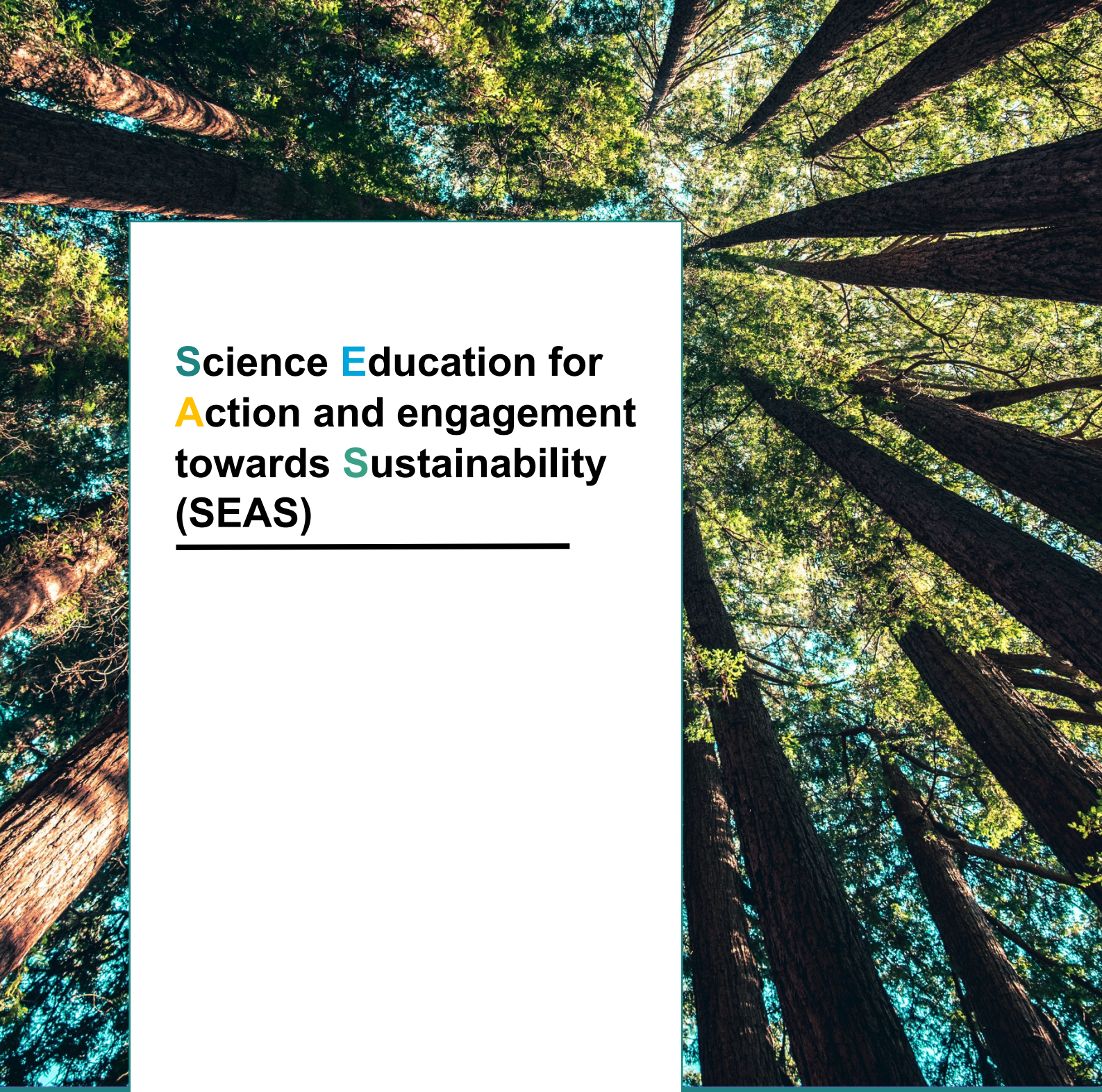


Science Education for Action and engagement towards Sustainability (SEAS)

D5.5

Open Schooling Assessment Framework

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Contents

Summary 3

Introduction: Assessment Framework for Open Schooling Innovations 4

Rationale and structure of the framework 8

Assessment Area 1: Enabling collaborations. Transformations at the interface between the school and the broader community 18

Assessment Area 2: Empowering Learners. Assessing transformations at the level of learning experiences and contents 22

Assessment Area 3. Supporting Teachers. Assessing transformations at the level of teaching 25

Summary

The purpose of the present document is to provide educators, educational researchers, policymakers, and out-of-school actors with an assessment framework that can guide them in their efforts to conduct, document, and evaluate open schooling innovations. The framework is based on experiences gained through the planning and implementation of the Science Education for Action and Engagement towards Sustainability (SEAS) H2020 project, which has gathered educators, researchers, and out-of-school practitioners across 6 European countries throughout a three-year period.[1] The guidelines laid out in this document draw therefore from both theory and practice, and reflect insights that have been empirically documented to diverse degrees throughout the project.

In this document, we first provide a rationale, structure, and definitions of key concepts for the framework. Then we elaborate on three evaluation dimensions that may be helpful for evaluation purposes.

[1] www.seas.uio.no

Introduction: Assessment Framework for Open Schooling Innovations

1.1. What is open schooling?

The European Commission defines open schooling as those initiatives in which "schools in cooperation with other stakeholders, become an agent of community well-being[2]". As elaborated in the SEAS deliverable D2.2 on Definitions of Shared Pool of Concepts, this definition contrasts with other senses present in the existing literature, where open schooling is often defined in terms of an expanded accessibility to education by addressing issues of distance, quality, and cost. While issues of accessibility may also become relevant for the type of activities that are the focus in this assessment framework, here we refer to a notion of open schooling in which the core element is the school's participation, in collaboration with others, in addressing issues of well-being in the global and/or local community around it.

In more concrete terms, open schooling involves collaborative activities in which schools generate knowledge and/or practical solutions as means to support students' learning of both disciplinary and interdisciplinary school subjects. In the SEAS project, we have focused on the potential which open schooling has for expanding what science education means and what its contribution can be with regards to issues of sustainability in both local and global contexts. But open schooling can be implemented with regards to any school subject, and is particularly well suited for interdisciplinary teaching and learning.

Through the SEAS project, we have documented how open schooling may involve co-creating arenas where the generations can meet in active listening and critical dialogue. It may involve co-designing open-ended inquiry cycles which aim at orienting more resourcefully inside wicked problems. It may involve establishing hands-on projects between schools and out-of-school actors, including policy makers, NGOs, local businesses, transnational industries, artists, experts, researchers. It may involve developing one-time science-and-art projects. It may involve returning periodically to concrete sustainability questions concerning local terrains, whether they are rivers, mountains, sea sides, cityscapes, or cultural landscapes. It may also involve exploring possibilities for lasting institutional, societal, moral, or political change.

