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The EcoMystery Project:

Interactive Escape Rooms for Climate Crisis Awareness and Civic Engagement in School Education

WP2

National Survey Italy

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The EcoMystery Project: Interactive Escape Rooms for Climate Crisis Awareness and Civic Engagement in School Education

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1. Findings of the Online Questionnaires in the Italian pilot schools

A key part of the NDR research was conducted using a series of online questionnaires that gathered the perceptions of teachers, students and families regarding climate change education. For the Italian sample, 2 schools were selected: the I.C. Salvo D'Acquisto Follo-Calice al Cornoviglio (Liguria Region) and the I.C. A. Fogazzaro Noventa Vicentina (Veneto Region). A total of 45 primary and middle school teachers (most with 6 or more years of experience teaching humanities, math, and geography subjects), 110 (mostly middle school) students, and 81 parents and family members responded to the surveys.

The following sections break down the key findings of each target group and question cluster.

1.1 Teacher Findings

Current methods and efficacy

The first question cluster for the teacher surveys identifies the methods that teachers currently implement in their climate change curriculum and how effective they believe these methods are in achieving the desired learning outcomes for students. The findings show that teachers use one or more of the following methods to teach climate change:

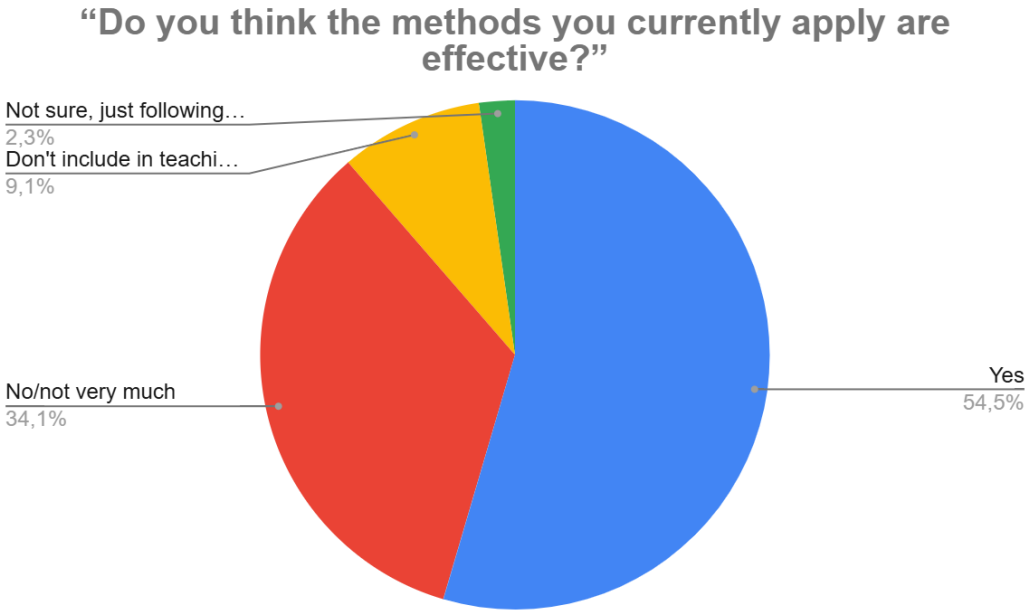
- lectures, research and textual analysis,
- group activities,
- multimedia and digital learning activities,
- interactions with territorial actors that work in related fields.

About 30% of the teachers simply stated that they follow the school, national, and/or Agenda 2030 guidelines without elaborating on their exact methodology. A word cloud with the most-frequent responses is shown below.

Frequently occurring words included in teachers' responses

When asked about the efficacy of these methods, many teachers expressed confidence that their **methods are effective**, while others had doubts. Some teachers also admit that they do not include climate change topics in their curriculum.

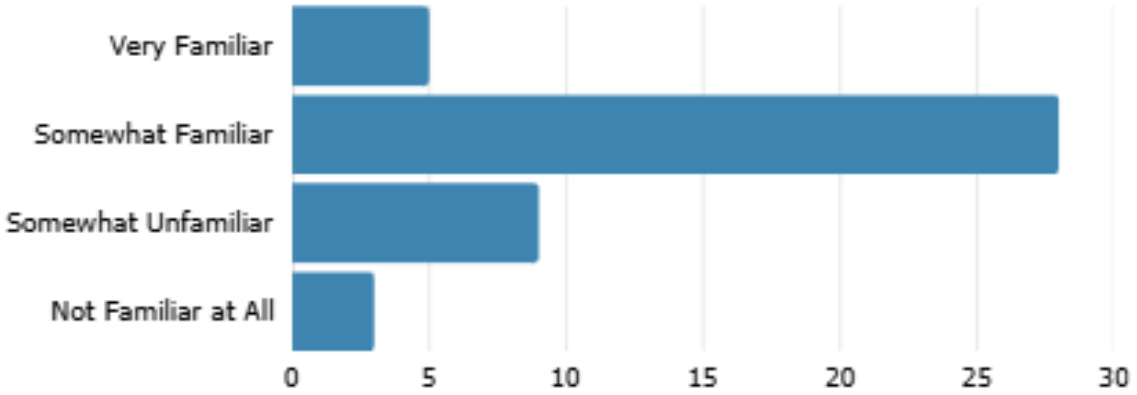
Effectiveness of teaching methods



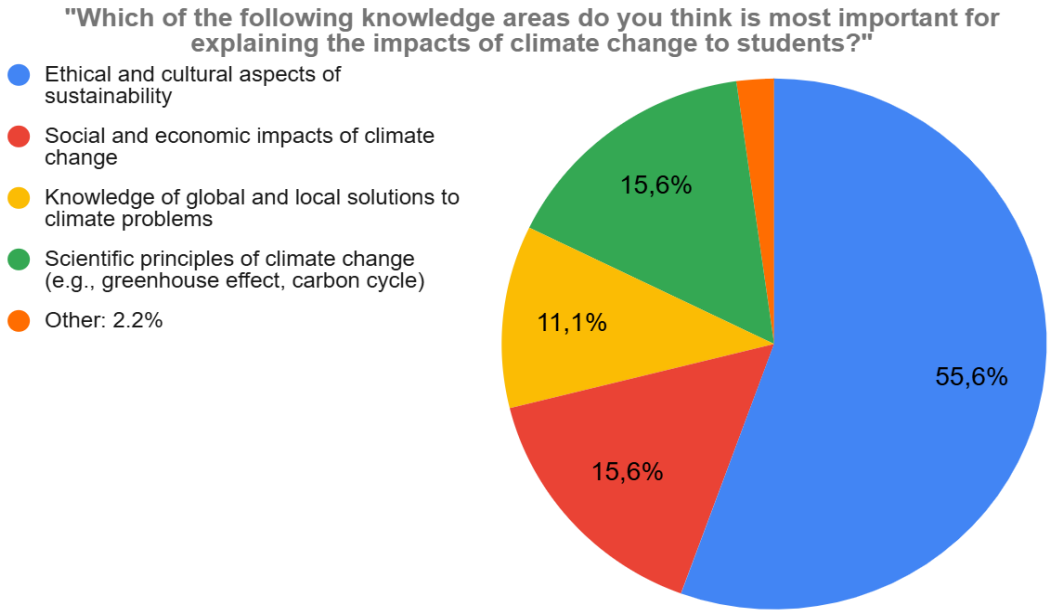
Knowledge gaps and teaching confidence

Teachers largely believe that they have at least a **good understanding of climate change principles** and affirm that they are among the most important topics for students to understand, in addition to the **ethical** and **cultural aspects** of sustainability and the **social and economic impacts** of climate change.

