game (serious game) and a "knowledge base" to teach/learn about "Sustainability".

Question 2: Your professional role/position (you can select more that one option:
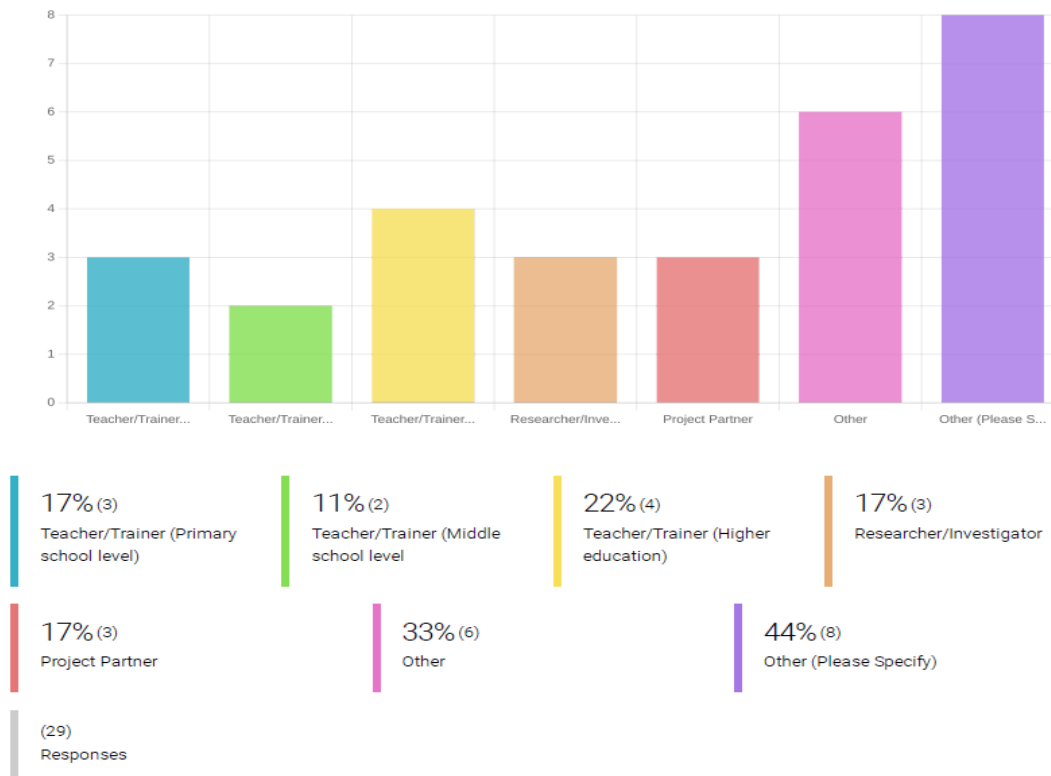
17% (3)
Teacher/Trainer (Primary school level)

11% (2)
Teacher/Trainer (Middle school level

22% (4)
Teacher/Trainer (Higher education)

17% (3)
Researcher/Investigator

17% (3)
Project Partner

33% (6)
Other

44% (8)
Other (Please Specify)

(29)
Responses

Six modules will framework the theoretical base of the game:
1. Environmental Awareness (Introduction)
2. Engagement (How to promote sustainability)
3. Connections (How to frame the problem?)
4. Visions (What are the possible futures?)
5. Action (How to proceed?)

As a teacher/ trainer and/or investigator in Education/environment field(s), we kindly ask your participation to map the list of topics that you find mandatory to be addressed:

Question 3: Which of the following subjects to introduce "Sustainability" and "Environmental awareness", in general terms, do you find meaningful to include as a "knowledge base" to a student:

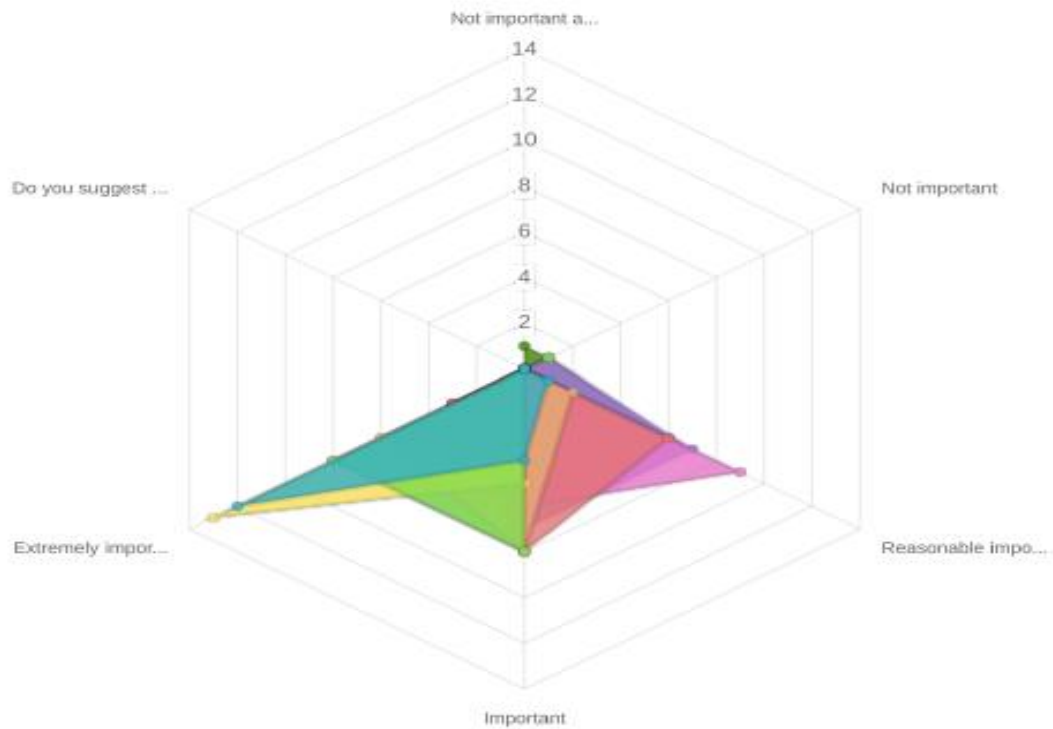|	Not important at all	Not important	Reasonable important	Important	Extremely important	Do you suggest any skills related?	Responses	Weighted Average
Planetary boundaries (environmental limits within which humanity can safely operate)	0 (0%)	1 (6%)	2 (11%)	8 (44%)	7 (39%)	0 (0%)	18	4.17 / 5
Bioeconomy (use of renewable natural resources as a means to promote economic growth)	1 (6%)	3 (18%)	5 (29%)	3 (18%)	5 (29%)	0 (0%)	17	3.47 / 5
Circular Economy (reducing the use of natural resources & design to last)	0 (0%)	1 (6%)	3 (17%)	6 (33%)	8 (44%)	0 (0%)	18	4.17 / 5
Planned obsolescence (planned useful life of a product)	1 (6%)	2 (12%)	6 (35%)	6 (35%)	2 (12%)	0 (0%)	17	3.35 / 5
GreenComp (EU reference framework for sustainability competences)	3 (18%)	6 (35%)	3 (18%)	1 (6%)	4 (24%)	0 (0%)	17	2.82 / 5
Paris Agreement (legally binding international treaty on climate change)	1 (6%)	10 (59%)	5 (29%)	0 (0%)	1 (6%)	0 (0%)	17	2.41 / 5
European Green Deal (package of policy initiatives, which aims to set the EU on the path to a green transition)	3 (19%)	5 (31%)	6 (38%)	2 (13%)	0 (0%)	0 (0%)	16	2.44 / 5
Sustainable Development Goals (United Nations shared blueprint for peace and prosperity for people and the planet, now and into the future)	0 (0%)	2 (13%)	5 (31%)	5 (31%)	4 (25%)	0 (0%)	16	3.69 / 5
Eco-anxiety (fear of environmental damage or ecological disaster and means to manage and reduce it)	4 (25%)	5 (31%)	1 (6%)	4 (25%)	2 (13%)	0 (0%)	16	2.69 / 5

3.26 / 5

Question 4: Which of the following topics to introduce "Sustainability" and "Environmental awareness", in general terms, do you find meaningful to include as a "knowledge base" to a student:

	Not important at all	Not important	Reasonable important	Important	Extremely important	Do you suggest any skills related?	Responses	Weighted Average
Planetary boundaries	0 (0%)	0 (0%)	1 (6%)	4 (24%)	**12** (71%)	0 (0%)	17	4.65 / 5
Bioeconomy	0 (0%)	1 (6%)	0 (0%)	**8** (47%)	8 (47%)	0 (0%)	17	4.35 / 5
Circular Economy	0 (0%)	0 (0%)	0 (0%)	5 (28%)	**13** (72%)	0 (0%)	18	4.72 / 5
Planned obsolescence	0 (0%)	0 (0%)	2 (13%)	**8** (50%)	6 (38%)	0 (0%)	16	4.25 / 5
GreenComp	0 (0%)	0 (0%)	6 (35%)	**8** (47%)	3 (18%)	0 (0%)	17	3.82 / 5
Paris Agreement	0 (0%)	0 (0%)	**9** (50%)	6 (33%)	3 (17%)	0 (0%)	18	3.67 / 5
European Green Deal	0 (0%)	1 (6%)	**7** (39%)	7 (39%)	3 (17%)	0 (0%)	18	3.67 / 5
Sustainable Development Goals	0 (0%)	0 (0%)	2 (11%)	**8** (44%)	8 (44%)	0 (0%)	18	4.33 / 5
*	0 (0%)	0 (0%)	1 (17%)	2 (33%)	**3** (50%)	0 (0%)	6	4.33 / 5
Eco-anxiety (mental health)	1 (6%)	1 (6%)	**6** (35%)	6 (35%)	3 (18%)	0 (0%)	17	3.53 / 5
								4.12 / 5

*The blank space is a typo in the original questionnaire.