[2] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/swafs-01-2018-2019-2020

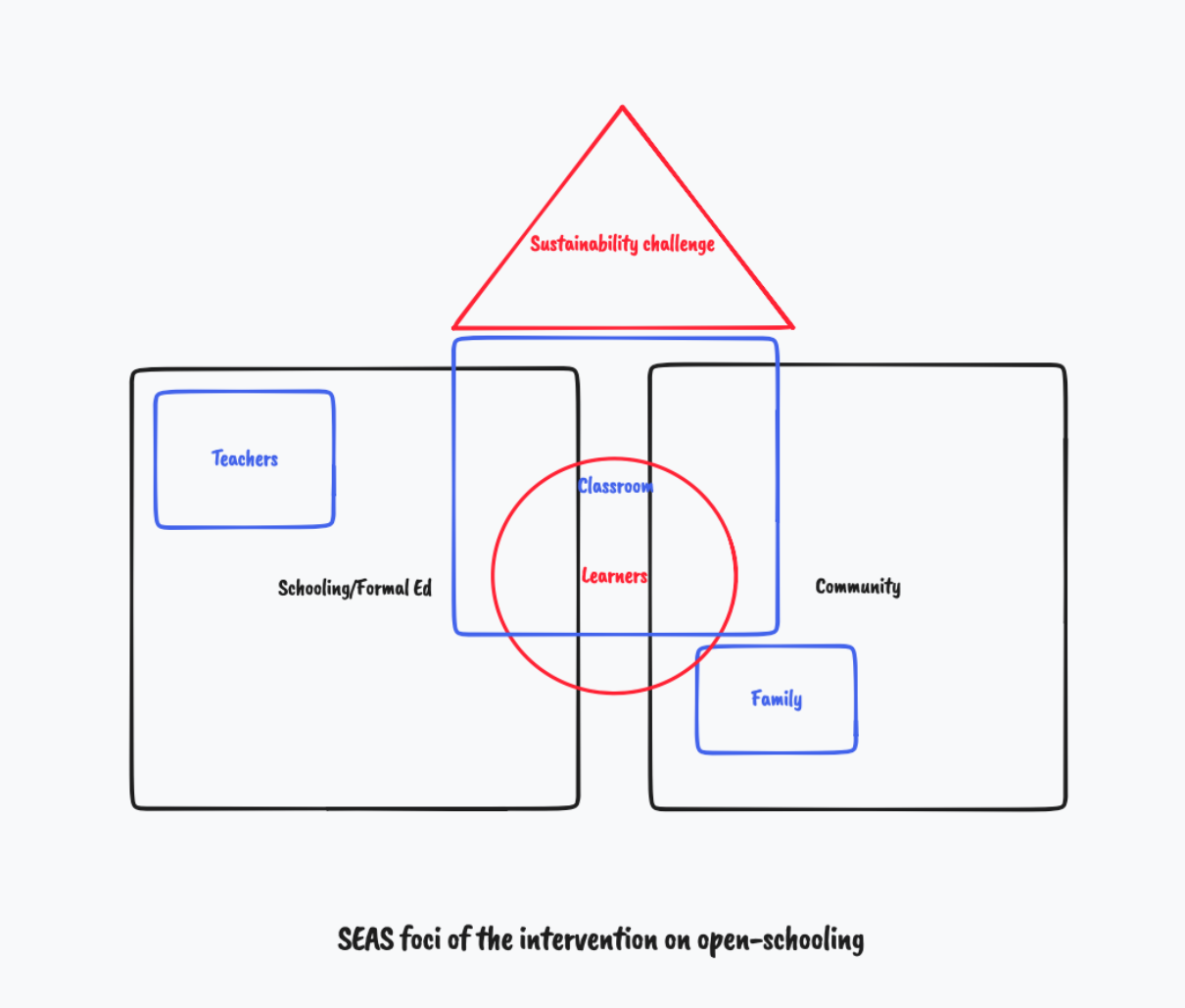


Figure 1. Overview of focal areas of the SEAS project, extracted from SEAS global assessment reports.[3]

Figure 1 illustrates open schooling as involving spheres of activity well beyond the classroom and positions 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 schools address real-life sustainability challenges, whether these are local, regional, or global. 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.

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

Why open schooling, and why an assessment framework for open schooling innovations?

Understood in the sense described above, open schooling presents a quite radical—and in some circles also controversial—innovation that challenges well-established perspectives on what the roles and missions of schools are, and how education in school ought to be organized.

Open schooling can be a controversial issue because it raises dilemmas as to whether the school should engage at all in activities focused on community well-being or addressing sustainability goals. Some may express concerns that schools may be instrumentalized to achieving political goals instead of its more intrinsic educational purposes.[4] Open schooling projects may also challenge established institutional ways of doing schooling, from questions concerning the practical implementation of projects, to deeper issues of teacher identity or school subject content. All of this brings into sharp focus the need for an assessment framework. Such a framework can help inform the planning and implementation of open schooling projects, and it offers guidance with respect to evaluating them.

Through the SEAS project, we have systematically gathered insights from empirical studies in six different European countries (Austria, Belgium, Estonia, Italy, Norway, and Sweden). We have documented personal, interpersonal, and institutional challenges and opportunities that emerge when schools engage in open schooling innovations.[5] Such innovations challenge not just the contents of existing teaching and learning practices (the "what" is being learned), but also the socio-material, organizational, and conceptual structures upon which such practices rely. This is how open schooling can open doors toward deeper changes in the way practitioners conceive and realize their work. Those are the sorts of changes which the literature on organizational learning refers to as *expansive learning*. These changes involve far more than superficial adjustments to teaching contents or methods. They expand the boundaries of both practices and persons, of how practitioners see and understand their role and mission, as well as those of their institutional bacgrounds and social contexts. Such changes are not straightforward and, while there is

[4] For a discussion on these dilemmas as they appear in the literature on education for sustainability, see Van Poeck, K., Goeminne, G., & Vandenabeele, J. (2016). Revisiting the democratic paradox of environmental and sustainability education: Sustainability issues as matters of concern. *Environmental Education Research, 22*, 808–826.

[5] Two deliverables of the SEAS project have been published that gather these insights, precising the specific research problems, data sources, and analytical approaches upon which these insights are based. These are D3.1 First Annual Local Assessment report, and D3.2 Second Annual Local Assessment report.

an increasing interest in this type of innovations in the literature, there still is scarce literature to document empirically, and specifically, what sort of changes are required.[6]

Why engage in open schooling innovations if they are difficult and controversial? A first response comes from policymaking. A growing concern on educating the younger generations for an increasingly uncertain and challenging world is reflected in political discourses and curriculum reforms across Europe. The very notion of open schooling as defined in this document is derived from formulations found in calls for research proposals by the European Commission (see section above on *What is open schooling?*). In Norway, for example, a recent curricular reform aims at providing opportunities for "deep learning" by reducing the amount of competence goals, focusing on core elements of the disciplines, allowing teachers to focus on complex subjects throughout longer periods, and embedding interdisciplinary themes of societal relevance within each subject – sustainability, health and life skills, and democracy and citizenship.[7] Similar developments have taken place in other countries, such as Finland, in recent years.

Underlying such educational discourses and reforms is a recognition that there is a need to create educational opportunities that are more relevant and applicable to the rapidly changing present and future realities of students and citizens. The increasing digitalization of societies across the globe, alongside worsening environmental degradation, the trespassing of planetary boundaries, and the challenge of climate change, all demand of a public education that provides citizens with real opportunities to develop knowledge and practical skills to participate in intentionally transforming democratic societies toward more sustainable and socially just futures. This is the larger context for open schooling innovations. They attempt to bridge the gap between knowledge and action, and between the sort of concerns and problematics that are addressed in school classrooms and those that otherwise characterize students' present and future realities.

The SEAS project has designed, implemented, and investigated open schooling innovations. Between the researchers and schools, we have addressed sustainability issues of societal concern, often in collaboration with out-of-school partners. We have examined and

[6] A term and approach similar to «open schooling" is that of Whole School approaches, which has gained a lot of attention in the literature on sustainability education in the last years. See for example, Henderson, K and Tilbury, D. (2004). Whole-School Approaches to Sustainability: An International Review of Sustainable School Programs. Report Prepared by the Australian Research Institute in Education for Sustainability (ARIES) for The Department of the Environment and Heritage, Australian Government;

[7] Kunnskapsdepartementet. (2017). Overordnet del – verdier og prinsipper for grunnopplæringen. Fastsatt som forskrift ved kongelig resolusjon. Læreplanverket for Kunnskapsløftet 2020. https://www.regjeringen.no/no/dokumenter/verdier-og-prinsipper-for-grunnopplaringen/id2570003/ See also http://blogg.regjeringen.no/fremtidensskole/mandatein-english/

documented transformative processes and the challenges and opportunities that arise in relation to personal, interpersonal, social, and institutional dimensions. The framework offered here builds on the theoretical premises and principles that informed the projects' design as much as it builds on insights and experiences gained through implementing and analysing that work.

