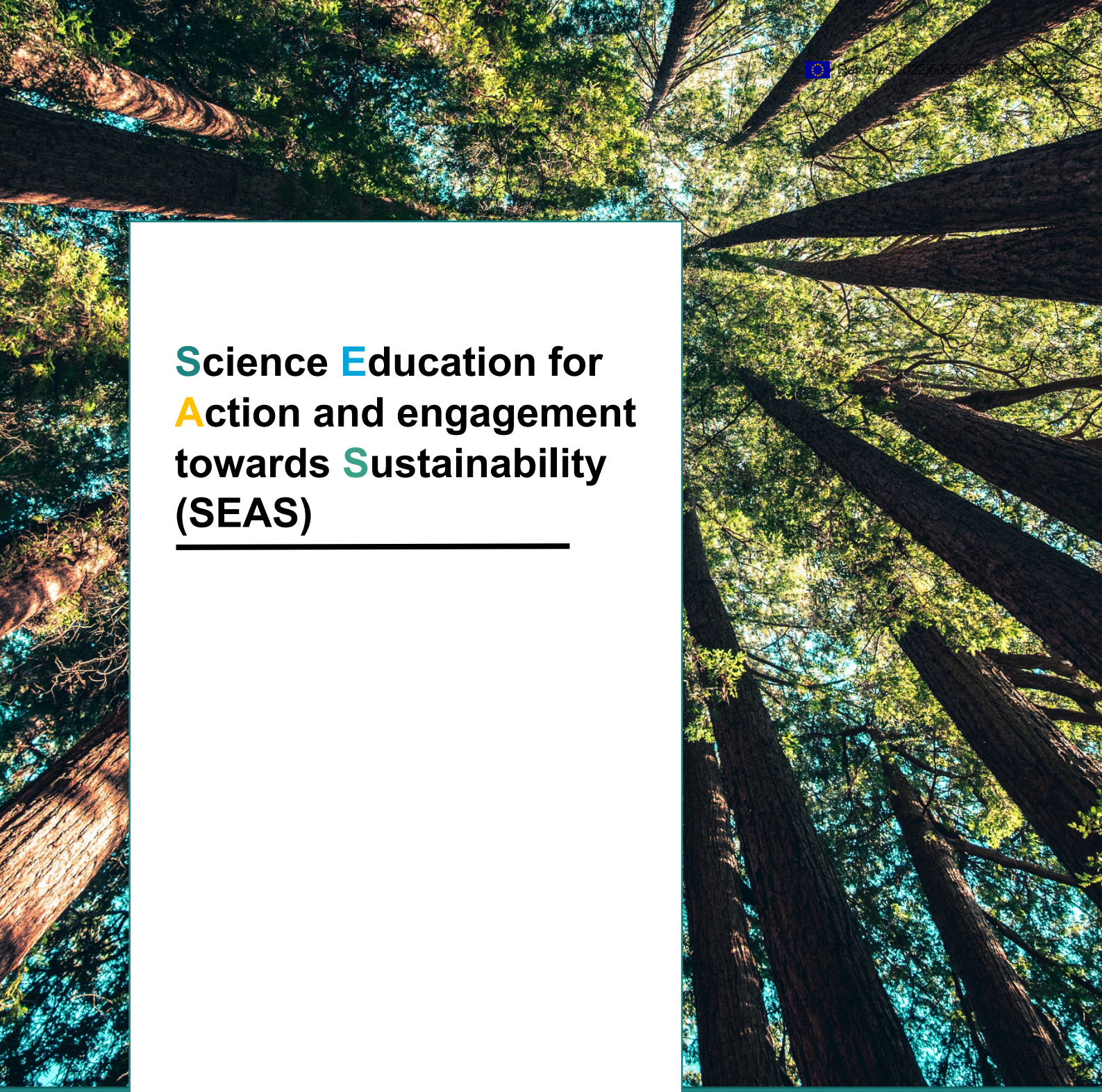


Science Education for Action and engagement towards Sustainability (SEAS)

D6.9.

White paper on policy recommendations for open schooling in a European context

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Introduction: The relevance of open schooling in the current socio-political climate

The aim of this document is to provide policy recommendations to support the development and implementation of open schooling innovations in the European context. Open schooling innovations expand and enrich the ways in which students engage with school subject matter by addressing real, societally relevant challenges in collaboration with local and global communities outside the school, with the goal of generating a common good both inside and outside the school.