Question 5: Which of the following subjects to introduce "Sustainability" and "Environmental awareness", in general terms, do you find meaningful to include as a "knowledge base" to a student:
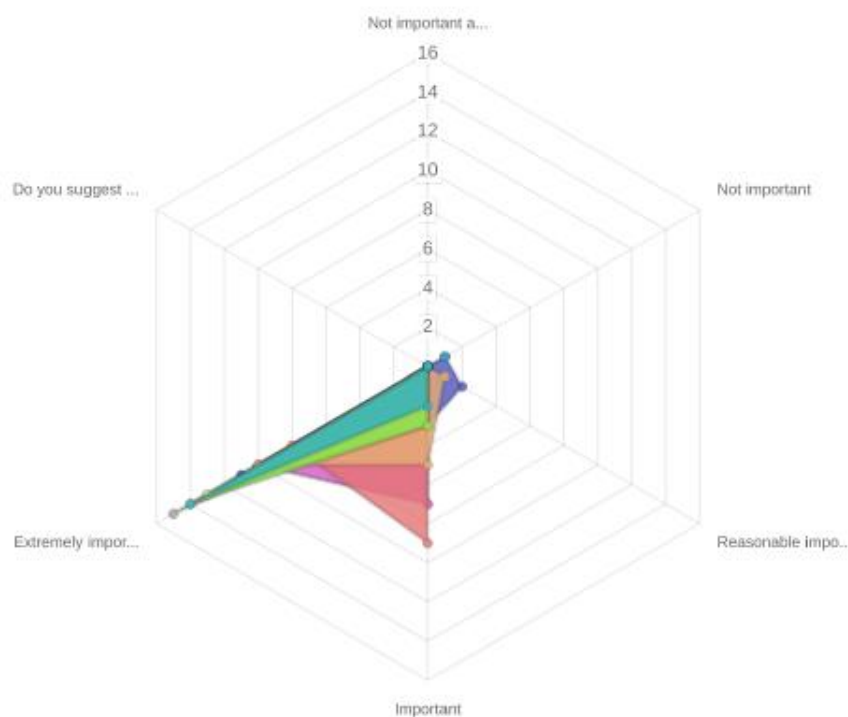

	Not important at all	Not important	Reasonable important	Important	Extremely important	Do you suggest any skills related?	Responses	Weighted Average
Planetary boundaries	0 (0%)	1 (6%)	0 (0%)	2 (12%)	**14 (82%)**	0 (0%)	17	4.71 / 5
Bioeconomy	0 (0%)	0 (0%)	0 (0%)	3 (18%)	**14 (82%)**	0 (0%)	17	4.82 / 5
Circular Economy	0 (0%)	0 (0%)	0 (0%)	3 (19%)	**13 (81%)**	0 (0%)	16	4.81 / 5
Planned obsolescence	0 (0%)	0 (0%)	1 (6%)	5 (31%)	**10 (63%)**	0 (0%)	16	4.56 / 5
GreenComp	0 (0%)	0 (0%)	0 (0%)	**9 (53%)**	8 (47%)	0 (0%)	17	4.47 / 5
Paris Agreement	0 (0%)	0 (0%)	0 (0%)	7 (41%)	**10 (59%)**	0 (0%)	17	4.59 / 5
European Green Deal	0 (0%)	0 (0%)	0 (0%)	7 (41%)	**10 (59%)**	0 (0%)	17	4.59 / 5
Sustainable Development Goals	0 (0%)	0 (0%)	0 (0%)	2 (12%)	**15 (88%)**	0 (0%)	17	4.88 / 5
Eco-anxiety (mental health)	0 (0%)	1 (6%)	2 (12%)	3 (18%)	**11 (65%)**	0 (0%)	17	4.41 / 5

4.65 / 5

The final question of the consultancy asked about contributions for the Digital Learning Space and Educational Game developments. The inputs gathered underscore the importance of tailoring educational content for different age groups within the ECF4CLIM project. For the 6-9 age range, the focus should be on describing the "beauty" of resources and linking them to the ultimate goal, such as growing food. The primary objective includes fostering empathy, solidarity, and equality by analyzing the human and environmental context, reducing anxiety, and avoiding excessive theoretical literature or policy discussions.

For secondary education, the emphasis shifts to raising awareness about the manipulation of publicity and economic interests, as well as practising discrimination. Higher education should aim to combat fake news through activities like creating memes, and campaigns, and teaching students how to critically evaluate information sources.

The concept of student empowerment emerges as a key theme, emphasizing that young people can actively contribute to the promotion of sustainability. The conclusion also highlights the need to address the transfer of ideas from sustainable gaming scenarios to real-world practices. These insights where taken into consideration on the developments of the Digital Learning Space and the Educational Game.

On the 4th General Assembly meeting, held on 11th and 12th May 2023, ISQ validated the developments with all the attendees (47 participants including representatives from the Demonstration Sites, Advisory Board, research team and other institutions), by showing the first samples of the Interactive Knowledge Bases(Digital Flipbooks) and the different digital education resources planned for the different Digital Platform areas.

An informal assessment (verbal and via SOCRATIVE app) was made, for this and other developments under WP7 and, the contents presented were quite well received.

Above, some of the results of the questions related to the Learning Space and related "Digital Intereactive Learning Games"[5] are presented

4. Do you find the **Learning Space** and its different areas and contents useful for your work as an educator?
0 POINTS

12/23 A Yes, absolutely!

2/23 B No, it will not have applicability in my school/work.

9/23 C Its ok but it could be improved.

5. What **other contents** would you consider useful to be shared in the **Learning Space**? (For teachers, students and civil society)
0 POINTS

[5] Please consult the Annexes to access the full report.

Anon anonb3a5b872a69b4491

23/23

the visual image is relevant for younger students but the content is relevant for older students. The content - sustainability concepts include far too much text for younger studrnts. the graphics for the older students should no be three dimensional, but more simple two-dimensional like cartoons

Anon anonf19523f158c2484b

I have not enough knowledge of the content yet

Anon anon300a154a70d14015

simple facts and games, eg be quick in quizz

Anon anonf239c29d95584647

I don't remember any other at the moment

Anon anonae86d3dda6f24835

lesson plans and lesson activities

Anon anon696ffbc9ac6b43ff

i need to check what is on the learning space to answer this question

Anon anon37aa063548b54584

it would be better if translated to the other langages

Anon anon9b5d0fcb58fc4c41

students

Anon anon71a7857e6e014141

I think the contents are well created and sufficient

Anon anon87cbc6fe54644b90

success stories

Anon anone6811133c77e4a4b

.

Anon anon73e70abe5c72400b

civil society tools

Anon anon07e98f91eda6437d

no idea

Anon anon1d2c6b4df8d94897

games

Anon anon4488209821a549d1

Link to the page about GreenComp and ECF-roadmap in mappa.fi (when published)

Anon anon46a476378bba4614

scenarios

Anon anon6bb3f63534514ed7

examples of pratical activities

Anon anona776363920f54113

> virtual reality, virtual visita

Anon anon2d562e438af54197

> not known at this moment

Anon anonbac4b41975a44f5d

> social and economic sustainability issues

Anon anond2c2a0ffbcd54473

> I don't know

Anon anon60f91c9cfb294361

> Impact of the climate warming on daily life.

Anon anon62ced4f647e144be

> -

Figure 2 Sample of "ECF4CLIM-WP7" SOCRATIVE questionnaire, held on the 4th General Asssembly.

Developers took into consideration some of the comments and suggestions gathered from this assessment and did their best to integrate them. "Linking the GreenComp and the ECF Roadmap", "success stories", and "examples of practical activities" are the main suggestions taken into consideration.

After this face-to-face assessment, on May 15th a formal questionnaire with eight questions was launched with the objective to seek informed feedback from teachers, trainers, and investigators in the Education field regarding the developed content for the Knowledge Base in the ECF4CLIM Educational Game and Flipbooks. The aim was to fine-tune the contents based on their previous insights and opinions and, again, reconfirm that we were following the best approach as possible, meeting their students' needs and expectations. This feedback was crucial for refining the educational materials in the remaining working months of the project.[6] The draft versions of the Knowledge Bases – e.g. the text developed at the time for each one of the modules - were available at the ECF4CLIM Google DRIVE where respondents could read it and analyse it in detail. In the next pages we can see some of the highlights taken from this consultancy:

*As a teacher/ trainer and/ or investigator in the Education field, we kindly ask you again for your participation in giving us your feedback on the contents developed regarding the **Knowledge Base for the ECF4CLIM Serious Game and Flipbooks**. This questionnaire is intended for the fine-tuning of the contents, in the next few remaining working months.*

MODULES:
0. Environmental Awareness (Introduction)
1. Engagement (How to promote sustainability)
2. Connections (How to frame the problem?)
3. Visions (What are the possible futures?)

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[6] Please consult the annexes to access the full report.

4. Actions (How to proceed?)

Please see in detail the contents at: https://drive.google.com/drive...

Question 2: Your professional role/position (you can select more than one option:
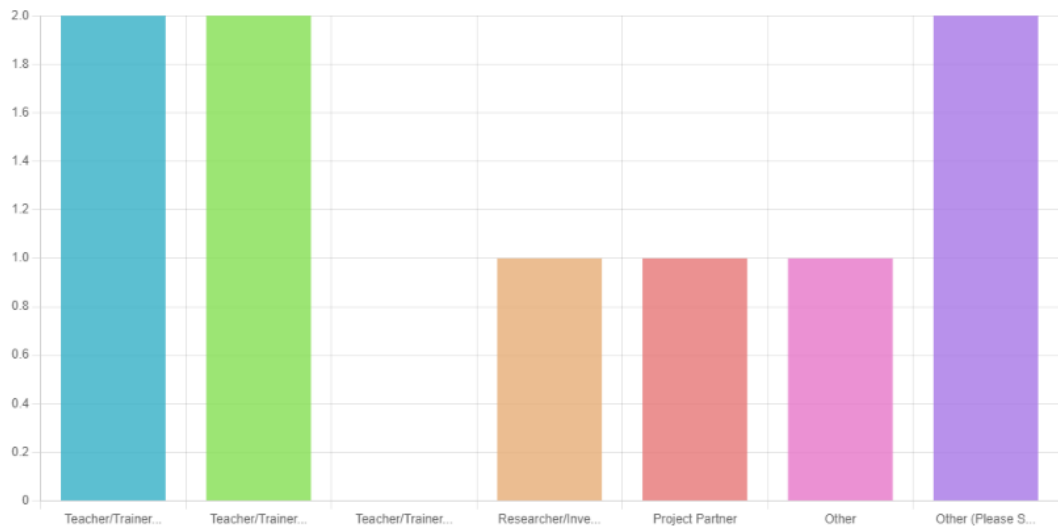
29% (2) Teacher/Trainer (Primary school level)	**29%** (2) Teacher/Trainer (Middle school level	**0%** Teacher/Trainer (Higher education)

14% (1) Researcher/Investigator

14% (1) Project Partner	**14%** (1) Other	**29%** (2) Other (Please Specify)

(9) Responses

Question 3: Regarding the Module 0. Environmental Awareness (Introduction) How do you evaluate :

	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	2 (29%)	2 (29%)	**3** (43%)	0 (0%)	7	3.14 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	2 (29%)	2 (29%)	**3** (43%)	0 (0%)	7	3.14 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	1 (14%)	**3** (43%)	3 (43%)	0 (0%)	7	3.29 / 4
							3.19 / 4

Question 4: Regarding the Module 1. Engagement (How to promote sustainability) How do you evaluate :

	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	0 (0%)	2 (33%)	4 (67%)	0 (0%)	6	3.67 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	0 (0%)	1 (17%)	5 (83%)	0 (0%)	6	3.83 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	0 (0%)	2 (33%)	4 (67%)	0 (0%)	6	3.67 / 4
							3.72 / 4

Question 5: Regarding the Module 2. Connections (How to frame the problem?) How do you evaluate :

	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	1 (14%)	2 (29%)	4 (57%)	0 (0%)	7	3.43 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	1 (14%)	2 (29%)	4 (57%)	0 (0%)	7	3.43 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	0 (0%)	4 (57%)	3 (43%)	0 (0%)	7	3.43 / 4
							3.43 / 4

