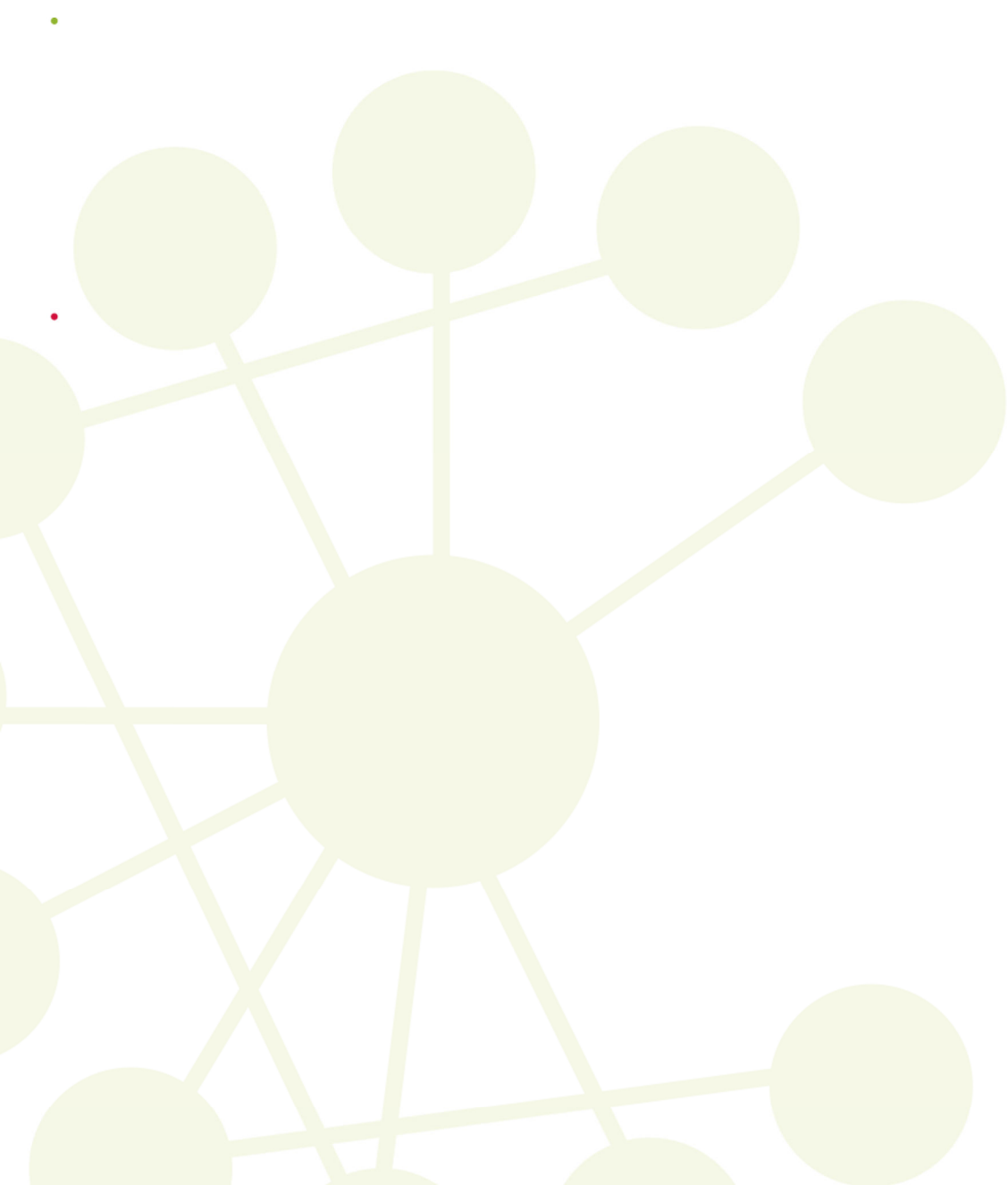


Account on the European MOST conference/WP6



Information about the report [deliverable/milestone]/WP

WP N° 6

Publication date: 15/08/2023

Report/WP title: D6.1 Account on the European MOST conference

Project Information

Agreement no. 871155

Project title: Meaningful Open Schooling Connects Schools To Communities

Project acronym: MOST

Start date of project: 01/09/2020

Duration: 36 months

Program: Horizon 2020 - SwafS means Science with and for Society

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This report is based on the work within the project Meaningful Open Schooling Connects Schools To Communities (MOST). Coordination: Prof. Dr. Katja Maaß, International Centre for STEM Education (ICSE) at the University of Education, Freiburg. Partners: ICSE at University of Education Freiburg, Stadt Freiburg, Walter Rathenau Gewerbeschule, Germany, Universität Innsbruck, Verein klasse!forschung, Energie Tirol/Energieagentur Tirol, Austria, Univerzita Karlova / Charles University, Stredisko ekologické výchovy SEVER Horni Marsov, o.p.s., Czech Republic, Universidad de Jaén, Agencia Estatal Consejo Superior De Investigaciones Científicas, Spain, Vilnius Universitetas, Vilnius City Municipal Government/ Vilnius Educational Improvement Centre, Lithuania, University of Malta, WasteServ Malta Ltd., Malta, Utrecht University, Stichting Naturalis Biodiversity Centre, Netherlands, Norwegian University of Science and Technology, Ducky AS, Birralee International School, Norway, Jönköping University, UppTech, Sweden, Hacettepe University, Ministry of National Education Turkey, Turkey.

Meaningful Open Schooling Connects Schools To Communities (MOST) has received co-funding by the Horizon 2020 programme of the European Union.

The creation of these resources has been co-funded by the Horizon 2020 program of the European Union under grant no. 871155. The European Union/European Commission is not responsible for the content or liable for any losses or damage resulting of the use of these resources.

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Executive Summary