Open schooling innovations align with national and international calls for educational initiatives that should better prepare citizens of all ages to meaningfully and democratically participate in societal contexts in which the relationships between environmental crises, social justice, science, and technology are growing in complexity and significance[1]. In one such call, UNESCO's 2015 "Rethinking Education. Towards a global common good?" states, "the world is changing—education must also change" (p. 3). Open schooling initiatives do not only offer new, more engaging, and meaningful teaching and learning opportunities, but also open new opportunities to rethink how schools can better respond and adjust to the sort of educational challenges that we face today—epitomized in the COVID-19 pandemic, the nature and climate crises, or the ongoing war in Europe and elsewhere. Accordingly, the guidelines presented here offer a project perspective about how open schooling can contribute to reimagining school science in this complex, uncertain and accelerated world.

The notion of open schooling and its transformative potential

The notion of open schooling as understood in this document emerges in the context of the European Commission's efforts to address the formidable challenges that the current millennium and the advent of the Anthropocene pose to the promise of education as a basic human right for all. The current complex societal challenges require all citizens to better understand science and technology, and how these connect with social and political structures – if citizens are to participate in knowledge-based decision-making and innovation processes actively and responsibly, as asserted in the "Science Education for A Responsible Citizenship" report (EU, 2015).

[1] See, for example, Norwegian Ministry of Education (2015). Fremtidens skole. Fornyelse av fag og kompetanser. [The school of the future. Renewal of subjects and competences]. https://www.regjeringen.no/no/dokumenter/nou-2015-8/id2417001/ ; Siarova, H., Sternadel, D. & Szőnyi, E. (2019). Research for CULT Committee – Science and Scientific Literacy as an Educational Challenge, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels. Accessed at https://www.europarl.europa.eu/RegData/etudes/STUD/2019/629188/IPOL_STU(2019)629188_EN.pdf; UNESCO (2015). Rethinking education: Towards a global common good? Paris: United Nations Educational, Scientific and Cultural Organization.

The same report makes a call for expanding science education beyond traditional school models. The report presents the concept of open schooling as key to addressing that ambition. In this context, 'open schooling' relates to a re-definition of the role of schools and of school science. It revolves around the idea of schools cooperating with other organisations outside of the school, with the common aim to achieve community well-being. This is to be understood in contrast to other senses of the term 'open schooling', which are rather connected to ideas of accessibility and distance education (e.g., Phillips, 2006). 'Openness' here refers to the idea of schools as permeable and flexible structures that are open to society and able to make a difference in the world.

Recent global socio-economic and environmental developments present new educational demands and dilemmas, but they also bring the potential to unleash transformational opportunities, as educational institutions contribute actively to shaping and preparing for a more sustainable and socially just future. In August 2020, the UN Secretary-General launched the "Education in the time of COVID-19 and beyond Policy Brief", warning that the pandemic has created the most severe disruption in history to the world's education systems, threatening a loss of learning that may stretch beyond one generation of students. These school closures are, according to UNESCO's policy brief, likely to erase decades of progress (UNESCO, 2020). The closure of schools during the pandemic indeed represented an exceptional event that raised awareness about the need to rethink the concept of schooling, bringing into question the very role of schools (as an institution, a place of knowledge, a place of relationships, as well as its relationship with other spaces and sectors in society). With the easing of lockdowns, and after a moment of reflection to assess the situation, schools re-opened in distance mode, re-organising themselves in virtual ways. Those new arrangements imposed new relational systems, as teachers and school leadership had to employ novel ways of relating to their students. School relationships and rituals, especially more implicit ones, were forced to change. This has generated individual and institutional transformations. Such pandemic-caused adjustments highlight implicit practices whose impulses emerge beyond institutional setting. They focalise the potential of open schooling as a transformative approach.

The research project informing the policy recommendations presented here operated in such a highly complex context, burdened and aggravated by the consequences of the COVID pandemic, but also deeply enriched and influenced by it. The challenges and opportunities of that context undoubtedly contribute to the shaping and developing of transformational perspectives on open schooling.

The SEAS project as empirical basis

The recommendations provided in this document are grounded in empirical and analytical work carried out as part of the European project Science Education for Action and Engagement towards Sustainablity (SEAS) during the 2019-2022 period[2]. The SEAS project responds to the Horizon2020 work programme call for initiatives supporting "collaboration between formal, non-formal and

[2] www.seas.uio.no

informal science education providers, enterprises and civil society in order to integrate the concept of open schooling, including all educational levels, in science education"[3].