Question 6: Regarding the Module 3. Visions (What are the possible futures?) How do you evaluate :
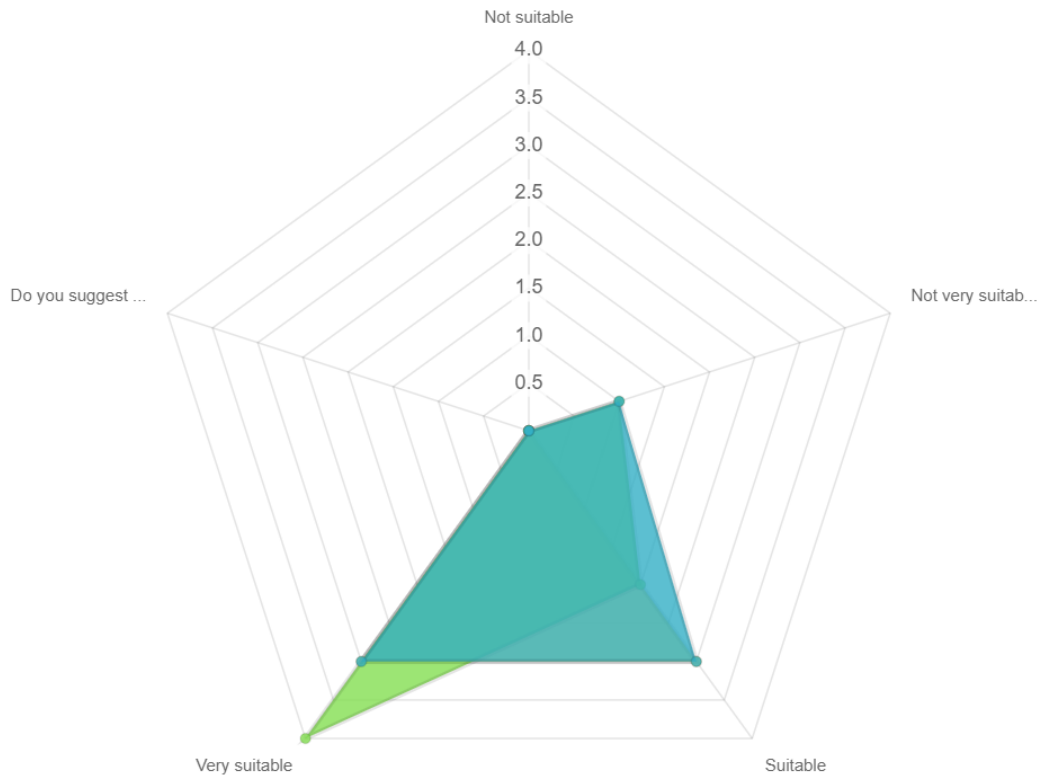
	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	1 (14%)	3 (43%)	3 (43%)	0 (0%)	7	3.29 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	1 (14%)	2 (29%)	4 (57%)	0 (0%)	7	3.43 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	0 (0%)	3 (50%)	3 (50%)	0 (0%)	6	3.5 / 4
							3.4 / 4

Question 7: Regarding the Module 4. Actions (How to proceed?) How do you evaluate :

	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	0 (0%)	3 (43%)	4 (57%)	0 (0%)	7	3.57 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	0 (0%)	3 (43%)	4 (57%)	0 (0%)	7	3.57 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	0 (0%)	3 (50%)	3 (50%)	0 (0%)	6	3.5 / 4
							3.55 / 4

Summing up, these were the major key findings from these consultation phases for the refinement of the Knowledge Base in the ECF4CLIM Knowlegede Bases (Flipbooks) and Educational Game; wich guided to reach the final version of these contents:

1. **Imagery Representation:**

Across different age groups, respondents suggest that the imagery in the modules, especially for younger participants (around 6 to 15 years old), should be more representative of current video games.

2. **Simplicity of Content:**

Consistent feedback emphasizes the need for simplifying the content, especially in Module 0 and Module 1, for participants aged 6 to 15 years old. There is a call for reducing text, eliminating irrelevant terms, and focusing on clear, concrete explanations.

3. **Content Adjustment for Age Groups:**

Participants express concerns about the volume of content, suggesting that it needs to be adapted to different age groups. Specifically, for 6 to 9-year-olds, the content needs to be significantly simpler, while for 10 to 15-year-olds, there should be a reduction in content and a focus on concrete examples.

4. **Concrete Examples and Engagement Techniques:**

There is a suggestion to incorporate concrete examples in Module 2, such as critical comments on advertisements and the use of anti-advertisements. Additionally, the engagement techniques need to vary based on different age groups, with a call for examples that understand different interests in sharing knowledge and comparing knowledge from various stakeholder perspectives.

5. **Simplification for Older Age Groups:**

For age groups 10 to 15 and 16 to 25, respondents highlight the need for further simplification of content. The feedback emphasizes a desire for clear messages and simplified explanations.

6. **General Recommendation:**

A consensus exists across the feedback that the content should be adapted and simplified to suit the cognitive levels and interests of different age groups. The overall recommendations included adjusting imagery representation, gender-balanced and considering ethnic diversity; simplifying content across all modules, adapting content to different age groups, incorporating concrete examples, and ensuring clarity and simplicity for effective engagement of the students. Summing up, based on the feedback gathered from these questionnaires, bilateral meetings, General Assembly meetings and email exchanges, Digital Interactive Learning Contents were fine-tuned and tailored to answer end-users' needs and aspirations.

2.4   Types of digital educational resources developed

The educational resources were developed for three types of end-users:

1- Students

These educational resources are designed to guide students and teachers into the captivating realms of climate change and sustainable development. The flipbooks have been meticulously created and organized in alignment with the ECF4CLIM roadmap areas, encompassing an introductory module. Tailored to cater to different age groups (6-9, 10-15, and 16-25), each flipbook incorporates external resources and videos to enhance interactivity. A strong visual element was carefully incorporated, adopting an inclusive approach that features European and non-European individuals, gender-balanced. Furthermore, all flipbooks are available for download, providing an offline experience for those who prefer traditional reading.

In detail, the different modules:

- Module 1: Sustainability Awareness – this module serves as an introductory component designed to familiarize students with key concepts of Sustainable Development and sustainability. Its purpose is to provide context on central topics such as climate change, Sustainable Development Goals (SDGs), Circular Economy, and Green Deal. This module aims to lay the foundation for students by offering a comprehensive understanding of these crucial sustainability concepts and, prepare them to acknowledge the ECF4CLIM roadmap.

- Module 2: Why and How to Promote Sustainability – the first Module of the ECF4CLIM roadmap. Balancing multiple and sometimes conflicting values and objectives is inherent in working at educational institutions, making it challenging to translate ideals into pedagogical practice and leading to continuous compromises. Successfully promoting sustainability calls for prioritization and collaboration. The key question revolves around enhancing understanding and reflection on the meanings of sustainability and involving the community in joint efforts. This necessitates creating time and space for collective reflection on values, finding common ground amid diverse hierarchies, and acting under shared values for the well-being and satisfaction of individuals and the community.

- Module 3: Complexity in Sustainability – contents were developed aiming to recognise connections and underlying assumptions, crucial for identifying root causes and framing problems effectively. Collective problem definition requires an understanding of diverse perspectives on sustainability and how our context and cultural background influence our perception of problems and knowledge about them. This step is aligned with the GreenComp competence area "Embracing complexity in sustainability.

- Module 4: Expected, Preferred and Alternative Futures – this fourth module has the objective of introducing future generations to subjects related to ongoing ecological and expanding sustainability crises and, educating them about responsibility and the posed challenges given the lack of know-how even among adults. Without clear visions, there's a risk of perpetuating unsustainable practices and mindsets. To establish a more sustainable collective reality, it is essential to engage in visioning and collectively map

out alternative approaches. This requires unleashing creative and intuitive faculties to envision a different perspective, unlearning unsustainable practices, and learning while creating novel solutions.

- Module 5: Acting for Sustainability - promoting an ecologically sustainable future requires not only a desire but also the ability to frame problems and envision acceptable solutions. This last module is about "success hinges on walking the talk." In educational settings, sustainability initiatives involve individual efforts by students, teachers, and staff, but meaningful change necessitates collective action. Educational organizations aiming to drive societal changes through education must possess political and societal agency. Both individual and collective competencies are essential on various levels, emphasizing the need to consider the environmental performance and impact of actions while actively promoting sustainability.

Figure 3 List of the fifteen fliobooks developed

MODULE	AGE GROUP	TITLE	SUB TITLE	LINK
Module 1	6-9	Sustainability Awareness	Sustainability Awareness	Link
	10-15			Link
	16-25			Link
Module 2	6-9	Engagement	Why and How to promote Sustainability	Link
	10-15			Link
	16-25			Link
Module 3	6-9	Connections	Complexity in Sustainability	Link
	10-15			Link
	16-25			Link
Module 4	6-9	Visions	Expected, Preferred and Alternative Futures	Link
	10-15			Link
	16-25			Link
Module 5	6-9	Action	Acting for Sustainability	Link
	10-15			Link
	16-25			Link

Table 1 List of the fiftenn flipbooks developed and its liks

2. Teachers, trainers and educators

A diverse array of valuable resources has been curated to facilitate teaching on climate change and sustainable development. These resources, including lesson plans, interactive activities, and serious games, have been meticulously chosen and crafted to elevate educational endeavours[7].

The organization of these resources is thoughtfully structured, aligning with the ECF4CLIM roadmap areas, resource types, and age group categories (6-9, 10-15, and 16-25). The overarching goal is to empower educators to captivate their students in a cognitive and enjoyable manner, instilling a commitment to sustainable change. The collective aspiration is to inspire and educate the upcoming generation of environmental stewards collaboratively. Its project partners aim to continue to enrich and update this platform along the project's lifetime.

The teachers' area also includes a link to the "GreenComp and ECF4CLIM Roadmap for sustainable competencies", hosted on the MAPA.fi platform[8].

This finish platform provides tools for teaching, education, and youth work with a focus on environmental education, sustainability education, climate education, adventure education, science education, sustainability competence, and nature as a learning environment. Users can find thousands of materials, methods, events, and services from various organizations on the platform. By registering, users can bookmark their favourite materials, create themed collections, plan interdisciplinary learning units, and contribute their own content for shared use.

The platform is open for individuals and organizations that produce materials, offer services, organize training or events, lead projects, or manage networks. MAPPA serves as a showcase for organizations, networks, material producers, science communicators, educational institutions, public organizations, and businesses. Project partners decided to connect these two educational platforms – ECF4CLIM Digital Platform (and its Interactive Learning Contents) and MAPPA platform - since this integration not only enhances the accessibility of ECF4CLIM resources but also provides a broader audience, including educators, students, and organizations, with a centralized hub for sustainable education.

Furthermore, the collaborative features of MAPPA, such as the ability to create themed collections, plan interdisciplinary learning units and contribute content for shared use, complement the ECF4CLIM project's emphasis on collective action and engagement. This connection fosters a more comprehensive and collaborative approach to sustainability education, promoting a shared understanding of environmental issues and solutions.

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[7] At https://ecf4clim.smartwatt.net/learning-space-teachers/ , last access 22.12.2023.
[8] At https://mappa.fi/en/home/ , last access 22.12.2023.

Figure 4 Sample of the "Teachers, trainers and educators" digital ressources at ECF4CLIM Digital Platform

3. Educational Community: educational staff, parents, civil society

The ECF4CLIM Sustainability Blog extends a warm welcome to its dedicated digital space, designed to explore and advocate for sustainability in its diverse manifestations. The blog's mission is to inspire, educate, and catalyze transformative change[9].

Visitors to the blog can anticipate learning from peer experiences, discovering profiles of enthusiastic change-makers, and accessing global best practices. The aim is to empower both individuals and educational institutions on their sustainability journeys. Additionally, the blog encourages readers to actively contribute by sharing their own stories and sustainable initiatives.

Consider this blog a guiding compass, consistently directing toward meaningful action and transformative change. In pursuit of this collective mission, the blog encourages readers to stay connected, curious, and committed. Together, steps can be taken each day toward a greener, more sustainable world. Along with the other interactive resources, it's a project objective to continue to enrich this "educational community area" along the project, involving ECF4CLIM demonstration sites and their successful stories.

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[9] At https://ecf4clim.smartwatt.net/blog/ , last access 22.12.2023

Figure 5 Sample of the "Educational Community: educational staff, parents, civil society" digital ressources at ECF4CLIM Digital Platform

3 CONCLUSIONS AND NEXT SETPS

In conclusion, the ECF4CLIM project has successfully undertaken a multidisciplinary, transdisciplinary, and participatory approach to develop and validate a European Competence Framework (ECF) for transformative change. This framework empowers the educational community to combat climate change and promote sustainable development. Through innovative tools, including a Digital Learning Space with Interactive Learning Contents, the project engages students, teachers, and the wider educational community.

