

ESD-based education

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ESD-based Education

Fulfilling the Transformative Promise of
Education for Sustainable Development

Jos Eussen



The
OPEDUCA
Project



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ESD-based Education

Fulfilling the Transformative Promise of
Education for Sustainable Development

DISSERTATION

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on the authority of the Rector Magnificus, Prof. dr. Pamela Habibovic,
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A Voice in the Crowd

Listen to me,
Just hear me out,
If, I, could have your attention.

Just a Voice in the Crowd.

Day by day it's getting louder,
And day by day it's getting stronger.
But when I can't scream no more
and I need reassurance,
I listen to the crowd.



Fish - Vigil in a Wilderness of Mirrors

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The promise of Education for Sustainable Development can be met through a ‘Whole Student Approach’ which sees to youngsters learning Anytime, Anywhere, with Anybody and through Any device on themes that define their and our common more sustainable development. The concept ‘school’ a community-based open learning environment, a nexus of transdisciplinary learning based on educational partnership with its surroundings from which a local-to-global learning cooperative unfolds that effectuates the transformative power of education and generates lifelong learning.



The multi-faceted and -coloured ‘umbrella’ in the OPEDUCA-logo mirrors the variety and complementarity of educational sources in a social demographic region. Triangles fitting together in the middle, visualizing the place where variety and diversity can merge in the common interest of a more sustainable future while the broader base of each triangle (organization) still faces and acts towards the present.

The logo also refers to the variety and equality of people of all races, beliefs, preferences and likings, to the holistic integration of all subjects, disciplines and qualities in education as well as the variation of skills and competences arising from it. The white dove in the OPEDUCA-logo symbolizes the freedom to learn, have learners go wherever their unending journey of personal development takes them.

A Preface to Acknowledge

For this research I had the privilege to wander through, wonder about and work with the magnificent world of education, re-enter industry to find partnership, discuss science- and policy development with leading politicians and researchers and sit with students of all ages to understand them as the future itself. A journey started on a summer's day in 2004 when I pondered what a true focus on the development of youth could mean for our world. Scribbling the outlines of the OPEDUCA-concept in the margin of my crypto-puzzle, I set out to see if nothing might come to something. Although my travels might have been rampant in the beginning while carrying an encompassing vision, the numerous encounters they comprised have not been cursory. New horizons followed from pertinent observations of landscapes that in my mind were component parts of a logical and necessary whole. A vision that must have taken shape during the years I have been on route, one marked by a struggle through school and then ever more successful work experiences in a range of companies and a variety of sectors, including chemistry, sheet-metal, city administration, furniture, cable-trees and newspapers. A 25-year spanning adventure during which I was trusted the handle of CFO, sometimes tempted to do my best in HRM, Marketing, Logistics and Production, to eventually lose myself as a volunteer in the realm of youth development. Having had the immense luck to encounter true educators on the steepest parts of the road, I learned to understand the meaning and value of human endeavours and the pivotal role of education. Now what if today's students would truly realize and understand they can wheel the course of the future, what if they become fully aware they are the future and not parts to be assimilated in the societal fabric we created. What if we would all truly empower their development with all our might? Would they let nature and society deteriorate or take a stand, address challenges and overcome them all, take destiny into their hands? Is there an education possible to build such capacity for sustainable development? Blessed with the failure to look ahead in quite uncommon ways, I was grateful to find many wiser minds and stronger hands joining mine to consider and try that proposition. I enjoyed

the support of people, not primarily of organizations and institutes, for it are not human-made constructs that create value but people - people define the real of what can be done, develop, change minds, positions and preferences, gain insights, fail, fall, rise, get together, build dreams, imagine, live, learn. So what follows here is the fruit of the work of many, I ran ahead, scurried in between, pushed, pulled, provoked. To Academia I met or stumbled across along the way, you know I am a man of the forum, creator of agora, reach out with an embrace, seek debate and dispute in need of the warmth of conflict and resolve to have it cool in reason and held in friendship. I am thankful to you all, for your support or for keeping it from me. This stranger walking your still strange land will remain to speak out loud, so be aware when having me around in congress halls where too many sit nimble and numb, face Chairs and scholars pushing their preach while hiding from the furnace of true debate behind tabernacles ornamented with logos and profiled egos, claiming expertise and demanding respect one-way while so little of such is paid to those working in the daily clay. Those who walked and worked along will not be surprised to find what a horrendous challenge it has been for me to put a 4D vision on transformative education on a limited amount of 2D paper. Since the OPEDUCA-concept and the education proposed are not linear, this study stubbornly refused to be presented in neatly organized steps demonstrating clearest academic rigor. I however hope the logical complexity of an entangled and integrated concept now unfolds in academic clarity. What I sought to do and tried to perform is no more nor less than a product of the realms I lived in, of thoughts whispered in my mind by people I love and treasure. To all those and those I forgot I bow my head in gratitude since I cannot express in words how grateful I am for the undistinguishable impressions you left in me. You marked my thoughts, and it are your imprints that define the good this work presents. The rest is on me.

Being grateful, most of all I am the son of two wonderful parents whose support did not spring from any education but from the purest of love for a child.

To Denise, being the one of four in my family not striving to become a scholar, I pay respect for achieving the highest possible degree in the management & control of us all. Further details and revelations in this regard remain undisclosed. To my daughter Daphne and son Sander, nymphs standing by my side, thanks for bearing with me, Pappa finally closed the laptop and is out again.

*Dad, you great craftsman of iron,
Who was bound to bend with your bare hands and gentle mind all for the better,
You with your utter love for the simplest expressions of nature,
Your just criticism of all unjustness in this world,
You, who thought to have given me not enough for my journey through life,
You gave me all.
Wish you were here.
This is for you.*

Dedicated to my father,
Felix Eussen 1935-2000



Abstract

This study started out from my conviction education of youth is the route towards sustainable development. Researching the discourse, practice and added value of adjoining fields by way of direct observations and extensive exchanges between 2004 and 2007, a supportive cooperation of people came about, crosscutting societal domains. An alliance of knowledge and experience which in retrospect was the beginning of a truly multi-disciplinary partnership for ESD. From the beginning it consisted of people from schools, industry, science and governmental institutions as well as organizations in youth care, sports, the arts, and many more with direct added value for youth. Parallel to the publication of a wide array of science- and practice-informed issues in a jointly published magazine, meetings with an inter- and transdisciplinary character evolved into large-scale regional events, manifestations of all possible aspects of youth development for the wider public. It was a period during which Education for Sustainable Development (ESD) was lived as a positive, a bundle of opportunities and possible directions.

Although already in those years the pressure on formal education to change dramatically was increasing, the alliance chose to respect schools, have them hold their ground as probably best place for the transformation envisioned - schools seen as agora, as nexus of learning in the social-demographic area in which youngsters root their development, their 'Open Educational Area/region', 'OPEDUCA'.

Starting out from an original design, the gathering of practitioners' and experts' insights and experiences evolved to an encompassing vision and instrumentarium for ESD, put to the test in daily practice from early on. Having caught the attention of (inter-)governmental programs by 2007, the informal and largely unstructured alliance only then entered the more formal realm of ESD, getting acquainted with scholars, policy-developers and numerous initiatives on the national and global level. A process resulting in the merger of the OPEDUCA-project with the 'Regional Centre of Expertise on Education for Sustainable Development' (RCE) Rhine-Meuse in 2008, a United Nations University's contribution to the Decade of Education for Sustainable Development 2005-2014. As there was apparently no framework to study ESD,

nor an approach to realize its transformative promise, we proceeded along the pathway of the OPEDUCA-project, now accompanied by experts and researchers in an expanding international and academic setting.

Having become the multi-disciplinary (regional) cooperation envisioned in the world of ESD, the OPEDUCA-project provided such insight into the complex of societal actors and factors a framework for ESD emerged. One constituted of various domains (schooling, industry, environmental education, manifestations in broader society), each with its own characteristics, priorities, plans and attitudes. I positioned ESD in the middle of these as a converging energy, a guide and a goal, starting a parallel study of each. Therewith treading in a turmoil of ideas, claims, superficial notions of innovation and education, finding a cacophony that manifests itself as a layer of fog between the fields of practice and policy development. One heavily dominated by those who see schools and youth as means to serve a diversity of interests, consequently incurring waves of change that flood the shores of formal education yet leave no imprint. As I observed how programs on the regional, national and international level struggled to promote and press ESD in(to) that system, I proposed to regard ESD as the essence, placed it at the basis of education from a notion of future defining learning. Thereto I took a distance from prevailing ideas and claims, from those reasoning ESD to be utterly complex, diverse, situational and complicated to achieve. Such claims seemed to result from general exclamations in the sustainability discourse, stressing the entire world had grown immensely complex, the future unpredictable and society subject to continuous change. I also saw no reason to bow for unworkable and time-consuming ideas such as 'People, Planet, Profit' and other anthropocentric approaches that merely lead to an endless mingling of minds in unbalanced debates situated across the globe. Conditions and processes I started to criticize evermore, seeking to stir minds and invoke change, to end masquerades that hide a lack of progress. Attainments of ages appeared to be refurbished under the banner of ESD, as if working questionable '21st Century Skills' into 'ESD-competences' or the repeated notion of 'system dynamics' contribute to progress. I proposed and found support for the idea we might be living in more certain times, less complex than lauded, but have become a society of divides, made education an empty shell, forgot about youth as the future itself and were waiting in vain for the transformative promise of ESD to arise. Certainly if scholars and policy-

developers seek to bend yet not mend the system, think in terms of structures and systems instead of learning and development.

Reasoning with literally hundreds of teachers, school leaders, craftsmen and executives from industry and every other field of value, I argued to entangle overly complex notions of ESD and education in general, bridge or break down artificial divides induced by the system and eventually bypass institutions that maintain and feed on them. As a way forward I proposed transdisciplinary learning pathways throughout and beyond the educational system, allowing youth to learn anytime, anywhere, with anybody and through any device about those themes that define their and our joint more sustainable future. The students' learning process continuously connected with the real in the region and beyond to obtain meaning and involve best possible sources of knowledge and experience.

As the large variety of people involved and approached appeared to hold common ideas about future relevant learning, the boundary-crossing approach pointed to a joint notion and sense of togetherness and direction. Depicting sustainable development as a positive, realistic vista provided a sense of overarching purpose, the reconceptualization of ESD a defining argument for participation. Reasoning from the '*Dimensions of Sustainable Development*', themes to study were deduced from an embedded view on development with Earth as encompassing dimension, embracing Wellbeing and then Welfare. A logical approach for most as it provides for an ecological and social development perspective.

For practical effectuation, a coherent instrumentarium was developed on the fly. Expanding on the concept of OPEDUCA(-regions), the student's ongoing thematic learning pathways crystallized as mind maps, branches and elements 'feeding' from the development potential of the social-demographic region, then going beyond one's habitat through learning exchanges with peers across the globe. Granting students a '*Flight for Knowledge*' that taps into sources of information and real-life experiences, inviting them to observe, consider, (re-)think and create for themselves. Knowledge arising from a thorough understanding of the world as it is, came about and can become. A learning seen from the beginning as student-centred (who else?), lifelong (can we stop?), problem-based (can we learn without meaning and relevance?), built from inquiry (don't we question all and ourselves all the time?) and nested in the real (where else does life unfold?). A community-based learning in

which connections with the world of work are obvious, understanding industry as another manifestation of society, of all of us, and not per definition strange to sound development. Acknowledging companies as potential sources of education since it is there where we gather to manufacture goods and services, where our (un-)sustainable consumption informs production and the (ab)use of natural and social resources. Meaningful insights were found to awaken students' often dormant entrepreneurial potential through '*BusinessClass*', supporting them to see and create what is not yet there, turn thinking into action, be the entrepreneur of a sustainable future.

Since the OPEDUCA-concept as of 2008 also spread across the world of ESD and was introduced and assessed in various countries, the continuously expanding multi-disciplinary network functioned as a Delphi-like research while the application of the OPEDUCA-concept was underway. Overviewing the broad academic spectrum, attainments and propositions, I eventually formulated research questions regarding the actors and factors most relevant for the envisioned new reality of ESD-based Education. Seeking to understand to what degree the educational landscape is patched, companies can be involved, curricula support or obstruct, teachers are positioned and capable, students can understand what is proposed. All required to eventually sketch, understand and validate how a holistic approach for ESD can materialize in an applicable pedagogy and funded didactics. Research questions I obviously addressed far from academic solitude, choosing the fields of practice as office and the voices and deeds of those ploughing the fields of the future as research base. Therewith working in a participatory way, empirical to the bone, intertwining concept-development, application and further instrumentalization. A direct people-based approach proved to be an advantage over a sole academic (re-)search as it was beneficial byways of immediate and continuous access to daily reality. Literally developing at the inside of schools, industry and other organisations allowed for a multitude of diverse observations and exchanges that led to deeper involvement and contributed to the validity and volarisation of both concept and study.

Applied and further developed in the daily practice of 52 schools in primary and secondary education, having 'boots on the ground', the OPEDUCA-concept was

found to install a learning process acceptable and wished for in present day education. Although it differs from contemporary ESD in grounding principles, provides for a practical orientation, multi-disciplinary reality and applicable pedagogy, we found the resulting education also realises what the community of researchers and policy-developers in ESD has been searching for. The availability of an executable vision that re-conceptualised and positioned ESD as transformative force appeared key, as was placing useful application before the claims of the prevailing ESD-discourse. An adequate deconstruction of superfluous layers of policymaking, research, consult and ‘visionary’ innovations was found essential to generate necessary manoeuvring space for schools, re-allocate scarce capacities and bring peace of mind to teachers and students. The re-conceptualisation of ESD also giving way to the application of a substantial body of science which has been available for decades, now applied in a transdisciplinary way by practitioners without further ado.

While students effectively combined inquiry-, problem- and community-based learning, ESD-based Education was found to meet their associative disposition and natural inclination to learn integrative, critical and constructive. The instruments '*Flight for Knowledge*', '*BusinessClass*' and '*Global*' provided structured means for observation, contemplation, interpretation and storage of their learning process. Sustainability issues were constantly present without explicit guidance, the spectrum exceeding contemporary interpretations of ESD as issues became related to matters at hand, students addressing sustainability out of own account. Individual and collaborative learning could be merged, effecting personal activation and socialisation. Work ethic, posture as well as willingness to learn improved according to the students as well as their teachers. Across the board 25% were found to swiftly engage with the instruments from a near natural comprehension while a further 50% grew in the concept following the collaborative quality of the student-oriented pedagogy. About 15% of students most profoundly challenged by traditional education especially benefitted from the instrumentarium where it sees to empowerment, entrepreneurship and social endeavours. For 10% (specifically in pre-vocational secondary) the instruments did not proof sufficiently more attractive than traditional (classroom based) education. In balance, the mix of instruments

served both the more talented and more challenged in the entire age-range of 10-18. Finding no reason to differ between primary and secondary education, we observed students to progress up to two years ahead of schedule, passing year-grades.

Every instrument supported the development of students' metacognitive ability as lines of reasoning could be made visible, the process re-visualised to retrace thinking and reasoning. The concurrency of a '*pupil-student-apprentice continuity*' proved to be an asset as it made students aware they were respected from these perspectives simultaneously. Acknowledging they were no longer mere subject(s) to schooling but students working on their development, generated attention, involvement and perseverance. The combination of theme-based learning, real-life meaningful encounters and learning with peers and educators gave way to the application of unexplored capacities, literally allowing students to discover their development.

Working with over 300 teachers in daily practice, opening a coherent pedagogical concept for their insights and critics was essential for acceptance of the vision, concept and instrumentation. At the same time, due to a relatively narrow and shallow experience in outer school life and a concerningly flat curve of personal development, most teachers were challenged to deliver on the capacities required to effectuate ESD-based Education. Teachers' confinement to schoolish life and limited working experience beyond that underly poor narrative qualities, a capacity required to convincingly position future defining themes and re-fuel students' learning by applicable practice. Since ESD-based Education is transdisciplinary in essence, it merges school subjects and real-life phenomena, reevaluates disciplines and requires excellence in content. Furthermore, the OPEDUCA-concept merges learning philosophies towards a '*learning continuum for ESD*' and requires diversified ways of teaching. It was the disciplinary silo-structure as well as a 'lack of associative capacity' which prevented teachers to progress despite their willingness. A weakness underlying a full and true departure from any fear of risking curriculum compliance, even though ESD-based Education covers the entire curriculum multiple times. The role, position and professionalism of teachers proved more prominent than one might presume given the student-centred approach of the OPEDUCA-concept. As classroom-based instruction cannot merely be exchanged by coaching, any idea

of obsoleteness of the teacher should make way for an upgrade of the profession. Since teaching becomes more demanding in terms of the development of a worldly view, transdisciplinary understanding and application of '*constructive instruction*', many present-day teachers are profoundly challenged by ESD-based Education. The concept requires another disposition, a different position in a new school-setting, a professional handling of contemporary blockades and cooperation with colleagues as well as external educators in unfamiliar ways. Teachers with their overall gentle nature, weak organisational positioning and demanding day to day operations, were found trapped in a vicious circle since the present-day constellation of schooling at the same time demands and restricts their professional development. Teachers were found to have become executors of education caught in the restrictions of the institute school.

Moreover, since initial and further teacher education appear deprived of ESD, an intensive teacher education program (*OPEDUCA MasterClass*) had to be developed as an additional instrument which grew into a professionalisation course. During 21 intensive 4-day MasterClasses with in total 324 participants, we found that for only 25% the pedagogy and didactics proposed followed their natural composure. A middle group of grossly 40-50% depended for an effective application on these colleagues' lead and school leaders' consistent support, while 15-20% remained wavering back and forth. 10-15% of the teachers embodied a silent force reluctant to change, an inertia forming a stronghold in the school's governance and a limitation to its transition capacity. This small fraction we saw able to effectuate decisive negative influence once the school leader lacked steadiness and resolve.

Understanding ESD as the essence of education and at the service of improvements sought for, instead of claiming own ground, proved effective for the involvement of school leaders and teachers while it generated tension with an establishment trying to influence if not command education from the outside. The patched landscape of education proved a more serious challenge than assumed as we found schools not to merely function but suffer under layers of policy priorities and commercial interventions, harassed by a cacophony of ever more prioritized tasks and modernisations, flooded by waves of change. Schools were found to resemble richly ornamented Christmas trees standing upside down, both school leaders and

teachers burdened with what I refer to as '*assembled educations*', such promoting and pushing the correction of schools' deficits in the fields of STEM, ICT and alike. Educations surfacing in standalone projects and programs, not integrated nor integral and honest to their course. Further apparent innovations and the placement of believed solutions for a range of social phenomena in schools, eventually make a traditional machinery snap under pressure. Cracks then unleash further changes like an eruption, an inert systems' inflexible reaction, quite contrary to deliberate action resulting from a well-wrought vision and strategy. We found schools captured in the world of education, bouncing against self-made walls behind which a world of opportunities and resolve awaits.

Seeing education as the facilitation of learning, school as the organisation of education and the educational system as the institutionalisation of schooling, proved instrumental to entangle discussion and debate, dampen the cacophony of innovations, views, initiatives and priorities. We stayed away from these as we did from contemporary ideas in ESD with ostensible qualities, such as the manifestation of ESD-competences and a Whole School Approach. Consequently, the contours of a future-relevant school took shape as a nexus of learning, a both physical and virtual place enabling education.

The ongoing societally connected learning pathways in an OPEDUCA proved functional to break down the wall as the students' learning and teachers' regained development bridged the gap between schooling and life. Structural participation of the world of work and more specific industry, with its variety of fields of knowledge, we found a requirement for ESD-based Education since it provides for a multitude of meaningful learning processes and relevant competence development. Moreover, real-world expertise and access to sources of knowledge-application and -development hold the potential to free schools from their inertia and womb-quality, support them on their way to becoming a nexus of learning.

ESD-based Education goes beyond a companies' HRM interest and is understood as a meaningful application of its CSR, connecting students' learning to the core of value chains. Respecting and involving industry as another manifestation of our societal construct then contributes to the rise of entrepreneurs able to engage in both

consumers' and industries' transformation towards sustainable consumption and production. Direct involvement of people active in the added-value chain of companies effectuated the educational partnership sought for and enhanced schools' teaching capacity with educators. Especially where it comes to the development of the person and students' generation of entrepreneurial qualities, it became clear only entrepreneurs themselves can teach such. The participation of industry, for too long hardly acknowledged by ESD-research, provides for a healthy balance and understanding of values, also beyond the students' access to excellent sources of information and applied competences. Industry as partner in ESD-based Education opens ways to better understand and eventually effectively address Earth-devouring value chains.

As the multi-disciplinary partnership was genuine and rested on a shared vision it had a transition quality intrinsic to the concept, involving the broadness of society through the accumulation of authentic competences and representative mass. Finding that a large variety of people from different professions embraced the same concept proved supportive of the notion we created un-human divides in society. People discovering unity and togetherness outside their role in the system and across human-made boundaries and borders, indicates we split ourselves through artificial contradictions that generate conflicting interests, feed polarisation and open spaces for imperfect solutions. All these presently touch on education in ways most unsustainable yet can be overcome.

The OPEDUCA-project and -concept were accepted as a conducive framework and promising approach to realise transformative learning while not losing out on the transmissive. It became clear that not contemporary schooling as such, nor the curriculum or the often-mentioned complexity of sustainable development hinders ESD. The main challenge proved to be a profound professionalisation of school leaders and teachers to effectuate and manage the transformative pedagogy proposed and resist the potpourri of interferences with education. Science and policy development are required and challenged to engage in a supportive and less directive way. The world of ESD-research must open itself to other disciplines and the reality of practice, let go of any too self-congratulatory, secluded and inside oriented

attitude and operations. Too many efforts in ESD and especially those proclaimed loudest, are found to lack vision, a cohesive strategy and applicable pedagogy, failing practice.

There should be critical awareness of limited and potentially negative effects of over-accentuating ‘ESD-competences’, ‘Social Learning’ and a ‘Whole School Approach’. Especially a ‘Whole School- or Whole Institution Approach’ appears not an approach for ESD but a typical institutional response of a system not conscious of itself, having fallen to pieces and trying to glue itself back in place. Pressing such a pretentious idea on present-day schools as a concept for improvement comes down to overplaying a too vague, overly complex and therefore costly concept, risking circumvention of the essential focus on learning and therewith standing opposite to ESD. A school should not merely consider but face society and seek the integration of its education, not become encapsulated in ever more formally structured relations and processes with the capacity to grow into new parts of a system justly criticized. We came to the insight a ‘Whole School Approach’ is at its best a result but not a condition or prerequisite for the realisation of ESD. One can only trust teachers will choose students over structures.

The OPEDUCA-concept meets the transformative promise of ESD, matches present policy requirements, invokes improvements of formal education and contributes to the notion of a learning continuum that touches on the essence of sustainable development. The re-conceptualisation of ESD and corresponding instrumentation leads to curriculum-independence of ESD-based Education and makes it stand clear from influences and alterations by political, religious, commercial and other motivations. Put otherwise, the OPEDUCA-concept realises a more objective, science- and experience-based ‘living’ curriculum and answers to the decades-long search of researchers and policy-developers for an integrated vision, applicable strategy and workable practice.

Key recommendations regard the strategic importance of an encompassing vision, the acknowledgement of a learning-continuum underpinning an ESD-pedagogy, the liberation of schools from the system, a more direct involvement of the world of work in education, a strategic upgrade of initial teacher training, the need for a

democratisation of ESD-research and the introduction of governmental policies to restrict the cacophony around schools while supporting the construction of a local-to-global learning space for sustainable development.

Schools criticized and scrutinised per definition, require public, if not otherwise private, protection against a multitude of double-faced and hypocrite initiatives dominating what has become an educational marketplace. ESD-research and policy-development can play a critical role in this regard if able to take a distance from any sanctimonious attitude itself.

The entirety of this study offers comprehensive practice- and science informed insights ESD-based Education enhances students' learning process while providing outlines for an ESD-based School. From a societal perspective, the OPEDUCA-concept realises a multi-disciplinary partnership in the social-demographic region with the potential to underpin a local-to-global learning space for sustainable development. Therewith it contributes to a deep, complex and integrative knowledge generation that contributes to solving problems humanity faces. In all, it is as strategic as it is human to consistently comply to the conviction youth no longer has a future.

They Are.



1. Introduction

This study reflects the origins, proceedings and results of a multi-year participatory approach in the field of Education for Sustainable Development (ESD) and adjoining sciences. Conceptualising ESD as a most promising avenue towards sustainable development, the study seeks to contribute to science and practice by ways of a vision on ESD and the development of ESD-based Education to fulfil its transformative promise.

As the concept sees to the establishment of ‘OPen EDUCational Areas’, regions in which youth can develop towards its full potential, it was named the OPEDUCA-concept; the multi-disciplinary cooperation for ESD unfolding throughout such a region pointed out as the OPEDUCA-project.

In this first Chapter I will briefly introduce the background of the OPEDUCA-project and the headlines of the OPEDUCA-concept to provide context (1.1), detail the academic perspective (1.2) and present the structure of this study (1.3).

1.1 Context

My proposal to regard youth as the main actor and factor in the light of sustainable development dates to the community-generated quarterly magazine ‘KidsLive!’ I published between 2004 and 2007 (84 p., 8 issues in 160.000 copies each). It aimed to collect and communicate a broad variety of aspects determining youngsters’ development. In parallel a series of meetings and larger scale events (up to 7.000 participants) was organised to give an array of disciplines and initiatives in the field a stage. Both magazine and events generated a public-private connection that bridged the worlds of education, industry, science and government. The KidsLive!-phase set the stage for the OPEDUCA-project and had the OPEDUCA-concept gradually emerge. By 2008 the OPEDUCA-project developed into a multidisciplinary cooperation including over 400 experts, practitioners, researchers and policy-developers. The notion that a new paradigm for ESD might be evolving originally stood apart from

but coincided with UNESCO's 'Decade of Education for Sustainable Development 2005-2014 (UNESCO, 2004), following which United Nations University initiated the development of 'Regional Centres of Expertise on Education for Sustainable Development', RCE's (Fadeeva & Mochizuki, 2007). The RCE Rhine-Meuse, positioned in the South-East of the Netherlands where the OPEDUCA-project was underway, became the first in Europe and one of the first six worldwide. It adopted OPEDUCA as of 2008 as its core activity, following which the OPEDUCA-concept became broadly shared with the world of ESD-research- and policy-development while it continued to unfold in the diversity of practice.

The OPEDUCA-concept held the grounded idea to base education on sustainable development and consider ESD as an ongoing thread throughout and beyond the formal system, entangled in real life. As I found little use to add to the growing critics and pressure on formal education, I took a pro-active stand, looking at the possibility to propel sustainable development by positioning ESD as the concept for education itself. Since the OPEDUCA-project was not a public nor academic program but a pure alliance of experts and practitioners, it allowed for profound freedom of thought and speech in a most liberal, critical and boundary-crossing way. As thinking and action went hand in hand, the OPEDUCA-project became the multidisciplinary cooperation for sustainable development it proposed, the OPEDUCA-concept tangible, applicable and educational from the start. Therewith this study also recounts how research meets reality and policy-development relates to practice.

The OPEDUCA-concept as initially proposed can be best introduced by ways of a few sketches, each time drawn anew on a blank sheet of paper at the start of every exchange over the years (fig. 1.1). Regarding youth literally as the future itself, a youngster is positioned as a continuous learner, walking a future-oriented pathway of educational opportunities, influenced throughout by the public and private realm. The learning process an ongoing thread throughout the system, a bundle of future defining themes continuously studied, a critical pathway towards a more sustainable development.

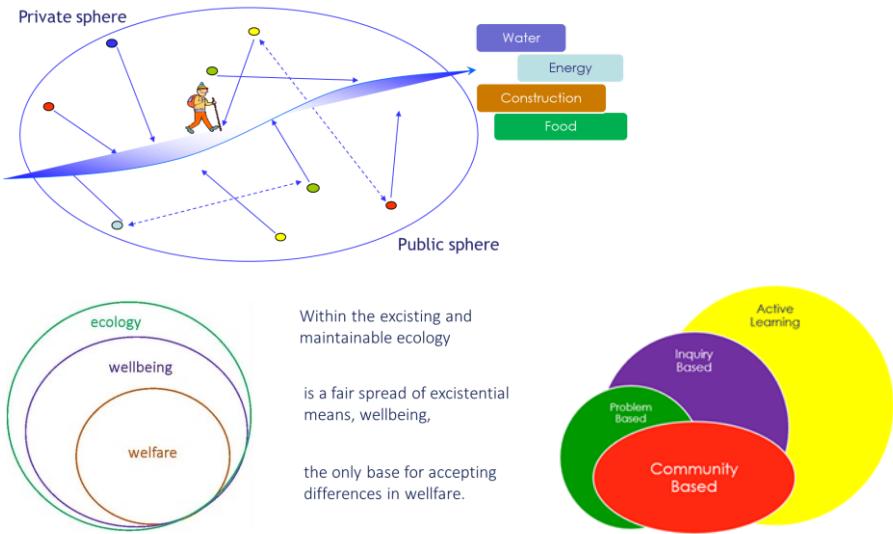


Fig 1.1
Base-drawings of the OPEDUCA-concept

The themes reasoned to result from the ‘Dimensions of Sustainable Development’, a nested concept considering Earth first, then Wellbeing followed by Welfare. The ongoing thematic learning envisioned by ways of ‘Fields of Knowledge’, a mindmap-like idea (fig. 1.2) for collecting information during the learning process, evolving along the learning pathway and becoming ever more entangled and interactive with real life phenomena. The learning proposed to build on students’ active involvement, being inquiry-, problem- as well as community-based, enabling youngsters to learn anytime, anywhere, with anybody and through any device. ‘School’ seen as a community of educators and students positioned as nexus in the learner’s OPEDUCA i.e., ‘social habitat’.

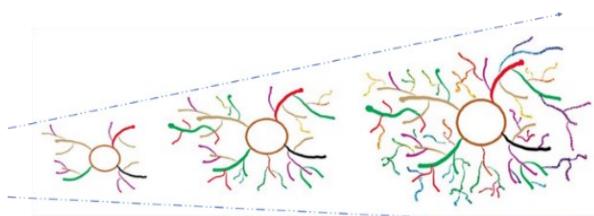


Figure 1.2
Basic idea of Fields of Knowledge projected to grow from basic understandings of a theme towards more diverse, detailed and complex structures.

1.2 Academic Perspective

Through the academic lens, OPEDUCA was a hypothesis proposed to the various fields it addressed. Applying a contextual and collaborative approach with considerable breadth and depth, a design-based participatory and interdisciplinary action research evolved. As the conceptual elements reached practice, I took a less dependent position to further profile developments, gain more understanding of the process and observe the working of the concept and instrumentarium in-depth. Before detailing the academic perspective, I describe the try for a framework to position and study ESD.

1.2.1 A Framework to Study ESD

The research was positioned in the still emerging field of ESD and ongoing scholarly discussions regarding education. Although ESD-research of considerable breath and capacity was underway for years when this study originated, the essence, meaning and added value of ESD was still subject to debate. Consequently, its design and application wavered while the effectuation of its transformative potential remained outstanding. The work thus far appeared to focus on its definition and the description of characteristics, still far from the conceptualisation of an applicable vision on learning or pedagogy. Extensive discussions with the research-community about the state of the art in ESD gave way to the image of a vast landscape, within it a broad stream with little depth whose currents risked turning awry as it sought its way. In a try for a framework I proposed to look from the outside in and first picture the various realms for which ESD might eventually be functional. Thereto we started to present and consequently bring to debate 4 spheres, as visualised in figure 1.4, each with its own characteristics, focus, priorities, stakeholders, structures and systems.



Fig. 1.3

A framework for ESD emerging during the OPEDUCA-project, depicting the fields of research.

Taking inventory of the various spheres, each appeared a world of its own, or better a constitution of various fractions with their own interests, influence, lines of thought and activities:

- Formal education, set to deliver education through everyday practice despite imperfections and challenges (grey block),
- while trying to meet societies' call for progress in learning- and knowledge development (red block).
- Overarching societal demands voiced by an array of stakeholders and interest-groups, not seldom commanded by issues of the day, ill pronounced yet exercising distinct influence (blue block).
- The advocates and agencies of ESD, comprising a variety of approaches, notions and beliefs (green block).

Taking ESD's presumed transformative capacity to heart and having a preliminary design in mind, I proposed the whole as an emerging framework for ESD. Arguing the various spheres could be folded into a coherent whole, involving actors and factors in adjoining fields, minds and hands joining in a forward pointing approach. Participating in each sphere continuously, moving back and forth while discovering

crosslinks and challenges, the outlines, working and dynamics of the framework took further shape, proposing ESD as an integrative quality, transformative in essence and per definition.

With an emphasis on collaborative experimental action, we consequently engaged in a process of continuous development, organisation and intermediate reflection, seeking to understand the world by trying to change it. A process advocating collective inquiry into the best of what is in order to imagine what could be, followed by collective design of a desired future state that is compelling and thus does not require the use of incentives, coercion or persuasion for planned change to occur (Bushe & Kassam, 2005). The OPEDUCA-concept can therewith be seen as an artefact envisioned, designed, then studied while applied, lifted from the cradle and brought to work outstanding the need for a decent education of itself.

1.2.2 Hypothesis, Propositions and Research-Questions

The OPEDUCA-concept consists of various propositions that lead back to a central hypothesis, originally formulated in 2007:

“ESD can be realised by means of student owned ongoing thematic learning processes on future defining themes throughout the entire formal educational system, connected with educational sources in the region to from there base a local-to-global learning space that affects the transformative potential of education for a more sustainable development”.

From the perspective of learning, education and schooling there are five key propositions:

1. Education for Sustainable Development should be regarded and practised as a systematic ongoing learning process based on future defining themes.
2. Students' education should be understood as a continuous tread throughout the entire formal system of primary up to and including higher education.
3. Education through schooling should and can include a continuous educational interchange with real world phenomena, especially with the natural environment and the world of work.

4. Essential learning theories and educations can merge, providing for a joint pedagogy and educational framework of such universal quality and applicability every school can build on it.
5. Schools should be nexus of an educational partnership in regional society in constant exchange with alike regions worldwide, forming a local-to-global boundary crossing learning sphere that defines and contributes to the effectuation of (education for) sustainable development.