In the project, open schooling networks have connected schools and out-of-school actors across six European countries. The work has been documented and evaluated with the goal of better understanding what educational challenges and opportunities emerge when the schools' boundaries are transgressed to engage students in collaboratively addressing real sustainability challenges in their local and global communities. A total of 39 primary and secondary schools (with a majority of secondary schools), 3956 students aged 6-18, 176 school teachers, and 186 non-school organizations from the public and the private sectors—including environmental organizations, local and national governmental instances, museums and cultural centres, and companies—have actively participated in the project's open schooling networks. This rich and varied set of actors and their joint efforts to come up with new ways of educating at the intersection of school and society form the empirical basis of this report.

The SEAS project as a whole and most of the open schooling activities documented through SEAS focus on addressing concrete challenges of sustainability in the schools' local and/or global communities. Some of the school projects initiated and documented in SEAS, for example, have focused on plastic pollution and the challenges and opportunities that emerge when different actors, including artists, the plastic industry, and circular economy entrepreneurs collaborate to find concrete solutions. Sustainability challenges such as plastic pollution constitute complex or wicked problems that require bridging knowledge across multiple disciplines—from knowledge about the chemical constitution of different types of plastics, to the technological as well as the historical and socio-economical conditions of plastic's past, present, and future consumption and production. Because these are not just facts, but also matters of concern—the resolution of which have direct and profound implications for the students' present and future livelihoods—educating that addresses actual sustainability challenges is not only about gaining interdisciplinary knowledge. It is also about gaining skills for creative collaboration and for the envisioning of new ways of becoming active citizens in democratic societies. In this regard, although sustainability is in focus, the recommendations provided here are relevant to multiple other educational interdisciplinary themes such as democracy and citizenship, or health and life skills.

[3] https://cordis.europa.eu/programme/id/H2020_SwafS-01-2018-2019-2020.

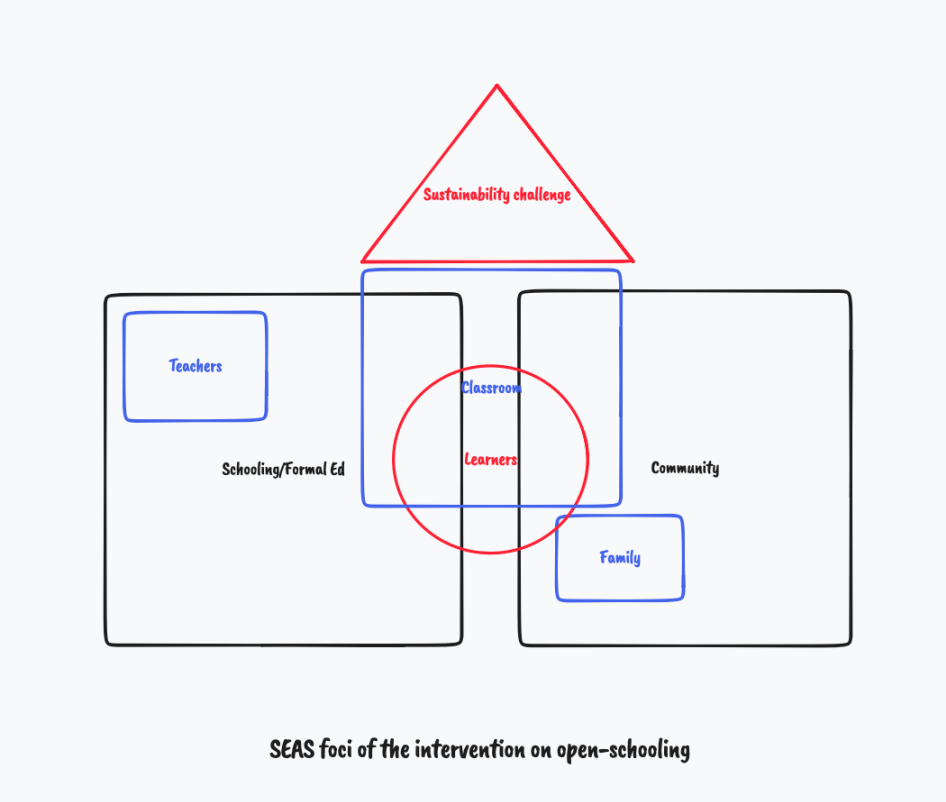


Figure 2. Overview of focal areas of the SEAS project, extracted from SEAS global assessment reports.[4]

Figure 2 illustrates open schooling as involving spheres of activity beyond the classroom, positioning the learner as navigating across these spheres. Open schooling includes what happens in the classroom, but it sets the latter in direct dialogue and interaction both with the broader field of schooling and formal education (the school as a whole), and with the broader community, including the family. As illustrated in the figure, this form of schooling vastly expands the boundaries of what is traditionally understood to be the "classroom setting". Such expansion brings relevance, and it brings complexity.