Familiarity with climate change principles



Most important knowledge areas to teach to students

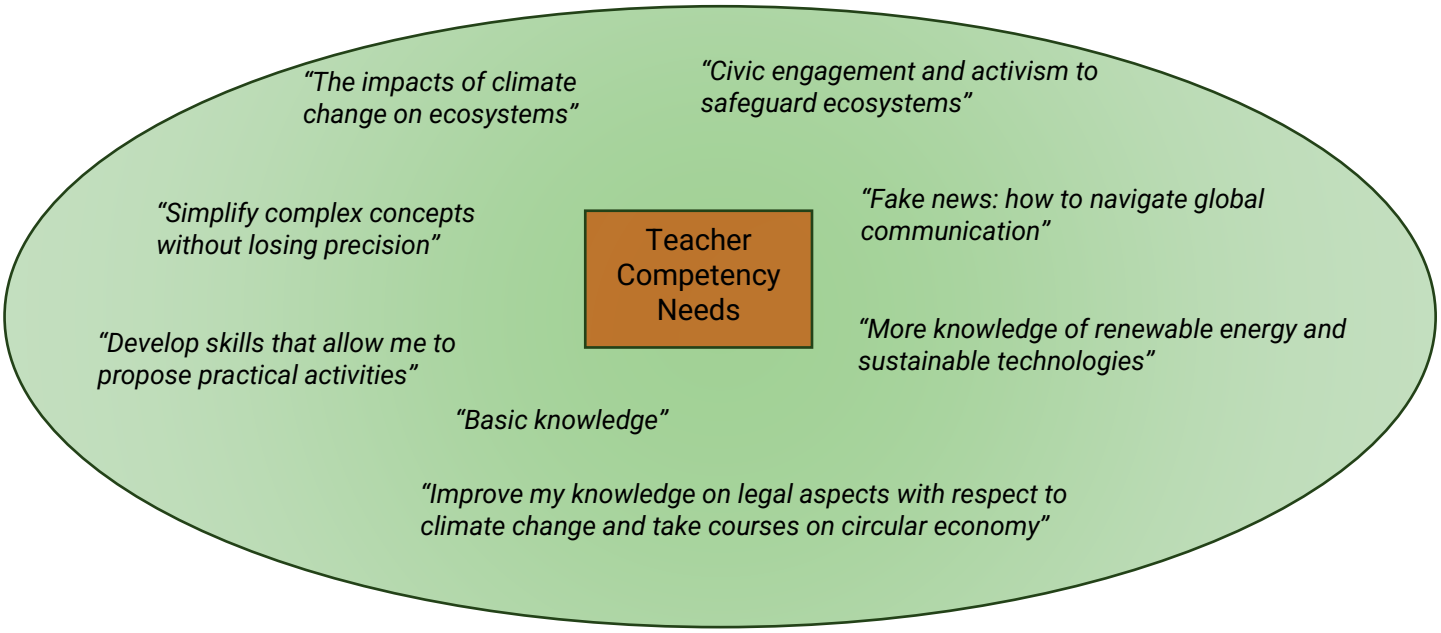


However, when asked if they were confident about teaching these subjects, most teachers disagreed and believed they would need more training and knowledge about these topics.

Confidence in teaching various climate change themes

Many teachers note that they **lack some scientific and technical knowledge** regarding the causes and effects of climate change, as well as digital literacy that could enable them to communicate more effectively with their students using technology with which they prefer to learn. On top of this, teachers find it **difficult to synthesize the technical language of scientific reports** into material that students of their level can understand and would like to develop their skills in this regard. They also overwhelmingly agreed that the best methods for teaching about climate change and responsible global citizenship are through **hands-on, practical activities**.

Teacher competency needs

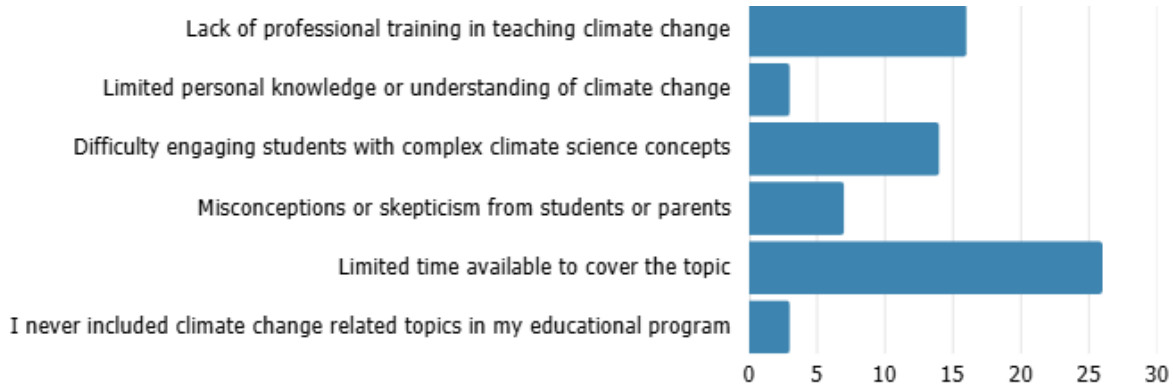


Challenges and barriers

Teachers largely identify 3 **main challenges** in teaching climate change:

1. Limited time to adequately cover the topic
2. Lack of professional training in teaching climate change
3. Difficulty in engaging students on complex topics