SEAS has used the notion of *open schooling networks* to refer to constellations of schools and out-of-school actors that collaborate around one or several socially relevant issues, most often issues of sustainability. But sustainability needs not be the focus of open schooling interventions: issues of public health, democratic participation, or social justice may all be the focus of open schooling collaborations, to name just a few. Again, the idea is that open schooling is a way to address challenges that potentially can bring about better lives for the involved communities. Challenges can transform into opportunities, innovations and openings for richer, more engaging, and more fulfilling learning for all, including students, teachers, schools, and out-of-school stakeholders.

Rationale and structure of the framework

Understanding social transformation in and through open schooling

Open schooling activities expedite and harness the potential for deep transformation. This is a core premise of SEAS generally, and of this assessment framework more specifically. To better understand open schooling innovations as sites of change and transformation, SEAS draws upon the heuristic of three spheres of transformation, which integrates the political, the practical, and the personal dimensions in a holistic model on change (Figure 2). The heuristic is based on a literature review of theoretical research in the social sciences, accounting for how social transformation happens.[8] The model has been mobilized in sociological research on climate change, In SEAS, we draw on the model also to analyse and understand such processes of change that schools need to go through.

[8] 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.

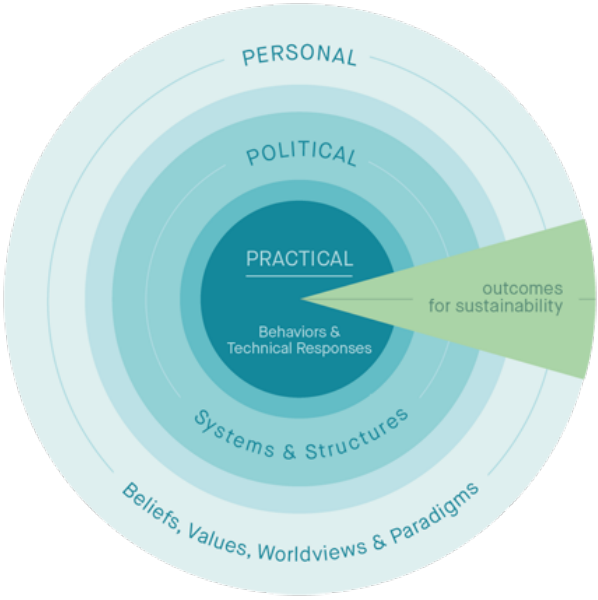


Figure 2: The Three Spheres of Transformation

The circle at the centre of the model refers to the sphere of life in which changes happen at the level of behaviours and technological solutions. This is the sphere that is typically addressed first in conversations of climate change mitigation: changing the ways we behave as individuals and changing the technological means of production and consumption. These changes include finding alternative energy sources and technological solutions that allow us to reduce gas emissions. They include also shifting 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 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.

These three overlapping spheres become means for understanding transformational processes as schools engage in open schooling. To examine and evaluate transformational practices in and through open schooling, one must consider all dimensions: changes in

technical solutions and behaviours, changes in political systems and structures, and changes in values, beliefs, worldviews, or paradigms. In open schooling contexts, this might mean, for example, 1) examining how 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).

The three spheres of change can be operationalized and further specified by drawing on alternative theoretical frameworks. While remaining consistent with the overall premise of transformation as a multi-dimensional, holistic process that cannot be reduced to either individual, inter-personal, or institutional aspects, alternative frameworks or models can help accentuate certain aspects of transformation. Examples of such alternative theoretical frameworks have been drawn as part of the SEAS project analytical work, providing diverse yet complementary – and often overlapping – ways of bringing insights into change processes connected to open schooling.

One such framework has been developed to add a dynamic, fluid dimension to the three spheres model, which may otherwise be seen as a static heuristic. The model involves inserting "meaningful disruption" and reconfiguration processes across the three spheres, thereby adding its dynamic dimension, reshaping the figure into a spiral that brings about deeper transformation at each new disruption event.

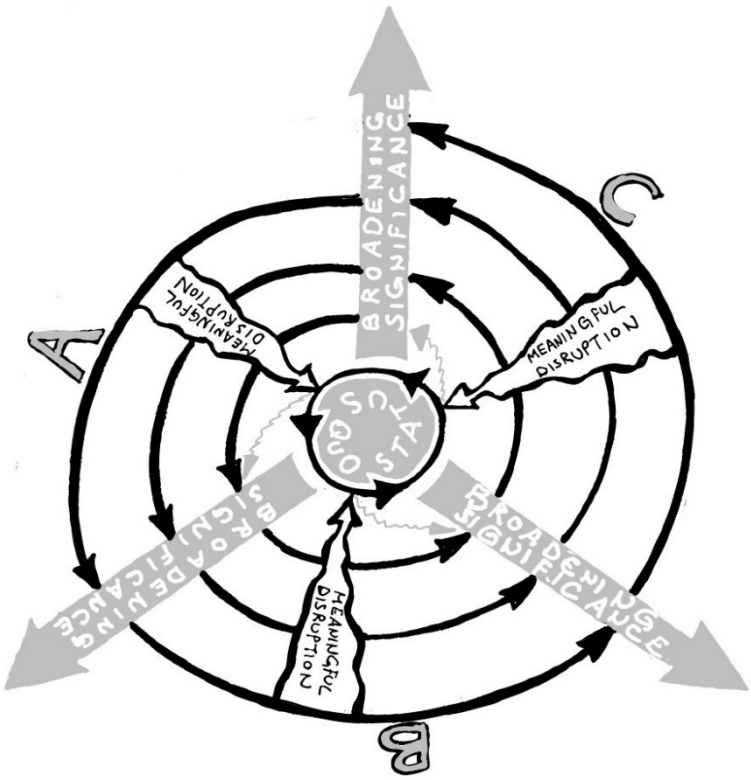


Figure 3: Broadening Domains of Significance. The model adds dynamic structure to the "three spheres"-model. The model is further elaborated in the SEAS rapport on models for the establishment of open schooling collaborations.

The model covers the spacious and fluid terrain between A) Values & Worldviews, B) Systems & Structure, and C) Practice. Like its predecessor, the "Three Spheres"-model, so too the model of Broadening Domains of Significance recognizes three interdependent areas of transformation (in the model designated A, B, C. Where the models differ is in the relative composition and dynamics between the three areas of transformation. Rather than theorizing these areas as being firmly embedded inside one another (rather, that is, than visualizing these areas in a relatively static relationship to one another), the present model theorizes them as interrelated and non-hierarchical impulses in ongoing, coherent, fluid events.

One way to understand how these "meaningful disruptions" may take place is by drawing from *transactional learning theory*,[9] based on the pragmatist work of John Dewey. This theory understands learning as being incited by *problematic situations* in which our habitual, primarily unreflective ways of acting and coordinating with the surroundings become disturbed. Reflection, and the opportunities for learning it brings about, starts when our environment disturbs such habits. Sometimes we can easily solve problematic situations with the help of existing habits. Learning then results in consolidating and enriching the habit. But sometimes the problem is harder to resolve and requires an 'inquiry'. Through experimentation one tries to solve the problem. If successful, this will result in new knowledge, skills, values, identities, etc. Learning can in this case result in a substantial transformation of habits or even the start of new ones. The work of implementing and evaluating open schooling innovations can, from this view, be seen as one of challenging and reconfiguring established habits of schooling (teachers' habits, students' habits, community habits), as well as the potential to establish new ones.