The MOST project organized a European final conference in May 2023 to connect open schooling initiatives across Europe and to create a vibrant science learning network that opens up to further countries and communities. The conference was part of the fourth edition of the Education the Educators conference series (ETE IV). This provided MOST with the opportunity to disseminate and discuss the project's results with a wider audience across Europe.

At the MOST final conference, we invited participating schools and representatives from each school-community project (SCP), our regional support teams, the MOST European support team, European science education actors, businesses, relevant European networks and other Open Schooling projects. The conference also provided a platform for sharing experiences and augmenting the impact of SCPs and the MOST Fairs. Moreover, the conference included a special session for policy representatives from ministries of education and municipalities of partner regions, heads of schools, authorities from professional teacher development spheres for elaborating on mainstreaming measures at regional and national levels with regards to transferring findings into future national education plans and curricula. The conference offered a platform for an international audience to exchange and discuss the potential of open schooling and how to overcome its challenges in the current educational systems.

The theme of the overarching ETE IV conference, *STEM & Open Schooling for Sustainability Education*, fitted perfectly to the aims of the MOST project. The call of ETE IV emphasised the importance of interactive working formats and spaces of co-creation to work together in the spirit of open schooling. The inspirational environment of the Naturalis Biodiversity Museum and the large number of contributions from all over Europe and by researchers as well as teachers and students ensured a vivid and vibrant environment for discussing the future of STEM education and disseminating findings from the MOST project. We recommend that future events on open schooling also emphasize and implement such spaces for co-creation and invite a wide variety of participants including students and teachers. We need to collaborate for overcoming the challenges that our societies and our educational systems face, and we need to prepare our students for the creation of sustainable futures.