These key propositions lead to three more regarding sciences adjoining education:

6. Industry and the world of work in general can be involved in schooling as partners in education.
7. Information and Communication Technology (ICT) is sufficiently well developed to enable a crowd-generated development of Open Educational Resources that contributes to schooling for all.
8. Societal challenges such as inequity, a loss of togetherness, the generational divide and youth-care can be better addressed when schools open their educational process to regional society.

Regarding the acceptance and applicability/valorisation of the concept I furthermore propose that:

9. The underlying vision and instruments are of such quality they give reason for actors in society to actively take part and contribute capacity by means of people, facilities and finances.
10. Schools in primary and secondary education are willing to contribute own resources by ways of management, teachers, school facilities and materials as well as financially.

These propositions give way to the main question:

“How can present day education through formal schooling be brought in transition and improved in order to base an ‘education permanente’ that enhances humanities’ potential to realise a sustainable future?”.

This leads to four questions formulated from out formal education:

- 1 Is the envisioned learning process acceptable and reason for application by formal education?
- 2 Can pupils and students comprehend and effectuate the instruments proposed?
- 3 Can teachers understand, accept and apply the teaching strategy and instruments proposed?
- 4 Can a professionalisation course enhance teachers' capacity for ESD-based Education?

and six from an overarching ESD-perspective:

- 5 What is required to realise a multi-disciplinary partnership for ESD and make it functional?
- 6 How can the role of industry in ESD be understood and conceptualized?
- 7 How can ESD-based Education improve learning and formal education?
- 8 What are requirements and blockades to effectuate ESD-based Education?
- 9 In how far is the concept in line with present-day science- and policy-development in ESD?
- 10 What main challenges need to be addressed to pave the way for ESD-based Education?

1.2.3 Methodology and Research-base

Imbedded in practice, the research was not limited to academic observations and can be seen as daily participatory and resourceful, organising what appeared needed but not in place yet. It had aspects of induction, deduction and emergence in alignment with the notion that a case study involves deeper, more comprehensive investigation of participants' understandings and experiences in a particular context which can be used to seek a holistic understanding of a phenomenon (Yin, 2015). Given the in depth involvement of both practitioners and scholars, the research was characterised by constant dialogue in an engaged and interactive way (Læssøe, Feinstein, & Blum, 2013), leading to a deep understanding of the issues researched.

Following history, the validity of the concept and instruments were addressed by:

- starting out from a preliminary design,
- seeking proof of concept by ways of the collection and merger of expertise knowledge in adjoining fields, taken together in the framework proposed,
- generating new practice to lay a base for fundamental knowledge,
- (re-)searching explanatory phenomena and mechanisms to oppose and prove propositions and findings.

As the study evolved it became clear that in the interest of a profound understanding of the prospects and validity of (a transition towards) ESD-based-Education, an all too rigorous academic approach would limit the opportunity of real time direct exchanges and observations - realism and validity had to prevail. Moreover, since practice begun to evolve spontaneously in course of the research, the empirical collection of data was not organised in strict academic format from the start and not restricted by it. Furthermore, we considered that available ESD-research was often conducted on a smaller and limited scale, restricting itself to certain elements of formal education, stand-alone projects and less extensive and complex configurations of instruments, participants and school systems. Consequently, I favoured the opportunity to remain most open for the full breadth, depth and realism of practice to better understand the feasibility of the concept and the proposed transition.

Notwithstanding these considerations and choices, evaluation reports were written, interviews documented, observations registered, opinions and outcomes recorded and reported, planning- and evaluation meetings held, surveys conducted, and critical opinions taken account of, also by the hand of second- and third-party observers. Obviously, the methodology included the collection of data by ways of interviews and inquiries with a variety of people in line with the concept and academic rigour, series of debates and discussions (bilateral as well in multi-disciplinary groups), a structured review of existing and contemporary research in the respective fields and critical assessments of practice generated throughout the research-period.

A complete record was kept in meticulous detail¹ and critically reflected on by ways of retrospective analyses.

Researchers from various universities regarding every field of science addressed have been directly involved to intermediately observe and assess the development of the concept, instruments and practice. Supplementary, a literature review of over 450 peer-reviewed papers was conducted to research for supporting evidence as well as conflicting findings.

Acknowledging formal education is still a key strand of youth's development, a methodological application of the instruments in daily educational practice formed a substantial part of the research base, comprising the direct participation of 52 schools, over 1.400 students and more than 320 teachers.

The working of the concept and instruments was observed in an array of practices, varying in education levels, time, place and regimes, with and without direct involvement, also independent from the designer. To secure pragmatic validity and transferability the application of the instruments has been studied in a diverse set of circumstances. Moreover, the main instruments to operationalise the concept were assessed and discussed in various social-demographic regions within the Netherlands and 14 other countries, allowing the gathering of opinions and evidence of the concepts' validity in a variety of contexts.

¹ Over 90% of all activities are kept by way of reports, meeting-minutes, feedback- and feedforward mails and a series of other (multi-)media. Dates, locations and participant-information were stored and kept in files, including all relevant contact data such as email addresses and phone numbers as well as over 42.000 complete email threads. Over 18.500 other files/records concerning the gradual concept-development, operational practice, underlying projects, etc. are archived, ap. 8% only on paper. The electronic files include over 340 hours of video and more than 9.500 pictures, covering the practice referred to. The registration allows for an 'audit- 'trail to date back to person, place and time when specific ideas and proposals were first shared.

OPEDUCA-project records 2007 - 2017

Meetings on record	4,432	excluding phone-calls, including Skype/ZOOM
Persons involved	1,221	exempt single (anonomous) presences in group meetings
Presentations at schools	62	> 20 attendees
Companies involved	78	> 50 employees
Universities	21	including cooperation in EU-funded projects and UNU-IAS RCE's
Scientists / Researchers in ESD	118	Included in total number of Persons involved
Cities / Municipalities involved	26	
Ministries involved	8	
Semi-Governmental organisations	31	Water-Authorities, Environmental Centres, etc.
Conference presentations	31	> 20 attendees (variation 24 - 230)
Countries	21	
Average fulltime staff project-office	4	excluding parttime staff in countries outside the Netherlands
Average seize of the Board	4	participation of 4 years and more

Table 1.1

Summary of the variety of sectors and number of people involved in the OPEDUCA-project. List of meetings recorded in reports, meetings minutes, feedback- and feedforward mails, video and other.

The methodological approach consisted of a reiterative set of activities, including:

- The formulation op the concept by folding the proposals in logical sequence into a narrative for the collection of expert- and practitioners' opinions, doing so meticulously in the same way and manner in over 1.400 bilateral meetings in the respective fields.
- First-hand practical application and assessment of the instrumentarium in regular educational practice.
- Mutual consult of findings with lead authorities in the fields of learning, education, schooling and ESD, including all respective (semi-) governmental institutions in the Netherlands and international governing and representative bodies (EU, OECD, UNECE, UNESCO).
- The constitution of the 'Leadership Forum Learning for the Future Netherlands', representing lead experts from science, members of Government and industry leaders.
- The formation and operationalisation of a 'School Leaders Network' of 70 school leaders from primary, secondary and further education.

- Intermediate arrest of proof of concept by ways of over 140 multimedia presentations to larger audiences in constructive debate, bringing findings thus far to the stand and test.
- Initiation and organisation of a series of multidisciplinary projects on the regional, national and international level, initiating cross-boundary cooperation to apply and assess the concept and instrumentarium.
- Participation in the academic discourse and community by presenting, lecturing and joined research.
- Participation in formal international efforts in ESD (UNESCO, UNECE Steering Committee, UNU RCE's).
- Organisation of the Global RCE Conference on ESD 2011 (bringing together over 180 leading experts in ESD during a 4-day setting) and various more on the European level between 2009 and 2016.
- Initiation and coordination of the EU-ERASMUS program 'The OPEDUCA Project Europe 2014-2016', involving nineteen schools and over 60 multidisciplinary partners and ESD-researchers from 8 European countries.
- Expanding relations in science and practice to over 17.000 people globally by ways of an extensive use of multi-media to support an ongoing Delphi-like joint construction of components and detailed configurations of the instruments.
- Constitution of a 'White Paper' in accessible wording in Dutch, English, German and Spanish, shared with over 160 experts in Education, Industry, Science and ESD to further collect critical opinions.
- Experimental application of the OPEDUCA-instruments without preparation in Madrid, Istanbul and Doha to assess their universal value and acceptance.

The above activities went accompanied in parallel by a series of exchanges, activities, keynotes and workshops regarding the improvement of education in adjoining fields (such as for the EU High-Level Panel on Entrepreneurship Education, the Oxford Forum on Global Education, WISE Foundation, UNESCO Ambassadors Meeting Paris).

1.2.4 Contribution to Knowledge

Not seeking proof to have changed the world of education and ESD already, I hope to contribute to practical and academic convictions it is changeable, aiming to

1. add in a relevant way to the development of a fundamental approach in ESD which enables schools to be(come) the nexus of development in regional society, empowered to unleash the transformative potential of education for sustainable development,

thereto seeking to add original vision, pedagogy and practical instrumentarium that support 7 improvements in education as such:

2. Effectuation of the understanding that youngsters' learning takes place in the larger realm of life.
3. Understanding how the burden of too heavy claims put upon schools can be lifted and resilience improved.
4. Undoing the disruptive fragmentation of education.
5. Bridging the divide between the worlds of schooling and work.
6. Enhancing the teaching profession to serve the use of scarce capacity and make it more attractive.
7. Integration of assembled educations to free capacity in favour of the students' learning process.
8. Improvement of the setting, support for and partnership with schools.

further contributing to:

9. The way a cooperation between schools and industry on education and knowledge development can be realised.
10. The development of a method to realize qualitative learner-generated content by ways of a new perspective on validated Open Educational (re-)Sources which covers the curriculum, expands and deepens the development of competences, lives up to the promise of personalized learning, decreases inequalities, contributes to a knowledge-society and has the potential to base a local-to-global learning space.

<u>Expert consultation</u>	<u>Organisation activities for the international ESD Community</u>
Leadership Forum Learning for the Future Netherlands	UNECE Expert Group on Teacher Competences for ESD
Dutch Education Council	UNESCO Ambassadors Meeting OPEDUCA (Paris)
NFTE Netherlands / Europe	RCE Global Conference 2011
EU High Level Panel on Entrepreneurship	European RCE Conferences 2010, 2012
Industry Network (24 + 500 employees)	OPEDUCA Presentations for general audience (Madrid, Bolzano, Istanbul, etc.)
European and Global RCE Meetings	OPEDUCA Lectures at Universities in Paris, Prague, Marrakesh, Istanbul, Doha
ESD researchers bilateral (ap. 60)	
Policy developers (Municipal, Provinces, Ministries; 35)	
School Leaders	
Political leaders	
OECD	Yearly OPEDUCA Spring Conferences (50-80 part).
United Nations University	Opening OPEDUCA Project by the Dutch Secretary of State
UNECE	OPEDUCA University Lectures (18)
UNESCO	Interactive presentations at schools (over 70)
<u>Participation in Interdepartmental Programs Netherlands</u>	<u>EU Funded Programs</u>
Leren voor Duurzame Ontwikkeling (2004-2007, 2008-2011)	'The OPEDUCA Project Europe' 2013-2016 (19 partners, 8 countries)
DuurzaamDOOR (2013-2016, 2017-2020) - EE/ESD	
Onderwijs Ondernemen (2009-2012) - Entrepreneurship	
<u>Independent research</u>	
Carl University Prague	CODES (Community Based ESD)
University of Southern Britanny	WRITER (Writing and verbal skill development)
Karl Franzens Universität Graz	ACEWILD (Environmental Education)
Siauliai Universitas	PERSPECTIVES (Entrepreneurship Education)
University of Applied Science Fontys	
University of Applied Science Arnhem-Nijmegen	
University of Applied Science Hogeschool Zuyd	
Grand Rapids State University	

Table 1.2

Abridged overview of national and international (formal) settings for research conducted.

1.3 Structure

The structure of this study follows its historic perspective and represents the methodological approach. Having introduced the context and background, Chapter 2 outlines initial considerations and viewpoints regarding sustainable development, formal education and ESD, setting the stage for the proposed re-conceptualization of ESD in Chapter 3. Its materialisation and instrumentalization from the perspective of formal education follows in Chapter 4 by ways of a description of the OPEDUCA-concept. Chapter 5 then presents a recount and critical analyses of its application in daily educational practice. Informed by research and practice, Chapter 6 reflects on determinants of ESD-based Education and compares my findings with contemporary research and policy-development in the field. In Chapter 7 I provide a systematic response to the research-questions, leading to a coherent set of recommendations for the future of ESD.

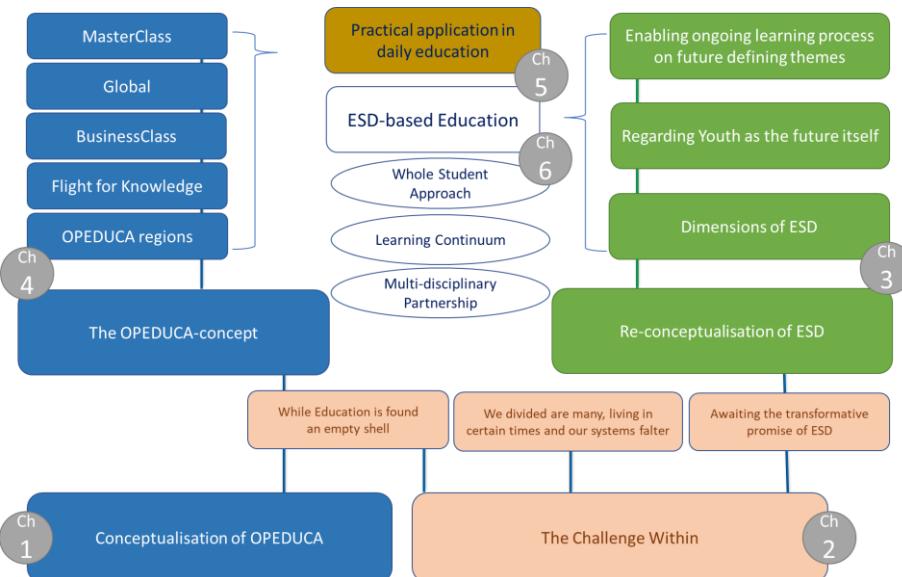


Fig. 1.4

A graphical presentation of the structure of this work, the numbers indicating the Chapters.



2. The Challenge Within

For an accurate understanding of the OPEDUCA-concept and the resulting reconceptualization of ESD, it is relevant to recount some preliminary thoughts and considerations shared when starting out with the OPEDUCA-project. This moreover since these are controversial when compared to the discourse in sustainable development. Recounting practice, the original, sometimes provocative, wording is used. Accordingly, the well-known narrative many scholarly publications in the field of ESD start out with is not staged since such referrals were not used as motive or argumentation to position the relevance of ESD. Pointing out mankind's efforts by summing up an ever longer and dated series of politics- and policy-induced programs, plans and agreements, does not reflect brave actions in challenging times but an institutionalised process kept upright to stay away from such most truly. Already in her 1988 Christmas speech, former Queen Beatrix of the Netherlands said: "*The earth slowly dies and the unthinkable, the end of life itself, becomes conceivable We people have become a threat for our planet*". This basic and most inconvenient truth is worded in endless variety in policy reports and literature which pulls our attention to uncontrolled population growth, excessive deforestation, destruction of habitats, extinction of species, increased greenhouse effects causing climate change, acid rain, erosion of stratospheric layers and the social-economic aspects of it all. Restating, reconfirming, re-acknowledging and so forth these claims and notions in an endless series of conferences and research papers adds no value.

While it was and still is common to refer to ESD in terms of togetherness, uncertainty and complexity, pointing to a re-alignment of existing systems, I argued we might be more divided than perceived (2.1), living in times more certain than believed (2.2), spoke about education as a magnificent work of humankind being treated unfairly (2.3) and expressed that ESD as convergence of our strive for a more sustainable development through education did not live up to its promise (2.4).

2.1 We Divided are Many

As the consequences of our nature-consuming nature through an unbridled expansion in numbers and consumption per capita surface ever more prominent, humankind seeks a way forward to address the unsustainable development of itself. In recent years we appear to swing into more determined action now that the damage done to earth and wellbeing progresses to our welfare. Now that burning forests take our homes and breath away and a more recent drama as Covid19 was only truly felt by many when beauty-parlours had to close and all-night parties abandoned for a while.

Observing 50 years since a most clear early warning (Meadows, Meadows, Randers, & Behrens, 1972), hope is brittle humanity comes to its senses easily. As time rolled by and our species developed around to globe and back, it might come around now that ecology gives us a corrective tap. But even in the face of existential challenges, precious welfare obviously rules wellbeing and overrules earth. Occurrences of pitch and moment (Brundtland, 1987) and recent eruptions such as 'Fridays for Future', appear a cri de coeur following failure. As we left Rome behind for Rio, travelled from Johannesburg over Paris to Madrid, we wrote wellbeing-for-all over our conference halls while we clung to welfare with all our might. Are we all one when it counts or merely focussed on the same for a brief while? (Menon & Rapur, 2018).

Things considered, what is lauded as "We" is still "I, Us and Them", a divide I regard the underlying cause for the inertia of a system folded into itself. Accepting a society defined by divides, still constituted of segregated nations, beliefs, societal sectors, colour, politics, of free time and such for work, of a time for schooling and a time for labour, of some rich and many poor, there is no "We" but numbers of "I", "Us" and "Them". And as divides occupy us strongly, live giving Earth became a "That". We split the person in positions and roles, created room for doubt, allowed uncertainty to feed a loss of action which led us to be led and told by others who are increasingly not whole themselves. Daily engulfed and occupied by tending to the wheel of scattered (e)motion, trying to keep the components of our systems running while mending its failures on the go, we cling to the illusion of system-induced welfare while we should have learned to become our whole well-being self again.

A most illustrative phenomenon is our preaching to the ‘People, Planet, Profit’-mantra, kneeling in front of a self-created divide. Believed to be an exploration of sustainable development, it became of use for further exploitation as we seek how to uphold what we have while avoiding the quest for what we can become. Since we are all inextricable parts of planet and the producers of profit, the mantra offers little more than people talking to people about what other people should do or refrain from. Planet I never met at the series of meetings and conferences I attended, pondering the harsh reality that one is indeed on the menu when not at the table.

I considered an undivided “We” as a collaborative of the many “I”, to manifest social cohesion and togetherness. For in the person what we first segregated following our institutional divides can merge again. Enhancing the ability of the individual, developing peace of mind, find balance therein and sense of direction, can bring trust and ownership to the “I” and create such “We”. That is why I regard the development of the individual the best change we have for enduring joint prosperity.

Developing the “I” is opposite to individualism and the idolatry of those we put on top of various ape-rocks, for such I see as self-deluding, promoting a false sense of perfection and happiness, ostentation projected through the lens of material welfare. Tokens of our system, such as wealth, power and fame that we install ourselves should not be confused with enduring contributions to society worthy following.

It should be realised that our creative and entrepreneurial qualities, our distinctive mark to imagine what can be and then create such, allows each of us and the next to point out a shared goal for the better of all, go on a mission based on a joint vision. Instead of balancing and treading in circles, we can see, project, plan, create a strategic pathway of informed sequential deeds. If we can step beside the treadmill for a moment, grant ourselves a gentle pause and be informed by ourselves, we might be able to most swiftly create a collective of the “I” and transform the divided “Ist” to a joint “Soll”.

As the many become one in their need for wellbeing and strive for welfare, our expanding, ever more interconnected and interrelated population amplifies the effects of what each of us does and forsakes to. Our mass presents sufficient potential energy to turn global society around for the better or worse. This might numb the lesser informed while those with deeper understanding are seen to flee to

time- and attention devouring considerations of complexity and unpredictability. As we consequently leave a worldwide phenomenon like climate change and the melting pot of our globally integrating mass on an ill-controlled stove with the clock ticking, Earth may take the role of cook once more and process humanity in its realm. While we hustle with recipes and new ingredients, trying to stay away from our barbaric genes to retake control of our numbers most dramatically, it might be time to turn the furnace off, for what we contemplate now loses the name of action soon. Although the issue appears to trickle down slowly in academics, also despite technological progress the absolute number of earths' human inhabitants is eventually and per definition limited. Global population expected to increase over the next 30 years towards 10 billion (Population, 2019), we are witnessing an evolution if not in retrospect a revolution from a mere number of 10 million that could live on hunting and gathering (Beek, 1992) towards a thousandfold largely depending on technology to remain upright. The Intergovernmental Panel on Climate Change (IPCC, 2007) marked population growth as a major driver of greenhouse gas emissions, forced by an increase of GDP per capita. Today there is hardly any doubt (Cafaro, 2012) population growth indeed is the cause of the relatively abrupt negative effects on earths' ecology, contributing highly to resource utilization and depletion, carbon emissions and thus climate change acceleration (Ehrlich & Holdren, 1971). Becoming too many needing and wanting too much, the world population must be stabilized and, ideally, gradually reduced within a framework that ensures social integrity (Ripple, Wolf, Newsome, Barnard, & Moomaw, 2019).

We are not simply challenged but forced to most urgently seek understanding of what it means to be alive on this world, what it takes to sustain as an interconnected mass with its back against the wall of Earths' carrying capacity. If technology does not bring us miracles such as boundless clean energy and a fully controlled re-use of resources and calories to nourish us, we are done with expanding this way soon.

2.2 Living in Certain Times

Despite the impression the previous may have left, I did not join the sheer endless recital of doom that points us to how ghastly our future is likely to become. Building our hopes on the young generation, the future can and should be presented as still open and inviting, not frighten them off with a plethora of qualifications that darken sustainable development. Many things may be uncertain but not all is unpredictable. During explorative talks it appeared the ESD-discourse takes solace in markers as complex, unpredictable and uncertain, used by some to hide a lack of resolve or urgency behind. Latest since the beginning of this millennium, the most heard challenge facing society is that challenges are facing society. That there are ever more developments which mark the way it works and the people working in it with uncertainty. The masses are made to believe that with the turn towards the 21st century nothing could be sure and thus counted on anymore, that all would change no matter how, no matter why.

As every decision is made in the face of uncertainty and matters relevant to a problem are entangled per definition, such can invoke a notion of complexity. Uncertainty induced by perceived complexity is not the sole domain of sustainable development and a continuous association of it with both qualifications may weaken our sense of action and resolve, even invoke fear and paralyse our thoughts. The uncertainty-notion then devalues the potential of ESD as it corners it in approaches away from daring and efficacy. Although on the other hand shapeability is far from mathematical certainty, we should at least refrain from having students associate sustainability with a continuum of not knowing. Such will leave us ill prepared and dumfounded by truth in cases we could have known how to address and change phenomena yet did not act.

Uncertainty and unpredictability are primarily assets of the individual, the smaller group or a specific set of phenomena, not necessary attributes of the whole. Where it is tricky if not impossible to predict an individuals' response and behaviour, that of the masses can be reasoned and foreseen with more conviction.

As to complexity, in my mind the world has always been as complex or as simple as human intellect and systems in place allowed it to be. To unravel the nature of our perceived uncertainty which feeds our sense of complexity and keeps us from action,

I argue to (re-)consider three aspects: we are rather inert, have forced an unnatural tempo upon ourselves and struggle with individual and collective identity.

As to our inertia, we should realise globalisation started already over 600 years ago, the UN was established 75 years back and the research leading to the Limits to Growth over 50. Although by then a defining part of (Western) population was bound and blinded by the illusion of growth in material welfare already, the consequences of our accumulated global massive behaviour were not faced. We largely remained as we were. Coming to our senses only most gradually, ever more tides must be turned - phenomena not complex and uncertain by their nature but massive because we allowed them to become so. I do not claim the whole is easy to unwind and turnaround, but chances are better if we face facts in time, keep ourselves well informed and not circumvent actions called for any longer.

As to tempo, much of what occurs before our eyes and in our minds now has a speed unnatural to their cause and is consequently deemed complex. Our pace of life became a rush as we pack our days with must-have and do's while new occurrences are pushed upon us by the beat of a second. While the peace of a school's chalkboard came to bleach in the hard light of ICT, youngster's' eyes glitter from their screens instead from play in the sun and home-office brought the upbringing of children close again, our minds perceive an overload. Moments of reflection and reason grow rare, and elements of nature more quickly tip beyond their tipping point. The tempo we laid upon ourselves inflicts stress and unrest, a false sense of complexity and therewith an unnecessary sensation of uncertainty.

Becoming each other's interdependent global neighbours, our homes shoulder to shoulder as our masses rise, obviously conflicts with the totem of independent self-governance, with individualism and personal development preached in parallel. Although closeness and dependency are native to our lives and should not be new to our minds, it is at least questionable if we allow true social closeness and interdependence back in our lives or try to stay on a pathway of individualisation partly driven by selfishness behind a screen of togetherness. In this I see no good or bad to begin with, but we cannot on the one hand laude ourselves with a strive for equality, equity, fairness, kindness, democracy and more values alike, while on the other have the "I" and a bit to the side prevail. Filling our sustainability discourse with

as then hollow phrases makes us unreal to ourselves and tears our fabric apart. Facing the moral does not.

We bang the drum of sustainability loud while not looking at the sticks of uncertainty and complexity we wield, not ponder the damage the frightening sound may do particularly to the young. Can we allow a self-inflicted sense of uncertainty and false complexity make us change fundamentals all too hastily, while it is about finally making decisions that have been outstanding too long? Is complexity not the stacked abundance of matters neglected for decades? As our Earth is not that uncertain and unpredictable from nature, fearing it reflects our lack of resolve, the argument we only recently came to understand such presumptuous. As a (much) younger man, I read an article in the Dutch popular science-magazine 'Kijk' (Koppeschaar, 1987) that explained in clear and gentle words the average temperature on earth was likely to increase by 1,5 and perhaps even 4,5 degrees Celsius, naming carbon dioxide and methane emissions as human-generated causes. Consequently, our Dutch majestic and back then recently finished defence against rising seas was likely to become inadequate someday, projecting severe consequences before 2100. The same I find myself explaining to university students 33 years later.

We may very well be living in certain times, having to face the question if we are able, ready and most of all willing to re-consider what we became, want to be and act correspondingly. As our greatest poet worded it in 1603 so eloquently, we should question ourselves whether 'tis nobler in the mind to suffer the slings and arrows of outrageous fortune, or to take arms against a sea of troubles and by opposing end them². Our capacity to change remains valid if our considerations and consequent actions rest on wisdom informed by realism, for otherwise we are about to exchange what we know and are capable of with true uncertainty and risk. Facing facts and a more correct and timely understanding of what we knew, did and have forsaken, I consider an essence of ESD.

² Expecting a reference here marks the message of this study most profoundly.

2.3 Made Education an Empty shell

In the years OPEDUCA emerged, the educational sector appeared subject to growing criticism (Dutch Education Council, 2007). We saw a popular two-sided phenomenon around formal education, one of guilt and reproach claiming more and better of schools while at the same dooming its doing and declaring it redundant. Although schools tend to be scrutinized per definition following their function, societal presence, visibility and personal involvement, critical opinions regarding technology education, ICT, soft skills and alike became widely shared. The claim schools kill creativity (Robinson, 2006) formed one of the landmarks for years of fashionable critics most of which circled around what was educated and the way it was delivered, declaring classroom-based instructions outdated. Observing the situation closer, claimants preaching change offered little solace by ways of vision or concrete solutions while creating opportunity for themselves to intervene by ways of consultancy. As murmur loudened and drums were banged by interest groups, the sounds resonated with politics and policy-developers who opened an array of funding-streams that in turn attracted more innovators if not gold-diggers to the field. The pressure put on practice seemed to shake its very foundations, creating cracks in walls that had held for so long, giving way to ill prepared if not careless innovations. As change became a goal, school leaders and teachers not holding their ground allowed the demonisation of schooling to become a self-fulfilling prophecy. Observing developments while standing amidst practice, I voiced explanatory thoughts how it might have come schools eventually called justifiable criticism upon themselves:

- Schools function under ‘layers of fog’ amidst a ‘cacophony of innovations’, undergoing ‘floods of change’.
- School leaders and teachers are deluded and misguided in the development of proper pedagogy and organisation, mis out on strategic improvements and consequently go short on themselves.

- Ostensible solutions are sought for by ways of priority- or ‘assembled’ educations, being the manifestation of societal pressure to organise and accentuate specific claims (such as STEM³).

Schools appear to function under a layered constellation of various strands of institutes and organisations, comprising elements put in place by public authorities as part of the educational system (curriculum authorities, inspectorates, etc.), initiatives arising from the field of practice itself (representative bodies, labour unions, shared services, etc.) and the education market (publishers, conference agencies, software suppliers, educational consultancy, NGO’s). A constellation that grew additionally crowded, cluttered and unclear as parties with ambiguous intentions manifested their influence by ways of countless programs and projects equipped with a variety of products, materials and services. Public authorities on the local, regional, state and national level as well as supra-national organisations such as the EU and UNESCO, even stimulated the whole by a spread of programs and funding mechanisms. Perhaps most worrying, the layered constellation appeared not seldom entangled and interrelated in terms of course, organisations and people involved. The whole manifesting itself as a persistent ‘layer of fog’ between higher level policy and the fields of practice.

As graphically expressed in figure 2.1, the layers weigh heavy on schools as they are supposed to deliver ever more and perform on a multitude of priorities spelled out for them. The pressure frustrating and preventing an otherwise more autonomous course of development.

³ Science, Technology, Engineering, Math

Higher Level Policy and Democracy

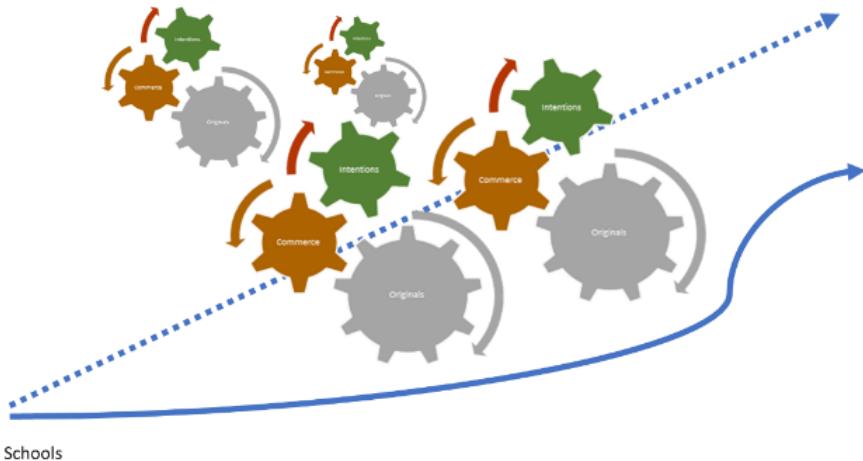


Fig 2.1

A machinery serving consultancy, eroding schools' capacity for improvement, warping a straightforward development.

Studying the constellation, it proved to be sturdy, costly and partly undemocratic since entangled power-structures started and dominated developments. The constant interference could be seen as a capacity eroding machinery at the cost of education as it:

- derives schools from means and funding meant for education, the layers functioning like a sponge,
- drains schools' capacity as younger talents and experienced teachers opt out and exchange the trenches for consultancy and other occupations, making a living on instead of in formal education,
- enforces the hire of costly capacity,
- obstructs a more natural, direct, exchange and bonding between schools and policy-levels, the layered fog causing politics and practice to lose sight of each other, leading to wavering developments on both ends,
- tends to have teachers accept a reverse notion of knowledge, installing the belief insight and knowledge is better beyond them,
- leads schools astray and away from own vision and strategy.

Parallel and symbiotic to the ‘layers of fog’ I observed a cacophony of (seemingly) innovations in the realm of learning (personal, place-based, discovery, social, deep), education (creative, 21st Century Skills, coaching, scrum) and schooling (abolishing classrooms, agile), experienced as a sprinkle of particles in the machinery (figure 2.2).

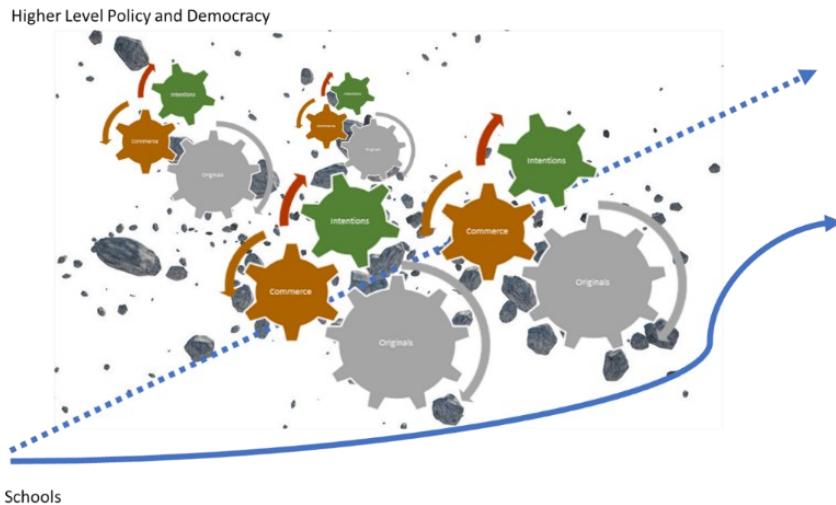


Fig. 2.2
Innovation particles as a spread around and generated by elements of the layers of fog.

Additionally, it was impossible to overlook the thousands of councillors, innovators and experts, ‘preachers of change’, swarming the field of education as a factor as such. Most selling ‘giving’ but coming for the taking, they represent a clearly commercial business-segment in education. Whereas the field of education often speaks with dismay and contempt of industry regarding its profit-orientation and salaries, it was remarkable to find daily rates in the education-business often vastly exceed those of upper strand consultancy- and accountancy firms in the private sector, the price-performance ratio entirely out of balance⁴.

⁴ As example to indicate the gravity of this aspect: a group of 30 schools in primary paid 4 times more for book-keeping than a 10 times larger multinational organisation with 9 business-units for its external accountant.

The 3-fold constellation had a capacity to stir the world of education so profoundly, it incurred ‘floods of change’, waves rolling towards the schools embodying massive amounts of energy and thrust, only to dwindle when making landfall - yet flooding the shorelines of daily education where scarce self-made improvements were consequently washed away.