Enabling transformations towards a more relevant school

Open schooling creates pedagogical innovations that challenge most existing school structures and habits. Supporting and providing the resources necessary to make open schooling innovations possible thus requires of a proper understanding of transformation processes, and how these can apply to the school context.

[4] See SEAS public deliverable D5.2 Report on models for the establishment and implementation of open schooling partnerships.

To understand the deep transformations that are required for current schooling systems to break with established ways of working and thinking about education and transition into open schooling models, the recommendations presented here are anchored on a heuristic model that conceptualizes change in terms of three spheres of transformation—the political, the practical, and the personal (Figure 2). The model is based on a literature review of theoretical research in the social sciences on social transformation processes,[5] and has been utilised to conceptualize transition towards more sustainable societies. Here, we draw on the model to conceptualize the processes of change that schools need to go into if they are to transform and expand their (personal, political, and practical) boundaries through open schooling innovations.

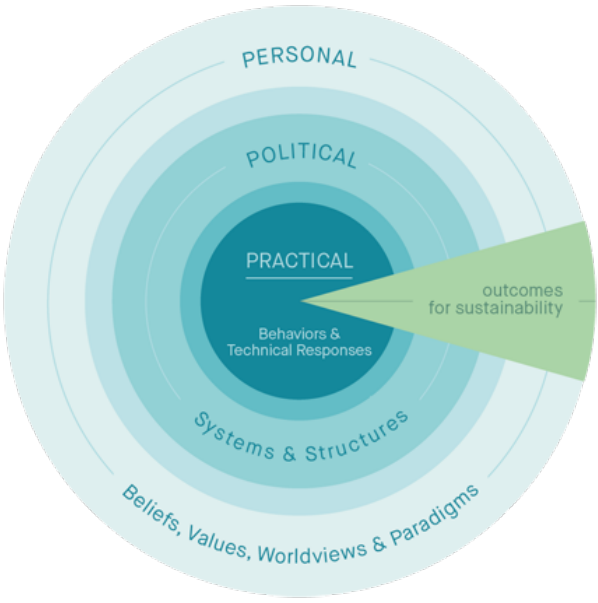


Figure 2: The Three Spheres of Transformation

The circle at the centre of the model refers to the sphere of human life in which changes happen at the level of behaviours and technological solutions. This is the sphere that is typically addressed first in conversations about climate change mitigation: changing the ways we behave as individuals and as consumers, and changing the technological means of production and consumption. In the context of climate change, this sphere refers to such actions as finding alternative energy sources and technological solutions that may allow us reducing gas emissions. It may refer to changes in behaviours and consumption habits, such as eating less meat or flying less. While this sphere is vital to reaching sustainability goals, our capacity to achieve changes in this sphere depends on the broader political and personal spheres within which these technical and behavioural opportunities can flourish.

The political sphere refers to systems and structures of human influence, including social and institutional norms and rules that regulate what is legitimate and what isn't. Public or private

[5] O'Brien, K. (2018). Is the 1.5 C target possible? Exploring the three spheres of transformation. *Current Opinion in Environmental Sustainability*, *31*, 153–160.

incentives, legal frames, and political programs set the stage for the possibility of certain habits and technologies to thrive in the practical sphere.

These political structures, in turn, are framed within broader worldviews and paradigms that characterize given societies at given times in history. These involve generalized beliefs and values that societies develop through broader cultural discourses and imagination. Such generalized beliefs and values set the background against which more specific political structures are made possible – and, by extension, also habits and specific behaviours. For social transformation to cross the critical thresholds where single gestures, impulses, or actions make a difference, all three spheres need to be considered.