Yet another way in which this broader framework on change can be interpreted and enacted into educational practice and research is by drawing from cultural-historical activity theory insights, which allow us to think of the individuals, social groups or communities, and institutional contexts (school, out-of-school) involved in open schooling as constituting *activity systems*. Such systems can be conceptualized as conformed by a set of elements and their interrelations, including the following: the *sign and tools* that are mobilized within and characterize a system's practices (e.g., the specific timetables, curriculum, and teaching plans at a given school), the subjects or persons who get involved and take specific roles and identities within that system (e.g., students, teachers, activists, policy makers), the communities the latter belong to (the school or the family), the rules that organize those communities, and the division of labour (see figure 4). The historical, practical, personal and

[9] van Poeck, K., Östman, L. & Öhman, J. (2019). *Sustainable development teaching. Ethical and political challenges*. London, UK: Routledge.

political contradictions or tensions that emerge within and between these elements as activity systems are geared towards the pursuit of new objects of activity or motives (i.e., new ways of learning on sustainability through open schooling). They are considered here the moving force and the analytical focus when understanding transformation.

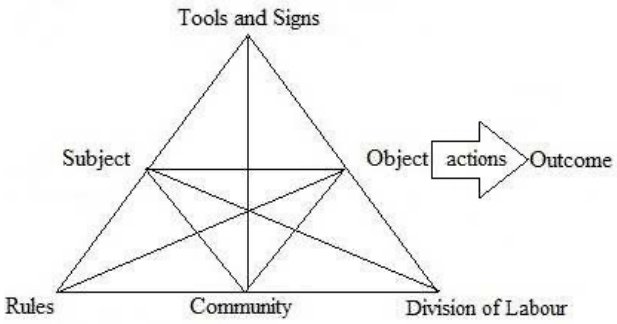


Figure 4: An Activity System (e.g., a school, or an out-of-school partner)

These and other theoretical models can be used and have been used as part of the SEAS analytical work.[10] The point to be made here is that, while the overall three spheres of transformation serve as a heuristic frame for this assessment framework, several specific theoretical and analytical approaches can be mobilized for the purposes of enacting the framework more specifically in educational practice and research. Here we draw from some of these, but others may be put to the work. This framework invites a principal openness for diverse academic backgrounds and interests that may provide fertile ground for exploring open schooling phenomena and agendas.

Understanding transformation across three assessment areas of open schooling collaboration

The focus on transformation that the three spheres model and the related theoretical frameworks listed above afford is crucial for the present assessment framework. But a focus on transformation remains at a very abstract and general level unless it is grounded in a closer, more concrete understanding of open schooling *as situated practice*. To anchor the assessment framework on such a more concrete understanding, SEAS has identified three assessment areas, or levels of activity, which need to be considered in open schooling innovations. By "levels of activity" we refer to specific practice spheres domains that require attention and intervention in any open schooling innovation. This involves attention and intervention on the part of either school members or researchers, as well as on the part of stakeholders outside of the school. The three spheres of transformation are at play within

[10] A collection of such models as they have been mobilized in or/and developed through SEAS assessment work are compiled in the project's global assessment deliverables D5.2 Report on models on the establishment of open schooling collaboration, D5.3 Report on models on transformational engagement scientific literacies and motivation, and D5.4 Report on models of teaching and learning scientific literacy; as well as on the annual local assessment reports D3.1 and D3.2.

each of these assessment areas: 1) *Enabling Collaborations*, 2) *Supporting Teachers*, and 3) *Empowering Learners*. We will briefly characterize each of these below. Each area considers changes at both the practical, political and personal levels.

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

As we have shown, the core defining feature of open schooling is the opening or broadening of the school's borders to include more socially relevant issues in the teaching and learning that takes place through schooling, as well as to transform the meaning and role of schooling in informing or addressing those socially relevant issues. A first assessment area that needs to be attended to is therefore *the interface between the school and the broader community*. It is to be expected that schools that have not regularly engaged in open schooling projects will face some practical, organizational, and conceptual challenges when it comes to establishing and coordinating collaborations with external actors around local or global societal issues. The assessment recommendations provided here aim at guiding practitioners' attention towards key aspects and moments of the work it takes to establish such collaborations and the sort of dynamics that have been observed to lead to transformative open schooling innovations.

Empowering Learners: Assessing transformations at the level of learning experiences and contents

The next assessment area concerns the level of activity that belongs to learning experiences and content: The "what" and the "how" of teaching and learning which happens when schools open themselves to the world. This concerns qualities of stretching out, of new perspective-taking, of novel voices articulated and heard, or of unprecedented sensemaking potentials discovered and developed. Whether and to what extent such open schooling interventions empower learners, whether they help learners develop senses of agency, or whether learners discover ways to mobilize knowledge for actively making a difference in the world, are all vital questions we need to ask as we assess the impact of open schooling.

Importantly, the focus here is not exclusively on students. Our notion of "learners" is more inclusive and integrative than that. In genuine transformative practices, everyone learns. This includes teachers, school leaders, community members, and it also includes researchers involved in such practices. In fact, what changes are not only learners and the ways in which they relate to specific subject matters of educational value. What changes are also contents and values. They too broaden in their significance. Again, we see that transformation is nested and complex. Impulses towards transformation in any sphere can ripple across the other spheres as well, in widening circles of significance.

Supporting teachers: Assessing transformations within the school community

At the same time as open schooling challenges the outer boundaries that connect the school with the local community, it also challenges the established organizational and political structures that otherwise characterize teachers' everyday work. Whereas this area is not only about teachers—it includes schools as professional settings and all the roles within it, including administrative staff and school leaders—it certainly considers how school systems and structures provide the required support to allow for such tinkering and flexibility as open schooling innovations call for. Among the questions to be asked are these: 1) What opportunities do schools provide for collegial collaboration within and across subjects? 2) What mandates or priorities are given by leadership? or 3) Which measures are taken to make teachers' creative work sustainable without overloading them? The focus on managerial aspects of school organization may again make the sphere of political systems and structures most visible in this area. But as we have seen, it is equally important to consider the sort of practical tools at disposal to teachers, or the type of broader narratives and worldviews that characterize a given school community. Here, as in the other arenas of possible intervention for open schooling, all three spheres of transformation overlap.

Quality in open schooling: A qualitative assessment framework

The assessment framework developed in this document is primarily qualitative. It focuses on qualitative dimensions of practice across the three assessment areas developed above, as they have been documented to relate to educational transformative processes. This does not close the door for developing additional, quantitative measures that might shed further light on the identified areas. However, assessing the "success" of open schooling innovations, we show, requires a qualitative approach. We begin with laying out a set of quality criteria.

Quality criteria in open schooling

The following criteria for what constitutes "quality" or "success" in open schooling are anchored in the understanding of open schooling as collaborations in which the school contributes to social well-being by collaborating with actors in the local and/or global community. They further build on the theoretical premise that open schooling facilitates such transformative, socio-material processes as described by the "three spheres"-model. With this in mind, we identify the following criteria for quality or success: 1) Functional

Coordination, 2) Meaningful Participation, 3) Agency Building, 4) Knowledge and Practice (Re-)Generation, and 5) Wellbeing.

1. Functional Coordination: In successful open schooling initiatives, partners within and across collaborating institutions *set goals and coordinate their activities to be functional with respect to those goals*. Functional coordination points to the need of mastering transformations, such that new institutional functions and relationships become feasible and sustainable over time. Open schooling may lead schools to articulate novel ways of coordinating teachers within subjects, teachers across subjects, teachers with school leaders, as well as internal school affairs with one or several actors outside of the school. The same goes for out-of-school partners, who need to find ways to integrate schools and/or other partners with whom they might never have been in contact before. Students too will need to master and navigate new, sometimes complex collaboration landscapes, across peers and community members.

2. Meaningful Participation: Open schooling aims at expanding the horizons of what it means to teach and learn by making schooling activities more engaging and meaningful. This requires participation to be not simply mandatory or routinary. *Participation in open schooling activities is about making a difference that matters*. Successful implementations will require that the goals and conditions of the open schooling activities are considered interesting and significant for all participants, from students and teachers to external participants.