In all, false sensations of innovation gave reason for contemplation. The stampede described was seen to delude school-leaders and teachers and undermine their faith in own skills and competences. When staging discussions on the matter I often used the analogy of a decorated Christmas tree, a vehicle where the ornaments, baubles and lights try to catch the eye and obscure the tree itself. Arguing education should be about the tree, the soil it stands in, its vast system of roots and the climate it thrives in - recommending less can be more when it comes to progress.

2.4 While awaiting the Transformative Promise of ESD

Humankind being a stubbornly hard learner, it might come to no surprise also UNESCO’s DESD 2005-2014 (UNESCO, 2004) and the consecutive GAP 2015-2019 (UNESCO, 2014) were largely disappointing as they left the purpose and power of education in a nimble middle. It indeed seems we should have regarded the science or fiction of ESD while the time was still there (Martens, 2006).

Even until recently, as UNESCO reported spring 2021, 45% of national education documents for primary and secondary education made little-to-no reference to environmental themes including sustainability, climate change and biodiversity. Less than half of those documents mentioned climate change and only 19% made reference to biodiversity, the depth of integrating ESD being little more than superficial (Benavot & McKenzie, 2021).

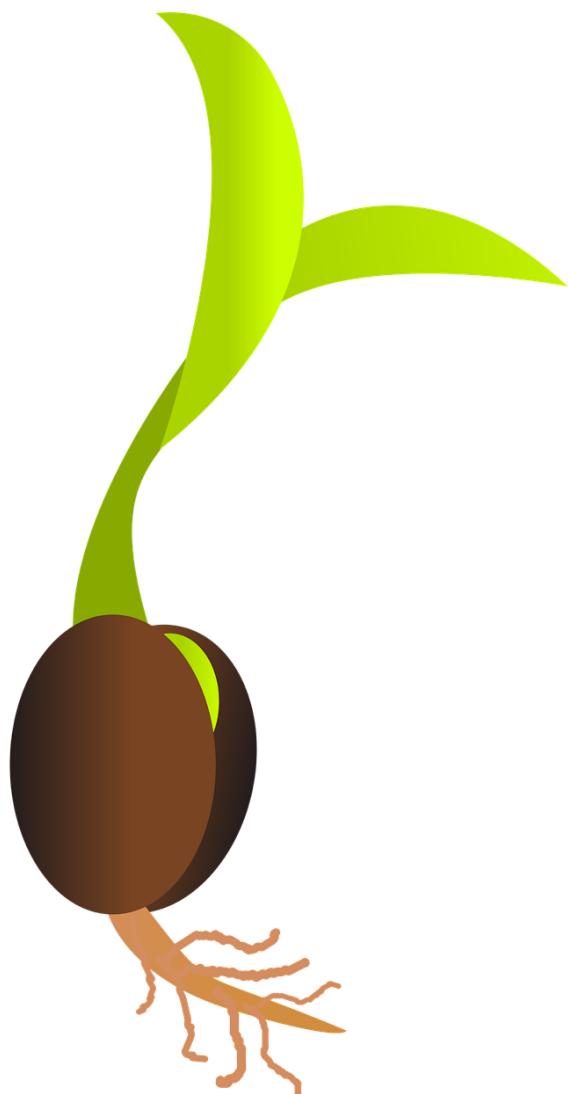
What initially surprised was to find that scholars and policy-developers alike had not come forth with a vision on the effectuation of ESD during UNESCO’s DESD since 2004. Therewith risking ESD would become another add-on to the curriculum or the next assembled education. Apparently research and consequently policy-development in ESD lacked original thought and substance thus far, despite the fact

initiatives of considerable pitch and moment had been initiated years before (UNESCO & UNEP, 1976). Consequently, a myriad of initiatives and playful activities dominated the playing field, ESD being poured out over the landscape of education and dropped off at the doorstep. Although policy-developers and researchers most actively involved regarded it just to have a thousand flower blossom this way, I voiced concerns such might end up in a field of weed, short-changing the meaning and potential of ESD.

Considering the above, it might be understandable schools tended to also regard ESD as a new and separate education coming towards them as a third-party initiative and not a seedling with the potential to grow into an oak amidst fields of weed. Explanatory factors that were visible early on became subject of this study:

- As early promotor came from the field of Environmental Education, it was likely the practice of temporary (seasonal) activities ‘out in the green’ would transfer into ESD. An environmental bias, noted by various researchers (Kilinc & Aydin, 2013; Læssøe et al., 2009; Summers & Childs, 2007).
- Although it was acknowledged for long ESD needed a prominent presence in Teacher Education- and training, such was not the case when we started our research. While esteemed scholars and UNESCO-Charis suggested ESD would (soon) be on the minds of all those associated with teacher education and morphed into initial teacher training, such was far from reality.
- Although researchers stated that a critical exchange enabling a variety of perspectives is essential for ESD (S. Gough & Scott, 2008), open access and debate appeared quite limited, critical opinions not welcome.

Observing over 140 schools in the Netherlands and beyond delivered not a single example of ESD being more than a label pointing to a school’s efforts which in each case stood apart from regular educational practice.



3. ESD Revisited and re-Conceptualized

The framework gradually composed to find the place, meaning and added value of ESD positions it as the transformative promise of education itself, its integrative quality a foundation instead of a goal. In this chapter I will present the headlines of this paradigm shift by introducing the ‘Dimensions of Sustainable Development’ (3.1), explicate the choice to prioritise youth (3.2) and recount my idea to regard ESD as an ongoing learning pathway like a thread throughout and beyond the formal educational system interlinked with society (3.3).

3.1 The Dimensions of Sustainable Development

Introducing the ‘Dimensions of Sustainable Development’ as basis for ESD I will briefly argue to have it replace the idea of ‘People, Planet, Profit’ (3.1.1) and then present the meaning of the dimensions Earth, Wellbeing and Welfare (3.1.2). The paragraph concludes with a brief explanatory example to indicate the implication of the Dimensions of Sustainable Development for learning and education (3.1.3).

3.1.1 Introducing the Dimensions of Sustainable Development – Replacing People, Planet, Profit

I proposed the ‘Dimensions of Sustainable Development’ in the course of the Dutch ‘Interdepartmental Program Education for Sustainable Development’ as a more orderly concept informing sequences to learn (J. Eussen, 2007a; Rikers, Hermans, & Eussen, 2010). The simple embedded model builds on the notion that within a sustainable ecology a fair spread of existential means, wellbeing, is the only base for accepting differences in welfare. It seeks to prioritize phenomena following their natural sequence and from there their causal relations and interdependencies.

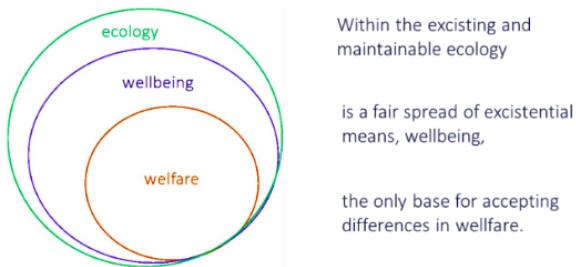


Fig. 3.1

The original graph used to present the 'The Dimensions of Sustainability' from 2007 on.

Our planet's life granting capacity ('Earth' further used as encompassing term) is respected as conditio sine qua non while welfare is positioned as a human-inherent strive for the accumulation of values beyond the realm of well-being. Worded otherwise, when a human activity preserves the Earth's natural capital and does not diminish the well-being of people living today or in the future, then it is sustainable (Remington-Doucette, Hiller Connell, Armstrong, & Musgrove, 2013). The Dimensions of Sustainable Development therewith present an initially not anthropocentric worldview, understanding anthropocentrism as an orientation on human-related values when defining policies related to the environment (Norton, 2005).

The Dimensions seem close to other holistic integrative sustainability approaches (Griggs et al., 2013; Tilbury & Wortman, 2004) that however mention both 'society' and 'economy' as embedded spheres. In my view economy should be respected as the manifestation and articulation of society's interpretation and transfer of values to secure wellbeing and generate welfare. Following, a more distinct delineation is required to obtain a foothold for naming and weighing values that underpin our decision making. Therefore the Dimensions-approach regards Wellbeing as such while acknowledging that also Welfare comprises not only tangible elements but (like the other two) imponderable values such as those in the realm of the Arts, a persons' sense of achievement and longer-term resilience.

Also later eponymous models that presented planetary boundaries and society in an embedded way, such as 'The Doughnut Economy' (Raworth, 2013, 2017), remained fundamentally anthropocentric and actor-based, reason within the limitations of present day structures and institutes and imply growth. The Dimensions of Sustainable Development invite to reason outside the present box and consider structures, institutes, organisations and behaviour no longer given but subject to transition.

The Dimensions of Sustainable Development allow for a more logical reasoning with the capacity to unclutter the discourse, offer initial direction and synthesize education into a coherent framework. Most important, they are proposed to replace the idea of 'People, Planet, Profit', the recital of which grew so common in the (E)SD-discourse it came close to a mantra, an idea no longer judged on its merits while used continuously. Noting that both 'people' and 'profit' regard ourselves, while 'planet' has no voice of its own and can only be represented again by ourselves, People, Planet, Profit leaves us with people talking to people about what other people should (not) do. A popular yet only seemingly pluralistic approach which furthermore presumes a balance of qualities of such different order that it is no more than a poor balancing act without a rope to stand on. The popularity of People, Planet, Profit can be understood from its simplicity but in my opinion also comes to use of those with little sense or need for urgency. Its ambiguity allows for an array of interpretations that result in a vagueness most welcome to an actor-based concept, allowing for participation while avoiding responsibility.

My main concern with the People, Planet, Profit-mantra regards the fact that it positions welfare as a pre-condition for wellbeing, growth as a legitimization for an irreversible use of ecology. Although it was brought to our attention already decades ago that an economy built on continuous expansion of material consumption is not sustainable (Meadows et al., 1972), such could be read in the ever cited Brundtland definition of ESD (Brundtland, 1987) and ever since. The dominantly anthropocentric idea stubbornly refuses Planet a place at the table, thus has it on the menu. Referring to its origin, the 'Triple-P bottom-line' conceived in industries' accounting sector, I see earth's ecological integrity as the real bottom-line and therewith not part of a negotiable balance (W. Scott, 2005).

3.1.2 The Meaning of the Dimensions Earth, Wellbeing and Welfare

Earth – from an Afterthought to understanding Where we Are

Presenting Earth as encompassing dimension builds on its regenerative life-granting capacity, respecting ecology as a perpetual source, not as a resource to balance our behaviour. In contrast to the neo-classical idea man-made capital can in principle replace it and other notions of ‘weak sustainability’ (Hartwick, 1978; Solow, 1974) human and natural capital are seen complementary, not interchangeable. A thinking partly in line with ‘Planetary Boundaries’ (Rockström et al., 2009), although I regard the calculus of earth’s carrying capacity less relevant. Human expansion will eventually lead to the use of not replenishable sources to such an extent it is more relevant to question if development seen as growth can ever be sustainable (Tijmes & Luijf, 1995). Taking distance from the idea our ecology is only valuable through the lens of human interest, the Dimensions represent a quite strict manifestation of non-anthropocentrism.

Each of us from youngest age on deserves a chance to understand Earth’s life-granting capacity as a universal value, one to internalise for reason of personal development and to relate to when considering Wellbeing and Welfare. This to sense, understand and form an opinion about for example ‘Ecological Modernisation’, postulating that technical and managerial approaches could solve the environmental crisis and lessen the need for radical changes (Baker, 2007), ponder if the challenge is not more about human life in harmony with the natural environment (Towell, 2016) or even adhere an ecocentric orientation and stand up for the environment independent of its value to humans (Kortenkamp & Moore, 2001; Thompson & Barton, 1994).

For the effectuation of ESD it is essential the learner is not derived from her own study and experiences, is allowed choice of value, position and action. Believing a human can care about something that is entirely beyond his use (McCauley, 2006), I chose deep over shallow ecology (Naess, 1973), seeking to have all contemplate in a profound way instead of accepting nature to be dominated by science, technology and capitalist production (C. Merchant, 1981). If not, we would derive the learner

from her own choice and pre-set a rather poor learning pathway, bypassing the essence of personal(ity) development. Moreover, it should not be taken for granted we have adequate understanding of Earth already, a substantial body of knowledge is still out there waiting for discovery. As we find ourselves to have learned too little from the little we know, new findings, insights, a better understanding and true advocacy are called for to begin with.

The Search for Wellbeing – Understanding What we Need (to be)

Whereas the survival of an animal depends on how well it adapts to the natural environment in which it lives, humans evolved to change and adapt it to provide for their fundamental needs. Doing so respectfully meets the essence of sustainable development, providing for the needs of humankind in an equitable way without doing violence to the natural systems of life on earth (Kemp & Martens, 2017). Having preluded on this informed idea when positioning Wellbeing as the inner dimension, the term still seeks to be understood. It is obviously most challenging, if doable at all, to define what wellbeing is to whom, when and under which circumstances. Let alone one can easily quantify the various qualifications and weigh them, finding persons and groups in endlessly definable modus vivendi. If we however reason from ‘mens sana in corpore sano’, there might be a certain harmony and consensus to start out from.

Contemplating this and looking through the lens of ESD, 3 components of Wellbeing can be discerned:

- Fundamental needs i.e., minimal living conditions.
- The ability to live a full life, including mental, social and cultural aspects.
- The interdependency of both with Earth.

Discussing the Dimensions of Sustainable Development with a variety of people from early on, they regardless of nationality, gender, age, culture, expertise, profession, belief, age group or any other thinkable divide between them, qualified alike aspects as most relevant when asked ‘what do you need?’. From the individual perspective it always concerned basic needs ‘water’, ‘food’ and ‘shelter’ (cross-referring each to ‘health’), then ‘not living alone’ (social aspects such as family, group, interaction),

followed by elements as ‘understanding’ and ‘expression’. ‘Happiness’ was largely conceived as the combination of multiple values. When contemplating ongoing thematic learning pathways, I found near perfect agreement youngsters should have fundamental and growing understanding of water, food, construction and energy. It was as insightful as it is logic to find mental, social and cultural aspects came down to exchanging the ‘I’ ('What do you need?') for the ‘We’ ('Are you alone needing, generating and using such?'), togetherness following out of joint achievement and use. From there we could register a series of silently remarked complementary values such as ‘company’, ‘fellow’, ‘partner’, ‘sharing stories’, ‘being together’.

Acknowledging there are those who adhere to (even) more subjective and less material manifestations of Wellbeing, it is essential for ESD to start out from a stricter formulation. Otherwise, this so essential inner Dimension will underly the more exact, objective elements of the outer and inner Dimensions Earth and Welfare, become subject to borderless and eventually fruitless debates that lead to ill-informed action or none. Not allowing Wellbeing a well-defined Dimension of its own leads to skipping essential values or leave them in the nimble middle where they dwindle. What divides Wellbeing from Welfare can be addressed by distinguishing between ‘in need of to be(come)’ and ‘desire’. Acknowledging Maslow’s classification regarding physiological needs that deal with survival and higher needs related to the use of our full potential, ‘Western’ civilisation tends to align self-actualization with Welfare (‘the more, the better’). Our understanding of Wellbeing ought not to be interwoven with Welfare (Marks, Simms, Thompson, & Abdallah, 2006) as it holds qualitative aspects such as autonomy, freedom, achievement and the development of deep interpersonal relationships’ (Kahneman & Sugden, 2005) as well as further mens sana aspects like self-fulfilment and love (Chuengsatiansup, 2003; Holden & Linnerud, 2007). All these justify the Wellbeing Dimension as holder of values to be respected for all.

For good order, despite the many positive associations also Wellbeing carries the conflict of unsustainable development within it, especially since it touches on our (over-)population in relation to earth’s carrying capacity. Although the speed and intensity of problems arising might be less dramatic compared to a welfare-driven consummation of our planet, earths’ capacity to support human life is limited even when considering most modest interpretations of wellbeing.

Welfare – Understanding What we Desire

The divide between Wellbeing and Welfare is marked most simply by pointing to all we desire to make, have, use and be when having achieved Wellbeing. Since the economy also substantially delivers on Wellbeing, the Dimensions-concept therewith diverges from a more polarising academic discourse in ESD that postulates ‘the economy’ as the cause and manifestation of (unsustainable) welfare. In contrast, in the entire OPEDUCA-concept economy is seen as a manifestation of human behaviour, the mere materialisation of our value-exchanges. The Welfare Dimension is positioned to mark overconsumption and excessive ownership of goods and materials (coal provides warmth in the realm of wellbeing, solar cell powered outside heaters on a winters’ terrace manifest welfare). Where such exchange of values and resources, whether or not explainable from a possibly deeply rooted human instinct to collect, own and use for own benefit, touches on other people’s wellbeing and earth’s life-giving capacity, it marks the demarcation line where value-transfer becomes value-abuse (coal to outside heater; the point is not to merely ponder the alternative of a nylon oil-based ski-jacket or the ecological justness of a sheep wool cushion and chunky-knit, but to question the heated outside seating to begin with).

We should realise more profoundly it is not ‘the economy’, nor industry in its lap, but all of us, as the consumers we are, who hold the key to sustainable development by way of controlling our consumerism (Dolan et al., 2006; Marks, Thompson, Eckersley, Jackson, & Kassar, 2006). It is thereto essential to be aware of the fact Earth has no cash-register, does not hold account of the natural resources it provides us. Consequently, our understanding of the value-chain is principally false as it starts off with free commodities from which towers of progress and wealth are built. Although I do not seek to quantify the price of one ounce of fresh air, obviously the pricing and margins throughout the system are likely to change considerably if we do. We would then be confronted with a new sensation of value, informing us where and in what degree we wrongly applaud products and services due to an unjust valuation of values. As amongst others reported in ‘Les instruments économiques au service du développement durable’ (Bourke & Vallejos, 2014), economic instruments can, by changing prices and market signals, discourage certain modes of production and

consumption and encourage others Expanding on the analogy used above, when understanding the price of the outside heating (including production, logistics, energy-use, etc.), the relevant question we face is to what use we bring it. And having waived the outside heating for comfortable seating, what about mounting it on the side of an ambulance in cases of emergency-treatment in the cold?

There should be understanding the individual can gain Welfare over Wellbeing because of achievements resulting from (more, harder) work, talent, luck and intellect, from efforts adding to the Wellbeing of others. Is the comedian who grants millions a good laugh or the heart-surgeon expanding lives not entitled to a larger living room or a Rolex? But then how to value the Welfare of the computer-game developer who collects substantial margins from youngsters' time of life and budget? Can we come to reason with ourselves when applauding a salary of 650.000 euro's a week for a soccer player and at the same time feel good about granting nurses a 1.000 euro one-off bonus for exceptional efforts during the COVID-19 pandemic? Judging the essence and value of Welfare in relation to Wellbeing rests on a profound understanding of phenomena and requires a deeper look at and within ourselves – there the challenge lies.

If we do not clearly demarcate between Wellbeing and Welfare, the larger mass of people, when having achieved the first, will run for the latter without giving it conscious thought. Will, driven by extrinsic, materialistic and self-imposed needs, follow others' excessive consumption and self-inflict a deterioration of Earth and Wellbeing just achieved. As to the excessive part of welfare, Worldwatch President Flavin stated: "The drive to acquire and consume now dominates many peoples' psyches, filling the space once occupied by religion, family, and community" (Starke, 2004). We seem to grasp around desperately, accepting illusions of happiness when seeing the soccer player on his private beach during a season-break and miss out on the air-purifying plant we just trampled on.

It is our choice, and I gather it within our ability, to steer ourselves to fulfil Wellbeing for all, 'filling out' that Dimension second to Earth. If we then have resources left to generate and uphold a Welfare Dimension, such might be most legitimate. Whether

or not and in which degree Welfare as an excess over Wellbeing can be realized then depends on a fuller understanding of how products and services for both Dimensions are generated and brought to use. Re-calibrating our economy should result from a coming to our senses, follow a re-consideration of what we want to produce, to then change the means and systems we use for it. If not, present measures ill-informed might delude us more than we realise, be most temporary in effect and less sustainable than stubbornly preached.

Not looking in the eye what drives us to gather and consume makes cowards of us all in the light of sustainable development. Makes us turn off the shower half a minute earlier and feel good about it, to then dress in new trousers on the production of which a thousand-fold of the water ‘saved’ was spent, dressing up for it makes us feel good. If a not-replenishable resource like Yttrium is spent on the production of a cell phone combined with energy derived from fossil fuels to play a game, I will not judge that good or wrong, for one can regard the joy of playing a great fulfilment, but consider the gamer entitled to an informed choice of value, based on insight and understanding how the same resources could be used to combat malaria and purify drinking water for the Wellbeing of many.

Endlessly discussing our system’s dependencies and dynamics, overstressing the complexity and uncertainty of it all, will not help but prevent us from looking at the larger picture made up out of quite clear strokes. Inundated with rules, programs and regulations we masquerade and falsify our positions and arguments, forget we can stop consuming meat this very moment, no longer change our closet of fine wearable cloths because somebody called a new fashion-season and switch off the mobile for an hour of paper-based reading. We can at any moment take most simple decisions that will instantly alter the gluttony of our global machinery because we are many. The thought that the deteriorating capacity of the masses can be turned to immense positive effect without even scratching Wellbeing achieved, should give us pause. It feels as if we forgot we are still capable of action, as if too much reasoning not merely puzzles our will but deludes our mind and ability to act. Solace may come if we see to re-frame the message of ‘lower consumption’ as ‘psychological lightness’

towards the sensation of shedding of unnecessary heaviness, not afraid of losing out on illusionary values (Newton, 2007).

The acknowledgement of an understandable and justifiable Welfare dimension is critical for the inclusive and problem-solving character of the sustainability-debate as it more profoundly and from a constructive perspective invites all to the table. It will also allow us to put the ‘inevitability’ of amorph economic growth under more scrutiny (Norgaard, 1992) and recalibrate the ‘politically powerful’ idea of progress towards a more realistic development paradigm (Barry, 1999).

3.1.3 Implications of the Dimensions of ESD for Education

The application of the Dimensions of Sustainable Development sees to the emergence of future defining themes, functioning as leitmotivs for education through the lens of Earth, Wellbeing and Welfare. As across the board the variety of people contributing to the concept reasoned Water, Food, Construction⁵, Energy and Health to be the most relevant and encompassing themes, they appear of a universal quality. Following a reasoning informed by evolution and history, the themes can be projected on the Dimensions of ESD as shown in figure 3.2. – phenomena then appear in an orderly fashion as each theme crosscuts every dimension.

As understanding of phenomena in a dimension rests on a profound and interrelated knowing of the one(s) encompassing it, the learning becomes contextualised, coherent and strategic. The setting providing guidance for a logical, natural and consistent learning pathway, interrelatedness also informed by evolution and history. Therewith I proposed that education based on the Dimensions of ESD gives rise to a clearer and more confronting study, preventing anthropogenic ambiguity.

5

WCG’s publication presenting the fact that 40% of our yearly use of earth resources goes on the account of Construction (Wit de, Hoogzaad, & Daniels Von, 2020).

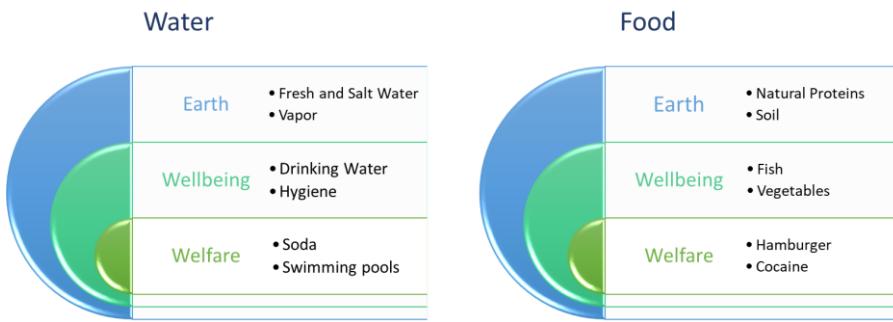


Fig. 3.2
Future defining themes through the Dimensions of ESD.

The notion sustainable development calls for a different type of science, one able to deal with ambiguity, complexity, and uncertainty (Brand & Karvonen, 2007), does not mean ESD needs to be characterised the same. Furthermore, acknowledging that sustainable development requires a wider community of stakeholders (Scholz, Lang, Wiek, Walter, & Stauffacher, 2006), is regard such a characteristic of each science to begin with. Referring to a lack of ‘external interdisciplinarity’ (Klein, 1990) and a need for ‘co-production of knowledge’ (Carolan, 2006), I underline the need for a democratization of science (Fischer, 2000) and in the realm of ESD most profoundly. The concept of the Dimensions of Sustainable Development can contribute to the realisation of ‘sustainability science’, reasoning that social consensus of what is unsustainable requires a special form of science, a research paradigm that reflects sustainable development’s multidimensional character and encompasses different magnitudes of scales (of time, space, and function), multiple balances (dynamics), multiple actors (interests) and multiple failures (systemic faults) (Kemp & Martens, 2017).

As the future defining themes crosscutting the dimensions are in- and extrinsically related to each other, the resulting theme-based learning per definition requires transdisciplinary understanding since the phenomena are so from nature. As there tends to be discussion about terminology and potential misunderstanding adds to the cacophony in learning and education (2.3), I try to place inter-, multi- and transdisciplinarity in a single graph (fig. 3.3).

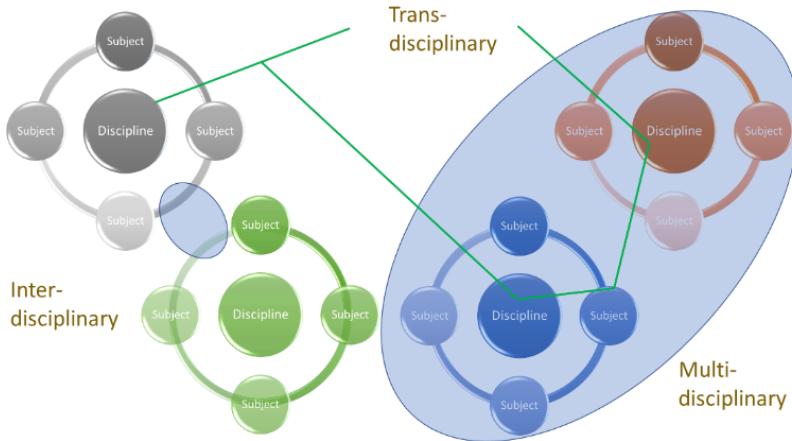


Fig 3.3
A try for disciplinary order

- Multidisciplinary concerns the disciplines an issue comprises, two or more 'engulfed' by the issue.
- An interdisciplinary approach requires (parts of) two or more disciplines to address an issue.
- Transdisciplinary regards issues outside the realm of one or an assembled group of disciplines and can only be addressed as joint effort.

Proposing learning is per definition multi-, as well as inter- and transdisciplinary (Marinova & McGrath, 2004) does not imply that a rising level of integration makes matters studied more complex, incurs more difficulty. That we experience such is the result of the way we organised our knowledge-domains -and infrastructure in disciplines and subjects to begin with. Specific parts of a subject or matter can be difficult to understand, but interrelatedness does not command such. There is no need to position ESD as complex beyond that notion. The challenge is to have a learner untangle and unravel matters, amongst others through evolutionary and historic logic, to grasp a thorough understanding of the 'Ist' and from there built intellectual capacity to see a 'Soll'.

Integrative thinking and transdisciplinary learning and education comes natural to humankind, we cannot do otherwise, it is not an innovative consideration in ESD. Transdisciplinarity serves our disciplinary understanding and proficiency in subjects and vice versa, ESD a spiralling process, a return to our gift of intelligence which goes hand in hand with continuous connections to the transdisciplinary world around and inside us. From this I expect the rise of transversal competences.

As the Dimensions of Sustainable Development call for a (renewed) understanding of values and involve behavioural aspects, the concept has critical meaning for education. Students will arrive at vast fields of knowledge, phenomena and experiences that present them with a variety of aspects and situations requiring understanding and capacity of action alike. This notion of transversality combines with transdisciplinary learning, enabling profound understanding and handling of issues, transversal to be understood as ‘multi-purpose’ knowledge and skills applicable and required in multitude. Such include but also go beyond obvious competences listed as ‘21st Century Skills’, ‘ESD Competences’ and ‘Circular Skills’.

Furthermore, the universal character of the themes’ is seen to contribute to a collaborative boundary crossing learning of students in a local-to-global perspective, joint interests presumed to provide a foothold for the exchange on cultures, beliefs and citizenship, allowing the learner to experience togetherness and mutual dependencies. Also, in this notion of ‘global citizenship’ I see the essence and value of transversal competencies.

Approaching ESD as truly transdisciplinary, involving the development of transversal competencies, I propose it as a full integration of content (the variety of fields of knowledge and disciplines) and pedagogy, merging learning philosophies and ways of teaching in ESD-based Education.

3.2 Prioritising Youth in ESD

As introduced, I proposed to more profoundly position youth as the future itself, not just because the road ahead is generation spanning but given the conviction individual development underlies a more sustainable society. As we obviously became disassociated from generations past and the earth who's air we breathe, water we drink and fruits we feed from, we can only grant the future itself, as it is in our midst already, the capacity to look forward with untainted eyes and resilience to make it theirs. Our youth is the only "We" we have. We can pick it up, look it in the eye and support it from early on, having the future literally in our hands and in our midst (J. Eussen, 2004, 2010).

Following my earlier observations considering the person being central to sustainable development and seeing humanity as the constitution of the individuals it comprises (2.1), it is the individual from who (un)sustainable development springs. Regarding learning as a natural contribute of the individual, I approach ESD first (and per definition) as individual learning for sustainable development. Therefor each human, beginning at youngest age when learning is still natural to life, should have unlimited opportunity to look at life as it is and unfolds, learn anytime, anyplace, with anybody and through any device about those themes that will most prominently define its own and our common future.

Moreover, since the future is beyond the horizon of those ruling the present, it can eventually not be governed by powers presently in place. However good intentions of present adults are, their thinking, disposition, interests and considerations are not of the future. Our capacity to govern the future is limited as we are not able to radically cure, either in ourselves or others, that narrowness of soul which makes us prefer the present to the remote (Hume, 1739). This means we should no longer see youth merely as subjects and actors in the present but as owners and factors of the future. As it was already written: "*I speak of the life of a man who knows that the world is not given by his fathers, but borrowed from his children; who has undertaken to cherish it and do it no damage, not because he is duty-bound, but because he loves the world and loves his children*" (W. Berry & Mealyard, 1991). Thereto we should take a positive vision of the future (Eckersley, 2002) and distance from negative

images. Instead of problematic visions drenched in despair, ESD can be a beacon of hope and means of progress youngsters deserve. I furthermore argued:

- Youth can unite and bind us as it presents our most magnificent common value.
- The saying ‘Youth has the future’ is no longer valid given what previous and present generations have caused and forsaken to do; Youth no longer has the future, they are.
- Instead of reasoning from uncertainty, the future can be looked in the eye and reasoned with, not about, comprising future society in its own design.
- Youngsters can be regarded initially good, have no reason to not live sustainable lives and might even be equipped by nature with the qualities needed thereto, respecting children as ‘gentle’ and indispensable to involve if we seek long-term societal changes. *“We're never going to have respectful and reverential relationships with the planet and sensible policies about what we put in the air, the soil, the water, if young children do not begin learning about these things in their houses, backyards, streets and schools. We need to have human beings who are oriented that way from their earliest memories”* (E. Boulding, 2000).

Building sustainable development on youth implies we believe there is a natural sense in every child to love earth and its life. If so, what we define as causes of unsustainability occurs as we grow up, harden, make a living through careers, create, enter and uphold systems with values of their own.

Reasoning with youngsters involved in the OPEDUCA-project over the years, I amongst others stated:

- “You will need to deal with the unsustainable consequences of our system and behaviour,
- since we have proven convincingly not to be imperfect, we are still doing things you will have to repair,
- as we are changing the present and its organisation, working requirements and competences will differ from what we backed ready for you earlier, you might be ill prepared,
- what we presently cannot solve or foresee will be up to you anyway”.

Such rather bold remarks were intended to awaken young minds, see if they could be challenged and motivated to grow into a critical individual learner in search of meaning and resolve. I regard ESD to be of a pro-active rather than reactive nature, providing the (young) learner with a strong foothold to stand on, roots to feed from and wings to fly. The challenge to create a prosperous future invites to think, think again, even to dream, fantasize, re-consider, to create lines of thought towards it. Doing so, I keep ESD away from the organisational or system-perspective, seeing an individuals' understanding, decisions and actions in the congruent logic presented as the Dimensions of ESD.

The individual learning is furthermore seen as a continuous articulation of the ‘Why?’, the inquiry most natural to the younger minds, to constantly generate new and evolving understanding of what is, thus taking a continuously critical disposition. We ask the question because we are human and we fail to be fully human whenever we fail to ask it (Ford, 2007). A critical understanding of the “Ist” underlies a growing insight and understanding of the “Soll” and the change towards it.

While scholars in the ESD-discourse propose education should prepare students for the unknown rather than learning what we already know (for example Perkins, 2014), such appears based on the presumption that, given the rate of knowledge creation in this ‘knowledge economy’, what is learned tends to be outdated rather fast. I principally opposed to that conviction since the past and present can be regarded to be construed of facts and rest on values with longer lasting quality. Although for example globalisation calls for more understanding of cultures, trade-mechanisms, a better mastering of (more) languages and the interdependence of value-exchanges, there is a vast landscape of resistant knowledge to start out from. The appearance and behaviour of most phenomena did and will not change overnight. Youth is still in the position to first gain thorough understanding of what is, develop an informed opinion how it came about to then engage in the exploration and development of the future. An over-accentuation of continuous change, the relativity of knowledge and uncertainty can put that learning at risk and is not to be seen as a motivating factor. I reason in line with the Socratic view, expecting that ‘learning from the roots’ will eventually contribute to learners’ autonomous capacity (Kumaravadivelu, 2003). As a later commentator on the OPEDUCA-concept worded it: “*... to imagine a better world while standing deep in the science of the world they live in*” (Smith, 2020).