1. The European MOST final conference

The European MOST final conference was part of ETE IV, the fourth edition of the Educating the Educators conference series and devoted to open schooling for sustainability education. This conference series offered an ideal opportunity for including the MOST final conference, since this series attracts a rich blend of teachers and researchers from all over Europe who are interested in innovations in STEM education on levels varying from policy measures to classroom practices. The ETE IV conference (May 11-12, 2023, in Leiden, Netherlands) was hosted by Naturalis Leiden and Utrecht University in collaboration with the International Centre for STEM education (www.icse.eu). More than 200 teachers, teacher educators and other interested people took part in several workshops, short orals, interactive poster session and a materials market (in total 224 registered participants). The innovative Naturalis Biodiversity Centre, which showcases the beauty and richness of nature in its galleries, and the spectacular architecture of the building provided an inspiring setting for the conference. The MOST final conference took place on the first day of ETE IV and included the plenary keynotes by Arjen Wals and Marta Romero Ariza. In particular, the conference featured the MOST policy meeting on overcoming challenges in scaling-up innovations by engaging teachers, teacher educators, researchers and practitioners engaged in mutual exchange with policy makers, and an international MOST fair to have teachers and students from various countries exchange their experiences in and the potential of school-community projects to address environmental issues in their environments.

THURSDAY MAY 11, 2023

08:30-09:30 Registration coffee/tea
 09:30-10:45 Welcome & Plenary lecture by Arjen Wals
 10:45-11:00 break
 11:00-12:00 Workshops & short orals & MOST Policy meeting
 12:00-13:30 lunch & interactive poster gallery & materials market
 13:30-14:15 Plenary lecture by Marta Romero Ariza
 14:30-15:30 Workshops & short orals
 15:30-16:00 break coffee/tea
 16:00-17:30 Workshops & short orals & MOST Fair
 17:30-18:30 Exclusive museum visit & materials market
 18:30 conference diner

FRIDAY MAY 12, 2023

09:00-10:00 Workshops & short orals & interactive poster gallery
 10:10-11:10 Workshops & short orals & materials market
 11:10-11:30 break coffee/tea
 11:30-12:45 Plenary panel discussion & Closure
 12:45 lunch

The program of the ETE IV conference including the MOST final conference (yellow)

The workshops and short orals at the ETE IV conference were used by project partners to disseminate MOST findings. ETE IV managed to attract a wide variety of interactive working formats to help bring out the specific benefit of gathering a circle of participants from research, practice and policy. Vivid exchange and collaborative work was ensured by spaces for co-creation and for sharing ideas and results using poster sessions and oral presentations to report on projects, approaches and research. Workshops and co-design spaces actively involved participants in particular in co-creation on

environmental issues. A materials market allowed participants to exhibit interesting professional development materials, classroom materials, co-creation templates, and learn about other materials.

1.1 Opening Keynote: Learning our way out of systemic global dysfunction: Rethinking STEM education in the Capitalocene

The ETE IV conference was opened with a plenary contribution by Arjen Wals on a Whole School Approach to realize quality education that is relevant, responsible, re-imaginative and hopeful in light of urgent global challenges. Wals is Professor of Transformative Learning for Socio-Ecological Sustainability at Wageningen University. He also holds the UNESCO Chair of Social Learning and Sustainable Development. His starting point was the current situation on our earth, which is becoming more and more polluted and aware of climate change. He posed some critical questions to the audience:

- What is considered sustainable? How sure are we?
- How to move beyond 'add-on' cosmetic sustainability towards critical and lived sustainability?
- How much space for interaction, co-creation and joint learning is available?
- Whose voices (globally) are being included or silenced?
- What qualities, competences and knowledges do people and planet need today for today and for the future?
- What are appropriate educational approaches, methods, designs, tools to use, given the kind of challenge and conditions identified?

He concluded with the following advice based upon a whole school approach:

- Create spaces where learners can experientially investigate existential issues rooted in their life-world and local environment while being mindful of the bigger picture
- Promote and support a systems approach – e.g. by linking with SDGs – also as a subject-matter teacher – 'whole subject approach'
- Rethink teaching in light of the competencies and qualities that matter in light of the global challenges at hand
- Utilize diversity and multiple perspectives – looking for synergy but also for contestation and conflict – 'the difficult middle.'
- Replace a culture of fear and powerlessness with a pedagogy of hope, space for action and an ethic of care

1.2 MOST key note: School-community-projects as Keys to Sustainability Education in the STEM Domains

Marta Romero Ariza from the University of Jaén (ES) presented findings from the MOST project on how school community projects (SCP) can look like, what learning opportunities they provide, and how they can be used to tackle environmental issues in the neighborhoods of schools. She started with the following questions:

- Are we equipping future citizens with what they need?
- Are we hearing all the voices? Are we engaging everyone or are we losing talents?
- Are we seeding creativity, inspiration and co-creation?