3. Agency Building: One of open schooling's premises is that we need an education that more closely connects knowledge with opportunities for action and democratic participation. This implies that all learners not merely develop "knowledge" or "skills" but also the sense, competence, and motivation required to take knowledgeable action in real-life contexts. Agency here is about helping citizens develop the possibilities to take response-ability over their life conditions. In the transformation-oriented context of our work, we identify agency not as something that is achieved by simply changing the *contents* of one's mind (i.e., "how one sees oneself as capable of taking action"). *Agency is a more complexly realized and more integrated socio-material achievement*. Successful open schooling initiatives foster agency not merely by changing theory, but by changing a broader scope of socio-material arrangements as they are situated in practice.

4. Knowledge and Practice (Re-)Generation: From the perspective that informs this framework, "learning" must be understood as the generation of new socio-material arrangements of knowledge and epistemic practice. We do not measure the success of open schooling innovations in terms of (more-or-less narrowly defined) "learning outcomes". Instead, we measure their success *relative to the degrees to which they*

generate new knowledge practices. These practices can be socio-material in nature; they can involve practices mediated by cultural tools (teaching materials and other organizational tools) that afford and constrain specific forms of learning and experience. This is not to disregard learning but rather to re-evaluate learning in its ecological niche: successful open schooling innovations *generate new learning ecologies*, and they generate the personal, inter-personal, and (inter-)institutional structures that sustain them, regenerating old ones.

5. Wellbeing: Finally, open-schooling initiatives are about generating wellbeing in the communities surrounding the school *through schooling*. This is well beyond the traditional view of schools as identifying students' learning as the ultimate goal. Here too, the point is not to disregard the value of learning or of the educational purpose of schooling. The point is rather to reconceptualize what it means to educate. From an open schooling perspective, educating is inherently connected with generating better prospects for the students' futures. Learning can happen without meaningful transformation of the conditions (e.g., of oppression, of ecological and/or social injustice) that determine the learners' opportunities to actually enjoy the use value of the learning they have acquired through schooling. Here, successful open schooling initiatives will have a positive impact on the broader communities they engage with. There is no such thing as open schooling for oppressive means, or for instrumentalizing education to politized non-educational ambitions. *Open schooling strives per definition towards a more just and sustainable world, something that is in every way connected to education in the deepest sense of the word*.[11]

Qualitative assessment: "Professional vision" in open schooling

The theoretical background, the assessment areas, and the quality criteria elaborated above all provide important lenses to students, educators, researchers, and everyone else interested in open schooling. They can help guide and enrich anyone interested not only in composing, but – importantly – critically evaluating open schooling practices, and "good" practices at that.

The more detailed assessment framework which follows here builds on all these. It is structured according to the three assessment areas elaborated above. Within each of the three areas, the reader will find a set of statements concerning *qualities* or *conditions* that

[11]Here, we refer to John Dewey's definition of education as the continuity of life through social experience, in Dewey, J. (1916). Dewey, John. Democracy and Education: An Introduction to the Philosophy of Education. New York: Macmillan, 1916.

might be observed in a – more or less successful – open schooling setting. The aim is wholeheartedly didactical: to guide the readers' gaze so that they can recognize more clearly aspects that make up the interdisciplinary field of open schooling as a professional field of practice.

Every professional field of practice can be understood as a particular way of organizing our ways of looking at and seeing the world. Take an example. Where lay people may just see "dirt", a professional geologist may see "evidence of ancient ruptures in the climate record" or "a complex narrative composed across deep time". In a similar vein, it takes the gaze of an experienced surgeon to see the cystic artery among an otherwise complex mishmash of human tissue during surgery.[12] It takes the gaze of professional aviation pilots to see a particular aviation-relevant situation in and through the cockpit's displays and readings.[13] This is what has been coined as *professional vision*. Professional visions can be understood as

> discursive practices [that] are used by members of a profession to shape events in the domains subject to their professional scrutiny. The shaping process creates the objects of knowledge that become the insignia of a profession's craft: the theories, artifacts, and bodies of expertise that distinguish it from other professions.[14]

The insights presented throughout the following sections provide readers with an in-sight into what open schooling practices might look like, as these have been conducted, documented, and assessed throughout the three-years period and across the six participating countries in the SEAS project. The goal is ultimately to help others "see" the ways in which our experiences, our background, as well as the experiences reported to us by many participants across multiple open schooling networks have taught us to see. We too are learners reporting forward to future learners, to help look, and to help attend to relevant detail when opening schooling to the world, and the world to schooling. In this way, we hope that new initiatives can be assessed with respect to those experiences, and the premises and values expressed through these sections.

As displayed in the table below, each element of the framework needs to be integrated within the other, providing readers with an integral qualitative understanding of dimensions that matter to open schooling purposes, and how they may concretize in more or less successful implementations.

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[12] See Koschmann, T., LeBaron, C., Goodwin, C., & Feltovich, P. (2011). "Can you see the cystic artery yet?" A simple matter of trust. *Journal of Pragmatics*, *43*, 521–541

[13] Roth, W-M., & Jornet, A. (2015). Situational awareness as an instructable and instructed matter in multi-media supported debriefing: A case study from aviation. *Computer Supported Cooperative Work*, *24*, 461–508

[14] Goodwin, C. (1994). Professional vision. *American Anthropologist*, *96*(3), 606–633.

Finally, all the more localized and more detailed points of discussion point back toward open schooling initiatives as innovation spaces. Open schooling has the potential to open and expand the horizons of what it is that schools and others can and will create together.

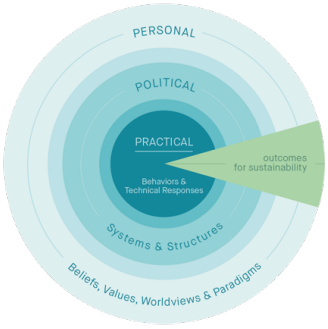
A transformational framework	5 Quality criteria	Three assessment areas	Assessment observations
	• Functional Coordination • Meaningful Participation • Agency Building • Knowledge-Practice (Re)Generation • Wellbeing	Enabling collaborations Empowering Learners Supporting teachers	Professional vision within each assessment area

Table 1: The assessment framework's structure.

Assessment Area 1: Enabling collaborations. Transformations at the interface between the school and the broader community

Co-designing shared goals to expand horizons of (educational) activity

Establishing shared goals or visions among partners is crucial to open schooling innovations. This is a core insight derived both from the theoretical background and the experiential phases of our work. Typically, establishing such shared goals or visions takes the respective partners beyond their more limited, narrower, received objectives. Establishing shared goals is a crucial step towards achieving the various quality criteria. A proper co-design process prepares the ground for real, meaningful, transformational engagement that leads to an enhanced sense of agency. Such a process needs not only to address practical or political dimensions. It must also open for perspectives concerning paradigmatic shifts in worldview, whether in individual actors or collectives. Such shifts need to be explicitly addressed and negotiated.

The relevance of carefully curated co-design spaces and procedures. When assessing open schooling innovations, one ought to ask whether the process affords proper co-design opportunities. Carefully curated processes are critical for real negotiation and the co-creation of shared goals and visions. Such processes typically include the following two aspects: 1) an in-depth consideration of what is the locally relevant challenge that open

schooling activities will address, and why; 2) close, open-ended dialogues to translate between stakeholders from formal education and out-of-school contexts. Careful translation may be necessary to reach a point of articulating shared visions. This process reaches into – and potentially mobilizes – transformative potential in socio-material practices, including practical, political, and personal conditions, both for each partner and across the collaborative network. It also allows practitioners to explicitly deal with important dilemmas with regards to finding an adequate balance between the goals of achieving social change outside of schools, and the educational mandate of schools. Research interventions such as Design-Based Research or Social Design Experiments can be followed as models to enable knowledge-building educational innovations that connect theory and practice.