3.3 ESD as an ongoing Tread throughout the Educational System

Following the Dimensions of ESD and the key-positioning of youth, pupils and students should not be seen as objects in the process of schooling but as learners in search for education. Consequently, their learning enhanced by education is facilitated but not commanded by a system of schooling in place, the learning process projected as perpetually future oriented and ongoing. Thereto I proposed to envision ongoing learning pathways as a tread throughout the formal educational system embedded in society and underlined the importance to consequently differ between learning, education, schooling and the system (J. Eussen, 2004).

As the formal educational system is an assembly of formats of schooling, it is incoherent and disjointed, both during the various stages as well as in relation to future (working-)life, a structure throughout which the individual can stumble and get stuck, even fall out in between. Moreover, the stacked and pre-defined level, tempo and sequence of schooling, meant to accommodate an amorph mass, per definition does not match (the differing phases of) a youngsters' personal development. Specifically:

- The consecutive parts of the educational system constitute a fragmented pathway of schooling, one divided and split harshly in level and sequence, providing gaps between following segments that allow for student-dropout and mismatches with society - gaps being traps.
- The command of the curricula which dictates examinations to mark the end of a segment seeks to comply with present and not future society.
- Learning from the real world and in the practice of work is now limited by the structures to incidental efforts in primary- and secondary education and work-based learning during vocational training, not naturally connected in ecology and society which is essential for the thematic learning envisioned.

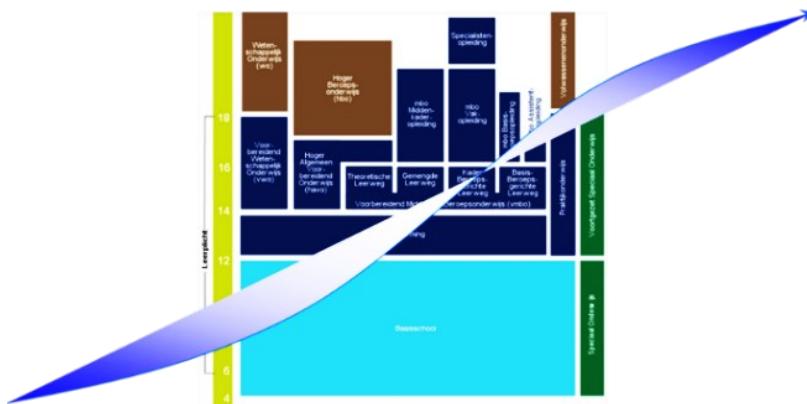


Fig. 3.3:

Standard sheet in OPEDUCA-presentations addressing the need of an ongoing learning process through the formal educational system, based on understanding the difference (though not divide) between Learning, Education, School and (educational) System.

Respecting the added value of the amenities and facilities of schools but also understanding their limitations as learning environments, the ongoing learning process is further seen as intertwined with sources of education outside the system. For reasons of accessibility, meaningfulness and social identification, these are first projected in the students' own regional social-demographic realm (their OPEDUCA) with an emphasis on connections in the world of work, presuming an extensive availability of relevant sources of content and experience.

Projecting students ongoing learning process as a tread throughout but also beyond the formal educational system, personal development prevailing over structures, and contextualising the learning pathways by future defining themes derived from the Dimensions of ESD, I came to propose an ongoing thematic learning process unfolding over the years as the essence of ESD.

Searching for the person, the individual developing in present day education against the emerging framework for ESD (1.4.1), I sought to unclutter the scene and terminology by a consequent distinction between learning, education, schooling and the educational system. This since concepts, pedagogies, rules, regulations, learning philosophies, referrals, terms of renewals and the like, often appeared mixed and mingled. Terms and ideas moving back and forth between essentials of thinking and action, over learning and ways to educate, to than bounce in the realm of the system.

A disarray contributing to the cacophony in place (2.3). It seemed as if schooling narrowed down education while education restricted the learning.

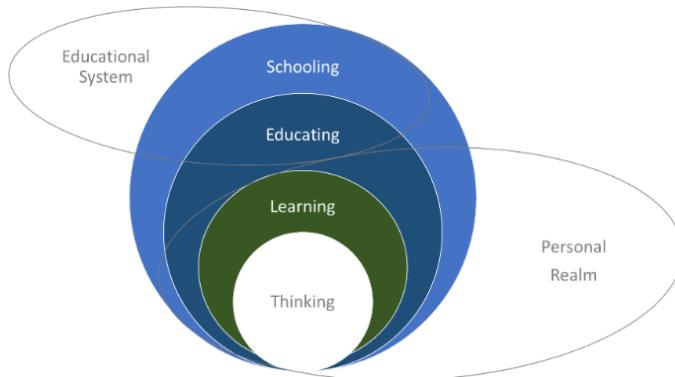


Fig. 3.4

Discerning Learning, Education, Schooling and the Educational system, the Thinking within.

To mark my point at the beginning of presentations, I virtually picked up a child and held it as the future itself, stating a child is a learning organism with an own mind and identity already, its learning a most natural presence that cannot be stopped nor prescribed. At its best it can be supported, facilitated and guided but not commanded, arranged, organised, measured and judged upon. Seeing education as the facilitation of learning, school as the organisation of education and the educational system as the institutionalisation of schooling, we created a construct where learning apparently left the minds' eye.

Although schooling requires a grade of governance and organisation that leads up to the manifestation of an institute commanding attention of its own, the educational system not only comprises rules, regulations, standards and facilities to enable schooling and organise education, but manifests itself as an institutionalised infrastructure of its own right. A vast landscape, home to the 'layers of fog' (2.3), populated with actors and interests away from 'educating' and far from 'learning'. And precisely there, at the base in the personal realm, is the home of ESD.



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4 The OPEDUCA Concept - ESD based Education

Assuming schools embody substantial capacity for the facilitation of education despite contemporary criticism that goes with the territory, the OPEDUCA-concept sees to the effectuation of ESD-based Education by ways of a coherent set of instruments for application in present day education. Respecting schools, keeping away from seeing them as a mere carrier or promotor of sustainable development, proposing to base education on ESD, was unprecedented in 2007.

Starting out with a description of the idea of Open Educational Areas/regions (4.1), this chapter presents the instruments:

- ‘OPEDUCA Flight for Knowledge’ for the instrumentalization of ongoing thematic learning processes (4.2),
- ‘OPEDUCA BusinessClass’ to enhance youngsters’ capacity to bring thoughts to action (4.3),
- ‘OPEDUCA Global’ to contribute to a local-to-global learning space for ESD (4.4),
- ‘OPEDUCA MasterClass’ to meet the development of teacher-capacity (4.5).

In paragraph 4.6 I present several key-principles ESD-based Education builds on.

4.1 The idea of an Open Educational Area an OPEDUCA

A general idea underlying OPEDUCA is to regard a social demographic region as a young learners’ cradle and home for development. The scope of such an OPen EDUCational Area/region is grossly determined by its social, cultural and economic cohesion, the locality where people are inextricably part of multiple manifestations, indissolubly bound together (a group of villages, city, province).

Following the notion learning takes place anytime, anywhere, with anybody and through any device, the learner is envisioned to note, experience, interact, take in data and create information while moving around in her natural and societal habitat. Regional society considered an accessible space that brings sources of education within reach of the learner, provides rich opportunity in real context for meaningful observations and experiences. The world seen as a network of relations, our being not locked up inside us but spread throughout a web of worldly inter- actions in which our existence continually unfolds (Fisher, 2002).

As schooling prepares for life, education should be close to life, learning processes interlinked and imbedded in the environment outside school. The participatory process thereto involves all areas of civil society, including businesses and public services (Fien, 1995). A strategic quality of an OPEDUCA lies in connecting and immersing youth in each Dimension of ESD simultaneously, the learning process a boundary crossing reality.

The OPEDUCA-concept includes the involvement of 'Partners in Education', meaning persons and organisations outside the realm of school contribute to education by providing place, practice and presence, articulated in first-hand data, information, narrative and personal experience. To distict these persons with educational value from teachers, I proposed to use the general term 'Educators'. Partners in Education are not expected to have the pedagogical skills and competences of teachers, they contribute outside the boundaries and restrictions of schooling, offer additional qualities - a complementary multitude of Educators manifesting an abundance of (re-)sources across the board. In principle an OPEDUCA calls for the participation of all in society to be(come) Educators, therewith substantially increasing schools' and teachers' educational potential.

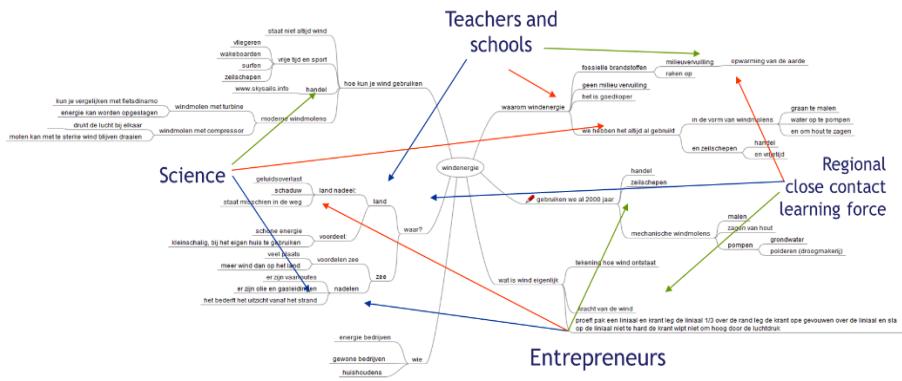


Fig. 4.1

Visualisation of Educators from various domains continuously contributing to a variety of elements in a 'Field of Knowledge' (see 4.2)

As our society grew more advanced, we detached and even alienated ourselves from nature, invoking the (unconscious) notion one might do without. Such can also be argued for the realm of Wellbeing when compared to social structures and cohesion in earlier decades. The working of an OPEDUCA-region is perceived functional to partly correct for this, believing youngsters' more frequent direct contact and exchange with natural phenomena and society contributes to their wonder and understanding, enhances awareness, bases respect, allows the educational potential of nature and social interaction to regain position. This potential should also be seen as a countervailing power for the Welfare-Dimension, enabling students to (re-)consider and question present day phenomena as abundance and waste through the (re-)discovery of natural values as biodiversity and silence. Invoking a feeling to be part of Earth and learning from and through it, I regard a critical requisite for future courses of action. Avoiding instead of repairing youth's disaffection with the outside is congruent with the need to make alive for them that the relation between people's values, emotions and activities is (no longer) connected to ecology (Kellert & Wilson, 1995).

Re-booting with nature should be understood most literal, as actually re-connecting with earth's basic elements, with wind, water, energy, soil, with the life thriving in and on it. In OPEDUCA the outside is the primary, not an addition to schooling by

ways of an incidental visit. A transcendent personal experience cannot be programmed or scheduled as it is a matter of the heart, of being raised not taught, thus requiring more continuous presence in nature. Raising youth in the shelter of the inside was excellently dramatized by placing a future generation in giant caves of steel, like beehives below the surface, people eventually having become afraid of the open (Asimov, 1954). Louve speaks of a 'nature-deficit disorder' as metaphor to describe the human costs of alienation from nature, mentioning a diminished use of the senses, attention difficulties, higher rates of physical and emotional illnesses, a rising rate of myopia, child and adult obesity, vitamin-D deficiency and other maladies (Suttie, 2016). Numerous studies indicate that direct exposure to nature can relieve symptoms whereas indoor activities in our paved, non-green areas, leave children functioning worse (Kuo, 2011).

From the broader perspective of ESD, the constellation of other OPEDUCA nearby and across the world is seen to form a complementary network, a 'Local-to-Global Learning space'. Envisioning an OPEDUCA-region to allow youngsters to grow firm roots, an outward development towards (global) citizenship offers perspective(s) for the (regional) learning and allows to relativize as well as accentuate experiences and their understanding of phenomena. Thereto the learning processes is situated in continuous connection with others, the universal character of the future defining themes supportive to that course. As youth faces the global dimension of human development, a deeper understanding and sense of belonging to one's own region and the global realm go hand in hand, merging realities and contexts. It is expected students gain more profound understanding of the own (region) through others. A self-enforcing spiralling process contributing to coherent perspectives by thoughtful exchange and participation. Therewith the OPEDUCA-concept is also expected to partially offset and correct amorphous images presented by questionable (multi-)media and politically induced opinions presented by (social) media. Considering that life-wide and -deep experiences in the natural and social outside will gradually replace media-induced images of the present and future.

4.2 OPEDUCA Flight for Knowledge

OPEDUCA Flight for Knowledge is the pedagogical framework to operationalize the ongoing theme-based learning. Although elements of the instrument are inextricably linked and part of a continuous process, I will present the concept by distinguishing between the idea of ‘Fields of Knowledge’ and ‘Flight for Knowledge’ as educational processes, then link the instrument to the concept of OPEDUCA-regions by way of distributed sources of education.

The Field of Knowledge concept

As we spatialise the world continuously, sketch configurations of phenomena, ideas, matters and concepts, the future defining themes studied are reflected as a ‘Field of Knowledge’, a mind-map like structure that encompasses the entirety of a theme, providing knowledge-schemes with pegs to hang data and information on. Although generating concepts maps has already proven to significantly improve student performance (J. Berry & Chew, 2008), for the construction of a Field of Knowledge I do not distinguish between mind-, concept- and argument-mapping (or any other description in that sense) but propose a combination of these by ways of:

- a logical order of subsequent elements, aspects, topics and objects,
- the registration of these in varying breadth and depth,
- the associating and interrelation between the various parts,
- the mapping of a corpus of investigation,
- a (re-)view of the process of construction.

Introducing the idea of mapping themes as a practical way to note exploration, students basically start by writing the theme-name in the middle of a sheet of paper, then sketch what they think they know i.e. register prior understanding in order to later achieve learning goals (Ausubel & Fitzgerald, 1961). The construction of a Field of Knowledge builds on the conviction that representing a set of relationships as a diagram enhances both understanding and recollection. Noting down new findings in logical context, situating facts and interrelationships, students split complex matters in smaller still meaningful parts and build from what they already learned

(Van Merriënboer, 2008), allowing them to bring what is newly found in relationship to what they have, interpreting information (Okukawa, 2008; Wolfe, 2006). As the students place further ideas, observations and findings, the field expands in breath (in 2D, more branches leading to complementary nodes, presenting further detail), meaning (considering the relations, lines, between the nodes) and/or depth (in 3D, 'drilling down'). The tips of the branches touch on phenomena, the branches themselves stand for the dependencies and relations between them, the placement of concepts. The initial gathering of data and information is fueled by constant inquiry to further the collection, learning the nature of existence (ontology), determining when something is true, false, unknown or unknowable using appropriate logic (epistemology) that in turn helps determine the nature of fundamental values and of moral choices (axiology) (Engle, 2008).

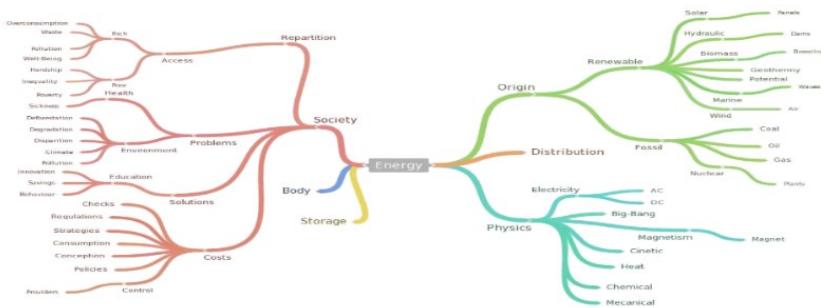


Fig. 4.2

Example of a basic, 2D, Flight for Knowledge on 'Energy'. OPEDUCA France (S. Lardjane, 2018)

The students use the spatial sensemaking infrastructure for construction in parallel with a structured discourse to clarify random observations in real life, starting out from the element closest to the observation, switching between deduction and induction. Data and information, concepts and relations are derived from a multi-, inter- and transdisciplinary perspective, presuming the integration of every school-subject, providing place to incorporate each curriculum-element of the various school levels, from primary up to and including higher education.

A Field of Knowledge can be seen as a multi-layered neural network, presenting a hierarchy of interrelated concepts starting out from ‘simple’, then added to complex. It offers a scaffolding to place and (also literally) store data, which if combined (can) become information or data of a higher or lower abstraction-level.

Furthermore, a Field of Knowledge:

- starts out from a chronologic order to take the learner forward in thinking by considering cause and effect relations also in an historical perspective,
- informs a continuous and systematic organising, sorting, placing and retracing of elements,
- applies logic reasoning to have elements follow and derived from another, stipulate and explain a higher level of insight while inviting for further clarification in more detail,
- provides for notation of the exploration(-proces), inviting for expansion and the addition of (complementary) data (to underpin, refine),
- allows the continuous addition of new elements to complement and expand on the existing scheme, further underpin and refine placed elements,
- regards the sequencing of authentic, whole learning (tasks) from simple to gradually more complex,
- allows for the de- and re-construction of data and information previously placed, inviting for a process of contemplation and renewed understanding,
- allows the student to project her inner mental world, temporarily store thoughts coming up.

The construction of a Field of Knowledge being student-driven, limited prior knowledge to construct from is acknowledged while the teacher is supposed to refrain from handing over information and focus on guiding the learning process (Steffe & Gale, 1995). The student should be clearly challenged by a notion of initial ignorance to give an active mode of learning a chance to awaken. The role of the teacher however not that of a bystander as she is supposed to be involved and content-informed, able to gently support the students’ process by observing, questioning and hinting while joining the students in their ignorance.

Acknowledging students should not be forced outside their zone of proximal development (Vygotsky, 1980)⁶, from the perspective of ESD-based Education they are encouraged to more pro-actively expand their cognitive models by revisiting the present borders of their understanding.

The learner's construction is not restricted and only partially guided in considering, finding and using sources. Such can include traditional (text-)books, films, interviews, personal observations and a critical inquiry of data on the internet. The collection is assumed to take place by ways of carefull search and consideration but also 'on the go', meaning the gatering is continues, each Field of Knowledge accessible and modifiable all the time.

Following my proposal to see ESD as an ongoing learning process beyond the formal system, a Field of Knowledge develops and expands over time as the recording of a learners' personal work and diligence. It is a living sheme, subject to perpetual change, never finished, remaining changeable and fluid in extend, depth and breadth. The strategic thematic learning pathways are seen to unfold like coherent sets of branches, developing from simple to cohesive and comprehensive fluid schemes. This sense of evolution allows to fold consecutive parts of the fragmented (broken) structure of formal education together, 'dove-tailing' school levels (3.3).

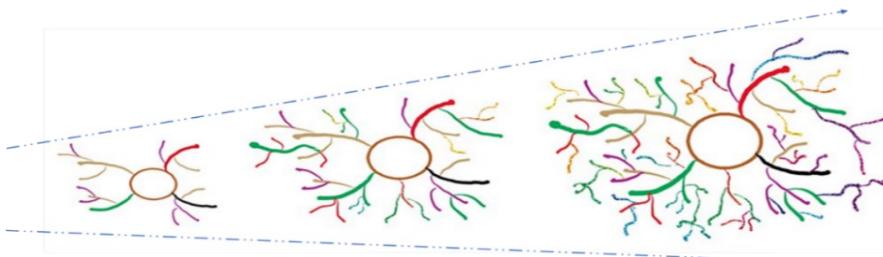


Figure 4.3

Fields of Knowledge grow more divers, detailed, complex, including more dependencies and links to real world phenomena.

⁶ The area between what they can do independently and what they have the potential to do under adult guidance or in collaboration with more capable peers.

Seeing the spread of the branches as working in 2 dimensions and the depth of each element as a 3rd, I speak of a ‘4th dimension’ of a Field of Knowledge when taking time into account. The time-element provides for metacognitive qualities through a ‘re-wind’ of the learning process and allows for re-considerations I deem crucial in the light of ESD. Each part of the Field of Knowledge is allowed to change (be amended) over time as the students’ insights, understanding and convictions change, data is re-interpreted, information leads to new insights, knowledge is developed along other pathways.

As todays’ truth can be tomorrows’ uncertainty and next years’ mistake, learners need to be able to scrutinise findings and interrelations constantly and most critical. Where they experience the need to reconsider their opinion and amend, such corrections are deemed useful as the learning process then remains open for new observations, other insights and others’ opinions. It makes them critically question what is thus far perceived as knowledge, adding meaning to their learning (Merriam & Clark, 1993).

Flight for Knowledge as educational proces in a school-context

The personal, student-oriented principle underlying OPEDUCA comes to effect as a Field of Knowledge is per definition owned by the individual student while partially constructed in a cooperative setting. The in essence asynchronous personal mode is paralleled by synchronous learning in collaborative mode, augmenting the learning through peers’ cross-reference, transcending the (individual) student dimension. The concept here differs from Novak who, following Ausubel’s assimilation theory of cognitive learning, also stated the value of concept mapping as learning strategy (J. D. Novak & Musonda, 1991). The research however rested in the realm of the instructional, addressing the challenge how to organize better instructional material. Flight for Knowledge departs from a constructivist view on learning.

Flight for Knowledge starts with an open exchange between students and (a group of) teachers regarding the world we live in today, how it unfolds and what we can expect from the future, how we can take part in it, what we need to understand. Students are explicitly invited to ponder and voice their thoughts on a variety of

aspects in order to jointly come to a first inventory. The choice of themes is eventually not left open but informed by the Dimensions of ESD, preventing students to ‘waver around’. Meaning and relevance, highlighting the ‘problem-based’ aspect, is considered essential from the perspective of ESD. The teachers guide the students by ways of narrative, debate, reflection and opiniating to develop an emergent curriculum through collaborative investigation, taking in critical themes in students’ own lives but following a structured process for developing context-specific curricula (Auerbach, 1990).

After themes are set, without further ado students start their construction of a respective Field of Knowledge. Most practical, they do so with pencil and paper in Study-Teams of four grouped on theme-preference and indulge in sharing and recording all they (think to) know by taking inventory through dialogue. A collaborative process that intends to include debate and discussions, inviting varying and different opinions. The Study-Teams work in physical theme-areas, rooms/halls that hold (construction-) materials as well as virtual utilities, all textbooks (from mid-primary up to and including higher education), regional and national newspapers, live news bulletins on screens, etc.

As students are simultaneously part of various Study-Teams for each of eventually 4-5 overarching themes (3.1.3), they cooperate with around 12-15 peers directly. Position and role in each of the teams are expected to be dissimilar from nature and proposed to allow for reflection on own behaviour, practising (shared) social regulation. The learning is individual, the education social. While the Study-Teams produce collaborative Fields of Knowledge, each student manipulates (reconsiders) the personal version by taking in the findings, interpretations, opinions (and underlying values) of peers. Students finding a ‘misfit’ with an earlier construction of their own is perfectly acceptable and wished for. Eventually the Study-Teams include students from various ages i.e., levels, where possible formed across schools and beyond borders.

In the course of the proces Study-Teams regularly present their work to:

- externalise their understanding by ways of plausible narrative,
- present a mirror to themselves,
- experience and further develop their communication- and presentation skills (appearance, verbal expression, use of presentation tools, etc.),
- expand the collaborative learning process as other Study-Teams are positioned as ‘audience’ to question and advice upon what they see and hear while taking notes to enhance their own work,
- seek advice and support in terms of content, concepts as well as regarding the learning-process as such.

The quality of the Fields of Knowledge is considered specifically relevant for the presentations as they have to allow for a clear visualisation, argumentation, presentation of facts and figures, (presumed) interrelations and dependencies as well as the validity of arguments and propositions.

Eventually the students’ presentations work out towards and replace written tests, students literally taking the stage to give proof they mastered content, understand concepts, developed transversal competences, are becoming more competent.

The presentations expand to (semi-annually) appearances before a live audience of family, friends, teachers and Partners in Education from their OPEDUCA-region with the potential to grow into larger scale ‘learning-festivals’. During these events students are challenged to also more materially show the fruits and proof of their learning.

Teachers remain with their encouragement and effort to make all means available to the students. Contrary to the traditional master-pupil relation, they upfront voice their (per definition) imperfect understanding of the issue at hand, lay a base for their later collaborative role, provide for occasional room in the teams for themselves.

Teachers’ questioning preceeds explanations, explanations preceed intermediate instruction. Joining Study-Teams for brief moments is meant to observe, raise (exploratory) questions, compliment and point out where logic tends to fail, facilitate the construction process. This interplay considers an expert-perspective on both content and process, sees to teaching beyond mere guidance or coaching.

The teachers' encouragements and clarifications are first to be understood as contributions of a potentially better-informed student.

Flight for Knowledge includes two occasions for more actual instruction, firstly by ways of pre-scheduled (daily, weekly) mini lectures that intend to provide students with content and tools to enhance their study. They are assumed to be planned in the morning hours for a maximum of 20 minutes each, are accessible for every student, in principle regardless of study-year. The mini-lectures are one-way settings during which a pre-set range of standard-concepts, subject-specific elements and content of general relevance is presented (transversal 'building blocks'). The content is initially presumed by the teachers and later build up from their reflections of students' progress, next to which students can call for a specific programming. The mini-lectures conclude with a brief round of exploratory questioning and are as of then available to the students anytime, become part of their digital resource-base. Students decide how often they attend the (same) mini lecture (opting for repetition).

Secondly, teachers are regarded to instruct by brief intermediate lectures during the process (on the go) in case they notice students run into a wall, alike deficits reoccur in more Study-Teams, a general question requires clarification or students are observed to miss specific elements and insights (basing a new mini-lecture). They therewith provide for the intellectual part of inquiry-based learning, providing additional room, momentum and function to argumentation, discussion and debate to a continuous constructive discourse.

The teachers are regarded and required to function as a professional team for and amongst themselves to:

- consider and evaluate the learning-process as such,
- elaborate on individual students' participation and progress,
- reflect on the availability and quality of educational sources,
- evaluate the need and working of intermediate instructions,
- evaluate and (re-)plan the mini lectures.

Distributed Sources of Education

The structural participation of 'Partners in Education' in the students' learning process, inherent to the idea of OPEDUCA(-regions), can be visualised by placing a Field of Knowledge as an overlay on the region, projecting sources of education on its (geographical) map, one gradually generated and updated by students.

The discovery, allocation and placement of sources is regarded a part of the students' learning process, enlarging the traditional concept of 'community based learning'. In comparison, the OPEDUCA-concept is more distinct as students' are challenged and expected to develop their network of Partners in Education from own intend to dis- and uncover phenomena and values they can learn with and from. As the process evolves, eventually a distributed, multi-disciplinary and placed sourcing of education is realised.

The exchange with Partners in Education is conducted by the Study-Teams following specific inquiries, replacing amongst others traditional whole-class visits to the outside. Where students in mid-primary are closely guided and the visits have a more joint and social character, students progressing through secondary and further education are expected to act more independent. Exchanges can take place at school as the thematic areas are open to Educators, by external visit of (a representation of) a Study-Team and obviously through multi-media.



Fig. 4.4

The first conceptualisation of Flight for Knowledge considered the acces of a landscape of educational sources spread across a social-demographical area.

4.3 OPEDUCA BusinessClass

OPEDUCA BusinessClass unfolds as Flight for Knowledge is underway and students gradually gain more insight in the world beyond school. The idea is that students, while they switch back and forth between school and society during Flight for Knowledge, grow a body of experience and gradually develop and voice ideas of their own. BusinessClass particularly sees to the development of youngsters' belief in own ability to develop, evoke change, achieve and belong, be of value to society and themselves. The development of an entrepreneurial attitude is seen to complement the growing understanding of a more sustainable future with the capacity to envision change, re-steer from the present, create and re-built. The ability to turn ideas into action as the common denominator of human's capacity to create change, be agentic, effective, entrepreneurial.

In entrepreneurship I also see qualities as passion, perseverance, dedication and effectuated moral. Traits crucial to offset and overcome the neoliberalist profit-oriented reality that manifests itself in the unsustainable side of the Welfare-dimension. The development of entrepreneurial qualities is approached from the perspective of a student's intrinsic capacity, BusinessClass positioned in the realm of raising personality and only secondary as an instrumentalised transdisciplinary education. It thereto starts with a process of personal awareness and empowerment, the students' understanding and eventual experiential construction of a Businesscase instrumental to it.

In BusinessClass students take over the helm as they gain ever more understanding of the world as it is and can unfold in their minds. Thereto the instrument comprises five intertwined strands:

- Personality 'training'/development.
- Financial literacy (awareness/understanding of monetary and adjoining values).
- Enterprise education (the creation of value, functioning of added-value chains).
- Entrepreneurship education (developing the capacity to turn ideas into action).
- Economics education (understanding future defining themes from the economic perspective),

and two phases that integrate these:

- Personal Development and Empowerment followed by
- a process of Businesscase Development- and Presentation.

Personal Development and Empowerment

Developing students' capacity to become the entrepreneur of their sustainable future is seen to build and strengthen a students' sense of self-determination, of shapeability and autonomy based on awareness the future is open. Following the principle youth is at the core of ESD, implies they are not predestined, not to be assimilated in what we created but seek and realise what should be in place. As the collective effort rests in the quality of the individual, the student is first approached from a personal development perspective, working by ways of an empowerment-program.

Largely in a group setting with peers while focussing on each person, cross- as well as in depth interviews and exchanges mark the pathway. General issues addressed are ones' living-situation and -conditions, hobbies, sports and jobs, to from there proceed to self-knowledge and -reliance, responsibility, the sense of initiative and ownership of ones study- and working-career. Students' opinions but also feelings are exchanged with regard to where they stand now, what is to be expected of life and how they ponder and question matters today. Recurring issues are notions of achievement, what made one proud, setbacks experienced, lessons learned, wishes and dreams. Specifically addressed are amongst others the value of money, savings, (delayed) consumerism, debt, the value of goods and possession, to from there observe the working of social structures and societal systems. In between a series of practical exercises is carried out, mostly gentle and with a joyful character, yet always with a deeper meaning (goal-setting, planning, cooperation, teamwork, expression).

The goal is to set youngsters' mind free and gradually exchange thinking in restrictions and limitations towards a sensation of development. The empowerment phase has no objectivating or normative perspective; no sense of 'right, wrong,

better', is not predominated by certain values and not framed by contemporary sustainability notions. The approach intends to contribute to the students' own understanding, to self-awareness of the person-student, relating present position and potential future to their education.

There is a convincing body of research underlining that entrepreneurial skills and attitude empower students' participation in education, recurring terms being creative problem-solving, critical attitude, risk taking, collaboration and discipline (Bronte-Tinkew & Redd, 2001; Pellegrino & Hilton, 2012; Rosendahl, Sloof, & Praag, 2014). The students' future orientation is generally the prominent focus as it is widely acknowledged an enterprise education approach allows greater student ownership of the learning process (Jones & Iredale, 2010).

Businesscase Development and -Presentation

The choice to introduce students to the concept of a businesscase is a means of effectuation, partly a metaphor to further the process of the empowerment phase. It aims at their understanding of values, how they are created, used and relate to each other. Taken from the field of Accounting, the function and working of a company is explained by an introduction of a Balance sheet and Profit- and Loss account, meant to provide for a framework for the registration, measurement, processing and transition of values. Each element is linked morefold to real-world phenomena and their composition.

During the process, the students' personal finance and behaviour is linked to allow easier access to concepts, consequently used later in the process to link a company's responsibility in sustainable development to the personal and social realm.



Fig. 4.5
Generalised Balance sheet and Profit & Loss Account used to discuss value-streams.

Working towards a Businesscase, students are challenged and facilitated to contact and visit Partners in Education (complimentary to Flight for Knowledge) to reach a more realistic breadth and depth. Tapping from their real-world learning in progress and interests to work on, teams are formed of students with alike ideas. As in Flight for Knowledge, the process is participatory, the teams however fixed for the duration of the process. Students are intended to materially and meticulously construct their Businesscase, moreover in the foresight they will have to present it for a live audience and jury, comprising entrepreneurs and representatives from the creative sector. Alike Flight for Knowledge, the presentations are functional to develop transversal skills in communication, presentation, design, critical thinking, argumentation, role-play and cooperation.

4.4 OPEDUCA Global

Following the introduction of the concept of Open Educational Areas/regions, OPEDUCA Global sees to the students' understanding of one's own region as a composing part of global society. The concept expands the working of Flight for Knowledge and BusinessClass, taking students' study of the fabric of society from local to global by ways of:

- exchanges with peers, Teachers and Educators in other regions around the world,
- outreach to educational sources beyond one's own region.

Each OPEDUCA is regarded to exist in continues connection and exchange with other regions, underpinning a local-to-global learning space driven by student exchanges and cooperative learning-processes. Obviously these are intended to enrich the learning with cultural, social, historical and geographical aspects, support language-development, presentation-skills and most profoundly the development of personality in the light of world citizenship.

Understanding that social consensus on what is considered (un-)sustainable and what constitutes progress can differ across cultures, countries and regions. I consider it most relevant from an ESD perspective to have students experience how objective the 'knowing' about these is, if (normative) valuations play a role, how people (re-)act towards sustainability.

4.5 OPEDUCA MasterClass

Teachers are expected to have a more prominent role in OPEDUCA than one might presume when considering the student-owned and -steered qualities of the approach. Their proposed practice contains more than classroom-based instruction and not degrade the profession to a 'guide on the side' or 'coach'. Any sense of obsoleteness will make way for more relevance as the teacher has to deliver on the individual, Study-Team and school-level. As it became clear during the development

of the OPEDUCA-concept, the role and position of teachers would change, specific attention requested regarding:

1. the teacher's comprehension of the OPEDUCA-vision and fruition of the concept,
2. the application of the instruments in practice,
3. potential conflicts with present day reality.

OPEDUCA MasterClass took shape on the fly, grew from the gatherings of teachers as part of the multi-disciplinary partnership (1.1), initially being no more than a set of ideas, outlines, goals and tentative approaches. Small-scale meetings of 4-6 to full-day settings of 30-40 persons gradually took a more instrumental shape as the need for a separate education of teachers became clear (fig. 4.5).