She outlined how SCPs within the MOST project became projects that arise from students' interests in relation to their community's needs and enabled them to investigate local problems related to waste and energy in cooperation with experts, companies, associations. An important characteristics of this

process are co-design and aiming at development of sustainable solutions, while meaningfully applying STEM knowledge and skills. She gave examples from the MOST project that illustrated how SCPs might look like. Next she addressed the challenge of evaluating the impact with pre- and post-questionnaires for all participating students and teachers, and more in-depth case studies from participating countries:

1. What are the characteristics of good SCP and the main barriers for a successful implementation?
2. How are SCP perceived by participants (teachers, students and community members)?
3. What kind of STEM learning takes place and how do SCP help students to understand environmental problems and their role in solving them?

With the results from the questionnaires and the case studies, she provided insight into the benefits of the SCPs for tackling environmental issues. Two quotations:

“SCP gave students an opportunity to flourish by allowing them the opportunity to talk to each other, reach a compromise, see things, experience, make mistakes and learn from their mistakes” (Maltese teacher)

“It is always wonderful to see how proud students can be of their sustainability projects. And not only them. After planting the shrubs and trees isolating the traffic one mother said: Thanks to the children there will be reduction of air and noise pollution and it enhances aesthetic appeal of the area. Every green brunch helps” (Czech teacher).”

She finalized with emphasizing the importance of co-creation for finding sustainable solutions. In this process school can become hubs of social transformation and community well-being, such that schools empower our students and prepare them to become future agents of change.

1.3 The MOST policy seminar

The MOST Policy seminar focused in more detail on what teachers need to integrate participatory projects such as Open Schooling activities into the classroom on a regular basis. The seminar had two parts: first part included presentation of Giuseppe Mossuti, European Schoolnet; Antonio Quesada, MOST project, University of Jaén, and Tobias Feitkenhauer, Initiative Schule im Aufbruch. The second part included a World Café on the following questions:

- What do teachers need to integrate Open Schooling activities into their lessons? What are the challenges and how to overcome them?
- How can actors in the education sector contribute to pave the way for Open Schooling activities in the curriculum?



Figure 1: Participants discussing open schooling at the MOST policy seminar

The discussions in small groups led to several conclusions. A promising approach for a high-performing school of the future is to open up school education and let society learn with and from each other: In the European MOST project, schools were supported to open the doors of their classrooms to work on projects in real-life contexts in collaboration with community members. In these participatory projects, participants tackled an environmental challenge relevant to their community and brought their respective expertise to the problem-solving process. Here, the schools get involved in the community, the participants experience themselves as self-effective and learn with and from each other. Although educational systems constantly must face societal changes, they often seem to be less flexible, when it comes to spontaneously adapting to these changes. Therefore, it is desirable to establish a particular space within the curriculum or lesson tables of schools to provide opportunities to open up schools. In doing so, open schooling can become a driving force of institutional change.

Gultekin Cakmakci, chair of this meeting, concluded the importance of opening up schools, universities, industry and society, among others. Collaborations are important for a sustainable open schooling and subsequent organizational changes. In particular, universities' mission should go beyond, education-based, research-based towards closer collaborations among academia, industry and society, and a stronger focus on global challenges with interdisciplinary co-creation research.

1.4 The International MOST fair

At the MOST fair students and their teachers presented 18 school community projects from 9 countries. In the MOST project, students and their teachers collaborated with their communities (families, science education providers, citizens, businesses etc.). Together they worked on environmental issues with a thematic focus on waste management and energy saving. These participatory projects directly responded to the needs and values of those involved, benefitting the community as a whole and making schools agents of community well-being. Teachers, students and

SCP-leaders presented posters, gave pitches, showed materials and video's or carried out an experiment for an audience of conference visitors in a lively atmosphere. Especially the exchange between students from different countries was great to see.