Considering the intrinsic (rather than instrumental) value in the collaboration. Empirical studies conducted as part of SEAS have shown that out-of-school partners may conceptualize the value of open schooling collaborations in two different ways: 1) instrumental and 2) intrinsic. *In the instrumental approach*, the value of the collaboration is conceived in terms of gains achieved through the collaboration, without it requiring establishing or negotiating shared goals. In this approach, partners focus on what they can obtain from the collaboration without necessarily engaging in a more in-depth co-creation of shared objectives. *In the intrinsic approach*, the value of the collaboration is conceived in terms of jointly generated shared goals which participants value and which motivate the collaboration.

Emerging contradictions and tensions in the collaboration are attended to and harnessed as transformative opportunities. There is another key to stimulating meaningful transformative processes, particularly in relation to unlocking the process of establishing and conducting open schooling in collaboration with multiple actors. One must expect, become aware of, and ultimately analyse what tensions and contradictions might emerge. Such tensions and contradictions may arise, say, between a school's assessment demands on the one hand, and the requirements or conditions imposed by the locally relevant (social and/or sustainability) challenge on the other. These tensions and contradictions are likely to emerge when traditional schooling is challenged through complex realities. Our work shows that they ought not to be avoided or side-lined, but rather problematized openly. In fact, we argue that they contain crucial, indeed transformative potential. Successful open schooling collaborations attend to and capitalize on experienced tensions to make development possible across the three spheres of transformation. In the mentioned example, the tension may be reinterpreted actively as opportunity: *First*, to change the curricular demands, and

second, to reconceptualize the locally relevant challenge as an opportunity for teaching and learning.

Attending to the division of labour and coordinating structures

Open schooling innovations bring about new roles and perspectives for all participants engaged. But they also demand careful coordination and an ability to find solutions on how to collaborate concretely between schools and out-of-school actors, in ways feasible within the allocated resources. Through the SEAS assessment work, we have understood that there is not "the one" single solution to the issue, "the" skeleton key to unlock it once and for all. There are rather many ways to address the issue, depending on local circumstances and arrangements. We have been able, however, to document certain moments that appear to be relevant when assessing quality in an open schooling network.

Time, resource allocation, division of labour, and internal and cross-institutional coordination are key aspects when establishing open schooling collaboration. Participants embarking on establishing open schooling collaborations, particularly teachers, typically require structural support internally to meet the demands the complex collaboration posits. An important aspect of this is the need to *consider, discuss, and problematize explicitly what internal coordination structures need to be in place* to ensure that such collaboration can mature from the initial idea phases and into expressions which will enable success for the entirety of the collaboration. This is true regardless of whether the initiative concerns a one-time inquiry cycle, periodical interventions across a semester, or even collaborations that unfold dynamically across several school years. In assessing the potential of open schooling collaboration to thrive, it is crucial to find functional and sustainable divisions of labour that is agreed upon. These need to make sense to, and be agreed upon by, all parties involved.

In findings reported through the SEAS assessment, we have observed that open schooling collaborations can lead to new division of labour opportunities. Such opportunities in turn make it possible to overcome experienced hindrances. With attention and care, the original dilemmas which participants experience concerning (a lack of) time, (hindrances in) coordination, and (poor) resources can be transformed into generative ways of distributing resources and time. They may help make teachers' work more sustainable despite the new, more complex working environment that open schooling posits. Here as elsewhere, part of the quality to look for are successful (co-)navigating skills in previously uncharted territory.

Involving school leadership structures. We have also observed that the way school leadership structures get involved in facilitating and coordinating the collaboration with out-of-school partners can be crucial. Again, we have documented that there is no one "right" or "wrong" answer to be found with regards to whether members of the leadership need to be the ones coordinating, or whether it is teachers who directly should take care of the collaboration. Context trumps recipe. But we do have evidence that the degree and quality of a school leadership's involvement in open schooling designs plays an important role with regards to assessing the success of open schooling. Some documented cases show that there is an advantage for teachers to be in control and have direct access to the external collaborators – as long as their relative autonomy is integrated in their lesson planning practices and their allocated time resources. In these cases, the involvement of school leadership has resulted in diminished agency and a sense of alienation on the part of the teachers. In other settings, we have seen the advantages in delegating the coordination with external partners to assigned members of the leadership, thus taking off the coordinating load from teachers' shoulders. Across those cases, we find a value in open dialogue and relatively strong degrees of internal cohesion and integration.

Formalising collaboration with external partners. Formal agreements may play a pivotal role between schools and out-of-school stakeholders. Agreements that formalize the collaboration between school and out-of-school actors may offer a visible and transparent structure for the cooperation. This may ensure accountability and continuity. Agreements may also enhance the engagement of the involved actors. Involving students directly in the processes of articulating collaboration agreements with out-of-school stakeholders can be a powerful educational tool and help consolidate success. Closing formal agreements on desired change can pave the way for tangible, substantial change. Opening opportunities to master such a skill can help students become change agents. However, not all open schooling networks will organize around formal agreements, and not always are they required. The key assessment question is, to what extent is there a need to formalize the collaboration? And which forms can this formalization take that can enhance the quality criteria for the given participants?

Assessment Area 2: Empowering Learners. Assessing transformations at the level of learning experiences and contents

Supporting learners' interdisciplinary inquiries into complex (sustainability) issues

Because open schooling initiatives address authentic, complex issues of societal relevance, they often present learning opportunities that go well beyond what any teacher or school textbook, whether digital or analogical, or even a particular subject like science or social studies can cover on their own. Local and global issues of societal relevance are complex, multifaceted, and do not have one single or straightforward solution. This is what the notion of socio-scientific issues aims to capture. To be understood, they demand of open-ended inquiry. Supporting and catering for such inquiry processes is therefore central, acknowledging that no one has the answer to the problems and that the key is to come up with ways of exploring them. This is so specially if empowering and enhancing learners' agency in democracy is a goal. In SEAS, we have seen how inquiry arises when habitual or unreflective ways of acting or thinking are pierced by "meaningful disruptions" that open schooling projects open for. Such disturbances can lead to new knowledge, skills, values, identities, and affectivities, at the individual level, but also at the level of learning communities. Inquiry, thus, is a central aspect. Open schooling requires complex navigating skills from all learners, including teachers. The following quality assessment dimensions should all be understood in relation to inquiry as a guiding didactic and pedagogical principle.

Learners are actively supported in their inquiry processes. Support may come in many forms. It may include knowledge resources, methods for collecting evidence, opportunities for discussing data and for interpreting experiences, templates for writing, instruments for measurements, access to expertise, and more. A key challenge in open schooling is to make the inquiry a continuous experience across different participating settings and organisations. Key qualities in learners' inquiries include the following: 1) Shared inquiry affords learners active engagement outside the classroom; 2) learners are encouraged to follow their own questions and interests; and 3) learners may conduct research on real-world challenges with the support and active intervention of out-of-school partners.

Learners work in action-oriented cycles. Action-oriented cycles allow learners to inquire into questions concerning "what", "why", "where" and "how". Such cycles call for didactical collaboration and planning ("didactical carving") across settings and organizations. Teachers

and out-of-school educators need to consider ways to facilitate such that such cycles are integrated into the open schooling activities, and consider the didactical opportunities that are embedded within the locally relevant issues being addressed. Successful open schooling projects generate awareness around the two-sided nature of the locally relevant issues through a didactical carving approach. On the one hand, educators and learners explore and identify the educational potential in the activities that are taking place to remediate or address locally relevant issues (e.g, connecting those issues to broader disciplinary and inter-disciplinary issues). On the other hand, it involves being open to surprise and to seeing how the local or global realities being explored challenge existing understandings in the curriculum or in the teachers' or students' conceptions, and how those understandings afford or not action and agency.