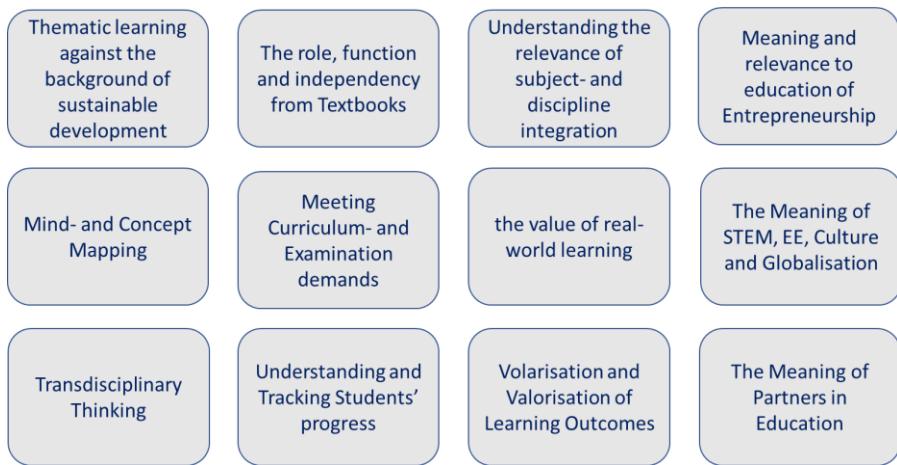


Fig. 4.6
Aspects requiring attention in the education of teachers

Although not an instrument in the beginning, OPEDUCA MasterClass eventually became one most profoundly as I will describe when recounting its further development and practical working (5.2).

4.6 Principles underlying the OPEDUCA-concept

Complementary to the principles and ideas addressed in the previous paragraphs (ongoing learning pathways, student focus, problem- inquiry and community-based learning, entrepreneurship- and citizenship development), the instrumentalization of ESD-based Education implies further convictions regarding learning, education and knowledge(-development). I will address these quite briefly in correspondence with the limited way they were articulated when OPEDUCA was conceptualised. As the concept expanded and practice unfolded, so did our understanding and application of these and other principles (addressed in the following chapters).

4.6.1 Free(d) to Learn with a critical constructive mind

Expanding on the notion ESD starts out from the critical individual learner in search for (future) meaning, the OPEDUCA-instruments further explicate the students' ownership of the process and the interrogative 'What, Where, Why, Who and How?'. What students work into their learning comes from experiences in the entire realm of their lives, considering the personal disposition as starting point, then enriched by observations and experiences in the real world.

Looking at a Field of Knowledge from a bird's eye, the students observe a landscape of elements and interrelations, overview a theme and consequently 'dive into the matter', like a bird's flight over a landscape of phenomena with landing spots and roads (relations) between them. A landscape allowing for a continuous search and discovery of earth and society in their entire appearance. Expanding on this analogy, students are in control in terms of routes, distance, heading and altitude, the choice of 'landing spots' to collect and leave data behind, keep hold of educational sources and Partners in Education. A visualisation intended to complement their understanding of a students' ownership of the learning process, accentuate their freedom to learn ('to go where the learning takes you') and deliver the sensation of 'collecting', underlying constructivist learning. Obviously, the term 'OPEDUCA Flight for Knowledge' originated from this vision on a students' unlimited learning. It also explains the choice for a white dove in the OPEDUCA-logo which stands for:

- the universal quality of learning, not restricted in time, place and occasions,
- the peaceful intend and goals of the learning as well as the learners' equality and neutrality,
- the open and fair interplay with socio-economic actors and phenomena.



The personal learning proposed is literally and quintessentially constructivist but does not call for a divide between (internal) construction and (external) instruction. The collecting, experiencing and interpreting student is supported by way of alternative critical interpretations of findings, concepts and the placement of facts, inviting teachers for clarification. The student cannot 'be told', the opportunity to repeatedly re-sort, re-merge and re-constitute data and information collected is essential to learning, a process intrinsic to the person and relevant for the emerge of metacognitive capacity.

The natural inclination to provide youngsters with answers, facilitate and guide can be argued as the sole essence of education, to be distinguished from 'schooling' (3.3). The process of educating provides guidance, furthers insights, points out possible but does not command directions. As the learning is underway, steering follows to stay on route, correct or change direction; a continuous process for which the student draws on im- and explicit input and guidance.

These considerations are also based on the understanding that our working memory has limited (intake-)capacity (G. Miller, 1994) and should be used effectively. Once 'input' is processed and stored in long term memory it can be used 'forever' and in 'infinite' amounts, but if not there has been no learning. The structured storage-function of the Fields of Knowledge follows from this conviction; the varied, initially short-focused collection process characterised by ways of multiple experiences and (brief) associations.

The (implicit) repetition of elements in Flight for Knowledge (multiple storage and retrieval of the same or comparable data, subject-elements and concepts as they also appear over again in other themes) is congruent with what is known about the working of our memory as the cumulative-strength hypothesis (Murdock, 1982;

Ward, 1893). Flight for Knowledge generates rich opportunity to develop a multitude of multiple traces (Bower, 1967; Logan, 1988), assuming that massed repetitions strengthen a single trace, whereas spaced repetitions may produce multiple traces (Gillund & Shiffrin, 1984).

Obviously, Flight for Knowledge also (implicitly) builds on the idea of dual coding as it sees to parallel verbal and non-verbal aspects of processing input (Paivio, 1969), contributing to more effective memorisation. Furthermore, the real-life learning elements are proposed to give way to continuous associations and references between what is lived, experienced and conceptualised while also allowing for more concrete observations (Paivio, 2013).

4.6.2 The de-Composition and re-Valuation of Subjects and Disciplines

Having introduced transdisciplinarity as natural to ESD, the OPEDUCA-instruments give way and call for transdisciplinary learning. Present disciplines and school subjects are although not prematurely disqualified as old-school utilities representing outdated knowledge (that cannot exist in principle). The argument contemporary curriculums no longer hold since all develops and changes rapidly while the future has become most uncertain, I counterpose with the notion that this is exactly why mastering the existing body of content and concepts becomes even more useful. Not knowing what the future brings does not imply students do not need to know anymore. Certainly in the light of sustainable development, students should be facilitated and enabled to close a possible content-gap (De Graaf & Kolmos, 2003).

The effectuation of learning on future defining themes invokes a decomposition of disciplines and consequently subjects to reach the transdisciplinary level. Subjects are ‘broken apart’, de-composed into topics, elements and objects as they are placed in context by the students. A process enabling contextualisation, integrative learning and a deeper understanding of matters. Each element of every (school-)subject is eventually (re-)placed following a more logical, contextualised and transdisciplinary perspective. This way also more recent and further-going scientific insights and phenomena can be worked in, placed.

Compared to traditional education, the pre-programmed sequential process of lesson plans, following textbooks and methods, is exchanged for inquiry-, problem- and community-based learning. Therewith the moment a student touches on curriculum-elements will differ and be less foreseeable. Elements studied, covered and assessed are kept note of at the individual students' level and consequently 'ticked off' repeatedly as various aspects are likely to appear frequently. The sum of the various Fields of Knowledge, BusinessClass and Global is seen to eventually cover the curriculum in content and intention. So long as the present system is in place, the prevailing curriculum is therewith respected as a prescribed list of contents, concepts and competences, yet approached as mandatory minimum; it no longer has a prescriptive, restrictive, steering and directive quality.

4.6.3 Thinking about the Value of Knowledge – a brief epistemic perspective

When speaking of 'Knowledge' in the framework of the OPEDUCA-concept, it comes close to the definition that knowledge is assimilated information and understanding of how to use it (Hess & Ostrom, 2005), a high-value form of information applicable to decisions and actions, knowledge derived from information as information is derived from data (Davenport & Prusak, 1998). Knowledge-creation is seen as the transformation of concrete experiences, followed by reflection, abstract conceptualisation and active experimentation (Kolb, 1984). Thereto the knowledge creating process in OPEDUCA constitutes the notion of:

- data (facts that can be looked up and taught),
- information (the useful combination of facts underpinning 'knowing'),
- knowing (the application of information to understand phenomena, concepts),
- knowledge (the application of 'knowing' to address a problem, making informed decisions),
- wisdom (the valuable application of knowledge).

This 'hierarchy' intends to offer a basic framework for a student to better understand, incorporate and evaluate the quality of observations, enhance a critical notion of what is dealt with. The OPEDUCA-instruments intend to enable students to study

towards wisdom to guide one's ideas, opinions and actions. Following, this basic framework requires being aware of facts, the ability to interrelate those and built information, combining such to generate knowing whereafter the just and skilful application of such knowing defines knowledge. Deciding how to use knowledge is a matter of wisdom, which underly values. As without values the application of knowledge turns awry, it is essential the student herself gains a profound understanding of the Dimensions of Sustainable Development which intend to provide leitmotiv. Such in turn serves the essence of own discovery, her notion and interpretation of values. Values can therefore never be commanded as they result from the learning, are not a commodity to be infused up front - the learner must undergo the (e-)motion. Relating this to a person's balance, I refer to Schumacher who wrote: "*Unless that person has sorted out and coordinated his manifold urges, impulses, and desires, his strivings are likely to be confused, contradictory, self-defeating, and highly destructive. The 'centre,' obviously, is the place where he has to create for himself an orderly system of ideas about himself and the world, which can regulate the direction of his various strivings.*"

I gather knowledge-development a process taking place in the mind, its fruits not transferable, not to be taught, let alone be looked up on the internet or elsewhere. Relating this to 'contextual knowledge' and terms alike, I argue context can direct (another, wiser) application of knowledge, but it is not the context that defines what knowledge is.

The data, information and concepts collected in a Field of Knowledge are proposed to be self-validating, validity assumed to be a function of:

- the authenticity of sources used, including the degree in which a student seeks and finds qualitative second (expert-)opinion with Educators (normative analyses),
- the quality of the peer-to-peer exchanges that include self-reflection, specifically when findings and argumentations differ (comparative analyses),
- the teachers' informed interventions, possible through continuous access to each Field of Knowledge,

- the ‘cleansing’ function of the presentations that holds an essential place through checks and balances,
- 3rd party access to content and concepts.

A Field of Knowledge does not hold valid data and information from the start, it is a function of the instrument to have students constantly challenge and correct their findings. They are assumed to practice and expand their critical thinking skills as they gradually built their metacognitive capacity, supported by the break-down and re-trace of their learning process (4th dimension of Flight for Knowledge). Teachers and Educators initially do not fill gaps or correct, but allow for errors and defaults, a practice I regard crucial for students’ self-dependence and their development from pupil to student.



5 Application of OPEDUCA in formal education

The OPEDUCA-concept was brought to regular practice by ways of a multilateral cooperation of people from all relevant sectors the concept relates to, referred to as the (ongoing) ‘OPEDUCA Project’. I will first recount its constellation (5.1) to provide the context of practice and then dedicate this chapter to a critical review of the application of the OPEDUCA-instruments, starting out with MasterClass (5.2) as it eventually preceded Flight for Knowledge (5.3), BusinessClass (5.4) and Global (5.5.).

5.1 Introduction

As introduced, the multi-disciplinary cooperation referred to as the OPEDUCA-project was deliberately unregulated from the beginning to prevent hinder from contemporary systems and organisational restrictions. Therewith a comprehensive cooperative of practitioners and experts, which mirrored the meaning of the concept, could be realised. Participants included school leaders, teachers and students from primary up to and including higher education, scientists in each respective field the concept addresses, representative policy developers from Municipalities, Provinces and Ministries, semi-governmental organisations and entrepreneurs from middle and large-scale industries. Complementary support came from practitioners in the worlds of the Arts, Sports, Welfare, Youth care, Culture and Religion.

As the concept found wide support with schools from early on, it was practically lifted from the cradle and put to practice more swiftly than foreseen. Applications started off and on, across the entire educational sector and in multiple regions. A development not planned, making the orchestration and synchronisation subject to improvisations but also delivering additional and most valuable insights. The landing of the concept amidst practice allowed for authentic contributions by practitioners, realism informing best comprehension. As the instruments were applied and critically reflected on continuously, practitioners’ efforts did not have to

be encapsulated in a more rigorous project-form. Such would also have stipulated and predefined activities, therewith potentially narrow the scope and validity of the research. Proceeding in an un-forced manner allowed participants to remain close to their convictions and commitment, be open and vulnerable. Furthermore, working amidst daily regular education provided for a more explicit manifestation of schools' contemporary challenges.

Favouring the opportunity to remain most open for the breadth, depth and realism of practice, academic rigor was served as the meaning, acceptance, applicability and transformative value of ESD could be profoundly researched. Academic quality further builds on joint intermediate reflections, evaluation reports, documented interviews, direct observations in practice by third parties, planning- and evaluation meetings with participants, surveys and critical observations of external experts and scholars.

Table 5.1 presents the research-base of 40 schools in primary and secondary education, 30 in the Netherlands (12 primary, 18 secondary) and 10 (3 primary, 7 secondary) in the countries listed in the left part of the two-column overview. The international element essential to study the validity of the concept and its applicability for schools functioning under different rules and regulations, in other geographic and societal areas, administered in a unique way and run by principals and teachers educated and trained otherwise than their colleagues in the Netherlands. The participation and practice of further schools and organisations in other countries (listed in the lower right part of table 5.1 as 'indirect') was less extensive, therefore their contributions and findings are considered complementary. The same goes for schools taking part from further and higher education who, due to their smaller numbers, are not regarded sufficiently relevant to draw conclusions on.

Specific references to primary and secondary education will only be made in case of clear disparities relevant for the interpretation of practice and findings.

School Levels	Number of unique schools	Flight F Know. Students	BusinessClass Students	MasterClass Teachers	Global Students
Primary	15	649	244	67	43
Secondary	25	1,063	346	231	38
Further	4			26	
Higher	8				
Total	52	1,712	590	324	81

School Levels	School.Lead. Network	Flight F Know. cases	BusinessClass cases	MasterClass number	Global exchanges
Primary	8	26	53	6	4
Secondary	10	37	90	12	9
Further	2		.	3	
Higher	4				2
Total	24	63	143	21	15

		<u>Direct</u>	<u>Indirect</u>
Total number of students	2,383	Germany	Spain
Total number of teachers (MasterClass & practice-only)	324	Finland	Qatar
		Austria	Slovakia
Organisations involved in 1 or more OPEDUCA-practices:		Lithuania	Japan
Companies (midsize and large)	142	Romania	Peru
Municipalities	29	Italy	Canada
(semi-)Governmental bodies	36	Czech Republic	Turkey
Universities	27	France	USA

Table 5.1

The research base in numbers

Overall, comparing earlier and contemporary research in ESD, the research-base was extensive while the gathering of primary, secondary and further education was thus far unprecedented (Holm et al., 2016). Considering the breadth and depth of the research(-base) and the number, expert level and practical standing of the people and organisations who contributed and where directly involved in the process, we regard our observations sufficiently representative to base qualitative conclusions on.

5.2 OPEDUCA MasterClass

Reinvigorating the Teacher

OPEDUCA MasterClass took shape and substance in accordance with the concept, making the process, content, style and setting ‘part of the message’, teachers for larger parts of the time taking the role of pupils and students. As consequently substance and form merged and interchanged, I will not only reflect on OPEDUCA MasterClass as such (as instrument) but also describe how we gained (preliminary) insights in the teachers’ disposition and capacity(-development). This also to avoid repetition when tending to the other instruments.

The findings are based on 21 4-day MasterClasses in which in total 324 teachers, coming from 30 schools, took part (average group size 15). Of these 311 (96%) completed the process, 13 (4%) left early, either being advised so (4), because of a jointly noted preposition that didn’t match the concept and setting (3) or because they didn’t find themselves motivated enough to conclude the 4th day (6).

Day 1	Day 3
Introduction	Taking a breath - first feedback
Interviews	Recap of integral working of OPEDUCA
Lunch	OPEDUCA BusinessClass
OPEDUCA Instruments	Lunch
Future Defining Themes	Teams working on their BusinessClass
Dinner	BusinessClass Presentations
Evening Guest	Industry as Partner in Education
Late night Drinks	Dinner/Drinks with an Entrepreneur
Day 2	Day 4
A Local-to-Global Learning	Chewing on the Challenge from Practice
At work with Flight for Knowledge (teams)	OPEDUCA Local-to-Global
The Curriculum Cracked	Teacher-Student reality in OPEDUCA
Lunch	Lunch
Flight for Knowledge presentations	An OPEDUCA Based School
A practical look at Flight for Knowledge	Your OPEDUCA-based School
Partners in Education	Good-Bye in 2 words

Table 5.2

Gross outline of OPEDUCA MasterClass

All sessions took place away from school, mostly at an Abbey or alike location which literally and figuratively allowed for a respectable distance from daily worries. Participants stayed over between days 1 and 2 and 3 and 4 with an interval of 3-4 weeks between day 2 and 3 during which they tried first practice with their students.

Participants on average spent between 52 and 64 hours, the length of the days varying between 15 (days 1 and 3) and 9 hours (days 2 and 4). The intermediate try-outs of instruments took according to the teachers between 4 and 16 hours. The proceedings (Table 5.2) aligned with the various components of the OPEDUCA-concept.

In consecutive paragraphs I will critically observe how OPEDUCA MasterClass contributed to the education of teachers in the breadth and depth of the OPEDUCA-concept (5.2.1), how it developed their understanding of the feasibility of the instruments (5.2.2), prepared them for practice (5.2.3) and furthered their professionalisation (5.2.4). Lessons learned are presented in 5.2.5 .



5.2.1 Educating teachers in the breadth and depth of OPEDUCA

Keeping away from being a training or course, OPEDUCA MasterClass was effectuated as an interactive immersion in the concept, methodologically applying instruction, exchange and debate, collaborative practice in small teams and groupwide participative reflections in an interwoven way.

Introduction to the Vision and Concept

The introduction in OPEDUCA was staged as a one-sided swift transdisciplinairy narrative, followed by extensive group-based exchanges following participants' initial responses. The execution style, characterised by fast phrasing addressing over 70 issues (including that same morning's news, historical facts and assumptions, local conditions and the state of the world), spilled a turmoil of statements, arguments, questions and critical observations over the teachers' heads, was yet consistent and actual. As teachers referred to it, the 'whirlwind introduction' in OPEDUCA proved most effective to rattle them loose from their daily grind and take them to the heart of the matter.

After the contours of the OPEDUCA-concept were plotted, participants engaged in bilateral '5- minutes' cross-interviews that took triple the time and more, followed by mutual feedback in the group which triggered extensive exchanges. As confirmed almost unanimously, the excersice proved effective to mutually discover dispositions, experiences and possible development goals, provided insight in both the person and professional. Personal values were presented, discovered and discussed, following a variety of recounted backgrounds (ranging from a teachers' motorbike travels to the North pole, a former live as certified translator or being born and raised on a farm). The group exchange was characterised by appreciation, not seldom astonishment, constructive questioning and positive feedback.

Since the first two program elements caught participants in a process of intensive interaction, story-telling and multi-disciplinary associations, they contributed substantially to the later widespread engagement for the instruments. As teachers

occasionally put it: “*You are not gone tell us ... you're gone make us live it*”. Especially the sensation there is much more to know and understand about each other (99%) was treasured as an important outcome. The critical notion colleagues didn't knew each other well was more then set off by the conviction there was apparently untapped capacity and opportunity to build on. Furthermore, participants concluded they thusfar too rarely exchanged about learning and education more thoroughly, acknowledging that in daily practice contacts regarded matters of the school as organisation (32%) and operational aspects of the teaching (52%); exchanges on the personal level limited to lunch-break and occasional chatter (16%).

As teachers jointly considered their students' future lives, each group again formulated the future-defining themes mentioned earlier (no more than app. 10-20% kept reservations). In-between considerations mainly regarded the importance of one's own subject (50-60%) and compliance with the curriculum (80%, 30% voicing



it a barrier up front). Less frequent (10-15%) teachers pondered if matters closer to students' daily life would be more effective to base Flight for Knolwedge on. Understanding these intermediate reflections pointed to questions, it proved effective to jointly and extensively argue that:

- the proposed transdisciplinary learning would demand more of subjects rather than less, a debate requiring a substantial number of examples readily available. Especially regarding Languages, History and Arts in-depth reasoning was called for to minimize remaining reservations,
- the curriculum is a looming presence, obscuring progressive thinking. To ease concerns, teachers were invited for a quick 'game' during which they were challenged to come forth with any curriculum-element, to find each could be handed back to them instantly placed in OPEDUCA,
- opting for issues closer to the students' life might turn out poor where it comes to sense-making, meaning, realism, longer term relevance and the depth and breadth of the studies (convincing over 80%). Also, this discussion rested on the prompt delivery of exemplary reasoning.

Where one might expect younger teachers to be more open minded regarding these matters, being less shaped by traditional practice, the arguments appeared to resonate stronger with older colleagues i.e. those with considerable experience. Where they stood for their subject and held their ground until convinced, those who voiced an innovative disposition earlier on appeared to let go of the relevance of their subject quite swiftly while putting little in place to compensate for.

During these earlier phases of OPEDUCA MasterClass both the logic of the concept and the force or argument were crucial to find the teachers' understanding and support. While room for ongoing discussions was left, in each group close to 90% grew open and willing if not anxious to move forward.

Teachers' preludes to practice - Flight for Knowledge

Teachers' first teamwork on a Field of Knowledge reflected their existing insights, experience and interest in a theme - the result mostly little more than an 'amoeba', presenting few branches, hardly any relations, no coherence, hierarchy or an orderly setting. Also when branches became included in the second and third iteration, the conception of 'depth' was never explored and grossly only a third discussed the relevance of the connections between branches and interrelations between elements. Yet, the exercise as such was perceived as challenging, motivating and invigorating. Teachers enjoyed the groupwork and presentations, became gradually more convinced their subject would indeed be honoured and teamwork delivered a better result.

The teachers' difficulty to produce a first respectable Field of Knowledge made a massive challenge surface early on, further referred to as poorly developed 'associative capacity'. Over 90% acknowledged shortcomings in relating themes to real life, trans- and interdisciplinary reasoning and a lack of academic background on the theme. This fair admittance was as honourable as it was constructive, motivating most to change perspective. As a teacher from a primary school stated in front of the group: "*I am ashamed that considering the theme Water I seem to cannot image much more than brushing teeth and doing the dishes, I will learn, but I am really embarrassed to find that I am the one, while lecturing students about equal rights and breaking through traditional roles, who is unwillingly underlining them*". Looking their apparent shortcomings in the eye, teachers were capable to drop cloaks and masks and continue even more constructive. Working as a team of colleagues facing the same challenge, the maps eventually 'exploded' in variety, colour and depth while the exchange of views led to dedicated debates about the essence of for example water-management, local food production and waste-prevention.

During this phase two further challenges for the teachers surfaced. When pondering to which Partners in Education one could potentially turn for specific elements, their insight in the composition of the social-economic fabric surrounding the school was found to be limited. It appeared a challenge to imagine where in the real-world phenomena existed and place educational values in society. Furthermore, while

being at work themselves, teachers gradually started voicing concerns how to manage the student's more outward oriented learning process, facing the exchange of classroom-management for 'something else'. To put this to the test, participants sought try-outs with students during the few weeks' interval between day 2 and 3. Hardly without exception, those who took their first experience to practice reported students "loved it and didn't let go once started". We observed this positive feedback to also mirror teachers' own growing dedication to the concept and instrument. We intermediately resumed that the major challenge would be the teachers' transition to Educator. As a Geography teacher remarked: "*So, if I get this right, you propose I read about the latest news regarding the brown-coal mining in Germany and talk about it in English with my students when dealing with fossil-based energy, which isn't in my curriculum to begin with*". Pondering this briefly while the rest of the group nodded in silence, he continued: "*I get it, yes*". Coming back on the insight later, he concurred again but admitted his English might be too weak, following which without further ado an English teacher stood up from her chair, offered tea in a symbolic way and sat next to him for the rest of the day. It was at these precious though often occurring moments we found proof OPEDUCA started to trickle in.



Teachers' preludes to practice - BusinessClass

Except for the ap. 10-15% who in some capacity had personal experience with entrepreneurship, OPEDUCA BusinessClass was a phenomenon strange to most teachers. Holding up a mirror, we questioned how it can be they, as grown up consumers, running households, could be so unfamiliar with entrepreneurship. A major part of the time consequently had to be spent on introducing the meaning of entrepreneurship, the impact of entrepreneurs and companies in general, the working of the economy, the issue of (un)sustainable consumption and production, the global distribution of resources, economic power in relation to politics, etc. At least half of the participants occasionally voiced a negative sensation regarding 'business', 'managers' and alike terms, expressing dismay when aspects as 'attitude' and 'personality' came into play. Most striking and therewith insightful examples of such feelings surfaced when colleagues from initial teacher training participated, some of whom 'broke off' the exchange, stating the development of a young person should have nothing to do with 'attitude', 'personality' and 'style'.



Eventually teachers grew more understanding and became as involved as before when working in teams to create and present a first businesscase. Standing in front of their colleagues, energy levels and enthousiasm surged again, the presentations characterised by joy and dedication to keep their cases upright, not seldom accompanied by a good laugh in constructive spirit. We noted teachers' attitude hardly differed from that of students in BusinessClass. Tension, pleasure, choice of wording, composture and a visible sensation of 'achievement' proved very much the same. This also held for the variety of physical and mental excersises to mark the essense and importance of teamwork, risk taking and more qualities alike.

Whereas also BusinessClass could be very well introduced, practiced and seriously considered, the program by then (half way during the 3rd day) began to weigh heavy on participants. Good will did not as much suffer from falling energy levels but as result of an accumulation of questions and challenges outstanding with regard to the application of the instruments in practice. In order to make more way for these, OPEDUCA Global was only addressed in headlines. Eventually the 4th day was dedicated to aspects discussed in the next paragraphs.

5.2.2 Teachers' understanding of the feasability of OPEDUCA

The application of OPEDUCA in present day education was as recurring topic, the curriculum and registration of students' progress, teachers' own competences and the approach of 'assembled educations' the most dominating aspects.

Teachers and the (curse of) Curriculum

Throughout MasterClass, the curriculum was a touch point for teachers to challenge the OPEDUCA-concept, provocatively questioning how their subjects would be respected and societal values such as 'equity' and 'peace' could be honoured. In frequence and weight, the curriculum-question was almost an entity (if not identity) in its own right, hanging in the middle of the room, a questionmark and hiding place at the same time. Thinking through its essentials (origins, ownership, relevance, actuality) led participants to question each other profoundly. A process

feeding the notion they had little influence if any on the curriculum and apparently took the way it was worked into their textbooks and accompanying materials for granted. By ways of a thought experiment participants were left to ponder how far ownership of education in this regard was taken from them; had they become ‘soldiers of schooling’ instead of Masters of Education?

Only after it was convincingly explained and proved back and forth the OPEDUCA-instruments would cover the entire curriculum, serve each question in the exams but also contribute to the broader spectrum of students’ competence development, teachers relaxed. A further explanation of the 3rd and especially 4th dimension functionality of Flight for Knowledge, to even more profoundly arrest the conclusion, however proved difficult to grasp. The 3rd dimension, offering the possibility of expanding each item in-depth (stacked) and the 4th, allowing for a timeline to retrace students’ progress, appeared for most too far beyond the 2-dimensional textbook-practice with its more linear progression.

The curriculum-discussion was used to develop the sensation with the teachers they already practiced cross-curricular education. It was pointed out, again in explicit detail and lauded with examples, that most tended to include ‘nice and interesting things’ to tell on the side, going beyond one’s subjects and even discipline. ‘Excursions’, mostly originating from one’s own interest if not fascination (the French teacher on the wonder of wines, the geography teacher on the ecosystem of the polar-bear). We found over 65% in support of the argument they were already trying to enrich their teaching this way, offer more than requested also to grab students’ attention. Consequently, during MasterClass the practice of cross-curricular narratives and the teachers’ implicit multi-disciplinary teaching could be looked in the eye. Feelings expressed in this discourse pointed out that:

- teaching had apparently become ‘stuck’, the desire to offer more suffering from a schoolish way of organising (classes, textbooks, lesson plans and alike),
- teachers tried to find (solitary) ways to escape the straitjacket by borrowing contents from other subjects,

- one is not truly aware of what colleagues are doing (alike), missing complementarity (the geography teacher not inquiring with his colleague from Biology why polar bears need that specific eco-system to survive).

We concluded it was not as much the thematic and transdisciplinary learning to cause tensions or conflict with the curriculum, but the way subjects are placed, managed and run. Most explicitly taking note of the fact teachers in general apparently accepted such.

The matter of how to capture, 'track & trace' students' progress and achievements when educating OPEDUCA-based, was as omnipresent as the curriculum. It appeared a deep-rooted concern we first encountered by returning the question, inquiring if demands now formulated could be met in present practice. How illusionary did they consider testing and examination nowadays? Facing facts, teachers remained partially concerned though grew convinced opportunities for a more fair and realistic progress- and achievement account could be met, not despite but because of educating OPEDUCA-based.

The development of Teacher('s) Competences

Regarding teachers' own competence-development, OPEDUCA MasterClass was drenched with the application of creative and critical thinking. As eventually everything deemed secure and stable was questioned and put to the test, teachers had to engulf themselves in formulating experiences and arguments, take part in debate, learn new concepts and how to apply them, collaborate, present, evaluate and analyse. Thereto time (ap. 15-20%) was spent on a range of mental and physical exercises addressing essentials of creative thinking, cooperation, leadership, acting under unsure conditions and alike. The working of MasterClass allowed for an explicit address of the teachers' disposition now that a new reality and corresponding competences were addressed, put to test and grew on them.

While all this took place in a most constructive and pleasant atmosphere, it became clear most would be facing quite substantial challenges in practice, were it only with

respect to the use of more languages, understanding industry and flipping to more informative programs on evening-TV. OPEDUCA MasterClass proved to be a clear mirror for one's present capacity. Overall, the envisioned multi-faceted competence-development of students would require teachers not to merely teach different but embody such competences oneself in a credible way. A participant's notion that "*We are not tempted to think out-of-the-box, you are telling us there is no box*", got ever more meaning as they had to create a mental image of an emerging reality.

Assembled Educations

'Assembled (or priority-) Educations' (2.3) were addressed to (re-)consider teachers' effective say in education against the background of separate programs for STEM, Environmental-, Entrepreneurship-, Language- and Citizenship Education. Debating if these should exist out of their own right, observing their origins, added values and capacity claim, teachers concluded assembled educations:

- could be traced back to outside interests laid upon their schools,
- led to stand-alone activities and only a partial involvement of teacher staff,
- were mostly separately funded and kept means away from education in general (noting they underestimated the impact by a tenfold and more).

It was due to the constructive approach, openness and progress achieved thus far these aspects could be discussed, moreover since teachers (ap. 15%) who took part in or coordinated the programs were initially reluctant to be open about their meaning, content, budgets, time spend and effects. Debate and eventual conclusions came difficult for those involved, certainly if such involvement included escapes from daily routine by ways of excursions, project-weeks and other activities one had learned to treasure. Up to one out of four of these admitted they now, when openly discussed, found themselves 'standing against the wall', stating they felt uncomfortable with the notion their additional activity was scrutinised. Table 5.3 provides the change in teachers' perception of assembled educations, first noting their initial response and again by the end of MasterClass.

Perceived sole relevance of Educations before and after MasterClass	298				increase factor	67 primary				231 secondary			
	relevant	OPEDUCA integrated				relevant	OPEDUCA integrated			relevant	OPEDUCA integrated		
STEM	138	46%	173	58%	1.3	40	60%	49	73%	98	42%	124	54%
Environmental Education	70	23%	103	35%	1.5	48	72%	52	78%	22	10%	51	22%
Sustainable Development	95	32%	197	66%	2.1	7	10%	51	76%	88	38%	146	63%
Entrepreneurship Education	22	7%	96	32%	4.4	8	12%	44	66%	14	6%	52	23%
Culture Education	49	16%	82	28%	1.7	31	46%	38	57%	18	8%	44	19%
Multiple Languages	32	11%	60	20%	1.9	4	6%	21	31%	28	12%	39	17%

Table 5.3

Teacher's disposition regarding Assembled Educations before and after OPEDUCA MasterClass (base: 90% of participants from schools eventually applying OPEDUCA in practice).

Exchange and debate confirmed our presumption that especially the promotion of STEM had led to an overweighed attention in daily educational practice. Environmental Education still holding strong in Primary as separate activity, schools in Secondary claiming to be active in Sustainable Development work with standalone temporary projects.

The general understanding of the integrative quality of ESD had grown during MasterClass while the importance of Entrepreneurship was eventually more profoundly underlined than expected given the average teachers' distance from industry. As the same increase was found for 'Multiple Languages', we tentatively concluded participants provided a higher score by the end of MasterClass due to the sensation they had experienced a challenge, looked something new to practice in the eye.

5.2.3 The preparation of teachers for application in daily practice

As participants continuously projected the concept and its practical implications against feasibility and viability in practice, this dominated the program of day 4. To capture and integrate most aspects, the design and working of an OPEDUCA-based school was presented as challenge to the group, resulting in the gradual emerge of an image and implementation scheme participants construed from their practical insights and experience thus far. Because this exercise was repeated during every MasterClasses, an insightful and realistic perspective for ESD-based Education

became increasingly clear. The teachers' thought experiment converged on three layers':

1. Learning process: can the practical implementation be imagined on the student and teacher level.
2. Transition process: how can the instruments be implemented in practice.
3. Organisational aspects i.e. characteristics of the school organisation.

Even when the concept was most clearly understood and underlined, these 3 layers continuously caused entangled, troubled exchanges resulting in (temporary) confusion, revert processes and fall-backs that called for a renewed understanding on the conceptual level. Eventually layer 1 went without further argumentation while 2 was considered doable. Teachers laid out a transition-plan by using a pillar-approach, starting with a class of 1st year students leaving all other intact, gradually working upwards over the years while expanding the number at the base. Regarding the rearrangement of capacity, teachers went along with:

- the notion of 'hidden cross-curricular capacity' ('borrowing' of subject-elements), opening the way for cooperation,
- the fact that teaching the essence of what is needed for a subject requires less time than now scheduled (saving 20 minutes on an average 50-minutes lesson),
- the notion that collaborative teaching prevents doublures now 'backed-in' in the subjects,
- the argument stand-alone activities, near-school projects and assembled educations would naturally be integrated in ESD-based Education, freeing capacity.