The Digital Learning Contents, strategically organized for students, teachers, and the educational community, encompass a diverse range of resources. Flipbooks designed for different age groups align with the ECF4CLIM roadmap, fostering sustainability awareness and action. Teachers have access to lesson plans and activities, while the educational community benefits from a dedicated Sustainability Blog for sharing success stories.

The journey doesn't end here. The project aims to continuously enrich and update the Digital Learning Space, ensuring it remains a dynamic and relevant resource. Ongoing collaboration with demonstration sites and Advisory Board members will provide valuable feedback for refinement. Additionally, efforts will focus on further engagement with civil society, encouraging active participation and contributions to the Sustainability Blog.

As the project progresses, the Digital Learning Content will evolve to meet the changing needs of the educational community. The integration with external platforms, such as MAPPA, signifies a commitment to expanding the reach of ECF4CLIM resources. The project partners remain dedicated to fostering a holistic approach to climate education and sustainability, making strides toward a greener, more sustainable world.

4 ANNEXES

Anneex 1- "Knowledge Base for the ECF4CLIM Serious Game and Flipbooks" held on 16th January 2023

Annex 2 – SOCRATIVE Questionnaire "ECF4CLIM-WP7" held on 12th May 2023

Annex 3 – "Digital Learning Space" held on 15th May 2023

Heading

Through a multidisciplinary, transdisciplinary and participatory process, ECF4CLIM develops, tests and validates a European Competence Framework (for transformational change, which will empower the educational community to take action against climate change and towards sustainable development.

To encourage learning by doing, several novel tools will be co-designed with and made available to citizens, including, among others a Digital Learning Space which comprehends an Educational Game (serious game) and a "knowledge base" to teach/learn about "Sustainability".

Six modules will framework the theoretical base of the game:

1. Environmental Awareness (Introduction)

2. Engagement (How to promote sustainability)

3. Connections (How to frame the problem?)

4. Visions (What are the possible futures?)

5. Action (How to proceed?)

As a teacher/ trainer and/or investigator in Education/environment field(s), we kindly ask your participation to map the list of topics that you find mandatory to be addressed in the introductory module

 1. Environmental Awareness. and which of them are more/less meaningful per education level.

1 I agree with the processing of my personal data for the purposes of the ongoing investigation. I understand that my participation in the ECF4CLIM project is voluntary, that the information I provide is confidential and that I am free to withdraw it at any time.

100% (18)
I agree

0%
I do not agree

(18)
Responses

Your professional role/position (you can select more than one option)

17% (3)
Teacher/Trainer (Primary school level)

11% (2)
Teacher/Trainer (Middle school level

22% (4)
Teacher/Trainer (Higher education)

17% (3)
Researcher/Investigator

17% (3)
Project Partner

33% (6)
Other

44% (8)
Other (Please Specify)

(29)
Responses
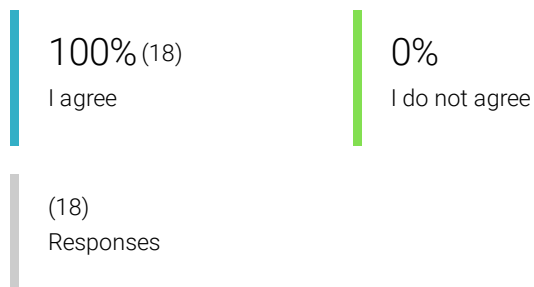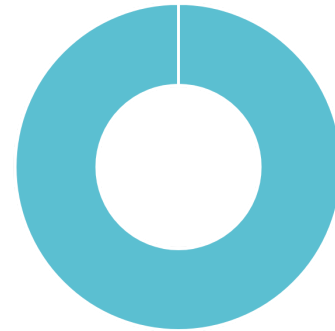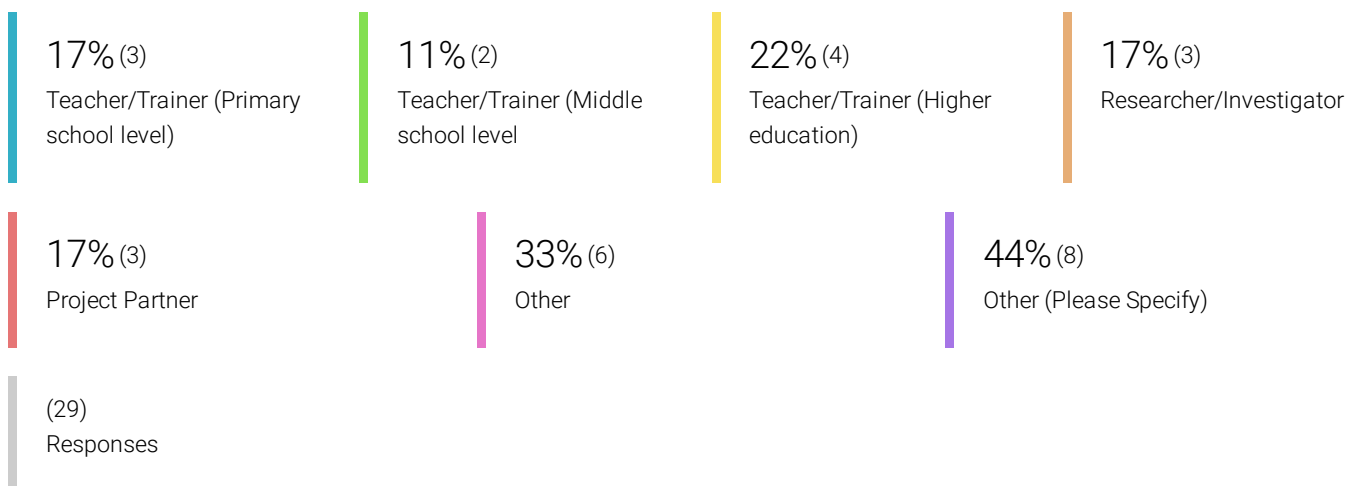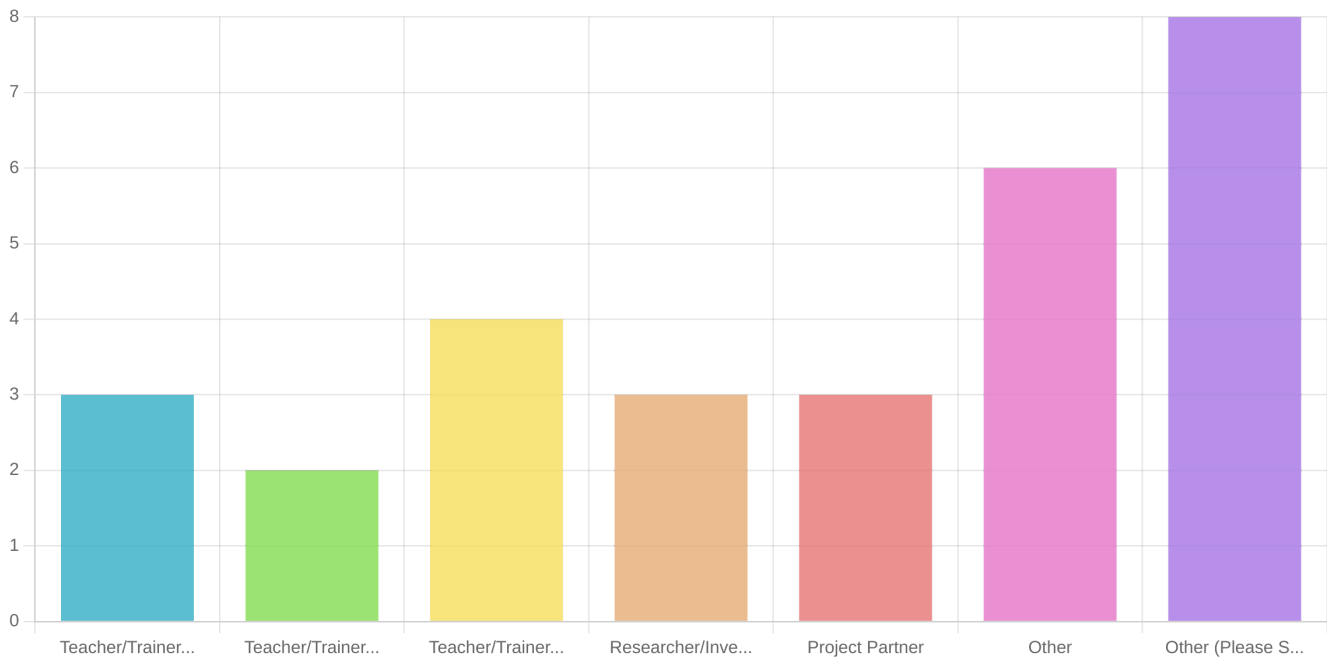
Teacher Training Science Advisor

environmental educator

Training advisor

Teachers trainer all levels before university

Jefa Área Captación Recursos Europeos

Jefe de proyectos

Teacher trainer

Head of service in the adaptation area of the Spanish climate change office

3 Which of the following subjects to introduce "Sustainability" and "Environmental awareness", in general terms, do you find meaningful to include as a "knowledge base" to a student:

	Not important at all	Not important	Reasonable important	Important	Extremely important	Do you suggest any skills related?	Responses	Weighted Average
Planetary boundaries (environmental limits within which humanity can safely operate)	0 (0%)	1 (6%)	2 (11%)	**8 (44%)**	7 (39%)	0 (0%)	18	4.17 / 5
Bioeconomy (use of renewable natural resources as a means to promote economic growth)	1 (6%)	3 (18%)	**5 (29%)**	3 (18%)	5 (29%)	0 (0%)	17	3.47 / 5
Circular Economy (reducing the use of natural resources & design to last)	0 (0%)	1 (6%)	3 (17%)	6 (33%)	**8 (44%)**	0 (0%)	18	4.17 / 5
Planned obsolescence (planned useful life of a product)	1 (6%)	2 (12%)	**6 (35%)**	6 (35%)	2 (12%)	0 (0%)	17	3.35 / 5
GreenComp (EU reference framework for sustainability competences)	3 (18%)	**6 (35%)**	3 (18%)	1 (6%)	4 (24%)	0 (0%)	17	2.82 / 5
Paris Agreement (legally binding international treaty on climate change)	1 (6%)	**10 (59%)**	5 (29%)	0 (0%)	1 (6%)	0 (0%)	17	2.41 / 5
European Green Deal (package of policy initiatives, which aims to set the EU on the path to a green transition)	3 (19%)	5 (31%)	**6 (38%)**	2 (13%)	0 (0%)	0 (0%)	16	2.44 / 5
Sustainable Development Goals (United Nations shared blueprint for peace and prosperity for people and the planet, now and into the future)	0 (0%)	2 (13%)	**5 (31%)**	5 (31%)	4 (25%)	0 (0%)	16	3.69 / 5
Eco-anxiety (fear of environmental damage or ecological disaster and means to manage and reduce it)	4 (25%)	**5 (31%)**	1 (6%)	4 (25%)	2 (13%)	0 (0%)	16	2.69 / 5
								3.26 / 5

Planetary boundaries (environmental limits within   Embodying sustainability values. Promoting nature