The evaluation showed that visitors very much valued the presentations and also the conversations with students, teachers and other people involved in the SCPs. They were also happy with the way it was structured to encourage interactions and fruitful exchange of experiences to move beyond only walking around and passively looking at the various posters.

When asked what aspect of the fair they liked best, many visitors appreciated the participation of the students. Teachers rated the international MOST Fair as a very good opportunity to disseminate their SCPs. Meeting others who have done similar projects and sharing good practices and stories were highly appreciated. The students also appreciated meeting students and teachers from other countries, exchanging ideas and discovering commonalities:

“They were also students like me that wanted to help their school. And they were very dedicated too”, one student recalled.

Recommendations from participants included suggestions like:

“Maybe invite people that can actually make all the plans and ideas happen in more places or cities or even countries.”

“I have no improving for the Most Fair. It was just great, specifical the moderation and how they taught us to share our projects/ connect with each other etc. Please keep that!”

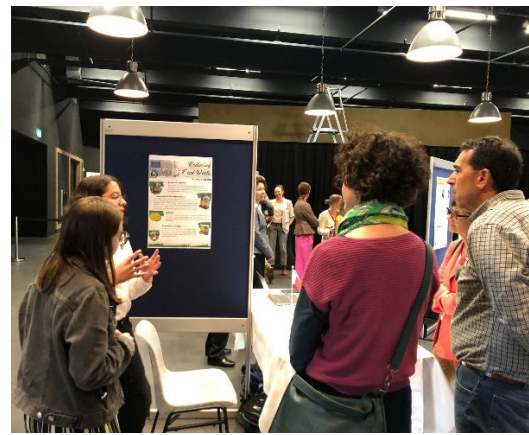


Figure 2: participants at the MOST fair

1.5 Dissemination of MOST results at ETE IV

The MOST project was also presented in many ways in workshops, paper and poster presentations as well as in the materials market of ETE IV, which enabled colleagues to share classroom materials for the implementation of innovative projects in the spirit of the theme of the conference. The call for proposals for ETE IV resulted in a wide variety of co-creation spaces and interactive sessions. The conference created a vivid atmosphere for bringing people together and reporting to each other on open schooling and sustainability education. The parallel sessions were used by many partners from the MOST consortium to disseminate and discuss the findings within our project with each other and all other participants of the conference. The MOST project provided the following paper and poster presentations:

- MOST science fairs through virtual environments (Turkey)

- A report of two rounds of SCPs at Birralee International School (Norway)
- The effect of a SCP on developing sustainability consciousness among students (Netherlands)
- The specific skills that teachers need to perform SCPs (Tukey)
- The transfer of theory and practice into teacher professional development on open schooling and environmental issues (Spain)
- Instructions for schools on how to organize SCPs (Austria)

This nice variety of contributions was enriched by many other workshops and interactive paper and poster presentations. These contributions included reports from national initiatives, but also many other European consortia used the conference to present their work. Among national projects were:

- Flebocollect, a Spanish citizen science initiative,
- promoting teacher competencies towards sustainability conducted through STEAM interventions in the IndagaSTEAM Escuela Project,
- the project PATIS BIODIVERS (also Spain) on biodiversity in school yards, and
- Academi@ STEM Mangualde, promoting teaching materials for an innovative STEM curriculum in Portugal (with support from Scientix).

European projects working on sustainability education and/or open schooling also presented their work, either in workshops, paper presentation or during the interactive poster sessions. Some of the projects that were present are:

- COSMOS <https://www.cosmosproject.eu/>
- GEM <https://icse.eu/international-projects/gem/>
- STEMkey <https://icse.eu/international-projects/stemkey/>
- 3C4Life <https://www.teach4life.eu/>
- CONNECT <https://www.connect-science.net/>
- Educhange field courses <http://educhange.net/2.0/>

These contributions show the international flavor of the ETE IV conference that even went beyond the borders of Europe with contributions from Kazakhstan, Japan, Israel and USA. All these parallel sessions resulted in a rich variety of findings and potential ways to address sustainability in STEM education and how to envision and organize open schooling. The commitment of all participants to these topics was also shown by the large presence of almost everybody at the closing panel discussion.