Layer 3 was perceived with doom by nearly all as it presented the collection of 'continuously temporary challenges' in a school's practice. Participants proved resourceful in recounting a series of aspects (regardless of school type and the same in each country) that would smother aspirations most profoundly. These included spaces being 'relabelled all the time', failing ICT, colleagues falling ill, school leaders changing position, in-between small projects requiring attention, unexpected and ill supported political interventions. We acknowledged any improvement in education

is a wicked challenge for teachers as they first must confront imperfections, shortcomings and clear defects in present day practice that seem to linger on ‘forever’. Eventually between 20 and 40% of participants declared themselves willing and capable to effectively address these ‘once and for all’, spoke of ‘poor excuses’, while others stated to be ready to ‘re-claim ownership’. Including more moderate expressions of support, 70-85% were most willing to make the switch from thinking in restrictions to re-thinking and re-defining education and school practice. Overall, around 4-6 in each group (10-20%), would go for it whatever the consequences, while 1-4 participants (5-15%) would stay away from any alteration of practice to begin with. A rare exception voicing the present position achieved was too comfortable to risk. The more the consequences of an OPEDUCA-based-school were discussed, the clearer it became 30-60% of the teacher-population would waver back and forth, a successful transition depending on the trust and freedom of movement the 20% ‘high-achievers’ would be granted. The proof of the pudding would most certainly be in the eating.

Obviously, aspects of the school as organisation and especially the quality of its management, was a critical issue when projecting OPEDUCA on daily practice. A psychological block for participants appeared as soon as management, the school leader and higher institutions entered the mental picture. The level of trust appeared low, teachers in most cases uttering fears that those in the lead would eventually not see it through. Most foresaw a practice (as they said to have experienced many times before) in which teachers would accept the challenge, spend extra time and energy to then eventually be discarded, left without the support required and even put to blame for an eventual lack of success if not failure of innovations.

	total 324		primary 67		secondary 231		further 26	
<u>The School leader is:</u>								
fully capable	42	13%	31	46%	9	4%	2	8%
meaning well, though not capable	36	11%	11	16%	23	10%	2	8%
depends on the matter at hand	32	10%	2	3%	21	9%	9	35%
wavering from left to right	72	22%	2	3%	68	29%	2	8%
not capable at all	26	8%	1	1%	24	10%	1	4%
no opinion	10	3%	2	3%	8	3%		0%
		67%		73%		66%		62%
<u>Opinions gathered:</u>								
by teachers speaking out	162	50%	41	61%	114	49%	7	27%
in a deductive way	56	17%	8	12%	39	17%	9	35%
unresponsive / not deductible	106	33%	18	27%	78	34%	10	38%
		100%		100%		100%		100%

Table 5.4
Teachers' trust in school leader capability for the transition process envisioned.

Following organic explanations surfaced when taking inventory of blockades for improvement⁷:

- The force of habit, for example buying learning materials and methods.
- The lack of personal ability, quantitative and intellectually.
- Being overruled by school leader's decision to concur with newly upcoming policies and plans.
- A feeling of 'capitulating' before the start ("had it, seen it, done it before").
- Feeling pressured to enter a minefield without equipment and protection.
- Colleagues delivering lip-service, 'not home' when called on.
- School management suspected to push the 'Start Next Game'-button when facing opposition.
- A continuous flow of policies affecting practice without new means.

⁷ As these imponderable notions were shared, either profoundly or by more gentle expression, we did not score on the elements.

The explication of transition elements led to discussions about improvements going back and forth, bouncing between (perceived) barriers. However, when guiding the teachers' considerations, inviting them to take a heart, dare to look beyond and consider possibilities, the process gained momentum and got into a rapid (taking 2 to 3 hours) re-design of the concept 'school'.

It could be tentatively concluded teachers do have the will to improve practice and can overcome restrictions of present-day schooling, thereto however the 20% most capable and driven must be trusted with a continues lead. Holding up the mirror eventually 4 groups of teachers could be identified:

- The ones that (capable yet or not) make their stand and realise improvements sought for (20-25%),
- Those willing to join true heartedly (25-30%).
- The silent, gentle, middle-group of 35-50% who would be most willing to work along, although not based on a deep wrought inner drive to engage (the 'Wait-and See' group).
- The small though potentially defining group of 5-10% that not so much gave way to conservative thoughts but held silent, being the personalisation of the system and institutions in place.

The balance observed is therewith narrow, a transition process can turn out either way depending on the setting and security teachers would find back in practice, especially regarding the steadfastness of the school leader.

Expanding on this process we progressed by bringing the teacher-professional and personality to the foreground.

5.2.4 Teacher Capacity as a Professionalisation issue

The setting, style and atmosphere during OPEDUCA MasterClass allowed for a critical reflection on teachers' professional identity and personality. Elements addressed too rarely in daily practice, as if the culture in education made it a sensitive issue. Yet any further development highly depends on these assets.

To illustrate the gravity, it needs to be recounted, without any intention of condescendance, occasionally participants were advised to leave OPEDUCA MasterClass early. Such either because of an utter incomprehension of matters addressed, for reason of not wanting to stay overnight, for being decidedly against any use of English in regular education or for not seeing the relevance of having dinner and sharing a late night drink with colleagues. Besides these exceptions to the rule (2%), in the course of the program quite some more gentle occurrences and statements gave rise to participants frowning their brows or cause a temporary ‘drop-out’. Table 5.5 lists some claims, expressions and statements that unnerved participants and invited for discussion.

Effects observed separate / uncomposed largely uncorrelated with concurrence	total 252		primary 54		secondary 174		further 24	
Indeed, this is not a training. It's a MasterClass	39	15%	2	4%	29	17%	8	33%
You treasure your Turf	28	11%	4	7%	23	13%	1	4%
You are disassociated from the real world	43	17%	14	26%	14	8%	15	63%
One has to accept English as a fact	23	9%	19	35%	4	2%	0	0%
You should follow(-up on) individual student progress	48	19%	2	4%	41	24%	5	21%
You are apparently not up to date with the News	68	27%	22	41%	41	24%	5	21%
Industry is of key importance	36	14%	21	39%	14	8%	1	4%
With the right teachers a school can do with 20% less	56	22%	41	76%	13	7%	2	8%
At the end of the day it's up to you and the student	9	4%	2	4%	6	3%	1	4%
Irreversible drop resulting from composed effects (direct teacher feedback)	20	8%	6	11%	12	7%	2	8%

Table 5.5
Elements contributing to a (temporary) teacher drop-out in OPEDUCA MasterClass

Further debating this, quite some teachers were found to have little interest in politics or philosophical thinking, didn't enjoy a late-night debate or devour literature. Although heard about different, generally the older teachers (45+) appeared to (have) put more effort in a richer personal, intellectual, development. While around 85% of the new entrants at least proved of a drive to develop such, the ‘internal fire’ in the age-range 25-35 often felt more like an energy efficient LED-light.

As to personal development, it was quite contradictory and confronting to find that those who had made learning their profession didn't prove to be lifelong students themselves. Less than 20% studied on after initial teacher education, most participated in 1-day trainingcourses focussing on specific issues or a sporadic conference. No more than 4% appeared to be studying momentarily. Furthermore, while teachers were familiar with classical/leading concepts in education and learning(-psychology), only few kept track of more recent research. These indications of eroding professional capacity correlated with and appeared explanatory for teachers' sensitivity for ideas of contemporary 'tough leaders', a continued dependency on textbooks and a positive disposition towards assembled educations and external programs.

Relating teachers' capacity to improvements envisioned, we had to tentatively conclude we were observing a likely too poor professional attitude or even lack of personality. Such partly a self-fulfilling prophecy since teachers were found to secretly feel inadequate and insufficient. The lack of experience in any other field than education obviously a determinant; walking through the respective careers, over 85% appeared to have no relevant (working) experience beyond school at all. As a most supportive senior teacher worded it:

"People, what do we expect? After having been a child until we graduated and assumed this job, we have been around children again all our lives, together with people mostly very much the same ..." .

A statement of a most confronting quality, yet hardly meeting substantial argument of colleagues.

5.2.5 Lessons Learned

OPEDUCA MasterClass proved crucial to equip teachers with an understanding of the OPEDUCA-concept, awaken their sense of ESD and work on their professional development. It allowed for valuable insights in the present practice of schooling, educational challenges and the learning process of pupils and students.

The external setting on a location away from school, taking more days and including overnight stays, was functional to set participants free from daily practice, allow for a more liberated thinking beyond present boundaries, to tailor time to specific elements, dispositions and needs and create opportunity for participants to exchange amongst each other informally.

The choice to make the process, content, style and setting part of the message was wise. The intense, direct, personal and informed way MasterClass was delivered proved essential, the open yet safe and comfortable setting functional for the participants' vulnerable and constructive attitude. The immersive setting came to its right for an indepth study of the OPEDUCA instruments and opened up to the backgrounds of practice.

It was functional to carry through a variety of mental and physical activities, each with an own specific focus to address amongst others creative thinking, the narrowness of present mindsets, the essence and values of collaboration, goal setting and the will to achieve.

It was possible to create a critical-constructive setting and atmosphere that allowed for an open exchange which contributed significantly. Teachers' open hearted participation, profound reflections from practice and will to take the role of students,



informed themselves most thoroughly, their collegial effort an added value in itself. Participants became aware of the existence of untapped personal capacity.

Teaches added substantial value to the ongoing development of OPEDUCA as pedagogy, including didactical detail. As the concept and intended working of the instrumentarium were not instructed but made subject to a constructive process (each MasterClass anew), teachers' embracement of the intention and potential of the concept incurred a sensation of adoption and nurture. Consequently, the OPEDUCA-concept was not only transmitted but subject to further development itself. The instrumentarium underwent a profound assessment, was scrutinized through the lens of practice, while applying it was an indispensable learning experience for the participants. Restrictions and opportunities of contemporary education could be extensively discussed, therewith contributing to a realistic implementation scheme for the instruments.

Next to the conceptual and instrumental perspective, the process opened the teacher's dispositions from the personal as well as professional perspective, both of which were accepted as subject to development. OPEDUCA MasterClass held



key-characteristics for successful adult education. It provided a safe, participatory and action-oriented learning environment that enabled the expression and try out of ideas and the application of past experiences to current learning through divergent thinking. Present problems, challenges and needs were addressed by a two-way communication, encouraging reflection (Brundage & MacKeracher, 1980). This in contrast to traditional training models focussing on imparting knowledge and skills not effective in bringing about change in pedagogical practice (OECD, 2016). Masterclass created a belief with teachers in the OPEDUCA-vision, concept, approach and instruments, their awareness and acceptance to be regarded as a proof of concept (Biggers & Forbes, 2012; Chinn & Malhotra, 2002; Kuhn, Black, Keselman, & Kaplan, 2000).

Teachers evaluated MasterClass shortly after as well as in retrospect. At the end, each participant was invited to choose 2 words that described their experience. With single exceptions each time the combination held at least one solely positive term, 89% only positive. The collection over the entire population provided 28 qualifying terms, 4 of which can be regarded contemplative, 3 negative, all others constructive-positive⁸. Grading MasterClass, the average was 9,4 on a scale of 10 varying between 7,4 (for the lower 10% of the population) and 9,8 (for the upper 45%). The most noted critical reflections by way of independent interview 6 months or more later, regarded the lack of a manual (for reference and guidance, 74%) and the eventual dis-continuity at school (missing follow-up, 16%).

⁸ 28 most used qualifying terms, 4 of which can be regarded contemplative ('thinking', 'puzzled', 'bewildered', 'unsure'), 3 essentially negative ('much', 'fast', 'confused'), all others constructive-positive ('fascinating', 'finally', 'breath taking', 'energizing', 'fulfilling', 'sense', 'pleasant', 'constructive', 'reinvigorating', 'dream', 'hope', 'empowered', 'value', 'refreshing', 'motivating', 'enlightening', 'empowering', 'real', 'exciting', 'believing', 'wow!').

5.3 OPEDUCA Flight for Knowledge

Spreading Wings

OPEDUCA Flight for Knowledge came to practice in 15 schools for primary and 25 for secondary education, next to which schools for further education and university students (in teacher training and other disciplines) were involved. In total the practice of over 240 teachers and 1.700 students active in 73 applications of Flight for Knowledge have been closely observed and analysed. Critical reflections are based on direct observations by multiple parties, reports and analyses by teachers, questionnaires and interviews with students, parents and other Partners in Education. Taking into account the large number and variety of the cases studied, experts involved and the fact activities were accessible, it can be justly assumed the observations and analyses provide for a valid basis to conclude on.

In consecutive paragraphs I will critically reflect on the application of Flight for Knowledge from the perspective of the student (5.3.1), the teacher (5.3.2) and Partners in Education (5.3.3) to then recount how the instrument meets demands of formal education (5.3.4).

5.3.1 Students' Reality in Flight for Knowledge

This paragraph describes how students:

- understand the concept of learning on future defining themes,
- manage the construction of Fields of Knowledge,
- like and affect the idea of working in study-teams,
- perceive the idea and effectiveness of exchanging with educators outside school,
- accept and manage a practice of (continuous) exchanges and presentations to show progress and results.

Obviously, these elements are part of an integrated process and not always clearly distinguishable due to their interdependence. As each aspect studied is also determined by the students' ability to partly self-steer their learning, I will pay specific attention to that aspect.

Students' conceptual understanding of Flight for Knowledge

Students' first steps in Flight for Knowledge followed teachers' initiative to present the instrument to them. In 90% of cases this took place in larger groups by ways of a general one-sided introduction with clear elements of instruction. Therewith students were initially kept in schoolish confinement, the broader meaning and working of the instrument cloaked. As a result, students' creative and associative powers of thought were not called on consistently from the beginning. During later approaches teachers paid more attention to the ideas behind the instrument and amongst others used mood-boards, videos and Partners in Education to introduce the meaning, relevance and characteristics of a theme. From there students were seen to become more motivated, supported by the sensation they were going to address serious issues in the realm of sustainable development. From younger age on students understood the idea of the Dimensions of ESD, coming across logic to them. Overall, a third openheartedly shared that being set free from regular classes had initially been a motivator.

Brought together in Study-Teams, half went to work with dedication autonomously, a gentle push sufficed to activate over 80%. Students were seen to quickly note aspects that had their special interest, finding their own way towards issues within a theme more nearby. Thoughts not close to the surface of their minds could be triggered by remarks of peers, (media-)sources and 'tips & hints' from teachers and educators. Following, most schools reported an overall increase in motivation and effectivity of the learning process.

When working on the same theme for several hours a day, students remained motivated up to an average of 4 to 5 half days. A setting allowing for a more continuous feed of new perspectives in terms of wonder, astonishment and curiosity was essential. It was the teachers or educator's narrative force that established meaning for the students, therewith commitment to a theme and motivation to learn about it through further inquiry.

Where students managed to adopt the approach rather swiftly, such proved a pitfall in case their willingness to continue was not met by follow-up actions of teachers who were found quite content with the good start as such. Furthermore, students' postures pointing to a need for progress were frequently misread, interpreted as

common behaviour in regular class ("We are used to that, they often behave bored"). Only 20-25% of teachers responded by bringing in further concept-elements (extended inquiry, reconstituting Study-Teams, peer-to-peer teaching, external inquiry, use of multi-media, intermediate narratives by educators visiting school). In case students were approached and introduced to the theme-based setting in a more meaningful way, not approached as pupils but as students (regardless of age), the start was more profound and progress notably better. Teachers could then observe a rather autonomous process of ever more additions and associations to the Fields of Knowledge, the maps 'exploding' while anxiety lowered as the students focused, 'let out energy' by ways of learning (Verhoeven, 2017). A decisive quality was to evoke 'wanderlust' within the student, the ardent desire, urge, to wander and explore the world. The choice of themes on itself (whether Water, Food, Construction or Energy) was not a relevant factor as each proved equally valuable (their handling outweighed the choice).



Students' ability to construct a Field of Knowledge

Curiosity and (social) tendency to participate in a team-setting allowed students a low-key entrance in the construction process. Such especially when brainstorm techniques were applied to collect thoughts, ideas and questions, scattering words on the blackboard. A process giving way to creative thinking while the tendency to outdo and support each other was clearly present and constructive. Students were observed to feel rewarded when their contribution was accepted and noted without qualification. Being attentive for in-between remarks during the ‘turmoil’ (“*I know what that is*”, “*why that is*”, “*don’t belief that*”, “*have seen it my selves*”, “*don’t understand, why so*”, “*not true*”) proved to be the oxygen for the students’ nascent reasoning and associating. Traditional approaches (giving each student a turn) proved less productive if not suffocating, seeing up to half of the students drop out.



Taking in lessons learned, students were provided with a basic scheme for inquiry, advising on the main branches while staying away from content (fig. 5.1 and 5.2). Latest then students ‘branched out’ their maps, most naturally wording and discussing relations, dependencies and causality. The scheme provided sufficient guidance for 6 out of 8 teams to progress, app. 25% requiring more attention by way of a teacher sitting with them, however for no more than a few minutes.

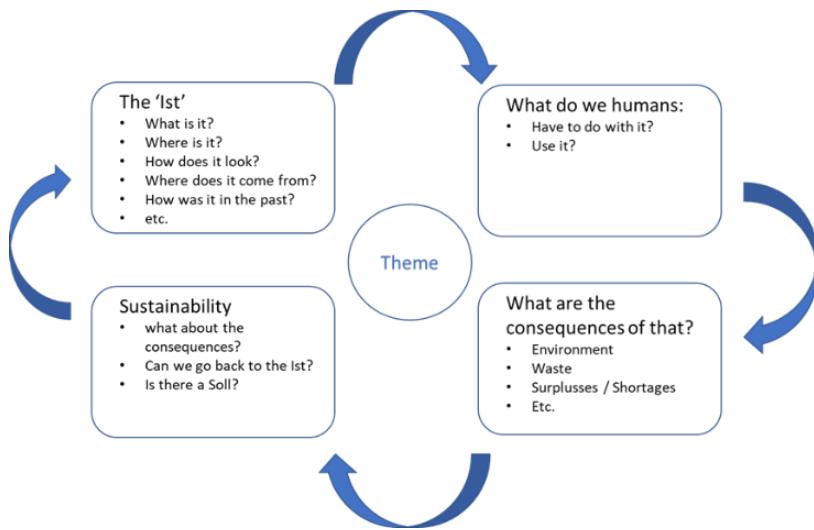


Figure 5.1

A logic of inquiry as base for a Field of Knowledge, main branches representing basic features.

As Lithuanian teachers formulated the growth from simple to more complex structures: *“They are very fast learners, drawings that first looked clumsy also to themselves they felt in need of improvement, they built a sturdy base of opinion and sought to improve their confidence”*.

Traditional textbooks were obviously a primary source of data for the students, resulting in activities in which they literally ‘cut the books to pieces’, ‘gluing’ parts on to their Field of Knowledge. In case of ‘leftovers’ from the textbooks, it appeared productive to have an open debate on these aspects’ usefulness, an exercise lessening students’ anxiety and meeting the common search for meaning (*‘Why do we need to learn this?’*).

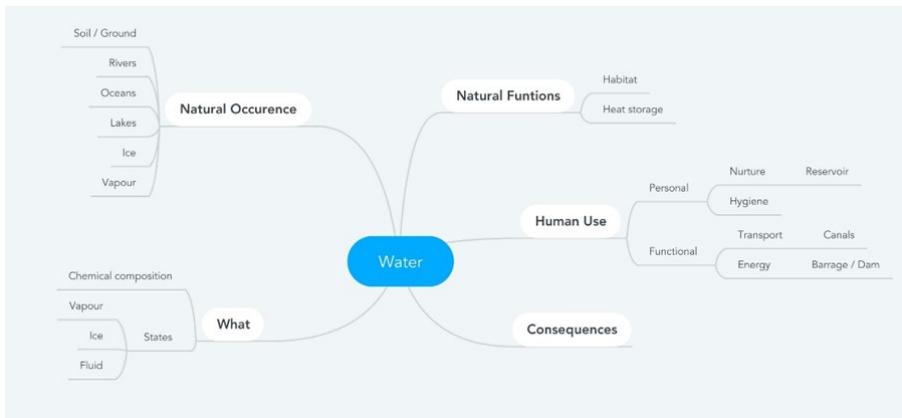


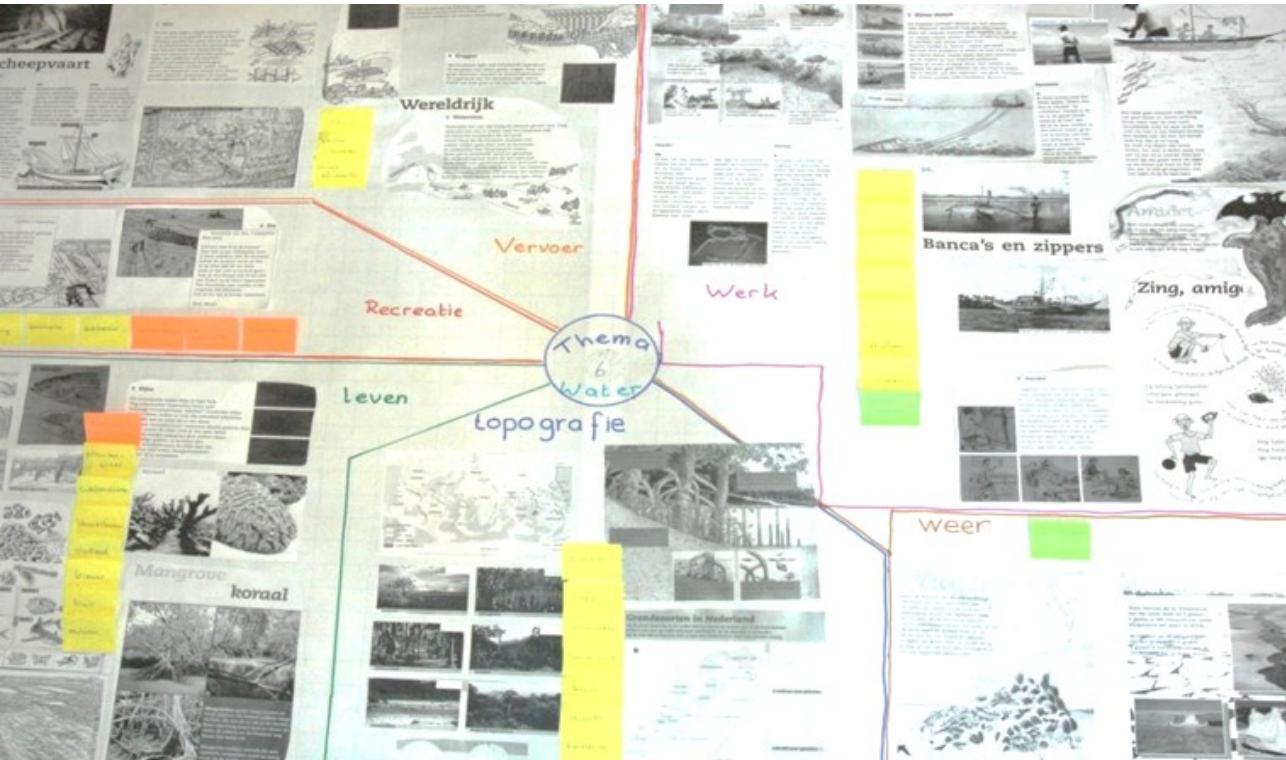
Figure 5.2
General example for a logical composition of the theme ‘Water’

We observed students able to develop a sense of purpose to underpin their learning, which, once spoken aloud, led to more self-directed steps in the process. As Romanian students worded this: “*For each area of research we started with a good reason*”. Voicing one’s commitment and participative attitude counterbalanced often prevailing notions in class (‘code’) that being interested is ‘not done’ and willingness to learn should be kept in wraps.

Students lacking initial inspiration decided as Study-Team to first search broadly for things they wanted to get documentation on, then generated a more targeted search-and-find process as the exercise brought more specific questions to their minds. Collecting and classifying those in a logical order, they determined a theme by deduction.

The self-driven quality of the process functioned as a catalyst, seeing students address issues in such breadth and depth elements quickly expanded outside the scope of the curriculum (on gross average between 70-150 relevant questions were noted on a single theme). Consequently, a plain contradiction occurred, for the better the introduction and initial guidance, the greater the need for (scarce re-)sources and manoeuvring space. Coming across a bit callous, a teacher hit the nail on the head when she noted: “*They are hungry, how are we going to feed them?*”.

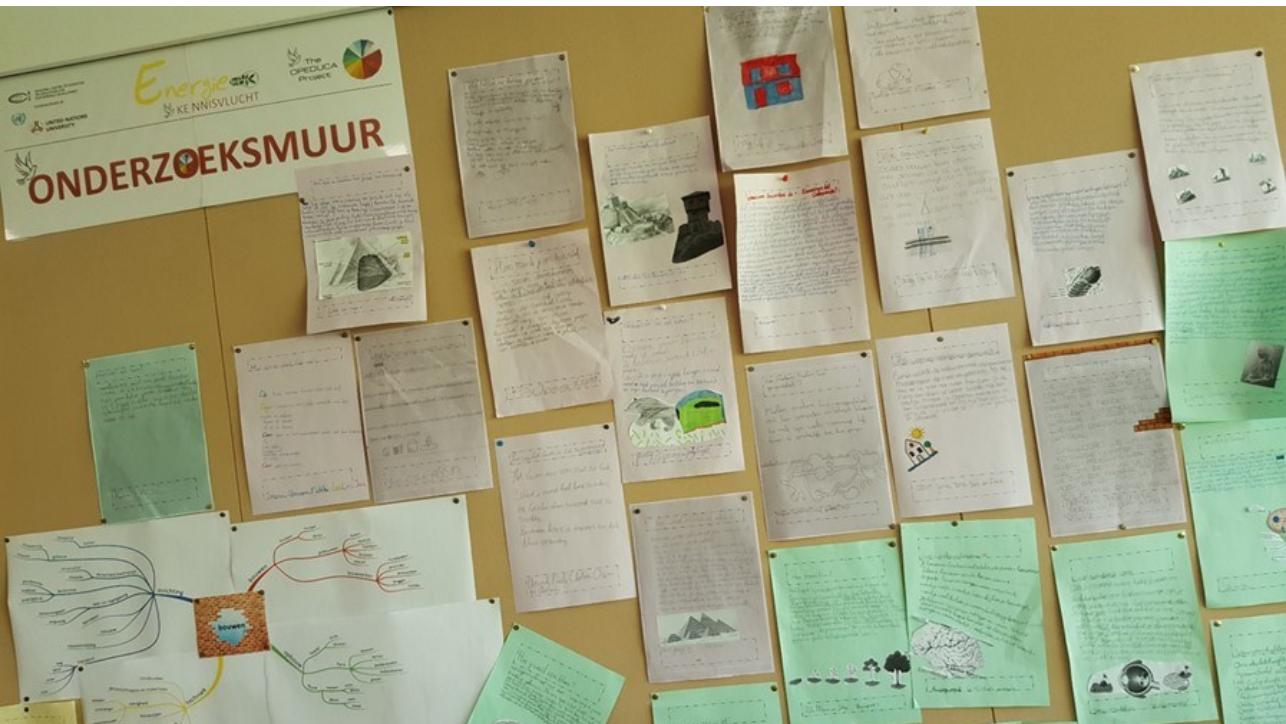
Teachers were challenged to hold their seat in the group process as ever more new inquiries called for guidance. A range of observations made us critically consider if teachers consequently (unwillingly) kept the process slow. In case they let go, the students' ongoing questioning would require a curriculum-coverage equivalent to half of the years' traditional program within weeks. A challenging situation moreover since various degrees and levels of complexity were addressed simultaneously. As to the motivation and thus involvement of the students, further progress therewith came to depend on teachers' abilities. Neglecting the energy flow or waving it off made students lay back, shifting from high gear to stationary. Staying closer to subjects was not a solution as it conflicted with and had an adverse effect on students' progress. Their higher-order thinking skills (creativity, critical disposition, debating) generated a 'pull-effect' since also the 'blanks' in their Fields of Knowledge called for attention. Researchers of the University of Bretagne Sud found that out of a total of 22 Fields of Knowledge, distributed over Energy, Ecology



and Water, the process was more challenging to students (secondary education) who worked closer to their curriculum; they were observed to be more comfortable with the blanks had there been no subject-sensation lingering in the background (S. Lardjane, 2015).

Over 80% off students in all stages of schooling proved capable of creating Fields of Knowledge. Going through phases of discovery and inquiry, searching and collecting data and information came natural. In-between lecturing, for example reminding (not reprimanding) them not all they encountered might be valuable or true, was appreciated when illustrated with examples. Students said to experience relief from traditional education.

The on average 20% of students struggling with the approach largely consisted of those challenged with multiple learning difficulties known to the teachers, a general lack of interest being most prominent (not being activated). Teachers mastering the



situation experienced more opportunity than in traditional class to sit with this group, lending individual support on the spot.

According to the teachers accommodating to their new role and able to keep up with proceedings, their toolkit expanded substantially. They noted more opportunities for the stimulation of thought processes, aiding students' ability to 'sort things out', concluding their capacity to reason expanded through practical application.

Students regularly claimed their learning was now "happening everywhere and at the same time", also when not in their (schoolish) role as student. A sensation also parents fed back occasionally ("We are now beginning to understand why the mobile is sometimes forgotten about during dinner as my daughter explains us why there are more female fish in the river Meuse").

Practice presented 3 added values initially not part of the concept:

- Students demonstrated an existing body of knowledge, adding pedagogical value to the instrument as it allows to mark a starting point for progress assessment.
- Students expressed external/explicit as well as hidden/implicit conceptual and propositional ideas, convictions and interpretations. Teachers took this as an opportunity to approach a students' disposition, worked more targeted regarding underlying experiences and psyche(s).
- The variety of activities gave way to not directly foreseen applications of transversal skills, agilities that would otherwise likely remain in stealth mode (care for the progress of peers, graphic talent, interrogation tactics).



Students' work in Study-Teams

Collaborating in Study-Teams proved effective from the start, though the balance between socialising and constructive work required attention. Having each student briefly present what they thought to contribute to the joint assembly up front proved to be effective in this respect.

The process of peer-learning was found to be constructive for 3 out of 4 Study-Teams, students capable of self-regulation as far as needed in this stage. Remarkably, 30% of the students claimed, even in the presence of a teacher, to have little confidence in her role as (sole) (re-)source. They sought intermittent presence of different elderly to progress, turning to parents (40%) and older students (5%).

In case the issue at hand was interesting, argumentative discussions in the teams made their output expand in breadth and eventually depth. Students stimulated each other to the brink of their conceptual reach, following which a gentle hint by teachers sufficed to progress. This upward spiral was parcelled with richer associations as students inspired each other because (and not despite) of different experiences and values. For example, 'washing hands' within the theme Water for one was an obligatory activity while the next had a more pronounced understanding of hygiene (addressing bacteria) and another associated it with a religious custom ('cleanliness'). The value of student-diversity aligned with the principle to have students participate in more than one Study-Team. Teachers of Gheorghe Sincai Secondary mingled teams of various classes to access the variety of elements playing a role in students' daily lives ("*This granted all the opportunity to see things from different perspectives and express ourselves freely and creatively*"). Students noted they felt "Invited to learn".

As to the formation of Study-Teams, a brief preliminary individual phase appeared effective. It required and gave way to personal commitment by expression of competence and appreciation and allowed teachers opportunity to gain more insight in prior knowledge. As a secondary school in Venice found, it can be constructive to also switch back to individual work intermediately, giving students the chance to

follow a specific interest, use personal (re-)sources and earlier experience. They could then ‘out-perform in silence’ and take their findings forward as contributions when back in the team-setting.

Students’ willingness to work in teams and the effectivity of the process was not subject to a strict pedagogical idea(l). We found for example found no proof of the added value of role-play as an attempt for social regulation. Even though one of the best performing schools in primary tried such for a whole schoolyear, assigning students roles such as ‘the Inventor’, ‘the Manager’, ‘the Builder’ or ‘the Designer’, was seen to degrade the learning process. And although Flight for Knowledge may invite to have students ‘work the way a scientist does’, also such an idea didn’t offer additional value; learning to reason scientifically had little to do with acting as one. Regarding ‘multiple intelligences’ we could not pinpoint differentiating qualities, although some teachers and parents occasionally wanted to see something that was not there. The claim a student is ‘otherwise talented’ was too swiftly used as an argument or excuse for divergent behaviour.



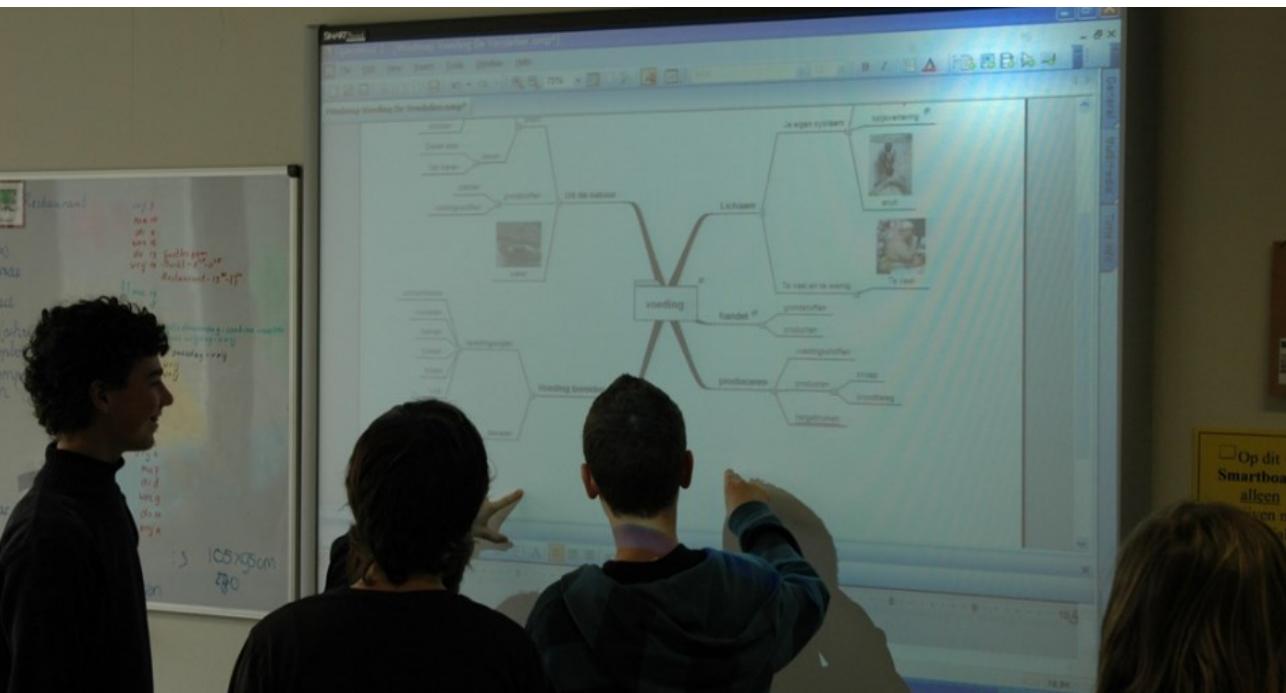
Three factors were decisive to make 1 of out 4 Study-Teams 'drop dead' quickly:

- Freedom given was taken to turn to chatter, go on social media and alike.
 - The approach did not appeal (mostly resulting from a too poor introduction).
 - A lack of guidance lacked (“*They left us alone*”).