Bioeconomy (use of renewable natural resources as a means to promote economic growth)	Acting in favor of sustainability
Circular Economy (reducing the use of natural resources & design to last)	Acting for change in partnership with other stakeholders.
Planned obsolescence (planned useful life of a product)	Identify one's own potential for sustainability and actively contribute to improving the prospects of the community and the planet. of the community and the planet.
GreenComp (EU reference framework for sustainability competences)	Envisioning sustainable futures
Paris Agreement (legally binding international treaty on climate change)	Acting in favor of sustainability. Action policy
European Green Deal (package of policy initiatives, which aims to set the EU on the path to a green transition)	Collective action Acting for change in partnership with other stakeholders
Sustainable Development Goals (United Nations shared blueprint for peace and prosperity for people and the planet, now and into the future)	Acting for change in collaboration with other actors. actors.
Eco-anxiety (fear of environmental damage or ecological disaster and means to manage and reduce it)	Adaptability Manage transitions and challenges in complex sustainability situations and make future-related decisions in the face of uncertainty. decisions related to the future in the face of uncertainty, ambiguity and risk.
Planetary boundaries (environmental limits within which humanity can safely operate)	Embodying sustainability values. Promoting nature
Bioeconomy (use of renewable natural resources as a means to promote economic growth)	Acting for sustainability/Collective action
Circular Economy (reducing the use of natural resources & design to last)	Acting for sustainability/Collective action
Planned obsolescence (planned useful life of a product)	Acting in favor of sustainability. Initiative individual initiative
Paris Agreement (legally binding international treaty on climate change)	Acting in favor of sustainability. Acting policy
European Green Deal (package of policy initiatives, which aims to set the EU on the path to a green transition)	Acting in favor of sustainability. Acting policy
Sustainable Development Goals (United Nations shared blueprint for peace and prosperity for people and the planet, now and into the future)	Acting in favor of sustainability. Acting policy
Eco-anxiety (fear of environmental damage or ecological disaster and means to manage and reduce it)	Acting for sustainability/Collective action
Planetary boundaries (environmental limits within which humanity can safely operate)	Biodiversity
Eco-anxiety (fear of environmental damage or ecological disaster and means to manage and reduce it)	Adaptation to climate change
Planetary boundaries (environmental limits within which humanity can safely operate)	Emotional intelligence, skills for dialogue and listening, team-working and skills of coping with uncertainty.
Bioeconomy (use of renewable natural resources as a means to promote economic growth)	Skills for dialogue and listening, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, entrepreneurship, problem-solving, team-working.
Circular Economy (reducing the use of natural	Skills for dialogue and listening, skills of recognising different kinds of sustainability

	Skills for dialogue and listening, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, problem solving, team-working.
GreenComp (EU reference framework for sustainability competences)	Skills for dialogue and listening, team-working, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, skills to assess critically own and cultural assumptions, skills of coping with uncertainty, leadership, emotional intelligence, global citizenship.
Sustainable Development Goals (United Nations shared blueprint for peace and prosperity for people and the planet, now and into the future)	Skills for dialogue and listening, team-working, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, skills to assess critically own and cultural assumptions, skills of coping with uncertainty, leadership, emotional intelligence, global citizenship, team-working, emotional intelligence.
Circular Economy (reducing the use of natural resources & design to last)	How to apply circular economy in practice in daily life
GreenComp (EU reference framework for sustainability competences)	Skills and awareness included in GreenComp is relevant, but the students do not need to know or remember the names of the concepts etc.
European Green Deal (package of policy initiatives, which aims to set the EU on the path to a green transition)	Understanding of the main idea of initiatives and agreements, not the details
Sustainable Development Goals (United Nations shared blueprint for peace and prosperity for people and the planet, now and into the future)	Only if with concrete examples.
Eco-anxiety (fear of environmental damage or ecological disaster and means to manage and reduce it)	Emotional coping skills are relevant, but not understanding the concept
Eco-anxiety (fear of environmental damage or ecological disaster and means to manage and reduce it)	To Know how to grow food in a whatever kind of home/school space. Empathy, Solidarity, Equality: Analyse the human and environmental context to promote those aspects which are meaningful for the students. Reducie anxiety at this age and limit the theoretical literature/policy. Children are aware of differences among themselves, and other schools in the same district/village. So why not generate some games of solidarity, empathy and equality among them, boys, girls, boys and girls in order to create their ideal school.

4 Which of the following topics to introduce "Sustainability" and "Environmental awareness", in general terms, do you find meaningful to include as a "knowledge base" to a student:

	Not important at all	Not important	Reasonable important	Important	Extremely important	Do you suggest any skills related?	Responses	Weighted Average
Planetary boundaries	0 (0%)	0 (0%)	1 (6%)	4 (24%)	**12 (71%)**	0 (0%)	17	4.65 / 5
Bioeconomy	0 (0%)	1 (6%)	0 (0%)	**8 (47%)**	8 (47%)	0 (0%)	17	4.35 / 5
Circular Economy	0 (0%)	0 (0%)	0 (0%)	5 (28%)	**13 (72%)**	0 (0%)	18	4.72 / 5
Planned obsolescence	0 (0%)	0 (0%)	2 (13%)	**8 (50%)**	6 (38%)	0 (0%)	16	4.25 / 5
GreenComp	0 (0%)	0 (0%)	6 (35%)	**8 (47%)**	3 (18%)	0 (0%)	17	3.82 / 5
Paris Agreement	0 (0%)	0 (0%)	**9 (50%)**	6 (33%)	3 (17%)	0 (0%)	18	3.67 / 5
European Green Deal	0 (0%)	1 (6%)	**7 (39%)**	7 (39%)	3 (17%)	0 (0%)	18	3.67 / 5
Sustainable Development Goals	0 (0%)	0 (0%)	2 (11%)	**8 (44%)**	8 (44%)	0 (0%)	18	4.33 / 5
	0 (0%)	0 (0%)	1 (17%)	2 (33%)	**3 (50%)**	0 (0%)	6	4.33 / 5
Eco-anxiety (mental health)	1 (6%)	1 (6%)	**6 (35%)**	6 (35%)	3 (18%)	0 (0%)	17	3.53 / 5
								4.12 / 5

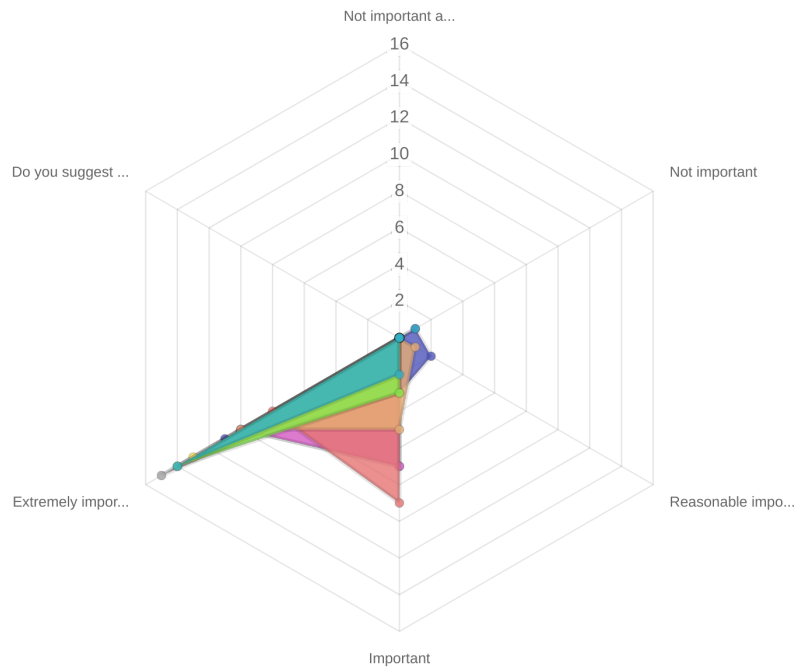|	
Planetary boundaries	Recognizing that human beings are part of nature and respecting the needs and rights nature and respect the needs and rights of other of other species and nature itself in order to restore and regenerate healthy
Bioeconomy	Capacity for projections of future
Circular Economy	Adopt a relational way of thinking by studying and linking different disciplines, using creativity and experimentation with novel ideas or methods.

Planned obsolescence	Identify one's own sustainability potential and Actively contribute to improving the prospects of the community and the planet.
GreenComp	Promotenature
Paris Agreement	Navigate the political system, identify political responsibility and accountability for unsustainable behaviors, and demand effective policies for sustainability
European Green Deal	Collective action Acting for change in partnership with other stakeholders
Sustainable Development Goals	Identify one's own sustainability potential and Actively contribute to improving the prospects of the community and the planet.
Eco-anxiety (mental health)	Approach a sustainability problem from all sides; consider time aspects; consider time, space and context in order to understand how context to understand how elements interact within and between within and between systems.
Planetary boundaries	Embodying sustainability values. Promoting nature
Bioeconomy	Acting for sustainability/Collective action
Circular Economy	Acting for sustainability/Collective action
Planned obsolescence	Acting in favor of sustainability. Initiative individual initiative
GreenComp	Taking on the complexity of sustainability. Thinking critical thinking
Paris Agreement	Acting in favor of sustainability. Political action
European Green Deal	Acting in favor of sustainability. Political action
Sustainable Development Goals	Acting in favor of sustainability. Political action
	Acting in favor of sustainability. Political action
Eco-anxiety (mental health)	Taking on the complexity of sustainability.Thinking critical thinking. Acting for sustainability/Collective action
Planetary boundaries	Biodiversity
Eco-anxiety (mental health)	Adaptation to climate change
Planetary boundaries	Emotional intelligence, skills for dialogue and listening, team-working and skills of coping with uncertainty.
Bioeconomy	Skills for dialogue and listening, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, entrepreneurship, skills to assess critically own and cultural assumptions, skills to assess the current state of practice, skills of coping with uncertainty, problem-solving, team-working.
Circular Economy	Skills for dialogue and listening, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, skills to assess the current state of practice, problem solving, team-working.

Planned obsolescence	Skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, skills to assess critically own and cultural assumptions, skills to assess the current state of practice, skills of coping with uncertainty, problem-solving, team-working.
GreenComp	Skills for dialogue and listening, team-working, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, skills to assess critically own and cultural assumptions, skills of coping with uncertainty, leadership, emotional intelligence, global citizenship.
Paris Agreement	Skills to assess critically own and cultural assumptions, skills to assess the current state of practice, skills of coping with uncertainty, Global citizenship, problem-solving, team-working.
European Green Deal	Skills to assess critically own and cultural assumptions, skills to assess the current state of practice, skills of coping with uncertainty, Global citizenship, leadership, problem-solving, team-working.
Sustainable Development Goals	Skills for dialogue and listening, team-working, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, skills to assess critically own and cultural assumptions, skills of coping with uncertainty, leadership, emotional intelligence, global citizenship, team-working.
Eco-anxiety (mental health)	Skills for dialogue and listening, team-working, skills of recognising different kinds of sustainability problems in everyday life: how the problems are intertwined and how they link to personal choices, skills to assess critically own and cultural assumptions, skills of coping with uncertainty, emotional intelligence.
GreenComp	The game should enable training of the various competences, but not to know all them as concepts.
Paris Agreement	Awareness that this kind of international agreements exists and main content
European Green Deal	Awareness that this kind of international agreements exists and main content
Sustainable Development Goals	Awareness that this kind of international goal agreements exists and main idea
Eco-anxiety (mental health)	Emotional coping skills are relevant, but not understanding the concept
Eco-anxiety (mental health)	Be aware of the manipulation of publicity and economic interests, and practice discrimination.