1.6 ETE IV Panel discussion: How do we envision education-oriented communities to stand up for sustainability

The conference closed with a plenary panel discussion on the question: How do we envision education-oriented communities to stand-up for sustainability?

One of the notable participants in the panel was Rivka Meelis, a passionate student from FridaysForFuture in the Netherlands. Rivka shared her vision for education and highlighted the challenges she sees in the current world. Her insights were invaluable, providing a fresh perspective on the need for future-oriented education. The panel also included Natalia Serrano Chumilla, a dedicated teacher from the Centro de Profesorado de Jaén in Spain, Caroline Lewis-Jones, a dynamic school leader from Birralee International School in Norway, José María Sanchís, a policy maker from the Conselleria d'Educacio de Valencia in Spain, and Jiří Kulich, an NGO representative from The Rýchory Centre of Environmental Education and Ethics in the Czech Republic (Caroline Lewis-Jones and Jiří Kulich are members of the MOST consortium). There was also a colleague from Extinction Rebellion, Harold Brockbernd, who added an additional dimension to the discussion as a teacher.

The panel discussion was moderated by Jesper Boesen from Jönköping University, Sweden. Throughout the 60-minute session, the audience was actively engaged with the help of interactive elements such as poll questions, resulting in an alive discussion with the auditorium. The session began with thought-provoking questions posed to the audience, generating insightful responses, and setting the stage for meaningful conversations. The moderator provided a brief introduction, emphasizing the environmental challenges we face and highlighting the significance of education-oriented communities in addressing these issues. The introduction incorporated insights from the UNESCO report titled "Reimagining our futures together: A new social contract for education," which stressed the importance of diverse and open schools that fundamentally reshape the role of humans in the world.

The contributions from the panelists illustrated the possibilities for interdisciplinary ways of working and gave advice on how to overcome challenges in classroom practice such as:

- Emphasize the importance of climate education comprehensively (beyond a chapter in a geography textbook).
- Adopt a perspective of action that is necessary and can prevent depression, powerlessness and fatalism.
"In school, there is the topic 'Climate change,' but that's only it – nothing about social impact, responsibilities, the urgency to act now." - Rivka Meelis
"Enable young people to experience that they can change something, that they can contribute – that is the best action." - Jiří Kulich
- Teachers don't need to be neutral towards the issues we face.
"Transparency is better than neutrality – in societies we just have different opinions. The students could also look critically at their teachers." - Harold Brockbernd
- Give students a voice in curriculum design & educational practices/projects! It is their future.
"We need to plant seeds in our students to be messengers to their surroundings and to further give it to the new generation." - Natalia Serrano Chumilla