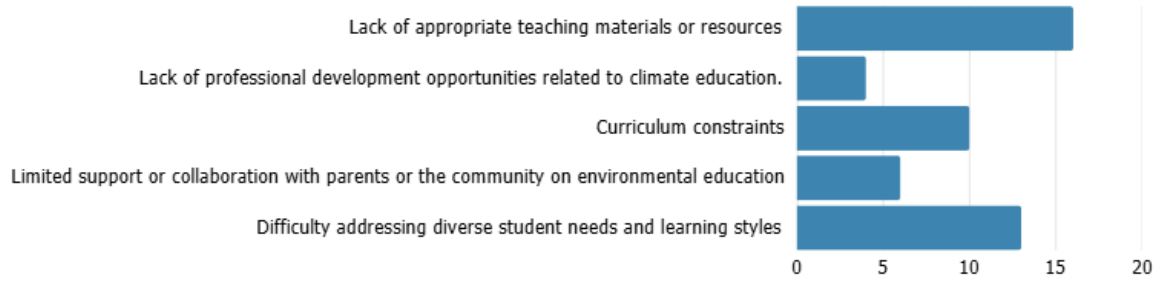
Teacher challenges



While the 3 **main barriers** identified are:

- Lack of appropriate resources and materials
- Difficulty addressing the different needs and learning styles of students
- Curriculum constraints (too much material to teach over the school year and not enough time to properly engage the students in each topic)

Teacher barriers

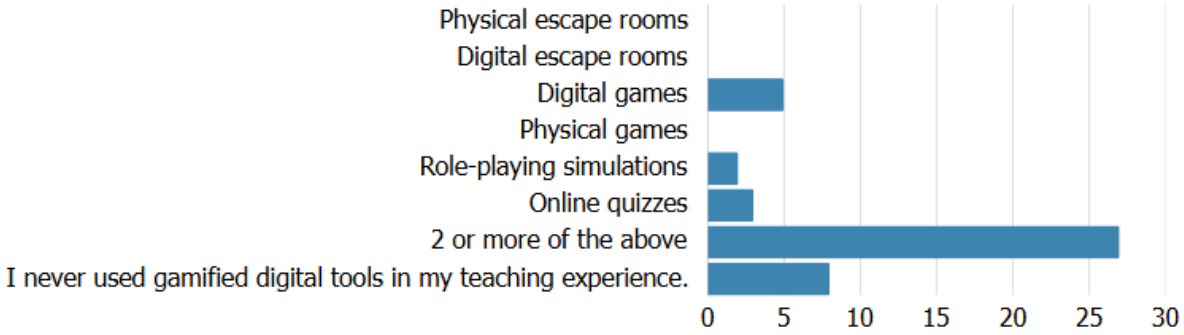


Familiarity with gamification and other digital tools

Teachers reported **frequent use of digital tools** in the classroom, despite some personal and functional (i.e. reliable access within the school) limitations, though there is **mixed familiarity** with the *concept* of gamification. However, nearly all the teachers are familiar with digital games and online quizzes – including digital escape rooms – and the majority have used them at least once throughout the school year, which shows that some teachers are aware of many gamification *methods*, even if they had not heard of the *concept* before taking the survey.

"How familiar are you with digital tools and the concept of gamification?"

"Which of the following gamification-based teaching tools have you used or are familiar with?"



Recommendations for improving climate change education

The final question cluster provides insights into which improvements teachers would like to see regarding the way climate change is taught in their schools. The highest priorities include designing more **engaging educational materials tailored to the age levels** of students and ensuring climate change is incorporated within the curriculum of all subjects, which guarantees **a more interdisciplinary approach**. Teachers were also given a chance to provide open suggestions, in which the most frequent recommendations were to provide **more interactive and participatory activities, especially through partnerships with local territorial entities** that could bring to life the study of climate change. This would allow students to engage in a real-world setting, seeing the issues of climate change firsthand and brainstorming potential solutions together with their peers and community organizations. Other responses reflected the aforementioned desire for a more interdisciplinary approach, as well as more time to discuss with other colleagues the best way to implement this approach. A few others mentioned the need for **more training, knowledge, and resources** on teaching climate change.

Improvement area	Average score (out of 5)
More engaging, age-appropriate materials	4.1
More interdisciplinary approaches	4
Collaborations with external experts/local organizations	3.7
More teacher training and professional development	3.7
More time and resources allocated within the school schedule	3.6

Open response recommendations

Key takeaways

Italian teachers are **generally familiar** with climate change and its main ideas but **lack confidence in explaining more specific themes** like:

- scientific principles that are involved (i.e. the greenhouse effect and carbon cycle)
- social and economic impacts that result especially) ethical and cultural aspects of sustainability.

However, they are mostly confident in the efficacy of their current teaching methods (traditional lecture approaches, some interactive games and teamwork activities), though they would like to utilize **more engaging and participatory learning approaches** digital escape rooms could be a more readily available and adaptable solution collaborations with local organizations are also highly favorable

Main challenges:

- lack of time
- missing training
- lack of resources that enable them to adapt their teachings to a variety of student learning styles

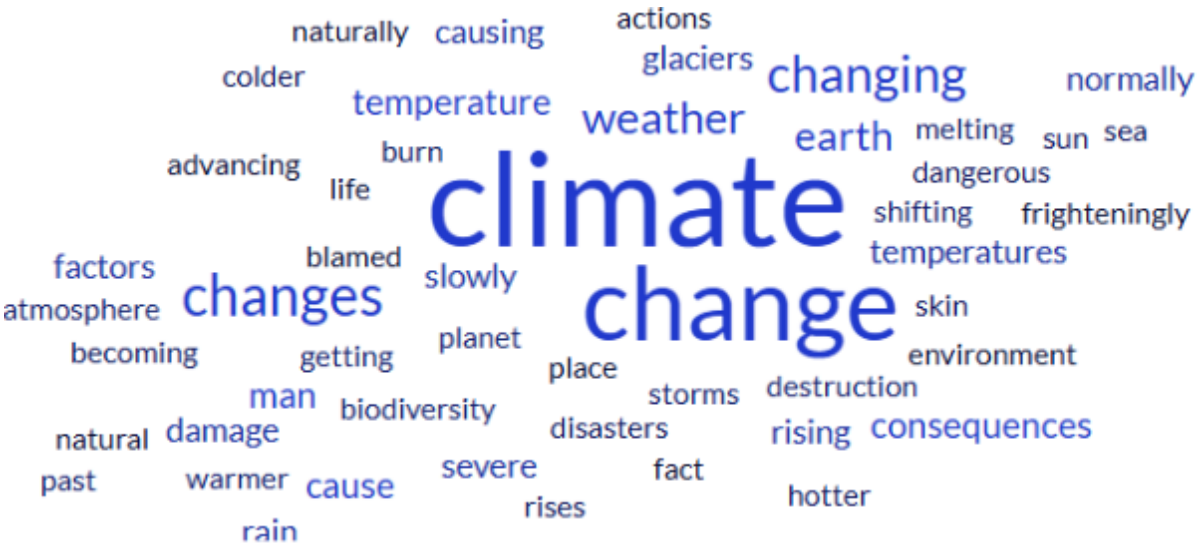
1.2 Student Findings

Knowledge of climate change

The student survey began with a simple question: "What does 'climate change' mean to you?", to which the students gave open responses. **The majority of students gave a tautological or circular response**, meaning that they simply repeated the question back as an answer – for example, "the climate is changing". Another significant portion of students gave **vague answers** that hint some knowledge of climate change as a global issue, usually that temperatures are increasing (and in some cases decreasing) drastically or worryingly due to human activity (i.e. pollution) and that this can lead to grave consequences for the planet and environment. A few students only listed **specific negative impacts** of climate change for their definitions, such as movement or melting of glaciers, destruction of biodiversity, rising sea levels, and increases in extreme weather and natural disasters. Only 3 students were found to have given sufficient responses that displayed a general understanding of climate change:

All 3 of these responses came from students of the Ligurian school I.C. Salvo D'Acquisto Follo-Calice, which could possibly indicate a slightly more well-rounded approach to climate change education in comparison to the Veneto Region school, though the sample size is too small to empirically support this claim. Analyzing on a broader level, nearly all of the responses were sentence fragments and not complete, thus also suggesting that students **may lack basic writing and critical thinking skills** which further inhibit their ability to piece together a complete picture of the various causes and effects of climate change as a global issue rather than just a mere variance in climate conditions.

Student response word cloud summary: what is climate change?



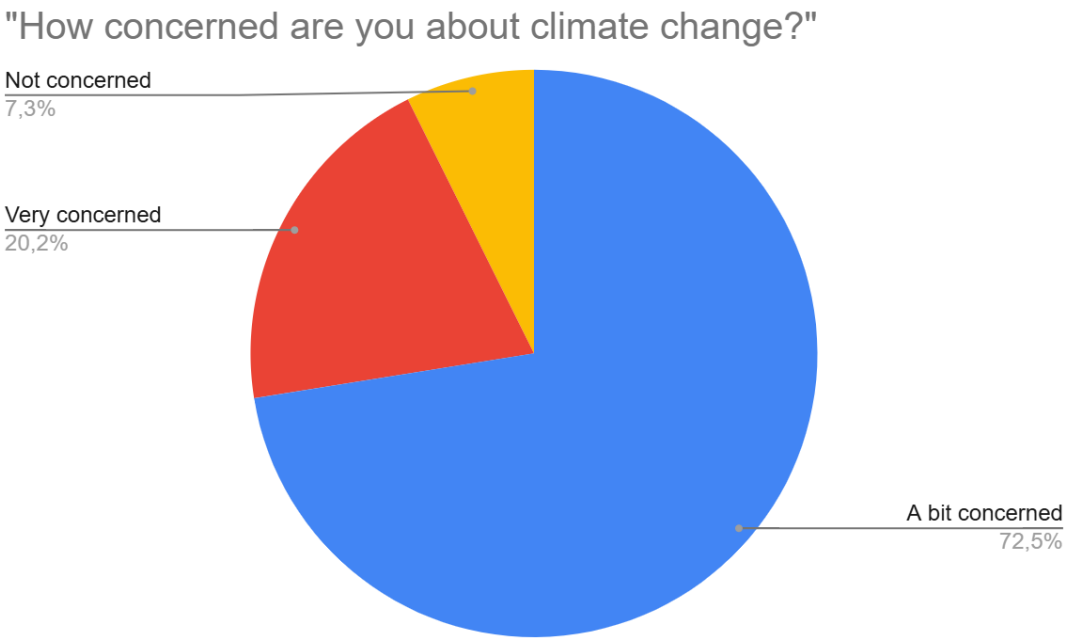
Following the open response question, the rest of the survey consisted of multiple-choice questions (closed responses). In the next part of the question cluster, students were asked to identify the main causes and consequences of climate change. These answers seem to contradict the vague responses seen above, as the vast majority of students selected at least 2 or more causes and consequences, and many identified all options listed on the survey (i.e. greenhouse gases, deforestation, natural climate cycles, etc.), which shows that they know more than they managed to write in the previous question. Thus, overall **students seem to be generally familiar with the**

causes and effects of climate change, **even if they are not able to describe them using their own words**.

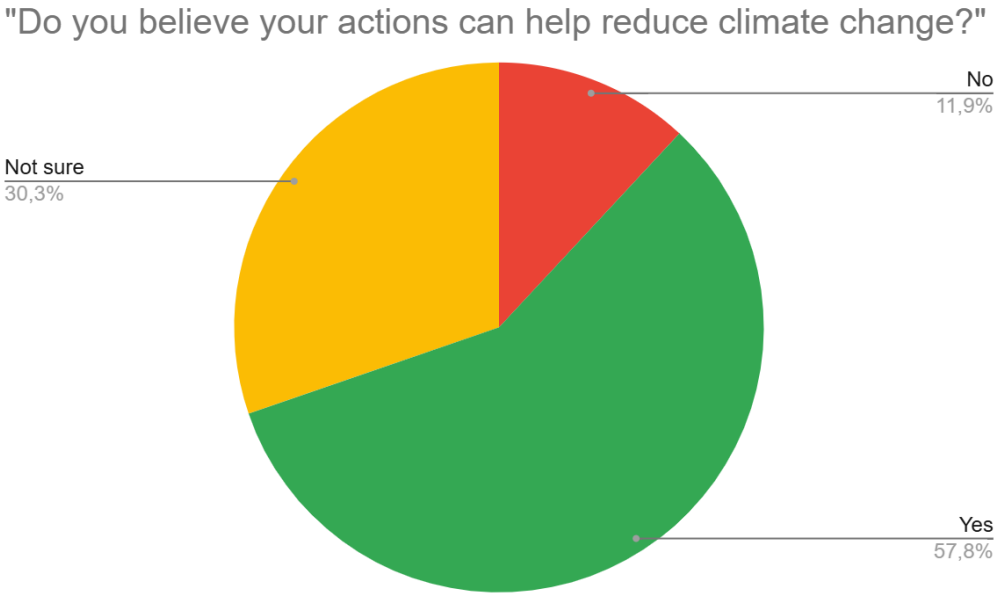
Level of concern and mitigation actions

When it comes to students' concern for climate change and how it will affect them, nearly 73% of students admitted to being somewhat concerned, compared to 20% being very concerned and 7% not at all. Additionally, only around 58% of students believe that their individual actions can help to mitigate the effects of climate change, while 30% were not sure and 12% disagreed. Nevertheless, the majority participate actively in personal and collective activities that promote awareness and reduce environmental pollution, such as community cleanup events, planting trees, recycling, reducing water and energy use, and walking, cycling, or using public transport.