5 Which of the following topics to introduce "Sustainability" and "Environmental awareness", in general terms, do you find meaningful to include as a "knowledge base" to a student:

⇄	Not important at all	Not important	Reasonable important	Important	Extremely important	Do you suggest any skills related?	Responses	Weighted Average
Planetary boundaries	0 (0%)	1 (6%)	0 (0%)	2 (12%)	**14 (82%)**	0 (0%)	17	4.71 / 5
Bioeconomy	0 (0%)	0 (0%)	0 (0%)	3 (18%)	**14 (82%)**	0 (0%)	17	4.82 / 5
Circular Economy	0 (0%)	0 (0%)	0 (0%)	3 (19%)	**13 (81%)**	0 (0%)	16	4.81 / 5
Planned obsolescence	0 (0%)	0 (0%)	1 (6%)	5 (31%)	**10 (63%)**	0 (0%)	16	4.56 / 5
GreenComp	0 (0%)	0 (0%)	0 (0%)	**9 (53%)**	8 (47%)	0 (0%)	17	4.47 / 5
Paris Agreement	0 (0%)	0 (0%)	0 (0%)	7 (41%)	**10 (59%)**	0 (0%)	17	4.59 / 5
European Green Deal	0 (0%)	0 (0%)	0 (0%)	7 (41%)	**10 (59%)**	0 (0%)	17	4.59 / 5
Sustainable Development Goals	0 (0%)	0 (0%)	0 (0%)	2 (12%)	**15 (88%)**	0 (0%)	17	4.88 / 5
Eco-anxiety (mental health)	0 (0%)	1 (6%)	2 (12%)	3 (18%)	**11 (65%)**	0 (0%)	17	4.41 / 5

4.65 / 5

|	
Planetary boundaries	Embodying sustainability values. Promoting nature
Bioeconomy	Acting for sustainability/Collective action
Circular Economy	Acting for sustainability/Collective action
Planned obsolescence	Acting in favor of sustainability. Initiative individual initiative
GreenComp	Taking on the complexity of sustainability.Thinking critical thinking

Paris Agreement	Acting in favor of sustainability. Political action
European Green Deal	Acting in favor of sustainability. Political action
Sustainable Development Goals	Acting in favor of sustainability. Political action
Eco-anxiety (mental health)	Taking on the complexity of sustainability.Thinking critical thinking
Planetary boundaries	Biodiversity
Eco-anxiety (mental health)	Adaptation to climate change
Planetary boundaries	The same skills as in the previous one.
Bioeconomy	The same skills as in the previous one.
Circular Economy	The same skills as in the previous one.
Planned obsolescence	The same skills as in the previous one.
GreenComp	The same skills as in the previous one.
Paris Agreement	The same skills as in the previous one.
European Green Deal	The same skills as in the previous one.
Sustainable Development Goals	The same skills as in the previous one.
Eco-anxiety (mental health)	The same skills as in the previous one.
Planetary boundaries	How to apply them in designing sustainable practices
Bioeconomy	Apply these in making inventions
Circular Economy	Apply these in making inventions
Planned obsolescence	Critical awareness of this
Sustainable Development Goals	Meaningfulness of these goals and comparing them with reality and dreaming what kind of a society would be an ideal sustainable society. Next steps how to realize these in own community
Eco-anxiety (mental health)	Emotional coping skills are relevant and awareness of negative coping disavowal and denial - how to avoid strengthening them in communication
Eco-anxiety (mental health)	connection with nature, forest bathing, outdoors education, interpretive paths

6 Any other topic/subject that you find mandatory to include and its not listed above?

100% (4)   0%

(4)
Responses
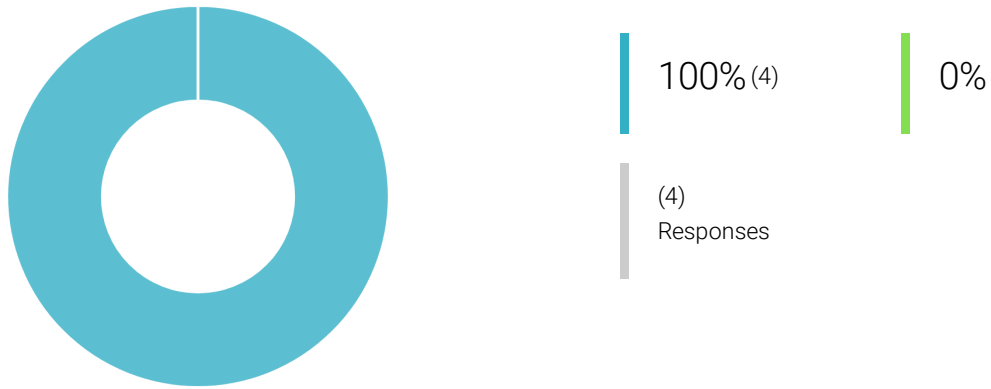
7 Do you have any comments that may contribute to the development of the Digital Learning Space and the Educational Game?

Between 6-9, I think we should focus more on the description of the "beauty" of the resources; and link the resources with the final object.

Primary: To Know how to grow food in a whatever kind of home/school space. Empathy, Solidarity, Equality: Analyse the human and environmental context to promote those aspects which are meaningful for the students. Reducie anxiety at this age and limit the theoretical literature/ policy. Children are aware of differences among themselves, and other schools in the same district/village. So why not generate some games of solidarity, empathy and equality among them, boys, girls, boys and girls in order to create their ideal school.

Secondary: Be aware of the manipulation of publicity and economic interests, and practice discrimination.

Higher education: Fight against fake news. Create Memes. Campaigns. How to constrast information. Find true sources of information.

What can do young people? Student's empowerment

No

The task for the end: How to transfer the ideas of a more sustainable reality in games to the reality -

ECF4CLIM-WP7

10 Questions

1. As a school/university what do you expect to obtain with the **Retrofit Tool**?

0 POINTS

Tool 1: Building energy retrofitting proposals

Figure 1–Methodology applied to develop tool 1.

⊘

28/28

Anon anonb3a5b872a69b4491

comparing different countries would be great but the context impacts that much so muvh -therefore that does not make sense. comparing schools even in some country does not make sense when some buildings are old and others new.

Anon anon3124a90d99e44828

Improve the energy management of the school, through objective specific climate data and building conditions

Anon anon56ec8a2d1fb64415

.

Anon anon73e70abe5c72400b

energy comsumption data and immedeate impact of action

Anon anonf239c29d95584647

Learning

Anon anon46a476378bba4614

Not clear. Maybe some tool to facilitate self reflection would be good

Anon anonf19523f158c2484b

Climate trends

Anon anon07e98f91eda6437d

do not understand the question

Anon anon9b5d0fcb58fc4c41

a tool to increase the developement sustentability competences

Anon anon300a154a70d14015

success

Anon anon4488209821a549d1

comparisons with other countries

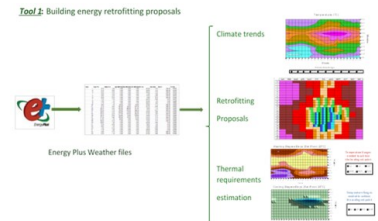**Anon anonae86d3dda6f24835**

a broader view on the matter

Anon anond2c2a0ffbcd54473

The climate trends and the thermal requirements

Anon anon696ffbc9ac6b43ff

give the students the picture of consequences of climate change and how important is sustainability

Anon anon62ced4f647e144be / **Anon anonaead1d502d4e4a22**

-

Anon anon2d562e438af54197

A support to the acquisition of competences through its use, understanding how different aspects affect

Anon anonbac4b41975a44f5d

retrofitting strategies

Anon anon1d2c6b4df8d94897

results ease to read

Anon anon71a7857e6e014141

A practical way of underdtanding what sustainability is about

Anon anone6811133c77e4a4b

The children are more interested in sustainability

Anon anon0983e83910654a14

help other offline actions to enhance environmental awareness of the univ comminity

Anon anon87cbc6fe54644b90

expand knowledge

Anon anon128488d7db8c4d81

I

Anon anon6bb3f63534514ed7

better monitoring

Anon anon37aa063548b54584

a tool to work with the students

Anon anon60f91c9cfb294361

some simulation on the options and perfrmances including costs

Anon anona776363920f54113

knowlegde

2. In energy efficiency, **do you find it enlightening and interesting to obtain energy savings by comparing a classroom under various scenarios?** (Please choose 2 to 6 options)

0 POINTS

Figure 7– Proposal for the bioclimatic map

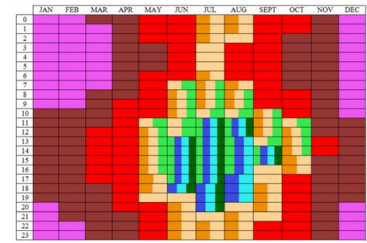| 7/25 | **A** | Surface area |
12/25	**B**	Classroom orientation
16/25	**C**	Construction quality based on building age
3/25	**D**	Number of floor (classroom height)
2/25	**E**	Number of facades
9/25	**F**	Percentage of windows in two orientations
8/25	**G**	Percentage of shading
16/25	**H**	Thermostat temperature in heating
10/25	**I**	Thermostat temperature in cooling
4/25	**J**	Cooling consumption

3. How do you see the applicability of the **Tool for evaluating the sustainability of interventions - KPIs** in your school/university? **- In case you already tried it**, do you feel that you generally understand and can resolve the issues raised by the tool?
0 POINTS
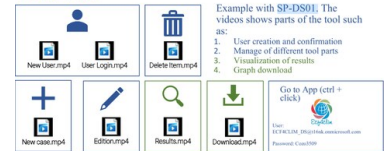
Anon anonb3a5b872a69b4491

25/25

not really applicable as the circumstances in the buildings has that much impact on the results

Anon anonf239c29d95584647

I haven't tried yet

Anon anon300a154a70d14015

different countries are difficult to compare, since buildings and their energyefficiency are quite different in Finland Romania and Portugal

Anon anon3124a90d99e44828

I do not already tested the tool

Anon anon37aa063548b54584

i think it can interesting but i haven't tried yet

Anon anonf19523f158c2484b

have to test first. I can't anseer yet.

Anon anonae86d3dda6f24835

it is very easy to understand and operate

Anon anon46a476378bba4614 / **Anon anon9b5d0fcb58fc4c41**

no

Anon anon696ffbc9ac6b43ff

very useful to compare results, easy to use and to see the results., a lot of information in an easy way

Anon anon73e70abe5c72400b

did not try yet

Anon anon07e98f91eda6437d

yes

Anon anon87cbc6fe54644b90

measuring results is a starting point for future measures. it is very useful

Anon anone6811133c77e4a4b

I think these tools are very useful.

Anon anon71a7857e6e014141

I think we can use these tools to evaluate sustainability

Anon anon4488209821a549d1

Not very useful -the numbers do not tell about the

results of our measures.

Anon anon1d2c6b4df8d94897

> Its a good way to try to understand the areas where needs more interventions.

Anon anon0983e83910654a14

> g

Anon anon2d562e438af54197

> It is user-friendly and easy to implement. Automatic uploading data simplifies the process for comparisons

Anon anond2c2a0ffbcd54473

> I haven't tried it

Anon anon6bb3f63534514ed7

> I think it's a good tool to provide future improvements

Anon anona776363920f54113

> we didn't use it yet

Anon anonbac4b41975a44f5d

> not tried yet

Anon anon62ced4f647e144be

> -

Anon anon60f91c9cfb294361

> quite applicable.

---

4. Do you find the **Learning Space** and its different areas and contents useful for your work as an educator?

0 POINTS

12/23   **A**   Yes, absolutely!

2/23   **B**   No, it will not have applicability in my school/work.

9/23   **C**   Its ok but it could be improved.