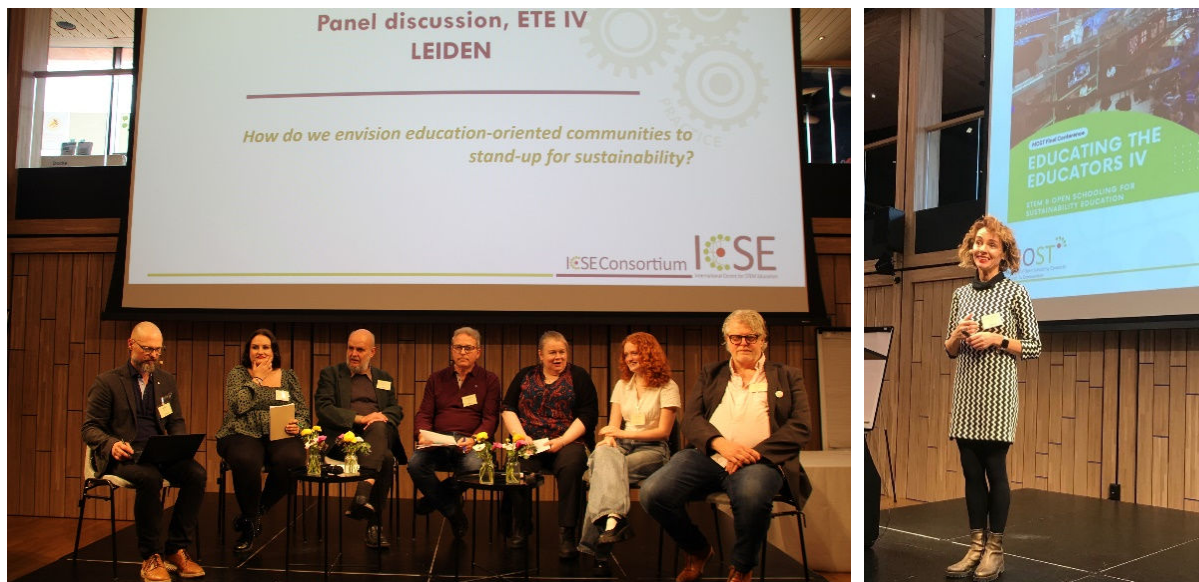


Figure 3: two plenary events, the panel, and Marta Romero Ariza

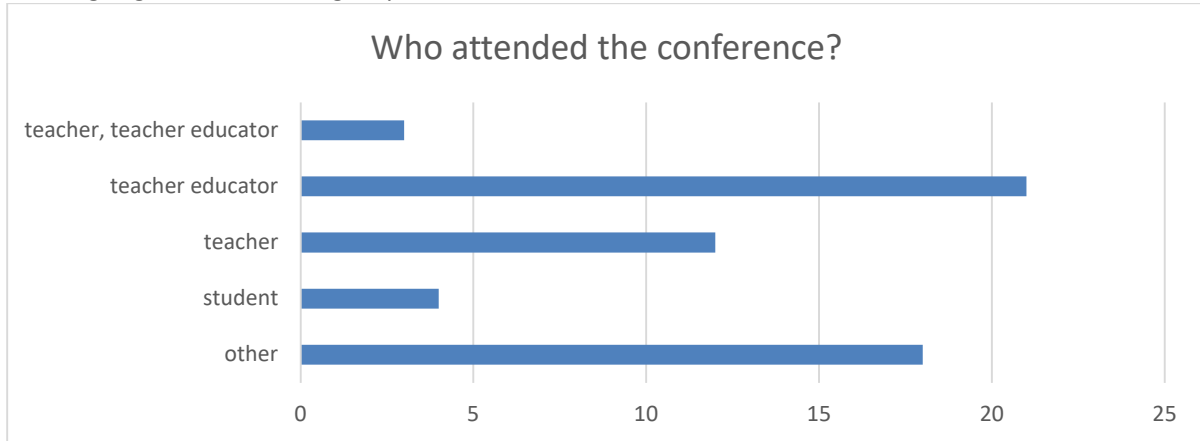
2. Conclusions

The plenary and parallel contributions to the ETE IV conference showed the interest of the international education research community in the overarching theme of the conference. The conference offered a vibrant platform for sharing innovative approaches and research results concerning the implementation of open schooling and sustainability education to address the environmental challenges that our communities and our societies face. The MOST final conference as part of ETE IV was able to reach a much larger audience and to present its results far beyond the partner countries. The topics of ETE IV as well as the content of the MOST project intertwined wonderfully such that a fruitful exchange took place. The presence and active involvement of researchers, teacher educators, teachers, students and other stakeholders ensured productive discussions on the future of STEM education and potential pathways for preparing our future citizens for the environmental issues that our societies face.

3. Appendices

3.1 Appendix 1: ETE IV Conference evaluation results

Some results from the evaluation (60 participants finished an evaluated questionnaire). We managed to bring together a diverse group:



How would you rate the overall organization of the conference?

Excellent: 76%

Good: 24%

The Keynotes provided useful, relevant information.

Strongly agree: 58%

Agree: 38%

Neutral: 2%

Disagree: 2%

The information learned is relevant to my work.

Yes: 84%

Partially: 16%

A final remark by one of the participants:

"This should become an annual conference!"