Multiple subjects are involved in articulating and facilitating the inquiry, and opportunities to transcend disciplinary boundaries are provided. Inquiry is recognized as a key characteristic of many school subjects, including natural sciences, aesthetics, and social sciences. Concerning science education, for example, inquiry is typically rooted in the scientific method. Science is treated as a means to approach empirical phenomena in the world, and science's methods are considered relevant to solve problems. Inquiry, here, is both a learning goal ("learning about characteristics of science") as well as an approach to teaching and learning. However, sustainability challenges often have learners needing to confront degrees of complexity that science education alone is hard-pressed to unpack and inquire into. The kind of inquiry relevant for such complex challenges (i.e., "wicked problems") demands integrating interdisciplinary and transdisciplinary fields of knowledge, as well as confronting ethical and political aspects. Even questions concerning non-anthropocentric ontologies, epistemologies, or morals may become an important part of the inquiry.

Importantly, the same need for interdisciplinarity is true for teachers, who often find their domain of knowledge challenged when dealing with complex socio-scientific issues and need of other disciplines and even professions to step in. In such cases, teams of teachers from different subjects, working together with out-of-school educators and practitioners, cross pollinate and expand their respective disciplinary boundaries, generating new insights and perspectives on their own and each other's subjects, and of the interdisciplinary theme or topic as a whole.

Learners are encouraged to deal with the complexity of sustainability challenges in ways that enhances their agency. Part of the complexity would be that the challenges are perceived differently by different stakeholders, which need to be included in the inquiry.

Complexity is a dynamic characteristic likely to evolve as the inquiry develops. Becoming aware of and having to actively negotiate between varying perspectives within one shared vision itself helps *open* an inquiry. Such active navigating, in turn, can foster a sense of agency. *Opening an inquiry in its complexity* requires that learners develop such qualities and skills as managing, weighing arguments, enduring pushbacks, tolerance, or moderation. All these qualities can become qualitative shades or hues of a more complexly realized sense of agency. As learners actively navigate complexity – and as their sense of agency deepens –, they may find themselves able to open new ways to counteract feelings of hopelessness, anxiety, or paralysis. Such agency may take a range of shapes, of course, including acts of criticizing, resisting, explicating, envisioning, or committing. Such expressions may be unfamiliar and create situations of discomfort to both learners and teachers. Teachers may interpret learners' expressions of agency as a questioning of their professional authority, of the discipline they are educated into, or even of the school as institution. Learners' agencies benefit if such expressions are conceived as opportunities for learning and further inquiries.

Encouraging learners to engage critically and emphatically with issues of personal and community relevance. With complexity resulting from personal involvement and action into concerns of personal significance, also follow opportunities for personal involvement in making value judgements, critically exploring alternative ways of thinking, speaking, acting, mobilizing, politicizing, and problem solving. Learners should get the space and opportunity for such involvement, including the expression of empathy and caring. In fact, developing action-oriented competences and skills cannot be limited to intellectual aspects of (any) target subject matter, but requires anchoring those intellectual understandings in personal and affective senses, so that the interdisciplinary "contents" or learning goals acquire significance for learners, and effectively empowers them to take informed action and not just information.

Learners bridge across contexts, narratives, and textual resources

Learners become aware of and can integrate diverse, often competing narratives and perspectives on complex issues. Because the interdisciplinary inquiry practices that characterize successful open schooling initiatives involve addressing complex societal issues in all of their complexity, there often are a multiplicity of ways to account for the phenomena learners experience and encounter. Specially because learners in open schooling settings encounter not just one legitimate voice (e.g. the teacher's, the textbook's) but multiple, including the voice of participating stakeholders such as non-profit activist organizations, private industry or businesses, it is particularly important that learners explicitly take up, examine and reflect upon the different narratives that come forth, including the one's that characterize their own current or past views. Often, such narratives present contradictions, tensions, and double binds, both across and within narratives. Such contradictions, tensions, and

double binds are pregnant with developmental potential, and actively monitoring and making sense of them is essential when meaningful, agency building, action-oriented learning is the goal.

Learners bridge across multiple (inter)textual resources, and develop their own voice. An essential learning experience in open schooling is the encounter with places, institutions, ideas, ways of knowing, texts, tools, values and purposes. As learners in open schooling contexts encounter a diversity of narratives, they too encounter and navigate this complexity through a number of textual and intertextual modalities, including digital texts, social media, and the internet. Students may find resources outside the usual suspects, in the everyday and the practical, and, ideally, a sense of coherence and mastery emerges as richer intertextual continuity is developed across encounters with texts, people, settings, and concerns. Narratives have the potential to transform such encounters into meaning, learning as they establish social relations, make social action; take part and act; negotiating identity, culture and power-relations along the way. In a successful open schooling implementation, students become aware of textual and inter-textual patterns and habits, identify new and desired for patterns, and through and beyond texts, particluar experiences and events as crucial moments in relating the old and the new.

Learners become knowledgeable agents, expressing their own relevant new and old understandings and knowledge. Exhibitions, contributions to public and/or specialized debates and dialogues, engaging in conversation with other knowledgeable actors, both within and outside the school; all these provide opportunities for students and teachers to share with their local and global communities relevant knowledge and experiences gained through inquiry. Successful, quality open schooling initiatives result not just in learning within the participating members, but also offer channels, forums in which this learning can be shared. Because the learning often is about very concrete, authentic and locally relevant issues, the contents of the learning are often novel. Students and teachers documenting "green washing" practices of local businesses, as well as their genuine efforts to become more sustainable, provides with glimpses and insights into local and global realities that perhaps no one else has investigated in precisely that manner before. This positions students and teachers as knowledgeable actors, in relation to both others outside the schools walls, and to themselves.

Assessment Area 3. Supporting Teachers. Assessing transformations at the level of teaching

Teachers play a particularly important role in open schooling collaborations. When they enter such initiatives, teachers may find themselves as positioned across any number of "betweens": *between* school leadership and students, *between* disciplines, *between* the professional identities of being 'teacher' and 'learner', *between* schools and open schooling

actors, not to mention – as is often the case when dealing with issues of ecocide – *between* anxiety and hope, *between* paralysis and empowerment, etc. Open schooling may confront teachers with a range of demanding questions. Such questions may include the following: What is it to be knowledgeable in a context (e.g. climate change) in which no one really has the "right" answer to our challenges?; What is it to be competent when I step into areas beyond my disciplinary background, but also beyond my habitual ways of teaching and of relating to others as teacher?; How is it possible to organize collaboration between teachers within or across subjects? And with others outside of the school walls? How can we consolidate and scale up emerging teaching practices that we find valuable, and how do we get others in the school system to value them?; How does one navigate the dynamic field between disciplinary tradition and interdisciplinary innovation?; or How can one develop sustainable support structures across the various strata within schools: from leadership through administration to the teachers?

Supporting teachers to create safe spaces and act as 'boundary people'

Successful open schooling collaborations may be marked by concrete setups where teachers can explore the potentials in acting as 'boundary people'. These would be safe spaces – physical or social – where teachers may experience a freedom to cross horizons of understanding, to test critical thresholds, to experiment with what it could mean to disrupt existing practice meaningfully, to leave comfort zones created by consolidated perspectives on what it is to be a teacher or on what it is to teach a discipline, and so forth. Open schooling explicitly tests existing physical and social boundaries. It is therefore advisable that teachers participating in open schooling be offered and can offer each other sanctuaries where risk-taking is not sanctioned but encouraged.