Concern about climate change



Confidence that individual actions make a difference

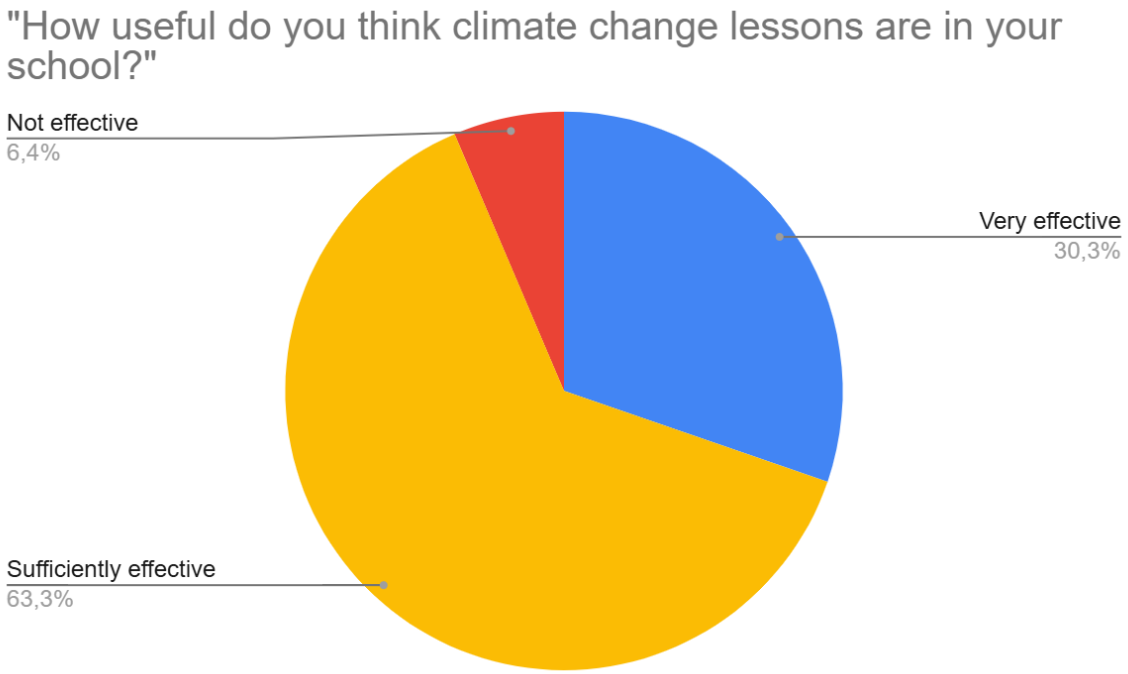


Efficacy of current teaching methods

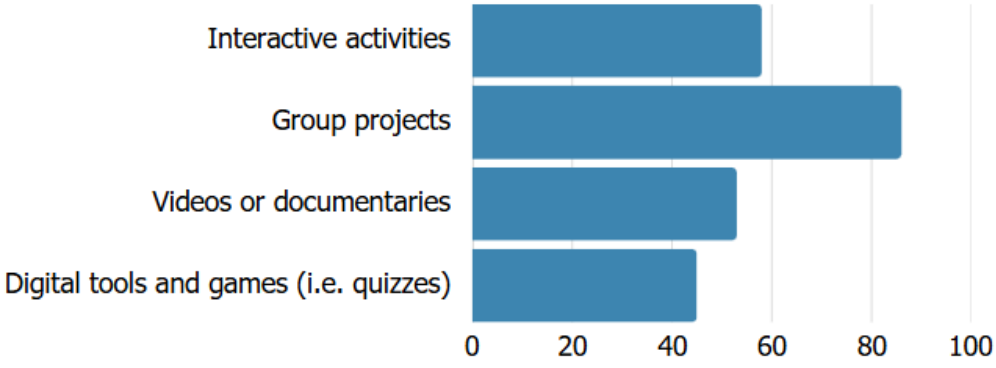
Echoing the teachers' responses, students noted that there are only a few main subjects where climate change is taught: geography, science, and civil education. While these might be the subjects that make the most sense to include climate change in their curriculum, it also reflects the **lack of an interdisciplinary approach** to the subject.

Despite this, most students believe that the current way climate change is taught in their schools is **mostly effective**, with 30% even claiming it to be very effective. They find that the most effective teaching methods are **interactive activities and group projects**, while monotonous methods like videos and online quizzes are deemed less effective. This further justifies the case for utilizing digital escape rooms in the classroom, as they give students an opportunity to build problem-solving skills via interactive teamwork.

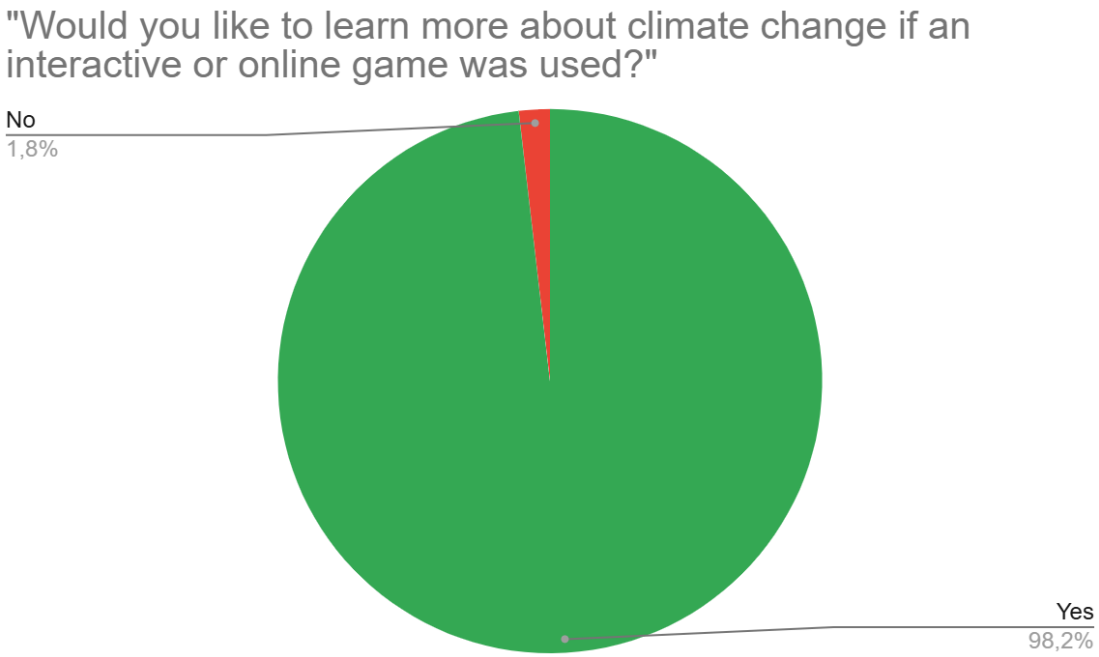
Efficacy of current approach to climate change education



"Which teaching methods do you find most effective for learning about climate change?"