Applying this model in the context of supporting open schooling innovations involves considering how to enable transformation across all three dimensions. It involves taking measures to enable changes in the practical sphere, such as behavioural and technical solutions for teaching and learning; changes in the school's political systems and structures that would support such technical and behavioural solutions (political sphere); and changes in the values, beliefs, worldviews, and paradigms that inform and provide meaning and orientation to the school's educational mission as a whole (personal sphere). This might mean, for example, 1) considering which new tools and practical measures for teaching complex sustainability issues are put into practice (i.e., the practical sphere), 2) what new organizational structures and policies are established to facilitate teachers' and students' participation, say, revised timetables or adjusted assessment goals, (i.e., the political sphere), and 3) what new forms of understanding the school's function and its educational potential emerge in a collaboration network (i.e., the personal sphere).

Policy recommendations

In line with the premises laid out above, the policy recommendations provided here aim at informing policy makers on ways of how to create optimal conditions for establishing and developing open schooling innovations in European schools. The recommendations are informed by assessment work conducted as part of the SEAS project and documented through two annual local assessment reports gathering experiences and analytical insights from open schooling networks across six European countries, a report synthesizing the findings at the local level in a global synthesis report, and a resulting open schooling assessment framework[6]. Across these reports, the SEAS approach has involved documenting and assessing transformational challenges and opportunities at three levels of transformational activity: (i) the interface between the school and the broader community, (ii) the teaching and learning activities in open schooling contexts, and (iii) the school's organizational structures that enable teachers to provide the appropriate support students and for each other.

Within each of these areas, we provide insights documented throughout the SEAS local and global assessment reports that are relevant to policymaking. Each of these insights takes the form of an

[6] The SEAS first and second Local Assessment Reports, Global Synthesis report, and Assessment framework can be accessed at www.seas.uio.no

affirmative statement concerning the transformational potential of open schooling and is understood within the three spheres of transformation framework. Each of the insights presented is then followed by policy measures that may be considered to support the establishment and development of open schooling initiatives.

Enabling collaborations at the interface between the school and the broader community

Traditionally, schooling has been characterized by the activities taking place inside the classroom and within the school's physical boundaries. However, open schooling educational initiatives break down these boundaries and involve collaboration between schools and non-school actors to contribute to community well-being. Enable collaborations across the school and the broader local and global community is the first task policy making faces. When collaborations across the school boundaries are enabled, open schooling has the potential to open and expand the horizons of what it is that schools and others can and will create together.

Open schooling collaborations that explicitly address the co-creation of, and commitment to, *shared goals and visions* are more likely to succeed and have an impact. The methodological framework and literature review on collaborative design informing the development of the SEAS project[7] suggest that when actors with different institutional backgrounds collaborate in joint endeavours, the process of explicitly and systematically tacking up and addressing the emerging shared goals that motivate the joint venture is crucial for the success of the collaboration. This is in line with the heuristic model of the three spheres of transformation, as open schooling collaborations should not be limited to the practical or political dimensions but must also open for perspectives concerning paradigmatic shifts in worldviews, whether in individual actors or collectives. Organizational (practical as well as political) structures and competence-building measures need to be in place to support self-aware co-cocreation spaces.

Specific policy measures
Time and space resources need to be allocated and managed to enable collaboration between schools and out-of-school partners. *Time and space constraints are reported by teachers as main barriers for being able to carry on collaboration with out-of-school partners. Identifying key contact roles that manage the collaboration schedules within each partner, involving school leadership structures, and allocating and distributing time as part of the school's and out-of-school partner's internal time organization, as well as distributing labour across the partnering institutions are measures that can ensure a sustainable commitment and collaboration.* Appointing specialized roles among school leadership positions and among participating teachers is important for ensuring adequate coordination among institutions and in ways that are responsive to actual teaching needs.
Formal agreements strengthen open schooling collaborations and can facilitate scaling up long-term collaborations. *Much of today's collaboration across school and out-of-school partners takes place*

[7] Ref to D2.4

either as the result of an informal arrangement between schools and local community actors, or as part of temporal externally financed projects, where collaboration with smaller local community partners often takes place ad hoc. Formal agreements that concretize expected goals and commitments make it possible to negotiate these goals and commitments further, legitimising collaboration activities with existing and new partners, as well as eventually scaling up and establishing longer term collaborations among school and out-of-school organizations.