Managing these factors proved a quality of good teaching, for at least half of the teams struggling could be (re-)activated and brought up tempo in case their (also implicit) signals were picked up and addressed by intermediate customised teaching.

Students' attitude towards (outside) educators

Overlooking the manyfold contacts between students and educators, exchanges were overall positive, varying between moderate successes (lower tier of ap. 15%) to highly motivating and effective meetings (around 55%). Students going outside



proved the better choice as visits of educators to the school were clearly less invigorating, mostly due to the schoolish way these were arranged. It consequently led to a lecture with instructive qualities, especially when performed for more students than the inquiring Study-Team.

Lessons learned as to the effectiveness of visits to the outside include:

- It proved worthwhile to wait for a concrete inquiry to emerge from the team instead of giving in to a wish (a finding obviously conflicting with a school's tendency to plan, prepare and arrange beforehand).
- Whereas it proved doable for the students to first contact Partners in Education through social-media and phone, over 70% of teachers gave in too quickly to going out, skipping the students' exercise to formulate a question and underpin its relevance thoroughly, the underlayer and prerequisite for a fruitful exchange.
- In-between approaches, partly clinging to traditional 'all class'-excursions, proved the less valuable option as it worked out disengaging for both students and Partners in Education.
- Not explicitly tending to students' feedback when returning ('de-briefing') was an often-missed opportunity.

From the perspective of the student, being educated by Partners in Education was never a disturbing factor and worked out positive. Already the process of reaching out for educational support proved most effective for the students' motivation, communication skills and self-awareness. Students recounted implicit values that could be related to the message (implicitly) send by the Partner in Education:

- *"What we thought is not always true,*
- *rules are supportive but do not always apply,*
- *values differ,*
- *errors and mistakes are part of practice,*
- *school is important but not decisive for career and happiness".*

To illustrate this: when a Study-Team from upper primary reported on their visit to a cow-farm, they also recounted they had to wear rubber boots in the stables (in small seizes provided by the farmer). Just as their teacher interrupted to explain

the students listening in that one should indeed not get one's own shoes dirty, the team pointed out it was done to prevent the cows getting sick from human bacteria, in one flow continuing with their finding cowmilk is warm from nature though mostly served cold and that a piece of beef is muscle. By then the entire class was busy taking notes while the teacher recaught herself.

Although the entire series of cooperation with external sources was successful, effective exchanges did not come about of their own record. For one, the schools' limited insight in the regional social-economic structure limited the reach for Partners in Education. Whereas this factor can be regarded temporary and a matter of development, on another note we also saw teachers occasionally steering students' search in order to visit specific places. A teachers' (3rd grade secondary) approval of the question "*When is a Dolphin happy in water?*" can either be regarded a very poor result of a vague inquiry-process or founded in the desire to visit a Dolphinarium.

Overall, the opportunity OPEDUCA Flight for Knowledge offers to in a more structured and structural way involve external expertise proved of substantial value, both for the content learned as well as for the development of a range of transversal competences.

Students' frequent presenting

With a rare exception students enjoyed and took the peer-to-peer presentations as well as those for larger audiences serious. Also, those who initially appeared less motivated concluded most positive by feedbacks as "*This was the best and perhaps only relevant thing I did this school year*".

The presentation-moments according to concept (in 'class', live audience, Global) were expanded by 2 more relevant moments as students also briefly presented ('solicited') to join a Study-Team and when visiting Partners in Education to present their inquiry. As to the presentation process as such, teachers added an element of response and reflection by ways of 'Tips & Tops', inviting for audience feedback in a constructive way by sharing observations as to what the presenters did very well, might do different next time or might have another look at. Teachers felt at home

with this process, facilitating what they regarded as the presentation of learning interspersed with questions, considering that students explaining amongst each other enhances retention and indicates mathemagenic quality (Rothkopf, 1970).

The presentations furthermore proved functional to students' motivation since they avoided to 'go on stage' ill prepared or with meagre facts and observations to share. Overall students mostly exceeded expectations, both in preparation and the way they 'defended' their work. Parents, invited in over 90% of cases, fed back to be impressed and proud, several wondering aloud why such activity could not be part of regular education.

Although it was to be expected that 13 out of the 15 schools most involved in Flight for Knowledge made it to presentations for live audiences, remarkably this figure was 72% overall. The students' presentations as such appeared to be popular, regardless of the (consequent) application of Flight for Knowledge.



Students' Self-Directing and Self-Steering ability

As described, it proved important to 'sit' with students at the start of a Flight for Knowledge to introduce the relevance of a theme. Considering 'life as it is and unfolds' together, their motivation to discover seemed to emerge from a comprehension of relevance that opened up initial understanding through a sense of fascination, feeding into meaning and from there activation – inquiry then resulting from both personal and collective contemplation. Students voiced motivators proving effective for their self-directing and -steering ability ("*I can show I know more*", "*Class is so incredible dull*", "*Now we can at least do something, we can learn faster, be ready earlier*").

Whereas student-ownership of Flight for Knowledge was overall sufficient, a set of poor pre-conditions that may be student-dependent however mostly not student-inflicted, frustrated their will to progress:



- Sticking with the same theme too long.
- Not being allowed to choose one of the main themes to start out with.
- Poor ICT-facilities (rating ‘miserable WIFI’ top of the list).
- Staying in some form of class-room order (lesson-duration being kept in place mentioned most).
- Not meeting the wish to go out earlier, more often, to places of their choosing.

Furthermore, from an observer perspective, we noted their will to progress was frustrated by a lack of experience with conceptual tools and basic notions of logical reasoning and critical thinking. Generalised, transversal skills appeared insufficiently addressed and developed in earlier years.

Overviewing the entire practice of Flight for Knowledge, both in primary and secondary 70% of students could manage the instrument, make it their own to work



with and enjoyed doing so. Of the 30% finding such a challenge, a third to half could be taken along as they found motivation in the mere fact it was better than traditional education. For 10-15% the approach did not offer solace due to a constellation of reasons that also made them perform poorly in a traditional setting. Counterbalancing this, the larger part of the ‘easy adopters’ (app. 30-40% of all students on average) progressed thus more independent (15-20% crossing the class-year border) teachers had more opportunity to tend to the challenged group.



5.3.2 Teachers' understanding and handling of OPEDUCA Flight for Knowledge

Complementing earlier observations during MasterClass and the findings already noted when recounting students' practice, I will focus on:

- the way teachers approached the strategic issue of future-relevant learning,
- went about with the construction of Fields of Knowledge,
- collaborated with Partners in Education,
- were capable to develop to (subject-) inspired educator.

Teachers and the practice of future-relevant thematic learning

Teachers were enthusiastic and driven by best intentions when bringing Flight for Knowledge to practice. Still in over 85% of cases the way they brought it to their students limited the process. Addressing larger groups (one class and more), assuring us 'students would be told more later', gave proof of a persistent schoolish style. More important, the challenge of 'limited associative capacity' (5.2.1) came to play early on. Only 1 out of every 5 teachers took the stage and invited through motivating narrative, therewith effecting the process five-fold as they:

- let the opportunity pass to introduce the encompassing concept, left out the reason for thematic learning (>80%),
- bypassed the opportunity to address the envisioned benefits for students' life-skills development (>85%),
- did not reassure students examination demands would be met, weakening motivation (>70%),
- did not present a motivating preview of studying real life phenomena and experiences outside school (>34%),
- underestimated the promise of more independent work in Study-Teams (>45%).

As to the setting of the future defining themes, grossly 3 practices could be noted:

- 20-25% staged the themes with the motivation and reasoning intended, though mostly not expanding on the deeper philosophy of the Dimensions of Sustainable Development.

- 50-60% introduced the themes, however, did not exchange on them from the outset.
- 15-30% gave way to working on issues (not themes) students were considered to relate to easier.

In general teachers did not seek sufficient momentum to allow students to take a theme to the heart, become actively present and activate prior knowledge.

Examples of effective introductions to theme-based learning proved to be the use of mode-boards to provide students with a first conceptual understanding (20%), presenting a compact example of Flight of Knowledge made by teachers (5%), putting the act to the word by welcoming students in an equipped thematic space (2%) and starting the introduction with the 'News of the Day' (15%).

Whereas teachers openheartedly self-reflected during MasterClass, such position was seldom taken when working with students, observing an 'awkwardness'. It was only a partition of the 20-25% of teachers presumed more qualified during MasterClass that sat down with groups of students to discuss, take inventory of what life is like about and might become of, ponder about issues that might have their interest, be concerned about, to from there built towards future relevant themes.

Teachers deployed in general 3 routes deviating from the concept:

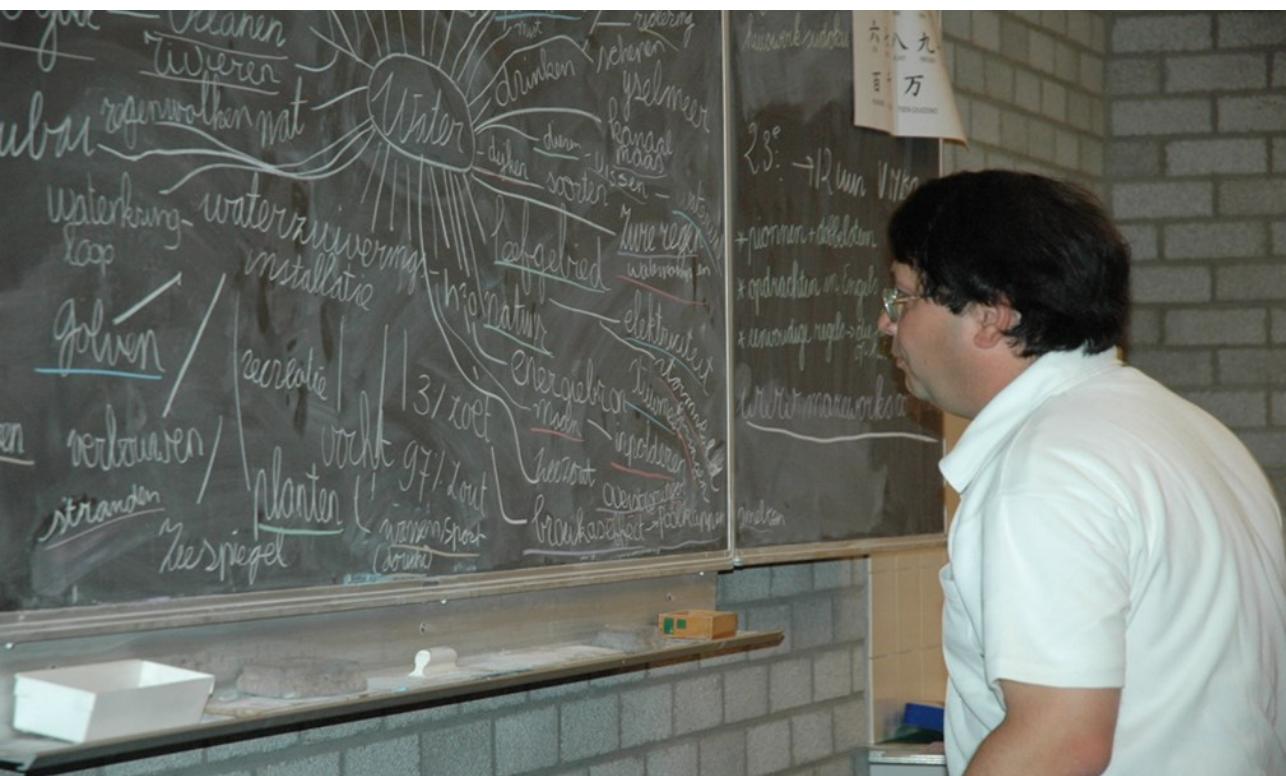
- Those with associative capacity came forth with integrative studies, for example by ways of a 'Mission to Mars Project' that combined the main themes Food, Energy, Construction, Water and Health.
- Teachers who felt more challenged held on to projects the school was already familiar with, for example working with a 'Bridges of our City Project' for the theme Water.
- Those who believed the choice of themes would not matter as long as creative and inspired learning were likely to occur, opted to take on any issue of interest expressed by the students.

In first instance each route chosen got underway but eventually deviations from the concept let them astray. In case of the Mars-example students risked getting lost in

complementary activites such as the physical construction of scale-models, while students percieved the Bridges-project as an anually returning not truly envigoring methaphore activity. In cases teachers committed themselves too support issues 'exciting' for the students, the activities hardly touched base from the perspective of knowledge- and competence development, the learning eventually turning out to be a 'mile wide and an inch deep'.

Teachers' practice with the construction of Fields of Knowledge

While students were underway with Fields of Knowledge, teachers who managed to restrict themselves to affirmative guidance and challenging interventions grew in their role. As proposed, the teacher is supposed to be involved and content-informed to gently support the students' process, observing, questioning and hinting on the fly, joining the students in their ignorance intermittently (especially the latter



appeared a strong stimulus for students' eagerness to proceed). Such composition however could only be observed with no more than grossly 25% of teachers in Secondary and 45% in Primary, most appeared at loss with the less regulated learning process. Students quickly sensed when a teacher took on a role play but accepted questions being bounced back by way of "I don't know either"-responses, as long as they felt convinced "He does".

Across the board teachers indicated they gradually found more time, certainly when classes were combined in Study-Team setting and shared a room/hall. Despite the opportunity, this however did not automatically work out in a re-investment of capacity by taking up new activities such as scouting for potential Partners in Education or intermediately analysing the functioning of Study-Teams. Consequently, constructive interventions to better balance teams were seldom and teachers found themselves ill prepared when students looked for advice on regional sources. As noticed, interventions that were affected, for example introducing role-play or a metaphor, did not work out well. With about a third of the teachers we observed a certain pre-judgement as they labelled or designated students ("*She is so typical a communicator*", "*He is so handy where it comes to ICT*"). More off concept was the (rare) assignment of functions to entire teams within the (traditional) confinement of the class they were constructed from ('the Design Team', 'the Research Team'). Informing about the reason for such, we found teachers felt ill at ease with stretches of 'inactive time' (students 'staring' at still poorly developed Fields of Knowledge). By intervening they however overdid, trying to make up for having missed out during the introductory phase. When students sensed a teacher had to fall back on traditional teaching, their trust in the approach dwindled.

Most teachers responded to their own uncertainty by keeping to one theme at a time. Although the concept allows for running themes parallel, they aimed for a more controllable practice, however without discussing the alternative with their students. A single-theme setting was found unproductive since:

- students' inquiries missed interrelations and interdependencies they themselves considered logic and 'needed', accepting the entanglement of issues inherent to crossing themes.
- students tended to get bored when having to work on a single theme.
- Students' parallel participation in more teams was consequently missed.

The single-theme choice also meant teachers went short on themselves since the sought for curriculum-coverage would obviously be more profound in case of a parallel setting.

Curriculum coverage proved to remain a prominent concern now that teachers experienced how students zig-zagged across subjects, varying in tempo and depth. Interventions organised to work the curriculum into teacher-versions of Fields of Knowledge stumbled over the earlier mentioned struggle to understand the supporting 4th dimension of Flight for Knowledge and teachers' unfamiliarity with contemporary ICT. Only in a handful of cases teachers invested time to work on an own Field of Knowledge in order to be better prepared.

We doubt if more strict guidelines, a process-description or other olive branches would have sufficed to correct for these shortcomings.

The inclination of teachers to regard the internet as a 'source of knowledge' calls for a critical observation. We gradually learned to see the internet as a potential threat to ESD since it provides students with (too) swift access to (prefabricated) content of any sorts disguised as data and information. It cannot be a substitute for the continuous production-process of our brain which is flexible and adaptable to changing circumstances. Besides the loss of deep-reading capability and the amounts of time spent on screens already, students' attention- and reasoning abilities can impoverish, leaving open if sufficient information has been found and justly interpreted. An example frequently used to mark our point; one can easily find water boils when heated to 100 degrees Celsius. Next to the question if it would not be more correct to note that boiling water marks the 100 degrees value, it is doubtful students are informed such condition also depends on air pressure and gravity (opening at least the interrogative if it does). We consequently underlined the OPEDUCA-instruments accentuate the process of critical inquiry (pre-internet), based in practice, providing for a place-based dimension, studying disciplines funded in empirical evidence and practical applications (Schwab & Brandwein, 1962). This to enable students to better search, find, interpret, judge and use what is derived from the internet.

Teachers and Partners in Education

Overall, the relationship with Partners in Education was positive, characterised by mutual respect and best intentions. The few exceptions to the rule we analysed profoundly to understand what factors proof consequential. As example, we recount a physics teacher taking a group of 5 Study-Teams by tourist-coach to an energy-production facility. On the spot we observed him not taking part in the introductions, keeping post next to the door while the students were bid welcome by a group of engineers. The teacher remained silent during the entire one and a half hours, including a tour of the premises, refrained from posing tentative questions even at moments of silence, however most energetically clapped his hands when noticing the bus had arrived back early. While urging the students to make haste and manoeuvring them out, he gave the engineers a brief nod and a smile. Reflecting on this, the engineers and their manager assured the students would remain welcome



any time, though did not want to see the teacher ever again. This divergence in (expected) behaviour points to a delicate balance we often observed, cooperation depending on grades of professionalism if not decency. Analysing this and other exemptions to the rule, we found confirmation of a grade of strangeness towards and ignorance of the outside world, or better, the notion of parallel worlds. To take away any harsh sensation in this regard, it needs to be underlined most teachers managed this critical analyses with utmost fairness and put it in perspective. An illustrative example being the comment of a teacher in primary who noted: "*That's why we wear shorts on a hot summers day and those guys are all tied up*".

Teachers' development to inspired Educator

In practice it became gradually clear the educator called for could not be realized by the teacher taking on a different role and accompanying position. Although most enjoyed 'educating by walking around', one of the school-leaders in secondary summed it up most effectively during an evaluation when stating that "*Some seem to put the emphasis on the wrong verb*". He therewith referred to an encounter where we found four of his team talking to each other in the hallway while their students (as such a fine example of 3 classes mixed in Study-Teams, age 14-15) were engulfed in Flight for Knowledge. Inquiring how things were going, the response was most positive, things were running "*Really good, honestly, fantastic, the kids are all busy and truly focussed, yes, just go and see, they are doing wonderful*". Indeed, most teams appeared quite busy, students focussed and hardly noticing somebody entered the room. It took however little time before teams invited us to sit with them for a minute. Leaving them again about 15 minutes later, the teachers were still chatting in the hallway. Critically analysing this most simple though meaningful practice with the whole group of 18 colleagues involved, notions were as follows:

- "*That situation was a pure coincidence*" (4),
- "*We are ought to be dispensable, well, that is what is happening*" (2),
- "*OK, let's get together people, point taken*" (4),
- "*To be honest, now in practice we admit we don't feel comfortable with the situation*" (3).
- "*Then let's look at this again, what can we do better*" (5).

Although not all student-teams were self-reliant for longer stretches of time (1,5 hours and more) and called on teachers and educators regularly, when compared to traditional lessons 25-40% of time they were. As noted earlier, teachers too often let go of the opportunity to turn former instruction-time into qualitative pedagogy, bonding with a theme and involving students, did not take the opportunity to lead by example. A not to be misread practice of teachers in doubt of themselves was a (partial) return to backed-in work-patterns, for example telling what ‘we’ would be doing coming weeks, turning students into pupils again.

We had to realise Flight for Knowledge requires a more thorough upgrade of teaching capacity. Such in parallel with the requirement to change the schools’ daily process in order to facilitate (and gently push) teachers to properly attend to more effective introductions of themes, mini lectures in the morning hours, the valorisation of learning outcomes, assume inter-collegial learning and engage professionally with external partners.



5.3.3 Partners in Education for Flight for Knowledge

As Flight for Knowledge opened nearly every door students knocked on, sources were made available and students allowed valuable experiences, the concept of Partners in Education proved realistic. Especially (manufacturing-)industry and other more clearly output- and value-driven organisations were cooperative and relevant. Sympathy correlated with the degree in which the students' inquiry was perceived serious and authentic. In over half of the cases potential partners asked about the reason behind the request, seeking more argument than a mere orienting visit. Their further commitment to rest on the direct relation between the students' question and the organisations' specific knowledge and experience as well as on the closeness they felt with youngsters' development. As a regional Manpower executive succinctly put it: "*I am a father, that's all the reason I need*". The most resolute partners sought 'bonding', envisioning longer-term cooperation (an aspect more pronounced in Italy and various Eastern European countries than in the Netherlands). As schools in France noted: "*All the people we contacted, research professors, engineers, scientists, entrepreneurs, all responded positive to our requests: OPEDUCA*



was considered as very interesting, therefore contacts with the experts can be maintained and will give rise to further and more”.

The diversity and relevance of the themes in combination with the articulation of (research-)questions created the external reach and cooperative response envisioned. Yet, preparatory visits to enlighten and involve partners were found important since ‘cold calls’ generated less than 15% effectiveness. Communicating the OPEDUCA-concept as underlier proved an asset that, if put to play, led to follow-up every time.

In the rare 9 cases out of over 100 observed in which cooperation failed, 2 resulted from a change in management in the partner organisation while 7 were due to a defaulting relation management by the school. To illustrate this, in case a school was happy to find partners would visit a Flight for Knowledge event during evening hours, their brief email-message read little more than: “We expect you at 20.30 hours”. It obviously would have worked out remarkably better had they communicated: “We’d very much appreciate if you join us as of 20.00 hours so we can welcome you



personally before the students will make their appearance as of 20.30 hours". In another case, school leaders meeting the CEO of a major company in housekeeping and partner in an array of activities, did not conceive it would have been appreciated or even appropriate to inquire after the present situation in the business, how the hiring of new employees came along and what competences one sought for these days, if indeed housekeeping would become involved in caretaking in homes for the elderly, etc. Mutual interest being important, for example Corneliu Coposu School (Romania) gently bridged the observed difference in style and attitude between schools and industry by having parents accompany teachers and Study-Teams to visits, not only to their own workplaces but also to other Partners in Education.

An exemplary practice of effectuating the concept was found by Weredi College (Netherlands) where 60 students lower secondary and about 20 companies participated in the main theme 'Construction', articulating and eventually manifesting the learning process by way of the actual construction of a sustainable house on the school's premises. Guided by only a handful of teachers and enjoying the support from industry (both in the supply of materials and knowledge), the student-driven process was integral, starting from first designs and drawings up to completion of the house. Partners in Education included architecture, design, roof construction, machinery production, isolation and facility-management. Students, teachers and partners worked on eye-level, meeting every 2 weeks for the better part of the morning to guide and support the process.

We observed Partners in Education to also convey emotions. Placing themselves at eye-level, they spook freely of natural aspects of learning (making mistakes, uncertainty, relief, resilience), humane elements that caught students' attention profoundly with the quality to draw them close. It can be argued we frequently touched on the relevance of a deeper psychological connection between a teachers' (i.e. educators') and students' inner life (J. P. Miller, 1981), understanding that caring and compassion involve sensitivity to the inner life of the student, an holistic curriculum and integrated studies becoming empty without them (R. Drake, 2018).

5.3.4 Flight for Knowledge meeting the demands of regular education

Obviously, omnipresent concerns about the curriculum and from there examination demands call for a most critical observation of practice to find confirmation the approach indeed meets these or provides otherwise. I will first tend to the most common elements of curricula (reading, writing and math), then to subject content and communication- and presentation skills.

Key competences Reading, Writing and Math

We noted the ability to more extensively and properly read, write and express oneself as students were amongst others required to:

- correctly note and justly describe data and information retrieved,
- express themselves more concise, describing interrelations and dependancies,
- present orderly, both in writing and verbal as well as in different languages.

The competence to understand, handle, interpret and mathematically work with numbers and values was enhanced as the learning required:

- a more extensive sense of the meaning and application of values and worths,
- a more profound understanding and application of mathematical concepts,
- a more varied and repeated application of math,
- a better comprehension of the universal value of calculus and concept.

A main difference when compared to traditional lessons was the enhanced notion, sens of relevance and need of mastery now that reading, writing and math became a continuous part of the learningprocess; relevance fed the students' rationale. Obviously, the real-life aspects played a role, like writing a letter to a fictitious person is rather shallow compared to writing one to a potential Partner in Education thanking them for a recent visit including the formulation of a follow-up request. Next to a richer application we observed a higher frequency of application, making students grow more competent and confident, applying what was learned in a skilled way.

Subject Contents, Concepts and Competences

Practice showed the universal themes derived from the Dimensions of ESD had sufficient substance to meet all subject content, concepts and related competences. No doubt remained the aggregation of the themes covers and relates to every curriculum- and examination element in place. Also, through concrete exploration we did not find curriculum-elements being left uncovered, most checked multiple times. The sensation to expand the learning was constantly present as 30-60% of a Field of Knowledge remained empty ('blank spots') after the curriculum-elements were already placed. We concluded this to provide proof of the fact the inquiry-driven (student-demanded) learning-content is more divers and extensive than the curriculum i.e. aggregation of textbooks. ESD-based-education exercises a 'pull-effect' on learning and requires more than prescribed.

We observed that transdisciplinary learning evolves in a natural way. When upper primary students wondered why their hometown river overflooded and swamped the fields each season, they looked to understand the amount of water the river could 'carry', quickly needing Pythagoras to calculate the sloop of the riverbed. The notion of sloops resulted from their own earlier on the spot observations when studying bird live along riverbeds, 'sensing' a river is not a square construct ("Like a canal, you know") but a natural phenomenon. In a single Field of Knowledge on Water, Pythagoras was eventually brought to life 17 times. In parallel, expanding on the flooding, students pondered what makes rainwater (un-)drinkable ("But, why save when it rains so much?") what called for more understanding of chemics and human biology while it (unnotably) internalised the concept 'scarcity'. Thus, resulting from the learning process, not as a concept lectured including a value-statement.

The subject 'History' became strongly positioned as students experienced there is no present without a past, accepting it makes little sense trying to study the present without understanding how phenomena came into being, everything originating in and changing over time. A growing sense of History fed the unfolding understanding of politics, culture and the arts, but also challenged students to understand the ecosystem in relation to the social domain (cities evolved close to rivers, rivers provide for watering crop-fields, fields require protection, cities are found to be protected, who owns the river, until "What about the Keystone oil-pipeline in the

*news today?”). Students put to work imagination and creative senses, seeking and reaching understanding of what has been, is and might become, including notions of power, influence, ownership and democracy. As Italian teachers noted (working with a group of 10 years old): “*The students started asking different questions, doing so in various classes as they had their Fields of Knowledge with them. In a language class they unexpectedly asked about the meaning of words, inquiring if the name of a city means anything as such*”.*

As these examples illustrate, the initially open structure of students’ questions provided for rich opportunity to link the learning to a range of curriculum-elements (silent guidance). Here again, the associative capacity of the teacher to relate to real-world phenomena appeared crucial. Practice in French schools (Lardjane & Nuutinen, 2016) showed an example of how the concept of ‘costs’ was handled in the perspective of comparative analyses since it appeared in Fields of Knowledge on Food, Energy and Water. Students learned to regard and apply ‘costs’ as a shared concept, appearing in different shapes. Would the concept have been dealt with only in economic subjects, the conceptualisation would have been (too) narrow.

Finnish researchers and teachers, comparing practice with their also for ESD renown education, found confirmation the OPEDUCA-concept complies better than contemporary practice (Sorri, 2016). Inquiring with members of the Finnish National Committee who worked on curriculum renewal, experts acknowledged their policy and practice did not go as far as now applied through Flight for Knowledge. Stating their reality is often restricted to separate programs and activities: “*Since our current curriculum is well planned and has many mandatory classes, it hardly leaves time for this, good pedagogical practice will suffer*”.

To illustrate the multi- to transdisciplinary quality of the learning, another example tells more than a theoretical formulation. Students in secondary (age 15-16) used the equation of Pythagoras when considering how far rays of sunlight would enter the dining room in a home for the elderly, following a debate about whether direct sunlight would be good for the residents’ health (literally: “... *there is also something with vitamins and sunlight*”). They expanded to understand if and how more or less light would change the temperature in the room as well as the colour-setting of the walls (they ‘hated’ the grey now in place). This exchange, taking place in a few

minutes, touched on more the neutral (teacher-)observer could hope for, certainly when looking through the lens of sustainable development. The students by natural inclination addressed nature as well as wellbeing but also touched on the dimension of welfare for the residents. The later follow-up in OPEDUCA BusinessClass would bring them to consider if the home could carry the costs of the amendments and construction (windows from floor to ceiling with sliding doors), what such meant for the monthly contributions of the residents and if that would be fair to consider. None of these questions were started by the teachers involved in this Flight for Knowledge on (notably) 'Construction'. In line with this evolving learning process, it came to no surprise other students found the gulf stream had started wavering because of 'a loss of speed', related that to climate change, more heavy storms in the UK and thus requiring other ways of building (and indeed, smaller windows). These integral, complex thought processes occurred overall, students developing knowledge and competences on the fly.

As teachers from Lithuania recounted: "*We can confirm it is possible to fulfil Lithuanian national curriculum requirements this way. Seeing the student-team on 'Water' searched for information about the eco-system's dependency of the matter, the owner of a hydrogeological business, who started out from their question on drinking water, found himself and the students in a process of overlooking environmental degradation in the Šiauliai-region. We gave them no assignment to learn about sustainability, this came as a natural process. Parallel, the manager of Šiaulių Energija' met with students as renewable energy had caught their attention. As he also expanded on his engineering-profession and discussed the work of thermal engineering, Flight for Knowledge overlapped with BusinessClass*".

Overall, teachers confirmed that the just critical observations and reliability of the elements studied, the validity of the inferences drawn as well as further practical considerations regarding assessments (Ruiz-Primo & Shavelson, 1996) are no hurdles for the application of Flight for Knowledge, validation becoming part of the process. The teacher's ability to see and understand the student's reasoning is obviously key, moreover since it requires to take parallel note of the (later) validation of elements, the relations between them and the way these were brought up by the students. Here Field of Knowledge partly aligns with 'curriculum mapping', including its

purpose to eliminate gaps and repetition between and within grade levels (Dutton, 2015). It appeared critical that teachers have the larger part of all testing- and examination elements readily available, preferably know them by heart. Supportive instruments teachers developed, such as ‘competence assessment tools’, primarily served to keep track of progress, to take note learning goals are met.

Communication and Presentation

Following the already pointed out ways students exercised their communication- and presentation skills more frequent and consequent, it can be stated Flight for Knowledge offers clear and relevant additional opportunities and values. A strong and distinguishing feature being the authentic setting when compared to the more framed (organised, instrumentalised, planned) assignments of traditional education.

Also the exchanges with Partners in Education enabled students to encounter a world where language (expressions, wording, tempo, non-verbal behaviour) substantially differed from what was offered in their schoolish environment. Students fed back to feel comfortable when experiencing they were ‘actually doing quite good’ where it came to the practical application of competences some struggled with at school. As a study-team (age 16-17) reported when returning from a meeting on the job with a contractor, he had apparently made his points ‘very clear’, a student recounting the radiation of some kind of convincing power of argument. This in interesting contrast with the experience of another team that interviewed a solicitor, reporting to be astounded by the variety of ‘new words’ used. Both experiences led to an interesting dispute about the ‘right and wrong’ usage of language, reasoning why the contractors’ choice of wording had come across rather harsh, packed in brief sentences, compared to the solicitors’ quality to only say that much with such apparent oversight. In (natural) follow up, the exchange proceeded addressing both person’s look and clothing, adding to the students (initial) understanding of the essence of communication in combination with posture (‘body-language’ was the term used). Unplanned for, let alone instructed, students took example which reflected when they presented their studies and cases.

In cooperation with the Dutch University for Distance learning, complimentary research was conducted regarding students' presentation(s). One of the findings being that the use of video-instructions to present students with ways of composure and expression, contrary to expectations did not contribute to their preparation and performance (Ackermans, Rusman, Nadolski, Specht, & Brand-Gruwel, 2019). I recall this more-year long vast research also to point out that attempts to capture, describe, format, let alone predict, prescribe and asses personal behaviour, better not stand in the way of the liberty and uniqueness of students' real life learning.

5.3.5 Lessons Learned

OPEDUCA Flight for Knowledge effectively combined inquiry-, problem- and community-based learning, providing students with a structured means for observation, contemplation, interpretation, and storage of their learning process. The distributed quality of the instrument led to meaningful exchanges with natural, social and physical surroundings, the ESD-informed themes bringing transdisciplinary learning nearby naturally. The activity of inquiry went parallel with the implicit gathering of impressions and experiences, a subconscious development manifesting itself during students' presentations.

Overall students' participation, attention, will to learn and active presence increased according to direct observations by their teachers. The learning became more critical and investigative, individual thinking matching and strengthening the collaborative setting. As the learning started out from the students' existing body of knowledge, the instruments provided additional insight in their phase of development, supported by the use of epistemic questions as to the source and construction of their knowing. Presentations to peers as well as live-audiences proved highly motivating and offered additional pedagogical value as students re-capitulated their learning process themselves.

Where practice faltered it mostly resulted from a too poor manifestation of a theme which prevented the internalisation of its relevance and meaning, missing students' activation. Teachers' wavering the competence to 'see the concept through', which

also manifested itself in insufficient ‘presence’, the main reason. Teachers faced considerable challenges, most prominently due to a lack of associative capacity and consequently limited transdisciplinary thinking. Their confinement in schoolish life under a too limited narrative capacity to appropriately position future defining themes and re-fuel the students’ learning by applicable practice. Alike, it made it difficult to create, uphold and expand relationships with external educators. Consequently, in over half of cases teachers lacked confidence to let go of schoolish aspects of education, leading to drawbacks to the traditional, approaching students as pupils again.