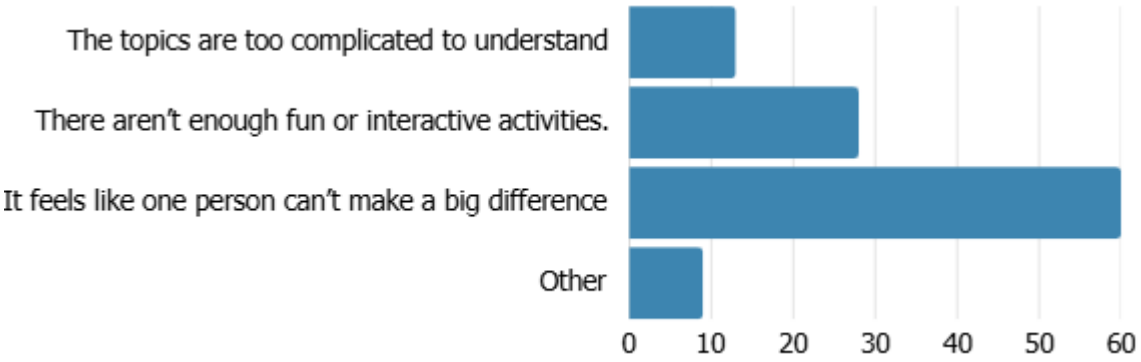
While most students have experienced gamified learning methods in the classroom, few of these activities have involved escape rooms. However, nearly all students indicated they would enjoy learning about climate change through interactive and online games, suggesting that **a digital escape room would be a desired learning instrument for them.**



Challenges and recommendations for improving curriculum

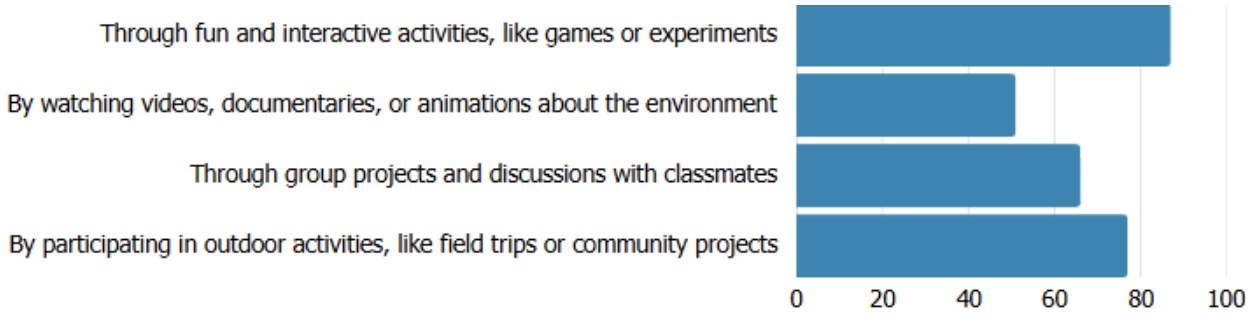
The biggest issue students confront when dealing with climate change is the sensation that **one person alone can't make a difference,** despite their previously noted broad belief that their own actions can contribute to mitigating climate change. Some also noted that there are **not enough interactive activities in the classroom** that make it easier to learn about the topic, while very few noted that they had no difficulties (8 of the "other" responses). This is a crucial finding, as it pushes the EcoMystery project to develop digital escape room scenarios and supplementary curriculum in a way that emphasizes the **importance of individual actions that can spark a change and evolve into collective efforts**.

"What challenges do you face in understanding or engaging with climate change education?"



Lastly, students were asked to select their preferred methods for studying climate change. **Students overwhelmingly emphasized the need for more interactive activities**, such as games and experiments, while **less interest was expressed in videos and documentaries**. Most students also desire more group projects with classmates and especially **field trips into the community**. This further shows the need for interactive group activities, particularly in the form of games, where students can work with their classmates to solve puzzles while learning more about climate change, which is exactly what the EcoMystery project aims to achieve with its digital escape room scenarios.

"What methods would you prefer to learn about climate change in your school?"



Key takeaways

Students may find it **difficult to summarize the main ideas of climate change**, but **they do recognize the causes and impacts** of climate change

Many are only **mildly concerned about climate change**, which could be due to their age level and current priorities (i.e. school, sports, friends, having fun).

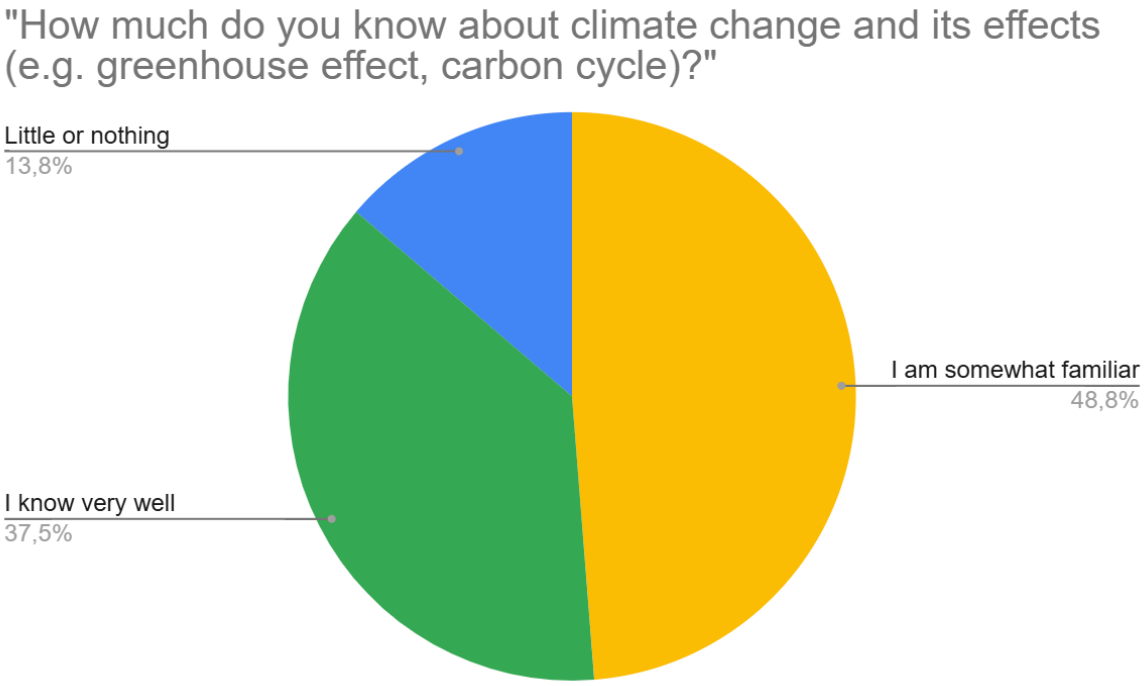
Students believe that **current teaching methods are mostly effective**, however:

- they would like to have **more interactive and group work activities**, especially involving field visits and participating in community projects
- they also expressed **strong interest in learning through gamified means** and experiments

1.3. Parents and Families Findings

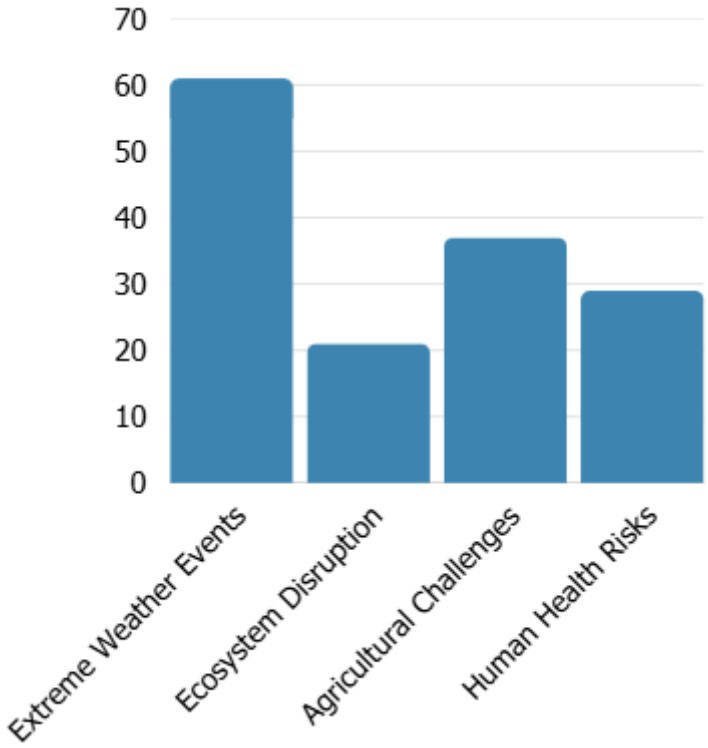
Climate change awareness

Parents and family members that responded to the survey believe they have a **good understanding of climate change**, with nearly half claiming to have some knowledge and 37.5% claiming to be very familiar with the topic.



They were also asked to list the most relevant impacts of climate change in their areas, in which **extreme weather events and agricultural challenges caused the highest concern**. This shows that parents and families recognize that climate change is already having an impact on their lives and neighborhoods; the threat is no longer hypothetical.

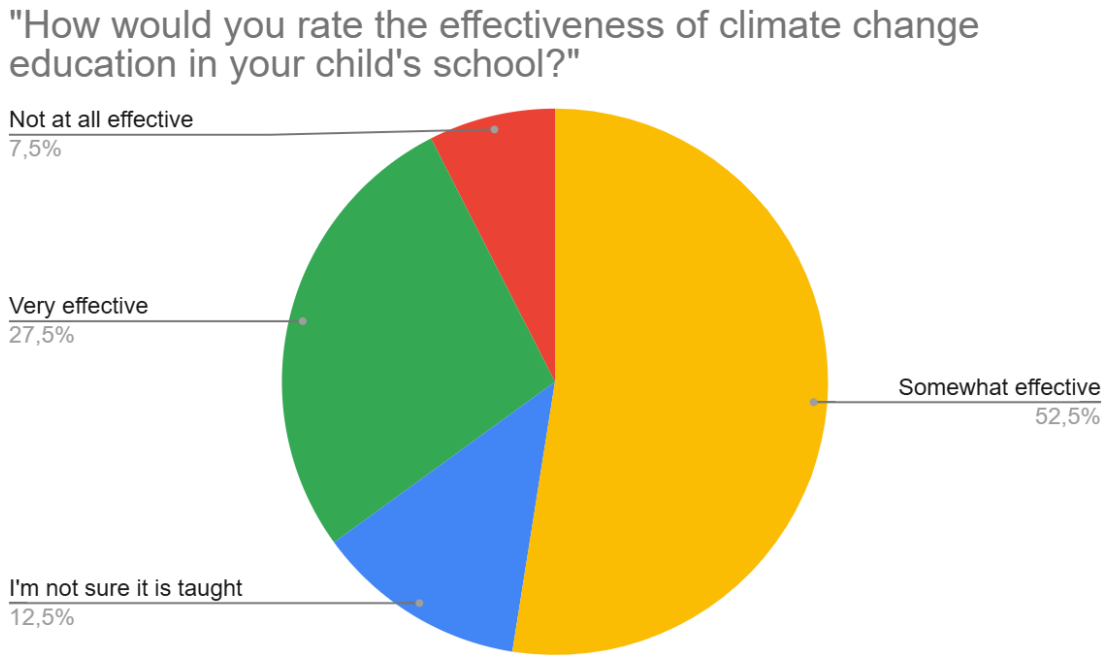
Most relevant climate change impacts in local area



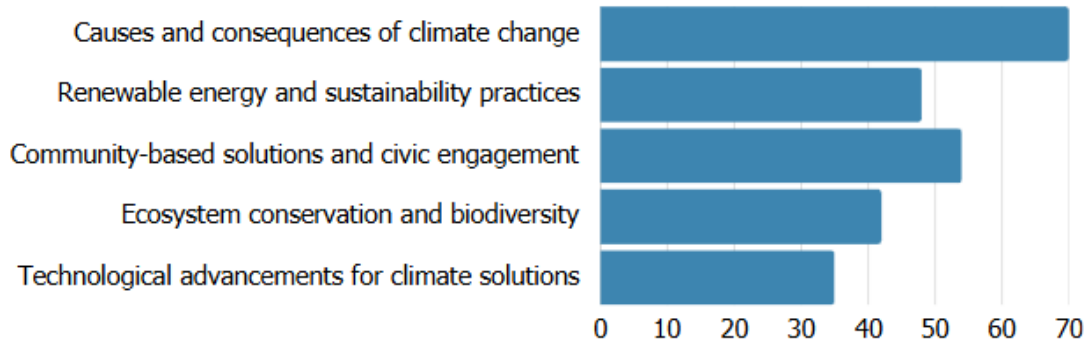
Efficacy of school climate education

The vast majority of parents and families are aware that climate change is taught in their children's schools, though **nearly half of them note that it is only taught occasionally as a topic of current affairs**. 80% of families believe that their children's **climate change education at school is at least somewhat effective**, significantly higher than the teachers' opinions and a bit lower than those of the students. They also find that the most important topics that should be taught are the causes and effects of climate change and how citizens and communities can mitigate both their contribution to the problem and build resilience to the negative impacts that occur.