Deploying competence and resources for facilitation can dynamize the creative collaboration and improve its transformative potential. *Research-based, collaborative design interventions such as the ChangeLab methodology implemented in the SEAS project*[8] *have the potential to challenge status quo practices and open for changing the partnering institutions' organizational habits, values and principles. In such interventions*, and supported by data collected during the collaboration, *practitioners are led into a process of becoming increasingly conscious of the goals, opportunities*, limitations, and contradictions *that emerge in the collaboration. Our research has, among other things, documented how this type of work allows partners to considering the intrinsic (rather than instrumental) value in the collaboration, leading to deeper commitment and transformational impact.*

Supporting and empowering learning in open schooling contexts

When schools are enabled to engage in collaboration with their local and global community in open schooling initiatives, students are presented with great opportunities for more relevant and engaging learning, but also new challenges as to how to manage their own learning and participation in a setting that is new to them in several ways. Policies that aim at supporting open schooling initiatives must therefore include measures to help teachers and students navigate this complexity through adequate disciplinary and interdisciplinary didactical and pedagogical approaches.

Successful learning in open schooling requires inquiry-based, action-oriented teaching approaches which integrate adequate disciplinary knowledge and critical thinking support, and which afford a sense of agency and of community-building. Open schooling presents teachers and students with the challenge of exploring authentic, complex issues of societal concern for which there is no single, simple, or even known solution. Accordingly, teaching curricula and the pedagogical means available need to provide support for learners to pose adequate questions and to think critically, exploring different solutions and scenarios in creative but also academically sound ways. A major challenge for teachers and students concerns the difficulty of balancing the time and focus spent on practical versus disciplinary aspects of the inquiry, making it crucial to wisely allocate time and teaching resources along the inquiry trajectory. In most cases, knowledge within one discipline will not be enough to adequately support students, making it paramount to transgress and integrate multiple

[8] SEAS deliverable D2.2 on the ChangeLab Methodology can be accessed at www.seas.uio.no

disciplinary sources, including support from knowledgeable others outside of the school context. Finally, some of the issues being explored can be experienced as overwhelming and generate distress or despair—for example, such issues as the ongoing climate crisis will present students and teachers with dauntingly dark prognoses and social injustice realities that affect their present and future. In these cases, provisions for students to develop a sense of agency and community building should be integral to the disciplinary learning goals, if the knowledge gained is to become usable and significant for the learners.

Specific policy measures
Inquiry-based teaching and learning methods should allow students to collaborate with each other and with members of their local and global community, pursuing issues of relevance to them. Projects in which students work in collective inquiry and where learners are encouraged to follow their own questions and interests are experienced as relevant and engaging. Such sense of relevance is increased when what students produce through their inquiry is not only usable for them as learners, but also contribute to the collective causes of relevant others. In such cases, learning about relevant issues is integrated with a greater sense of community-building and responsibility.
Inquiry-based learning curricula should allow for the crossing of disciplinary boundaries, even when focus is on a single discipline. Flexibility to use varied sources, both inside and outside of the school, as well as through digital means, is crucial for students' independence throughout the inquiry. Teachers' own competence within a given domain is often challenged, and this flexibility becomes also important for teachers, where expertise from colleagues and from external actors become crucial teaching resources. The students' competence and (digital and material) resources to be able to make connections across types of media, texts, and other semiotic resources across contexts must be provided.
Curricular demands within or across teaching units need to be such that they allow for engaging with inquiry themes throughout longer periods, allowing for integrating inquiry cycles of exploration and reflection. Reducing the number of curricular goals, identifying core competences, and bridging across school subjects are example of measures that can support teachers and students as they plan and implement inquiry cycles which can better balance out practical/pragmatic and academically oriented aspects of open schooling activities. Some recent curricular reforms in Europe, such as Norway's curricular renewal, are steps in this direction[9].
Agency- and community-building aspects need to be integrated as core competences of disciplinary relevance. This involves explicitly and closely integrating affective- and social dimensions along cognitive/intellectual aspects of learning. Research within SEAS has documented how engagement with and understanding of complex sustainability issues relates not only to positioning learners as subjects with agency to address and make a difference with respect to relevant issues, but also to

[9] NOU 2015:8. Fremtidens skole. Fornyelse av fag og kompetanser. Oslo: Departementets sikkerhets- og serviceorganisasjon. Informasjonsforvaltning Lastet ned fra https://nettsteder.regjeringen.no/fremtidensskole/files/2015/06/NOU20152015000800 0DDDPDFS.pdf

students' sense of care and capacity to recognise and address their own affective relations to human and non-human others and their environment.