Teachers are encouraged to explore the relevance of opening boundaries. To invite teachers to become boundary people is to invite them to step into an Open – itself a place of transformative potential. In such shared inquiry as open schooling fosters, that Open may or may not be peopled with others – school leaders, learners, out-of-school stakeholders, researchers. In fact, we have seen teachers – alongside learners – step into an Open peopled with *non-humans*, embarking on shared inquiry with other animals. To step into such an Open is to invite the possibility for new questions to arise, new visions that may be worth articulating, diffuse ideas that might need consolidating through language, or new commitments to spring forth from such clearer articulation. It may involve elements of experiencing alterity, that is, of stepping out of a professional certainty groomed across

years of teaching. Teachers may allow themselves to be 'contaminated' with the unknown. And then, to return into their various roles: *still* contaminated, *still* off-set, *still* moved by boundary conditions, *still* semi-porous to horizons that may have been sealed off previously.

Supporting teachers in consolidating open schooling practice within a plethora of duties and responsibilities

Many teachers are caught inside a plethora of duties and responsibilities. For example, a significant portion of our research has taken place during the pandemic, which had teachers confronted with any number of adaptative pressures. Such pressures can lead to situations where practitioners may see few openings for opening schooling initiatives. They may express low motivation or resort to a lack of time or energy. They may even express high degrees of motivation but resort to a lack of opportunity or structural support in their schools. If open schooling initiatives are to succeed, they must recognise and work resourcefully with such pressures. They must articulate strategies which present them, not as "just another" well-meaning impulse from outside, but as genuine opportunities for teachers to transform practice, habits, structures, systems, (school) cultures, or indeed worldviews.

Open schooling initiatives integrate professional development formats supporting teachers' explorations and consolidation of ideas. Teachers are often caught in tight, complex, day-to-day schedules which do not consistently allow for real-time reflexivity on their own practices. Often, open schooling challenges the way teacher planning is otherwise normally organized in schools. To make open schooling initiatives feasible, "sanctuaries" to allow stop and think as teachers' are in the midst of open schooling project's development and implementation is crucial. This involves creating spaces of shared reflection, specially where researches and/or other actors involved in the open schooling collaboration participate as co-researchers and co-designers of the reflective process. A variety of formats may be used, building on the premise that it is meaningful to create *principal openings* in otherwise tightly patterned professional environments. These openings can be ad-hoc or planned; they can take place one time or happen periodically as part of the larger open schooling structure. They help envision, concretely plan, run, recalibrate, reorient, and revisit open schooling initiatives in critical dialog. The presence of researchers or other actors creates an openness to step outside the stream of practice, even if just momentarily, and to take stock. Thinking here becomes a thinking *with* and *through* the Other. The shared reflexivity opens opportunities between practice and theory. Professional roles may open in the process,

inviting teachers to experiment with becoming "learners", "co-designers", "co-researchers", or, indeed, "dreamers and visionaries of alternate futures". The Greenhouse formats allow assessment to take place in real-time, as an integral part of the co-design. This, too, can help open novel horizons of thinking and doing.

Recognizing teachers as experts in their craft. Open schooling interventions, particularly during innovation stages, typically unfold across a triad of "schools", "out-of-school actors", and "researchers". Inside the triad, we have noticed that teachers may approach the researchers with certain 'positive stigmas', meaning teachers may approach researchers with certain positive biases concerning the degree and depth of the researchers' knowledge. Teachers may consider researchers to be particularly well-qualified inside a given area of knowing. While this may or may not be the case, we have paid particular attention to the importance of levelling the playing field. Open schooling, in the interpretation of SEAS, considers knowledge production to be *a shared doing*, and learning to be a *reciprocal process of open-ended inquiry*. Successful open schooling projects will pay attention to affording to teachers the role of experts in their field.

Balancing authentic activities with disciplinary demands. Successful open schooling initiatives find means to balance 'authentic' activities with 'learning' relevant disciplinary knowledge. How this plays out in practice is situated and specific, and it is not easily translated into recipes or guidelines. We do see, however, that *interdisciplinary collaborations* can be a way to offset and buffer such tensions. Teams composed of various teachers who represent different disciplines can distribute responsibilities even as they anchor a given open schooling initiative in a variety of disciplines. Each discipline contributes thus to *opening* the issue of shared concern in ways unique to that discipline, while in turn being enriched and challenged by other openings of other disciplines. In such working environments, "disciplinary demands" and "authentic activities" need not actually be experienced as antitheses to one another. They may be perceived as co-constitutive. Take as an example one case which we have worked with concerning ocean plastics. In that case, the in-depth study of the chemistry of hydrogen-carbon polymers *opened* cross-disciplinary conversations with the life-cycle analysis of products made by a local plastics factory, which in turn *opened* a cross-disciplinary conversation with the rhetorics and public appeal of historical environmental heroines, all of which were fractal moments in an interdisciplinary team-effort to *opening* the school into the larger context of a city-wide art-and-policy

initiative on transforming ocean plastics into an arena for collective hope, a project known locally as the Cathedral of Hope.[15]

Structures and systems are in place to carry and support teachers. This alludes to an earlier discussion in this assessment framework, namely the importance of integrating open schooling collaborations in school culture, particularly in and through leadership. Teachers who experience that their engagements with open schooling initiatives are not backed by leadership, not integrated thoroughly in existing school culture, or unable to transform school culture such that deeper integration becomes possible, may express strong motivational swings between feeling inspired and feeling deflated, even to the point of burning out. We document that this may at times be closely related to lacking structures of in-school support. Successful open schooling initiatives recognize the possible dilemmas concerning a balance between bottom-up engagement – the work and creativity that relies on the teachers' own initiative and (limited) energy – and top-down management, which involves the direction, mandate, and structural support that leadership can provide. Recognizing, anticipating, and expressing such dilemmas can be seeds to transforming them.

Open schooling can support and accelerate in-school adaptative organizational processes. Open schooling initiatives can help mediate between teachers and school leadership, as schools try to come to terms with the ins and outs of adapting to the existential demands of an ongoing socio-ecological pan-crisis. Recent years have made it evident that transformation and adaptation are no luxuries but necessities across all cultural spheres. When it comes to schools, teachers and leadership stand at the long frontier of that adaptation, as it must play out daily in the lived context of practice, existing culture, structures, and systems. It is clear also that teachers and leadership do not always face the same specific challenges and opportunities. Conflicts of interest can emerge even as both sides interpret their professional roles to make the most sense of the complexities and potentials of those roles. This is where open schooling collaborations can create *mediating spaces* where such adaptative work can take place. Greenhouse formats are one concrete example of such mediating spaces. Greenhouse formats can *open* such safe discursive spaces between teachers and school leaders where dilemmas, hindrances, and frustrations are allowed to come to the fore. The metaphor of the "Greenhouse" is chosen for a reason. Greenhouses are contained spaces for accelerated and carefully composed transformation.

[15] https://hapetskatedral.no/

Greenhouse formats can help accentuate, guide, and ultimately accelerate adaptations which schools would need to undergo *with or without* open schooling initiatives. "Fermentation", "growth", "decomposition", or "re-composition" are all related metaphors which warrant being interpreted in the sphere of cultural adaptation, and which may shed further light on the possibilities inherent in open schooling.

We have documented the value in a third party – researchers – coming in to moderate such Greenhouse formats. Researchers who are closely involved in open schooling collaborations enjoy the invaluable advantage of being able to position themselves in the liminal terrain between a strict 'outsider' and 'insider' perspective. This is how they can help *open* that liminal terrain to teachers and to leadership. All parties can meet inside that shared terrain, reorient more freely within it, and co-design paths that will lead through it and forward. The triangular composition of the Greenhouse format matters: Researchers are free to think outside of the day-to-day demands both of teaching and of leadership. Meanwhile, their close involvement in the work means that they have relevant insights into the personnel, structures, and systems that shape a school's culture. Researchers can draw their own conclusions, but those will be conclusions drawn from close involvement *with* a school. This is how they can feed back relevant insights and impulses into the school, which in turn can support and accelerate in-school adaptative processes.



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