Efficacy of children's climate change education



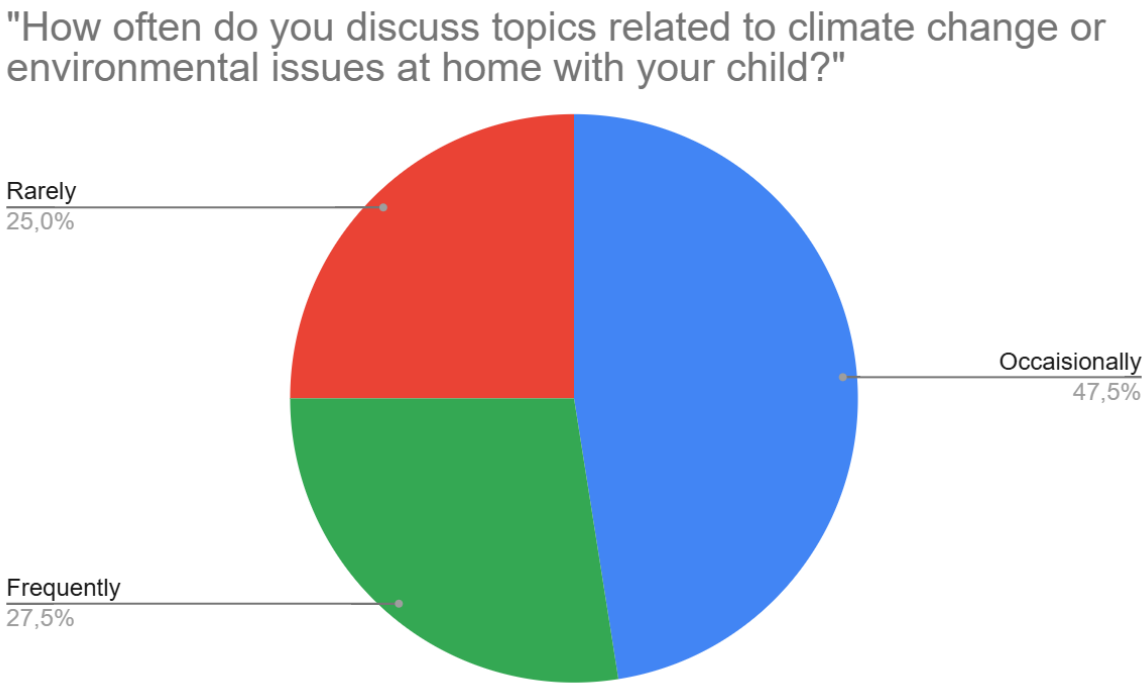
Most important topics that should be taught



How to support families in discussing climate change at home

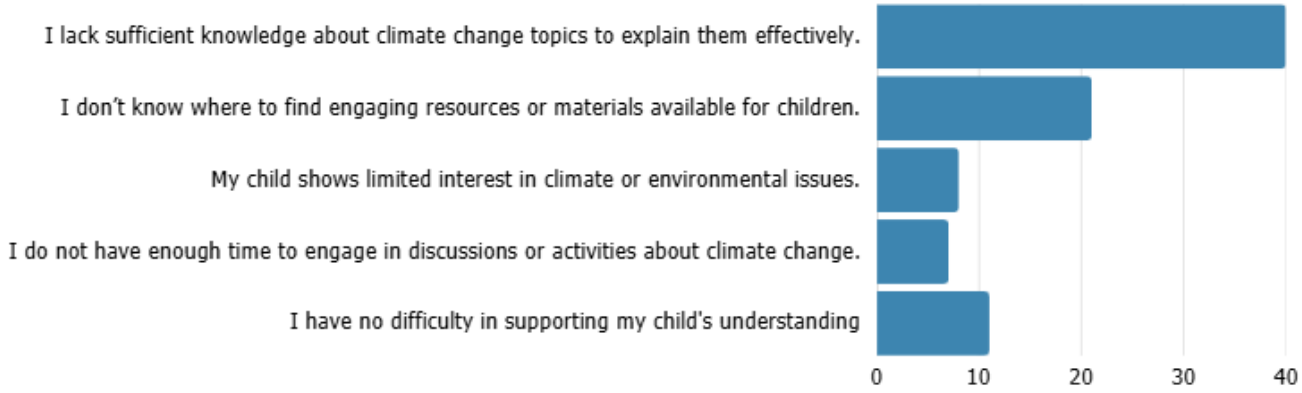
A significant portion of a child's development is completed outside of school, particularly within the home environment. This is why we were curious to see how often parents and families discuss climate change with their children, what challenges they face, and what could help them overcome these barriers. We found that **most families discuss climate change fairly frequently with students** – at least a few times a month.

Frequency of climate change discussions at home



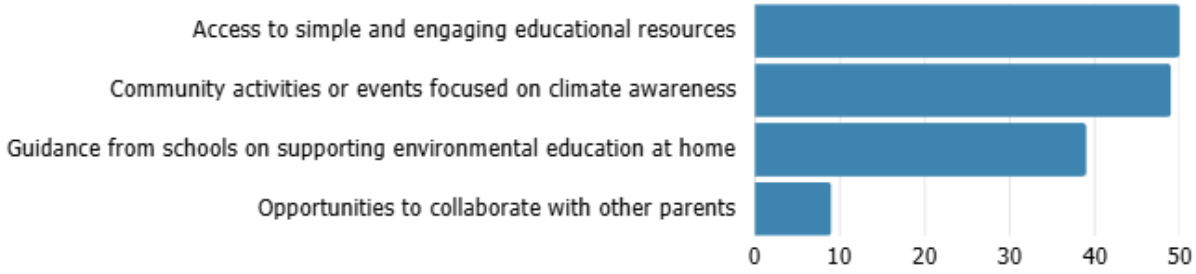
Despite previously claiming to have a good understanding of climate change, many families noted that their biggest challenges in discussing climate change with their children are that they **lack sufficient knowledge** and they are **not sure where to find engaging material** that could effectively explain the issue. Perhaps they feel that, while they have sufficient knowledge of the topic, they are still not able to effectively communicate the complexity and multidimensionality of various aspects, which leads them to believe they still lack some knowledge.

Challenges parents and families face when discussing climate change



To help mitigate these challenges, parents largely support **increased access to engaging educational materials and interactive community activities** where they and their children can engage together in real-world cooperative scenarios with their neighbors and community members. Additionally, **more guidance from their children's schools is desired** to help families understand how they can best approach climate change at home.

"Which of the following would help you support your child's climate education at home?"



Key takeaways

Main findings from the parents and family surveys concur with those of teachers and students

They believe they have a **good understanding of climate change**, though they would also be **interested in increasing their knowledge** so they can engage more effectively with their kids at home

Efficacy of the current climate change curriculum is mostly satisfactory, though using **more participatory learning methods and physically exploring a local environmental problem** by collaborating with community organizations could enhance the educational experience outside of the classroom

These findings underline the **importance of including familial perspectives** and feedback to ensure the project adopts a well-rounded approach to the “Escape the Climate Crisis” Coursework and the learning platform