Opportunities should be given for students' contributions to have a real impact in their global and local communities. Open schooling initiatives are unique in that they have as goal not only educating, but also and at the same time contributing to community well-being. Students can contribute by directly engaging in actions that have an impact in society, but opportunities should be provided for their academic school outcomes (products such as posters, essays, podcasts, videos, etc…) to be made available to relevant target groups and/or the broader public via exhibitions, publications, public addresses or dialogues, event participation, etc. This requires policies that strengthen the collaboration with and availability of private and public spaces such as libraries, museums, cultural centres, and any other informal and/or non-formal learning settings.

Transforming the school's organizational structures to enable transformative open schooling

To be able to support and effectively implement the type of teaching and learning practices that open schooling requires, it is not enough to enable collaboration across the school and the out-of-school contexts. Neither is it enough to implement the appropriate pedagogical and didactical measures for such complex and innovative learning settings. For none of these can be effective as long as the school's own internal organizational structures are not *also* changed; from the practical, to the political, to the worldview levels. Policy recommendations in this section, therefore, focus on these structures, with a particular focus on how these can make it possible for teachers and school leaders to jointly carry on successful open schooling initiatives.

Although the measures listed within this section address the school organization as a whole, most of them revolve around enabling teachers to perform the work that open schooling initiatives demand. As in any other formal education task, teachers are at the centre of open schooling initiatives. But here they are considered actors within broader networks of actors (other teachers, leaders, students), technologies and organizational tools, rules, and worldviews.

Specific policy measures

Time and space resources need to be given within the school for planning and coordination across leadership and teachers, between teachers across subjects and/or across grades. Planning of open schooling projects is demanding and cannot rely on traditional planning structures alone. Teachers may need to coordinate with stakeholders that would otherwise not be so important when planning regular classroom activities, including teachers in other subject and/or teams, leaders, and students. Such planning also demands a greater commitment on the part of the teachers, a commitment that needs to be backed up by leadership structures. Our research shows that teachers rely on school leadership committing and actively encouraging the type of work and educational values that are embodied in open schooling.

Real and feasible opportunities to involve students in the planning of activities need to be given. Teachers can involve students in the planning of open schooling activities during classroom time and as part of the open schooling activities. We have documented feedback from students demanding greater opportunities for involvement. Our academic and empirical background suggests that it is possible to strengthen the relevance and educational potential of open schooling if 1) dedicated spaces are created for this type of engagement, 2) such spaces are better integrated in or demarcated from regular classroom time, and 3) existing or newly generated student organisms are encouraged to participate in the planning activities.

Competence building and specific tools need to be provided for teachers, so that they may be able to connect complex authentic challenges in their community with educational goals and curricular competences. Connecting authentic local or global issues of societal relevance with specific goals and competences of the school curricula demands specific practices and competences as well as adequate tools. In the SEAS project, we have tested and further developed one such tool called "Locally Relevant Teaching" (LORET). LORET specifies overall phases and identifies specific strategies for this type of work. Tools such as LORET should be provided and integrated among the schools' toolkit to properly support teachers in planning and implementation of open schooling to ensure relevance to the curriculum.

Assessment practices need to be adjusted and responsive to open schooling goals and ambitions. Assessment and formative feedback are central aspects of the educational tasks, and this is no less true in open schooling. However, the interdisciplinary and often emergent nature of the issues being addressed make it challenging for teachers to implement assessment in the ways they are used to. While individual teachers and even teams of teachers can find out local solutions to their problems, schools should provide appropriate frameworks and collaboration opportunities for teachers to adapt their assessment practices. The school's expectations, aims, and values with regards to students' academic success need to be revised accordingly.

Real and feasible opportunities for professional development need to be provided to school staff if open schooling initiatives are to be scaled up. In the SEAS project we have documented extremely successful initiatives at the local level (i.e. a team of teachers limited to one classroom), but which have failed to scale up to the more global level of a school culture (i.e., implementing open schooling practices more broadly across levels and teams). Open schooling requires experience and opportunities for reflection and professional and competence development. It is paramount to generate a competence building culture within the school community, with a focus on developing the concepts, goals, values, and tools that the school finds useful as it works to implement open schooling. This is how schools can become agents who successfully develop and scale up solid open schooling practices that can be sustained in time.

Science Education for Action and engagement towards Sustainability

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