5. What **other contents** would you consider useful to be shared in the **Learning Space**? (For teachers, students and civil society)

0 POINTS

Anon anonb3a5b872a69b4491

23/23

the visual image is relevant for younger students but the content is relevant for older students. The content - sustainability concepts include far too much text for younger studrnts. the graphics for the older students should no be three dimensional, but more simple two-dimensional like cartoons

Anon anonf19523f158c2484b

I have not enough knowledge of the content yet

Anon anon300a154a70d14015

simple facts and games, eg be quick in quizz

Anon anonf239c29d95584647

I don't remember any other at the moment

Anon anonae86d3dda6f24835

lesson plans and lesson activities

Anon anon696ffbc9ac6b43ff

i need to check what is on the learning space to answer this question

Anon anon37aa063548b54584

it would be better if translated to the other langages

Anon anon9b5d0fcb58fc4c41

students

Anon anon71a7857e6e014141

I think the contents are well created and sufficient

Anon anon87cbc6fe54644b90

success stories

Anon anone6811133c77e4a4b

.

Anon anon73e70abe5c72400b

civil society tools

Anon anon07e98f91eda6437d

no idea

Anon anon1d2c6b4df8d94897

games

Anon anon4488209821a549d1

Link to the page about GreenComp and ECF-roadmap in mappa.fi (when published)

Anon anon46a476378bba4614

scenarios

Anon anon6bb3f63534514ed7

examples of pratical activities

Anon anona776363920f54113

> virtual reality, virtual visita

Anon anon2d562e438af54197

> not known at this moment

Anon anonbac4b41975a44f5d

> social and economic sustainability issues

Anon anond2c2a0ffbcd54473

> I don't know

Anon anon60f91c9cfb294361

> Impact of the climate warming on daily life.

Anon anon62ced4f647e144be

> -

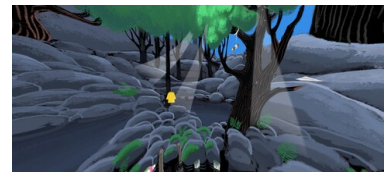**6.** Look at the picture for the **family house environment** (age: 6-9 years old). How do you like it?

0 POINTS

5/23	A	Excellent
11/23	B	Quite good
7/23	C	So-so, could be better
0/23	D	Not at all

7. Look at the picture for the **forest environment** (age: 10-15 years old). How do you like it?

0 POINTS

7/22	A	Excellent
5/22	B	Quite good
9/22	C	So-so, could be better
1/22	D	Not at all

8. Look at the picture of the **old man's house environment** (age: 10-15 years old). How do you like it?

0 POINTS

4/22	A	Excellent
11/22	B	Quite good
6/22	C	So-so, could be better
2/22	D	Not at all

9. Do you have any comments regarding the game environments?

0 POINTS

Anon anonb3a5b872a69b4491

22/22

especially the shopping mall visual image should be improved. Too little clothes etc in the picture.
perhaps the visual image could be two dimensional cartoon drawing style for older students

Anon anonf19523f158c2484b

I have not tested it yet with the lap top.

Anon anon300a154a70d14015

2d might be better, simpler graphics like in this picture are easier to adoot

Anon anon696ffbc9ac6b43ff

students will not like them too much

Anon anonae86d3dda6f24835 / **Anon anond2c2a0ffbcd54473** / **Anon anonf239c29d95584647**

No

Anon anon37aa063548b54584

i think they are very good

Anon anon4488209821a549d1

I'm afraid that learning through minigames will not be deep learning, but only small facts, not big picture.

Anon anon07e98f91eda6437d / **Anon anon60f91c9cfb294361** / **Anon anon87cbc6fe54644b90** / **Anon anon9b5d0fcb58fc4c41** / **Anon anone6811133c77e4a4b**

no

Anon anon71a7857e6e014141

No, it looks great

Anon anon1d2c6b4df8d94897

I think the area is very dark

Anon anona776363920f54113

more realistic forms

Anon anon73e70abe5c72400b

need to think further

Anon anon6bb3f63534514ed7

it's a little bit dark cenary

Anon anonbac4b41975a44f5d

no comments sorry!

Anon anon2d562e438af54197

> They are nice. For older children, used to videogames maybe they could be less attractive

Anon anon62ced4f647e144be

> -

10. Do you wish to follow and give your feedback regarding the next steps of the Digital Planform and related content? If so, **leave us your email**.

0 POINTS

⊘ **Anon anonb3a5b872a69b4491**

20/20 | anna.e.lehtonen@jyu.fi

Anon anonf19523f158c2484b

| No.

Anon anon696ffbc9ac6b43ff

| o

Anon anon300a154a70d14015

| no thank you

Anon anonae86d3dda6f24835

| we politely decline

Anon anonf239c29d95584647

| No

Anon anon37aa063548b54584

| fatimaaires@aebobadela.pt

Anon anon4488209821a549d1

| ...

Anon anon1d2c6b4df8d94897

| joanatmrodrigues@gmail.com

Anon anon2d562e438af54197 / **Anon anon9b5d0fcb58fc4c41**

| no

Anon anona776363920f54113

| patriciapereira.prof@gmail.com

Anon anon71a7857e6e014141

| georgi_dov@yahoo.com

Anon anone6811133c77e4a4b

| Yes. dragut.maria@gmail.com

Anon anon60f91c9cfb294361 / **Anon anon87cbc6fe54644b90**

| yes

Anon anon6bb3f63534514ed7

| daniela.baptista@prof.aecamarate.pt

Anon anon07e98f91eda6437d

| kirsi.koukkari-halme@tampere.fi

Anon anon73e70abe5c72400b

| -

Anon anon62ced4f647e144be

| varnaimonika2@gmail.com

This questionnaire will be open until 19.05.2023

As a teacher/ trainer and/ or investigator in the Education field, we kindly ask you again for your participation in giving us your feedback on the contents developed regarding the **Knowledge Base for the ECF4CLIM Serious Game and Flipbooks**. This questionnaire is intended for the **fine-tuning of the contents**, in the next few remaining working months.
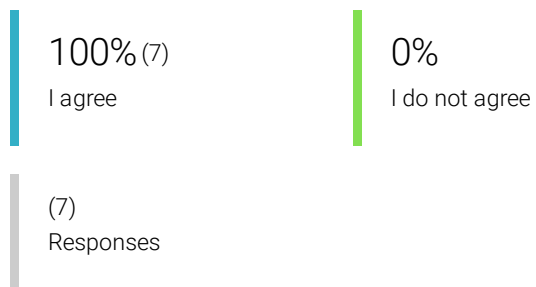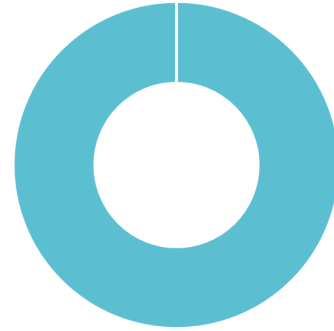
MODULES:

0. Environmental Awareness (Introduction)

1. Engagement (How to promote sustainability)

2. Connections (How to frame the problem?)

3. Visions (What are the possible futures?)
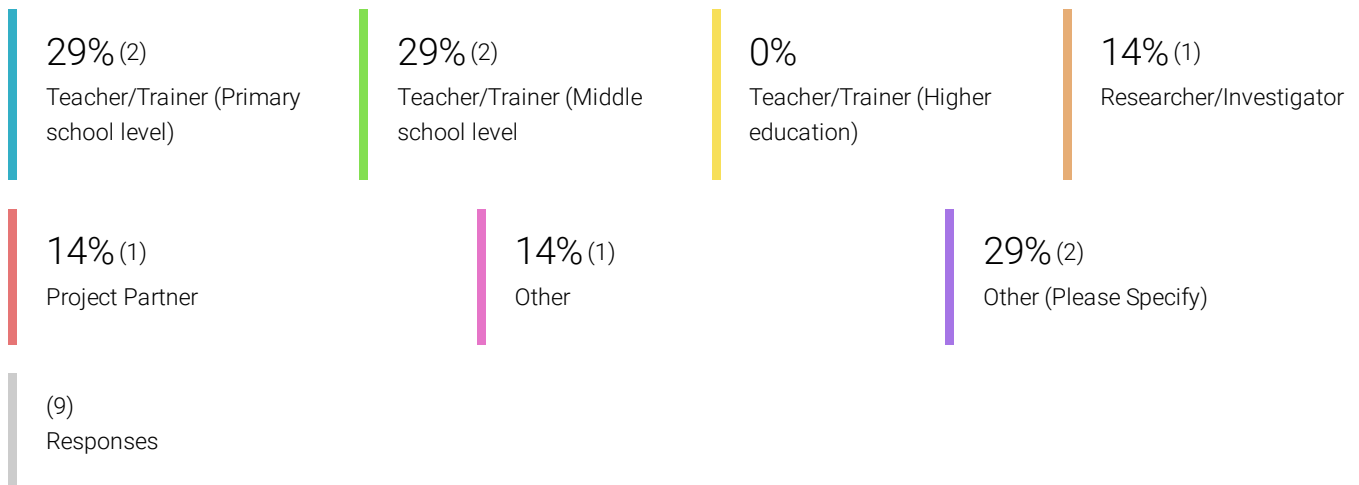
4. Actions (How to proceed?)

Please see in detail the contents at: https://drive.google.com/drive...

You are also free to comment directly on the documents.

1 I agree with the processing of my personal data for the purposes of the ongoing investigation. I understand that my participation in the ECF4CLIM project is voluntary, that the information I provide is confidential and that I am free to withdraw it at any time.

100% (7)
I agree

0%
I do not agree

(7)
Responses

2 Your professional role/position (you can select more than one option)

29% (2)
Teacher/Trainer (Primary school level)

29% (2)
Teacher/Trainer (Middle school level

0%
Teacher/Trainer (Higher education)

14% (1)
Researcher/Investigator

14% (1)
Project Partner

14% (1)
Other

29% (2)
Other (Please Specify)

(9)
Responses
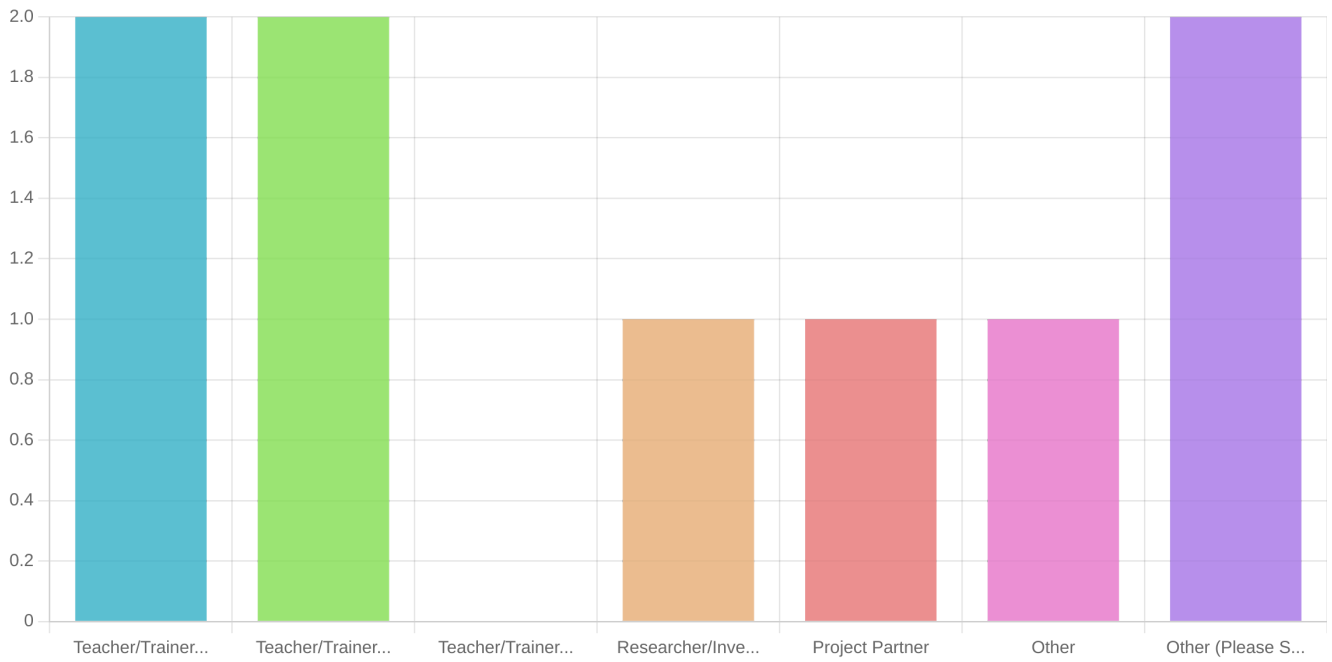
ISQ CRV

I also used to work as teacher for 9-12 year-olds for 15 years

3 Regarding the Module 0. Environmental Awareness (Introduction) How do you evaluate :

	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	2 (29%)	2 (29%)	**3 (43%)**	0 (0%)	7	3.14 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	2 (29%)	2 (29%)	**3 (43%)**	0 (0%)	7	3.14 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	1 (14%)	**3 (43%)**	3 (43%)	0 (0%)	7	3.29 / 4
							3.19 / 4

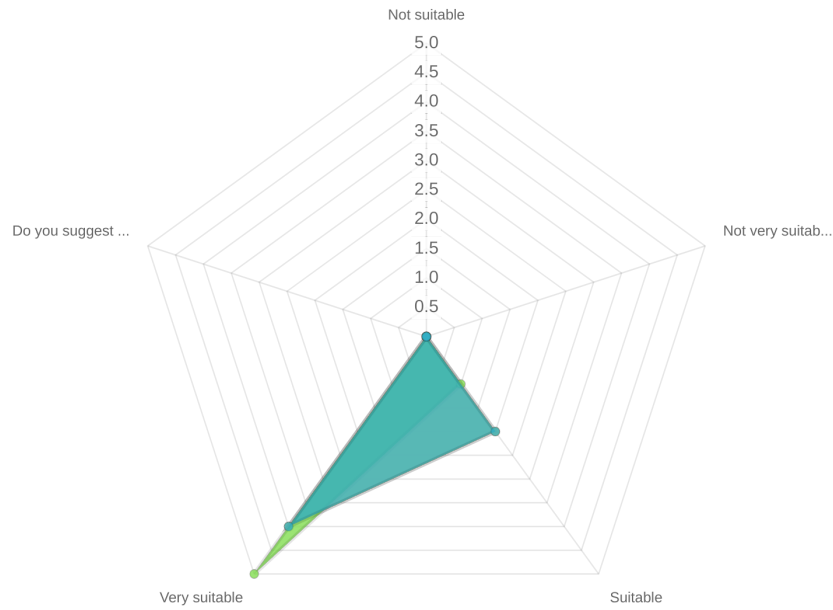|	
EQF 1-2 (around 6 to 9 years old)	Imagines could be more representative as the present videogames
EQF 2-3/4 - (around 10 to 15 years old)	Imagines could be more representative as the present videogames
EQF 3/4-6 (around 16-25 years old)	Imagines could be more representative as the present videogames
EQF 1-2 (around 6 to 9 years old)	Too much text, needs to be much more simple. Too many and irrelevant concepts, terms, not all of them should be included. Only clear message and concrete explanation of planetary boundaries is enough, how we are consuming far too much and need to change how we live. Additionally it is relevant to tell that concrete international agreements have been made.
EQF 2-3/4 - (around 10 to 15 years old)	Too many and irrelevant terms, not all of them should be included. Needs to be simplified

4 Regarding the Module 1. Engagement (How to promote sustainability) How do you evaluate :
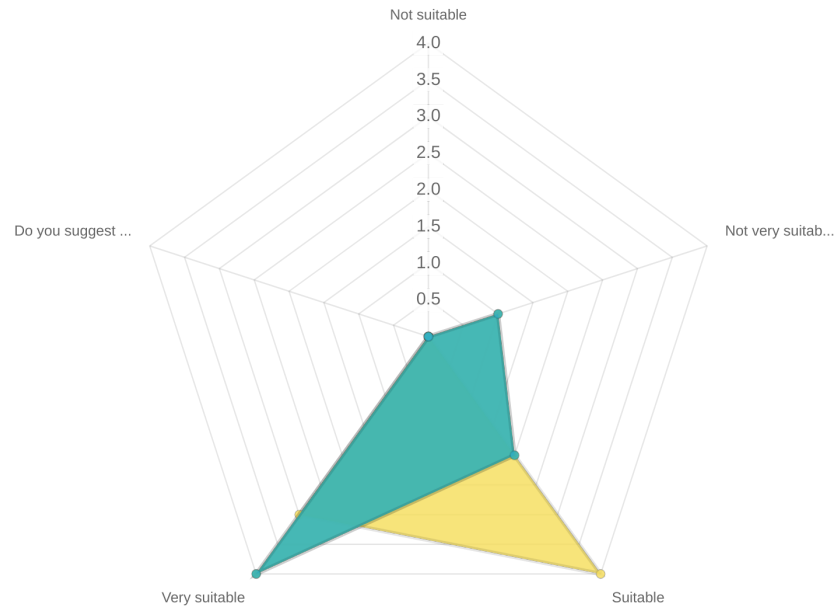

	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	0 (0%)	2 (33%)	**4 (67%)**	0 (0%)	6	3.67 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	0 (0%)	1 (17%)	**5 (83%)**	0 (0%)	6	3.83 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	0 (0%)	2 (33%)	**4 (67%)**	0 (0%)	6	3.67 / 4
							3.72 / 4

EQF 1-2 (around 6 to 9 years old)   Too much text, needs to be much more simple.

5 Regarding the Module 2. Connections (How to frame the problem?) How do you evaluate :

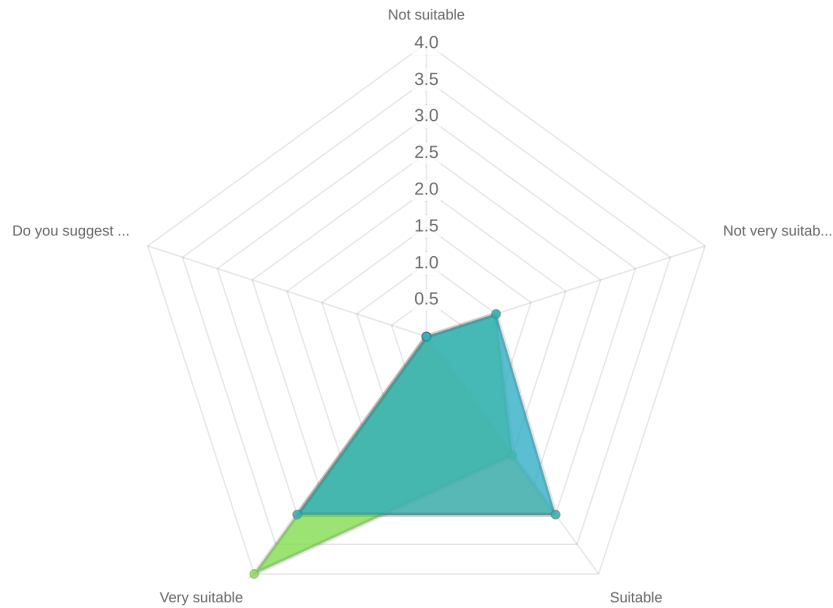|	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	1 (14%)	2 (29%)	**4 (57%)**	0 (0%)	7	3.43 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	1 (14%)	2 (29%)	**4 (57%)**	0 (0%)	7	3.43 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	0 (0%)	**4 (57%)**	3 (43%)	0 (0%)	7	3.43 / 4
							3.43 / 4

EQF 1-2 (around 6 to 9 years old)

Too much text, needs to be much more simple.

EQF 2-3/4 - (around 10 to 15 years old)

Lessen content Give concrete examples of advertisements with critical comments Use of anti-advertisements? Examples that focus on understanding different interest in sharing knowledge -comparing knowledge of same issue from different stakeholder interests

6 Regarding the Module 3. Visions (What are the possible futures?) How do you evaluate :

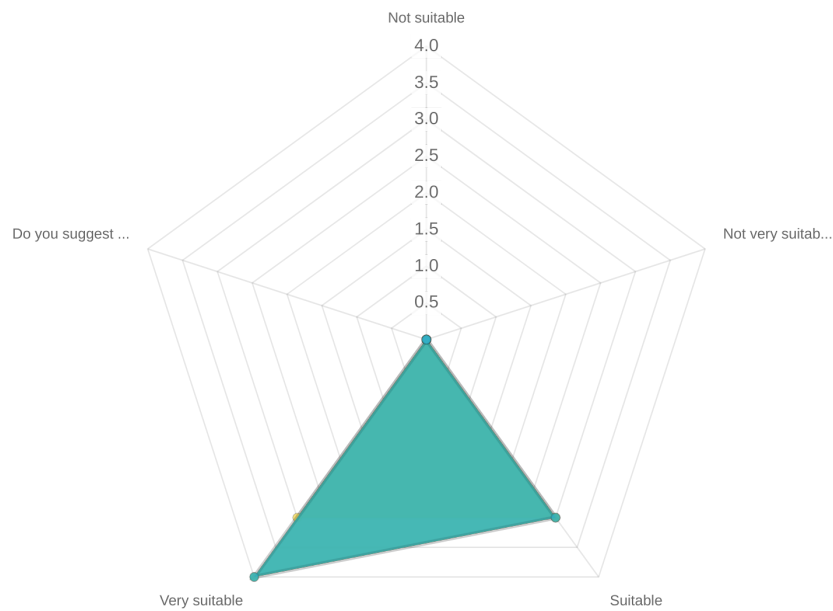|	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	1 (14%)	**3 (43%)**	3 (43%)	0 (0%)	7	3.29 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	1 (14%)	2 (29%)	**4 (57%)**	0 (0%)	7	3.43 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	0 (0%)	**3 (50%)**	3 (50%)	0 (0%)	6	3.5 / 4
							3.4 / 4

EQF 1-2 (around 6 to 9 years old)	Too much text, needs to be much more simple.
EQF 2-3/4 - (around 10 to 15 years old)	For ten-twelve years old there is far too much content - the content of the EQF 1-2 is suitable for them. For the older ones: too much content - needs to be simplified

7 Regarding the Module 4. Actions (How to proceed?) How do you evaluate :

	Not suitable	Not very suitable	Suitable	Very suitable	Do you suggest any changes regarding length, contents, adequacy, etc.?	Responses	Weighted Average
EQF 1-2 (around 6 to 9 years old)	0 (0%)	0 (0%)	3 (43%)	**4 (57%)**	0 (0%)	7	3.57 / 4
EQF 2-3/4 - (around 10 to 15 years old)	0 (0%)	0 (0%)	3 (43%)	**4 (57%)**	0 (0%)	7	3.57 / 4
EQF 3/4-6 (around 16-25 years old)	0 (0%)	0 (0%)	**3 (50%)**	3 (50%)	0 (0%)	6	3.5 / 4
							3.55 / 4

8 Do you have any comments regarding the Flipbooks? Example: https://publuu.com/flip-book/4...

The content should be adapted to different ages.