Flight for Knowledge effectuated the concept of Partners in Education, infusing valuable applicable content and competences. More substantial, the cooperation enhanced students’ motivation and broadened their understanding of the meaning and relevance of applied knowledge.

The entire curriculum could be met in a more diverse way while implicit repetition and a higher sense of validity added to students’ understanding, the development of competencies served by real(istic) and repetitive application. Teachers could observe that reading, writing and math were addressed more extensive and profoundly. Making way for individual qualities, Flight for Knowledge brought over 20% of students up to 2 years ahead of curriculum while students’ development exceeded the formative realm accros the board.





5.4 OPEDUCA BusinessClass

The Discovery of Unexplored Capacity

Following the structure of previous paragraphs, I will recount how OPEDUCA BusinessClass unfolded in practice, address key-criteria and critically observe the experience of the students (5.4.1), the role of the teachers (5.4.2), the work with Partners in Education (5.4.3) and how the instrument met requirements of present day education (5.4.4).

As presented in table 5.6 OPEDUCA BusinessClass was brought to practice by 25 schools (18 in the Netherlands and 7 in other European countries) involving 590 students, resulting in 143 presented cases. The average period for a BusinessClass trajectory was 8 weeks, working between 4 to 6 hours a week with the students.

BUSINESSCLASS	schools			students			cases			students/case	
	NLD	INT	TOT	NLD	INT	TOT	NLD	INT	TOT	NLD	INT
Primary	7	3	10	177	67	244	34	19	53	5	4
Secondary	11	4	15	254	92	346	69	21	90	4	4
	18	7	25	431	159	590	103	40	143		

Table 5.6
The application of OPEDUCA BusinessClass

5.4.1 Students in OPEDUCA BusinessClass

BusinessClass evolved towards four overlapping phases with highly complementary features and goals:

- empowerment,
- teamwork on business cases,
- exchanges with the world of work,
- presentations.

Empowerment-phase

The empowerment-phase comprised up-close and personal exchanges infused in group-discussions and cross-interviews (10-15 students), encounters with (public) role-figures and activities in the open focussed on primary notions of life. The meetings were usually set on external location, varying from a construction shack over a castle to the dressing room of a professional soccer-club.

Entering a BusinessClass trajectory students openheartedly spook about their search for meaning, their limited view on the world, how they perceived their present and



future life. Especially less motivated students were observed to question themselves as they questioned their school(ing). The empowerment phase therewith focussed on the re-discovery of meaning, preceding motivation and involvement. Contrary to the more limited instrumentation of traditional schooling, which tends to underline the importance of education stressing the functionality of school (be in time, pay attention, do your best, make sure to get good notes), BusinessClass started out from the person and worked towards the value of education and usefulness of schooling. Personal development was not introduced as such to make way for openhearted exchanges that turned out to go more in-depth than conceptualised, were direct up to confronting. The students challenged with statements as: *"What are you now really expecting from life? You think the world is waiting for you? Still believe you are gone get a job, own a fast car, second house, have loads of fun and money to pay for make-up and a tattoo? Really believe there will still be some social welfare left out there that is gone pick you up? Gone enjoy fresh air to breath and a steak on the BBQ? What do you think? Believe a Jeans is worth 80 euros and a rap-concert 140? Good heavens, considering you pay over 50 for some bits and bytes that create the illusion of a game"*. Phrases like these were not reproachful but on eye-level, the educators' attitude and appearance open, friendly. Acting this way, we found acceptance with the students who, also if they could see through the act, touched upon the authenticity of the person sitting with them, understanding it was in their best interest while nothing was expected of them yet.

The approach met the purpose to open students' minds for considerations of live beyond school and how their present values and habits might work out. The mutual narrative gradually invoked awareness nothing might be there unless they went for it themselves. It was argued that some, now seeing themselves 'blessed with the least of opportunities', might turn out to be those to make a most positive difference in their future lives and that of others. Especially intermediate 'small talk' proved essential to sort effect, addressing the '(non-)sense of schooling', money, debts, drugs, the dark corners of the internet, superficial friendship. Staying away from the normative and reproach, students could come to conclusions.

Although conceptually not foreseen, the approach regularly took to aspects beyond the person as students gradually gave proof of an interest in and vision on societal aspects, the natural environment, politics and the wellbeing of relatives. Over 70%

did not accept the statement '*The world is going to waste, nothing you're gone do about it*' and showed a more than expected interest in general wellbeing.

The exchanges were interspersed with physical activities to awake understanding of the value of cooperation, trust, resilience, persistence, disposition towards risk, leadership, character and goal setting. The latter competence proved most worthwhile paying attention to, introducing students to Charles Noble's expression one must have long-range goals to not get frustrated by short-range failures. The process was effective in constructively addressing the ability of people to meet challenges, turn thinking and dreams/ideas into action.

Through the growing number of Partners in Education it was possible to realise exchanges with role-figures the students did not conceive possible ("Box with an Olympic Champion", "Be with my favourite soccer team", "Make music with that awesome DJ"). Direct contact with role-figures proved effective due to the closeness and realism of first-hand experiences (providing sufficient time, 1,5 hours to half a day).

The empowerment-phase based a notion of responsibility to underpin self-directed learning. The students appeared in need of a thorough 'sit and get together' since many were found to lack (and 10-20% missed) capacity to see beyond the present horizon, set goals, gradually develop a strategy along which one can develop. Although during this research we could not realise a longitudinal study, the 8% (43) youngsters we stayed in touch with over the course of 5 years spook of endured positive effects, summarised as 'remaining on route'. We found confirmation students' sense of internal locus of control, the belief that one's own success or failure is a product of effort and work and not simply determined by outside forces (Nakkula, Pineda, Dray, & Lutyens, 2003), was positively affected.

Relating the empowerment phase and findings to regular education, teachers observed the effectuation of contemplative pedagogy, practice coming down to a first-person approach, not trying to command learning through schooling but have students connect the inner to the sensation of learning, building values and meaning. The empowerment phase concluded with the promise/challenge all would in 8 to 10 weeks from then present a full-fledged businesscase in front of a live audience.

Group/Team-work on BusinessCases

To eventually achieve the goal of a self-constructed Businesscase, students were supported by way of guided reasoning, working along the logical framework and instruments applied in Marketing, Economy and Accounting. Initial simplification allowed for a low threshold; students of every age were found capable to ponder questions such as "*What do we want to make and why? For whom? Where are we going to do that? With what and who?*". It was important to avoid subject-related terms from Economy, Math, Technology, ICT and Sustainability, from any school-related terminology for that matter.

The instrument provided for a more structured approach than Flight for Knowledge as it was facilitated by conceptualised economic and administrative frames and models the students were handed in an early phase of their work. Yet teachers stood surprised students swiftly mastered the idea of creating an enterprise and handle required concepts. Already in upper Primary they amongst others managed to:

- understand the concept of value-loss, comparing expenditures and depreciation,
- reason through if an investment would pay off (pay-back time),
- calculate cost prices, reason towards consumer prices, understand margins,
- understand the difference between and meaning of equity capital and loans,
- see the concept of continuous balance between assets, funding and net-results,
- understand the concept of interest (nearly half grasped compounded interest),
- discuss and reason the relevance of place/location,
- understand marketing concepts (target-group, commerce).

The increase in complexity of the cases was only moderately congruent with grade-level. We observed no relevant difference between upper primary- and lower levels of secondary education.

Students gained further understanding of considerations in the realm of sustainable development as they amongst others elaborated on:

- location in relation to the natural environment (arguing logistics, warehousing),
- the fairness of their products (usefulness, price, durability),
- the sourcing of materials (mining, transport, scarcity, labour conditions),
- the use of (kinds of) energy (production, storage).

The collaborative process was comparable to the Study-Team approach in Flight for Knowledge but more creative, marked by a liberal exchange of (unconventional) ideas and opinions, closer to narratives from real life. If students got briefly stuck, a hinting question sufficed: Educator: "*So, oh, I understand, so you plan a larger refrigerator to store more ingredients?*" 1st student: "*No, oh also yes, no, we are planning how to not waste fruits, they are expensive, at least the ones we need you know.*" 2nd student interrupting: "*Now you are again with money, I told you we cannot keep banana's this way and I don't agree we should use them, have you read where they come from? Do they also have them in Spain?*". This small fragment clearly points to challenges in present society, yet now not instructed about but reasoned thru. Only 2 of 4 in this Study-Team were triggered by the educator's interruption, one kept close to a screen with shipping-routes, the other appeared to be absent while doodling on a slide of paper, as observed later the rough sketch of a logo.

The case-approach supported the proposition that learning is positively affected when students develop a state of mind that takes them to a level of 'wanting to know', building on a 'need to know' emerging from a positive sensation. A process strengthened by the prospect of a live presentation i.e. 'performance'.

It was important a team could reach a point of ownership, feeling awe and seeing potential. While around 20% of the teams took off quickly, a breaking of the ice (getting the process underway) sufficed for another 60% that then caught up with or overtook the early adopters. Compared with this majority, teams struggling mostly consisted of 5 to 7 students (above the average of 4) and lacked one or two members that stood out to initiate the process (two aspects that correlated; group pressure subduing sole initiative).

Motivation ('strive') compensated for and lifted intellectual performance, a spirit of mind that had initial reluctance, if not fear, evaporate (for example for the math required). As the teachers of a partner Gymnasium in Austria underlined: "*We must encourage students not to be afraid to make mistakes, to look for novel solutions and the implementation of possibilities. The most important thing is to overcome fears. In well over half of the students we noticed a certain fear, being distrustful of themselves, not believing they can really make a business plan and take part in this activity. But later they enjoyed the work*". This 'joy' proved key because it based

movement and exchange, holding the promise of enhanced self-awareness. Students gradually sensed it would be more about them than about their case as such, thereto proved more open to acknowledge gaps in their understanding and interest in matters. This openness, also to each other, for which a base was laid during the empowerment-phase, proved the fertile ground students could build their learning process on.

Students Meeting Partners in Education

Whereas during Flight for Knowledge the information-element had considerable weight and competence development followed in its course, in BusinessClass the exchange with Partners in Education more profoundly affected students' (sub-conscious) development. Meeting company representatives and entrepreneurs, being and feeling welcomed in organisations and production facilities, proved essential for the learning process. Complementary to the students' already community-connected learning through Flight for Knowledge, they were now enabled to further their understanding of the working of organisations as such. Students had stories to tell when back, had found answers to their questions while additional value was generated by way of next-to-the-question experiences. On basis of their feedback and direct observations the following aspects were found most relevant (scored on 103 case-visits out of 143):

- The fact of 'being away from school' but still in a respected educational process (94%).
- Seeing, touching "real things" (92%).
- Being heard, welcome, feeling respected (83%).
- Sensing authentic support from people (70%)
- Entering premises, locations not accessible in daily life (69%).

Personal experience being the common denominator, the stories carried away as the students recounted what they had seen, whom they had spoken to, what they had felt, wondered about, had found strange or exciting. When for example students from lower secondary returned from a local bakery, seeking to understand the recepy for baking bread (in particular interested in additives), they were impressed by the

fact how early in the morning the baker started his work, that he had once been robbed and considered to open a small cafeteria in his store. Although such might come across rather basic, we saw the exchanges apparently compensated for many youngsters' limited insights in ordinary lives beyond their own. A finding that touched closely on the value we presume to linger in the fabric of the social-demographic region; work-place and -related learning processes are not merely useful in relation to content and competences but have more profound (societal) values.

By ways of a brief recount of 3 cases I further explain the value of Businessclass with respect to motivation, meaning of work, sense of education, mentality and responsibility.

Following their inquiry regarding flame-deterrant carpeting in airplanes, three Study-Teams of 16-year old students visited a carpet-production plant where they were introduced to the process from the sheepwool up to the addition of chemicals and carrier-specific colour added to the carpet. As the group strolled the plant they noted an iron bridge over an assembly line with a person sitting on it, staring down, concentrated as carpet-tiles passed by below on a conveyor belt in a continuous stream, a big red button within his reach. Two of the boys halted, looked puzzled and asked "*What's he doing?*". "*Well, he's checking the tiles, observing quality, checking for defaults in the fabric*", the hosting manager explained. "*When he observes something is not OK he hits the big red button and the whole line stops*". "*Oh, doing that all afternoon?*" the students added, not impressed. "*Yes, all day, even this evening. And together with his colleagues in shifts, 24/7 you know, whole week, night and day*". "*Wow, ho.. shi ..*" the boys murmured, clearly signaling a non-verbal 'not my kind of job'. The quality-employee on the bridge, who had a good sense of the situation, called after the boys, smiled and said "*He guys, and than to consider I did finish school and do have a diploma*". Several weeks later the whole group presented excellent businesscases.

In case of a 4th grade class in secondary, having expressed their (sole) interest in ICT, the CEO of a well-established major firm in the field visited them for an afternoon. A setting which tended to turn out brief when students realised ICT was about something else and more than their phone, games or a coding project. The manager

looked them in the eye, hung his jacket at the site of the chalkboard and stated that if they were not interested in what he had planned to tell, he was going to work on something that might have their interest. Since he noticed some ‘trade’ was going on in class, he proposed to jointly set up a pot-business. Inviting the teachers to ‘wait in the back’, they started out and in an energised exchange constructed a flourishing firm. Analyses amongst others comprised a decent SWOT-analyses, risks noted (police, mafia, cross border trade and competition, fire-insurance, an emergency plan in case of power outages). Without noticing, the larger part of the years’ economy-, marketing- and accounting lessons hand been brought to life and understanding within half a day.

A group of 30 students (lower secondary, age 15-16), quite fascinated by the idea, were invited by a BMW-manufacturer to visit and work along for a few days. The first morning, 5 students showed up later than 7 AM, 2 not at all. Their colleagues already inside as of 6.45 AM in order to proceed through security, the latecomers took it easy, parked their scooter and headed for the door to be notified by the guard to go back home or school, have one last try tomorrow and app the other 2 still missing the door would remain closed for them.



Students' Presentations

The outlook of presenting proved a major factor in the students' motivation to work for a decent result. Even when such in terms of calculus and completeness was eventually not so (15% of cases in Primary and 35% in Secondary) the presentation was still respectable looking at originality and presentation. The defining factor not the businesscase as such but the students' composure and on the spot performance. Being out there and giving proof of what was created and understood in a competent way defined success. Presenting orderly, accepting questions and providing answers in a correct way (while not always correct) marked the value.

In total 116 of 143 cases reached the presentation-phase, 10 of the remaining 27 had the intended quality but were not presented for a larger audience, 17 cases (coming from 3 schools) never reached completion, namely due to poor guidance during the process (leading to an intermediate turn-down by external partners), while one school had the students also present for a commercial third-party program (1 case). Of the 76 cases (65%) presented in front of a live audience and a Jury the scores were:

Excellent	19	25%
Very Good	44	58%
Well Done	10	13%
Poor	3	4%

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The students' presentation as such, the way they argued their case and held their ground, proved most prominent to the respective Juries. A more outspoken better score did not correlate with the quality of the case as the students' appearance, handling of questions, originality and energy appeared to be counted in. While clear errors, miscalculations, spelling-defaults and 'strange' reasoning were (gently) highlighted by the jury, the way students 'stood their case' outweighed objective elements. This social-emotional element can best be illustrated by recounting the opening words of an 11-year-old girl-student who headed the presentation of her team. Standing straight and facing the over 120 adults in the audience (mostly parents), she first waited for the four boys in her team to hand out menus of their new restaurant and an appetiser for the Jury, smiled a 'well done' to them to face the

audience again. Starting out with: “*Thank you, as you obviously noted, one of our team members is not with us this evening*” (pause). “*We had to conclude that’s contribution was not what we all had hoped for. But we are sure he will be with us next time. Let us start*”. When they later on amongst others argued the company would use a garage-box to store food-remains (“*Cooled, of course, we have solar cells on the roof*”) and a father in the audience inquired if they had bought or rented the box, he was informed: “*Indeed, we considered this but opt for a lease, because when our restaurant runs well we want to own it*”. As the sound of applause came down on the team the Jury had already made up the score. Certainly, this business had a talented ‘Director’, but at least half of the presentations held similar ‘moments of glory’, students ‘looking sharp’ (and feeling immense). Except for a handful of cases in which it was obvious students had hardly put in any work (4%), all at the minimum received a motivational clap on the shoulder and took off with a ‘well done’.



The younger age-group (10-14) was more capable than foreseen, especially on originality, frank reasoning and personal (resolute) performances, delivering proof of competences mostly not expected at that age. Challenged students from lower secondary level, certainly when set off against the broadly held (mis-)conception they could only perform less when compared to higher levels, gave proof of the contrary. They scored remarkably better on originality, 'daring', creativity and standing than their peers from higher level secondary.

Parents' feedback can be summed up by way of two statements we heard regularly in a variety of formulations: "*We didn't know our daughter/son would be capable of this, we are very proud*" (90% of all parents) and "*Why didn't the school do this before, are you to continue this way?*" (70% for primary, over 50% in secondary). Lingering around during drinks after presentations, we always inquired with parents if they



perhaps knew who that fine student over there is, receiving the best thinkable response to evaluate the working of BusinessClass: "*That? That is my daughter!*". Regarding elements not considered in the concept, we amongst others noted that the promise of an award/price did not provide additional motivation for the students, if any than merely as a promise to the side when entering the process. Feeling the sensation of achievement proved to be the best reward.

5.4.2 Teachers' relationship with and role in BusinesClass

Teachers' relationship with BusinessClass and their role in the process differed substantially from Flight for Knowledge due to the fact most (over 85%) lacked familiarity with the concept and its application at large (entrepreneurship, accounting, economics, marketing, 'elevator-pitches', public argumentation and debate). They furthermore missed associations and interfaces with their own subjects (55%) and/or considered themselves not entrepreneurial enough to teach others in this respect (75%).

The first two factors are related though not the same. The lack of familiarity with the concept proved more a matter of the teachers' perception of the field of economics as a set of unique subjects, likely a consequence of the silo-structure of disciplines. Although it would offer substantial opportunity if each discipline contributed to the process, the existing gap could not to be overcome. To illustrate this, when discussing waterpollution teachers could link with public waste-systems but not with a cleaning companies' use of chlorides in washrooms that results in chemical pressure on the filter-system in the sewage infrastructure. For a part their private household and experiences as owners and consumers could be brought into play, yet many a teachers' prejudice regarding industry was seen to underlie a lack of interest and therewith eroded their potential understanding of entrepreneurship.

To further clarify the sense of entrepreneurship, I frequently used a narrative borrowed from a discipline strange to most involved in the construction of OPEDUCA: "*We all know Einstein lectured us that time and space are two sensations of a single whole, that matter and energy are the same (Einstein, 1905, 1915). He even put it in a handsome formula ($E=MC^2$) so we all can understand that a black hole the size (or better: mass) of a considerable mountain delivers 10 million megawatts of energy,*

more than enough to supply the whole of humanity". Adding after a brief pause: "Anyone of you who until this moment, however briefly, did not consider if we can have black holes the size of a shoe-box, is not an entrepreneur".

Regarding teachers' own entrepreneurial competence, as found during OPEDUCA MasterClass, only about 5% of participants had a story to tell from own experience. Although another 20% enjoyed the instrument and took courage to apply it with their students, over half did certainly not. The remaining quarter wavered and presented a risk to the application of the instrument, best illustrated by two brief examples:

- When a team from secondary (3rd grade, medium level) with their teacher visited a regional bank in order to interview funding-experts, the students amongst others inquired what the price of an office-chair would be. Consequently the bank shortly after withdrew her support.
- During a rehearsal an Economics teacher (4th grade, higher level secondary) waved off students' use of depreciation, informing class that such was not applied in practice since the periodic downpayment of the loan for the investment equals the depreciation, so you can leave both out of the equation.

As we came to understand, the majority of teachers would encounter substantial challenges, notably already during the empowerment-phase, OPEDUCA BusinessClass became mostly a matter of entrepreneurs lending their contribution as Educator.

5.4.3 Partners in Education for OPEDUCA BusinessClass

In line with experiences in Flight for Knowledge, finding and involving Partners in Education for BusinessClass proved the concept true as companies were willing to contribute. They brought in four main values:

- Concepts and phenomena perceived as arid when learned about in a schoolish way could now be experienced in real life.
- Otherwise closed domains were opened for students at a relatively young age when compared to internship structures and other later bridges between the worlds of schooling and work.

- People who had already proven ideas and ambition could be brought to practice made competences tangible.
- Real life learning opportunities were made available for teachers.

Vice versa, from the perspective of the entrepreneurs and the world of work at large, OPEDUCA BusinessClass proved a doorway and valued means for their intention to contribute to education.

We found no sign any of the companies involved ever participated from a (hidden) commercial perspective, their participation always fair to its course. A finding partly a self-fulfilling prophecy following careful selection but also since the broader societal awareness of OPEDUCA in the region had a purifying effect, people were aware of their standing and visibility in community.

The manufacturing sector stood out in added value given their more comprehensive range and variety of functions, the tangible learning environment and the production of goods students can touch, decompose, see in shops, associate with as consumer. This real-life aspect and student's more profound identification with both products and production-processes offered good opportunity to learn about the exploration



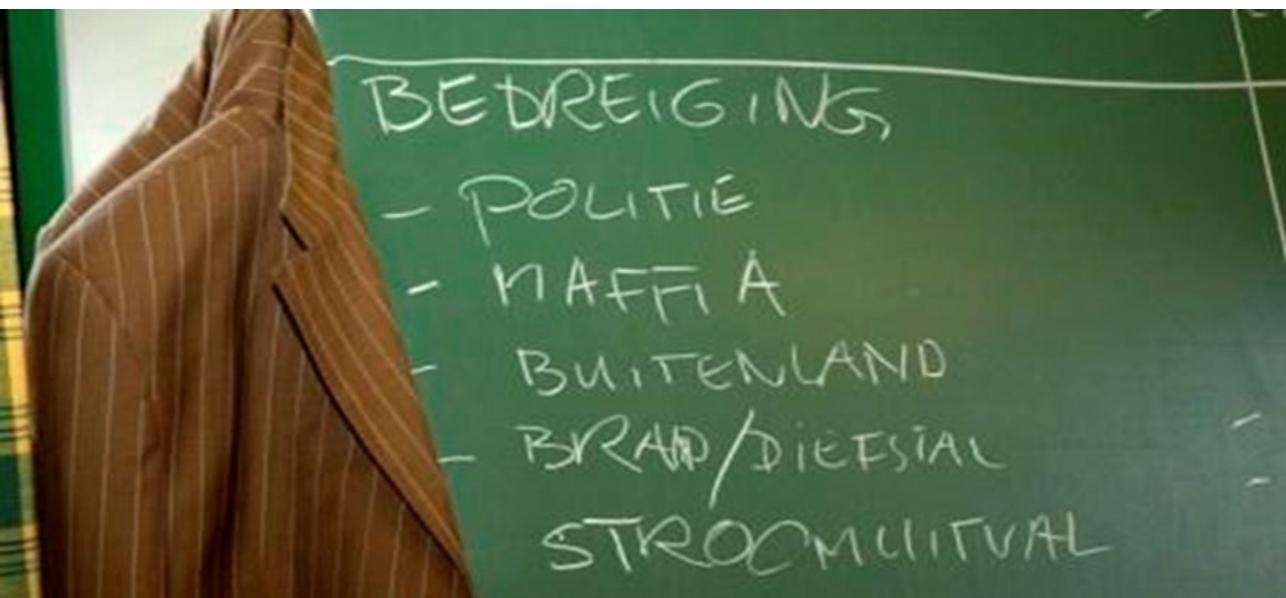
and use of raw materials, logistics, trade, life cycle concepts, energy-efficiency, waste-collection processes, etc..

The spread and variety of the partnership worked out beneficial for the envisioned transdisciplinary learning. Par example we recount the visit of the State-secretary of Environment of the Czech Republic, attending presentations of the students following their cooperation with companies in the field of power generation, waste and industrial water treatment, coal mining, recycling and rubber as well as -oil processing.

Critically observing the willingness of 84 Partners in Education to proceed, we found 14 to disengage when:

- students' preparation in their eyes fell short (3),
- accompanying teachers behaved unprofessional (3),
- schools allowed organisations to 'buy in' while lacking authentic partnership (2),
- operational aspects were too poorly organised by the school (6).

Attributes of the latter were amongst other schools calling on partners only a few days prior to an intended visit, expecting them to accept time-delays of half an hour



and ill developed use of social media to communicate (no prompt replies to mails coming in, calling back with substantial delay).

The involvement of Partners in Education delivered an additional value through a more gentle, compassionate approach of students. Compared to their teachers, educators were more inclined to trust students' potential. They used narratives combined with a more natural urge to pursue their explanations, infused with both material and mental images from practice. This constructive attitude and persistence triggered a more profound and extensive learning process with the students. Obviously this notion shouldn't degrade teachers' commitment and profession who had (in their own words) 'lost patience with students' following experiences with them over longer stretches of time. Still, we can tentatively conclude '2nd change' educators provide for students can be seen as an additoinal value of the instrument.

5.4.4 OPEDUCA BusinessClass Meeting the requirements of regular Education

BusinessClass partly overlapped and complemented the coverage of content and competences during Flight for Knowledge, its value for math, reading and writing (through application) obvious. The instrument proved most effective for the development of personal (transversal) skills and competences, self-awareness, resilience, trust, presentation skills and creativity.

BusinessClass has the potential to cover the entirety of economy-subjects to middle level secondary, also in case students have little prior background knowledge. Comparing curriculum-requirements, it can be stipulated the younger group (upper primary, lower secondary) understands issues waiting for them at least 2 to 4 school years ahead. For example, the majority of last-year primary students (age 12) understood the concept of depreciation and the 'pig-cycle' whereas 1 out of 4 had little problems grasping the concept of accumulated interest. This constructive effect however lessened in higher grades, according to students a result of their 'fear' for subjects and a lack of interest incurred in earlier years of their schooling.

We learned students' unfamiliarity with concepts to be related to too strictly divided curricula and harsh barriers between subjects. In case curricula for example hold an element as: 'The student develops a sense of the concept of costs', traditional education tends to narrow this down to a more (re-)strict(ed) learning-element in Economy and Accounting, not considering it for example with respect to the loss of bio-diversity or the societal cost of poor air-quality. The same we observed for values as 'scarcity', 'debt' and the meaning of 'ownership'.

As discussed frequently with teachers, their contemporary placement of content tends to contribute to the displacement of students. The way content is pre-arranged and brought to lesson-plan invoked and textbook based teaching, has an averse effect on transdisciplinary learning. The fact that, like with Math and Reading, 'business'-disciplines in present schooling are treated separate, risks them becoming an issue for students. We observed that elementary skills and subjects not only surfaced in BusinessClass, but also the way they did contributes to a sense of mastery over them. For example:

- as Math has meaning in real life for the calculation of cost, the analyses of consumer markets, the concept of inflation and a multitude of applications in Production and Logistics, it was not addressed as such but applied as a tool required. Practice provided students with direct proof the world is entrenched with numbers, figures and calculations, whether it regards the cubic meters of a production hall, the watts the bread-oven uses or the compounded interest on their loans.
- The production of shoes led students to consider the fabrication of leather (unleashing a norms- and value discussion as such), made them exchange on the livestock industry in Argentina, related that to deforestation and so forth.
- Coming across personal behaviours and social issues, concepts as fairness, power, rich and poor, pressure, negotiations, image building, etc. entered students' understanding through meaningful application.

Understanding that social aspects, history, culture, geography, politics and many issues lie just beneath the surface of understanding, businesscases big or small proved an eye-opener and underpinned both teachers' and students' motivation to

seek further insights. Essentially obvious connections created a sense of awe as cases conceptually and consequently linked to the real, structurally informing students about the presence and meaning of (un-)sustainable consumption and production.

5.4.5 Lessons Learned

OPEDUCA BusinessClass proved of specific value for the exploration of student-talents regular education is not laid out for. The learning exceeded traditional schooling in the realm of personal development, covered substantial parts of the economic disciplines beyond curricula and provided students with direct insights and experiences in the world of work.

Success sprang from the personal approach, finding BusinessClass gives way to the discovery of ‘unexplored capacity’. Students showed and fed back notions pointing to enhanced self-awareness, of feeling more competent, being ‘worth something’. External observers indicated OPEDUCA BusinessClass targets the ‘growth mindset’, most basic abilities can be developed through dedication and arduous work, ‘brains and talent’ being mere starting points.

The instrument presents students with the opportunity to manage entangled, complex situations for which their own composition and attitude are determinants. They were seen to build ability in a constructive way which lessened their sense of dependency, becoming aware and empowered they can create and act. Findings matching a Harvard-study on the working and effectiveness of entrepreneurship training (Nakkula et al., 2003).

OPEDUCA BusinessClass worked well with students between 10 and 21 years old, at every school level and irrelevant of social(-demographical) setting. The increase in case-complexity was incongruent with grade-level, differences between upper primary- and lower levels of secondary education moderate. Starting at younger age therefore holds the promise of a growth in case-complexity in following years, integrating more subjects to a greater extend, parallel with an expanding inquiry of real-world phenomena.

The instrument was less demanding and disruptive for the school-organisation than Flight for Knowledge and therewith easier to operationalise. This however also resulted in schools' tendency to organise and execute BusinessClass separately, consequently missing complimentary values and remaining with a hampered integral effect of OPEDUCA.

BusinessClass can hardly be orchestrated and planned for in a schoolish way, its execution a challenge for teachers who mostly lack sufficient own entrepreneurial skills and attitudes, their experience beyond school too limited. It therefore requires direct involvement of external educators, preferable from Partners in Education in industries' manufacturing sector as they were seen to offer a wider and more applicable array of phenomena in an appealing way.

Besides the economic discipline, BusinessClass introduced a wider spread of subject-elements than traditional education. Math obviously being applied profoundly, language learning expanded in terms of the application of logical reasoning and effective presenting.

Through the lens of ESD, OPEDUCA BusinessClass allows schools to aim beyond a more limited notion of social entrepreneurship and (semi-commercial) undertakings away from sustainability-defining value chains. Imagining and constructing business cases provided students with the opportunity to relate to sustainable development from their own account. Their direct and profound connections with companies provide for a tangible understanding of amongst others the use of resources, waste, intercontinental trade and working conditions. The entrepreneurial mindset brought about fosters the confidence young people have the capacity to develop a proactive attitude towards sustainable development and engage in entrepreneurship for a more sustainable future (Huion, 2017).



5.5 OPEDUCA Global

Lively Connections

The envisioned connection of students' learning process with that of peers elsewhere in the world was mostly organised by way of virtual conferences using Skype, ZOOM and similar platforms. The limited number of physical exchanges is statistically insufficient to conclude on as such, however provided supportive evidence. I will restrict the critical observation of practice in this paragraph to the components and values the instrument explicitly offers beyond what has been recounted already. Thereto I will again look from the perspective of the students and the teachers, then focus on present and future competences.

We critically observed the organisation, proceedings and effects of 19 exchanges involving 181 students (totalling both sides). Conclusions are based on the 15 that did not suffer from technical malfunction (3) or an error in scheduling over time-zones (1). Looking at their breadth and depth, in practice 4 levels of student exchanges appeared, ranging from basic meetings towards the conceptually perceived added value:

1. virtual meetings,
2. a virtual learning exchange,
3. virtually connected learning,
4. continuous cooperative cross-border learning.

The mere fact that for reasons of development youngsters reach out to each other cross border, can be regarded valuable as such if 'nice to know' aspects regarding each other's lives are followed by 'good to know'. While most criteria for such a virtual meeting are simple to realize, we noted the value beyond a social-media exchange lies in youngsters connecting as students. As soon as the meeting was characterised by a pre-arranged exchange of thoughts, ideas and questions, we valued it as a learning exchange, eventually qualified as follows:

- students finished at least 5 days before the exchange their presentation, questions and other preparatory work, securing their peers could counter-prepare,
- students managed to go beyond introductions and engage in content,
- the connections remained stable, sound and vision sufficient to express emotions, for a duration of at least 30 minutes (depending on the breadth and depth of the case at hand).

We considered an exchange as virtually connected learning when students went beyond what had been prepared, exchanging on issues at hand and organising a follow-up exchange with the intention to enter a continuing process.



When the exchanges become customary practice and a regular part of the students' learning process, evolving towards continuous cooperative cross-border learning, they answer to the envisioned OPEDUCA Global. As then it would be more correct to leave out the term 'virtual' since the exchanges become part of a new normal, continuously started by students as an ongoing cross border cooperative.

Observing the 15 exchanges they scored 5, 8, 2 and 0 over the categories. Strictly speaking the 4th level could not be effectuated during the research period as it requires more years of embedded Flight for Knowledge and BusinessClass practice on both sides.

During practise, we developed 'Virtual Youth Conferences' as a complementary instrument. Created by RCE Rhine-Meuse and first hosted by the City of Grand Rapids



in 2013, the more event-like approach eventually brought teams from up to 16 countries together in real time. As Major George Heartwell concluded:

"The Virtual Conference was spectacular. I sat for two hours and listened as students on three continents engaged each other in deep learning on issues with both local and global relevance. The technology worked flawlessly, the students were attentive and asked probing questions to each other. So today the world is a little smaller and the future a little brighter" (Heartwell, 2013).



5.5.1 Students' experience with Virtual Exchanges

It came to little surprise students embraced both the promise and execution of the virtual exchanges, whether in upper primary or secondary. The mere fact of contacting peers had their interest, was considered exciting and according to more than 70% meaningful. The preparation of the exchanges came quite close to the Study-Team activity in Flight for Knowledge, the virtual and cross border setting providing an additional edge. Compared to regular exchanges and presentations there were 3 differentiators:

- The use of a foreign language was considered exciting, especially its constant use.
- The more meticulous and strict planning and timing contributed to an amount of constructive stress.
- A more profound need to perform ("*No one wanted to be at a loss, the laughingstock of the exchange*").

The messenger being a peer had more meaning and therewith effect than foreseen. Although new insights and angles to consider were clearly interesting to the students as such, the fact they came from peers gave additional substance/weight. Students wrapped this up in wordings such as "*They are very much like us*" and most basically "*They are really there*". After a hesitant start students exchanged quite straight forward, used brief sentences (also a language-effect), expanded little, got to the point, delivered more on veracity. As illustrative example, 16-17 years old Canadian students' statement "*The permafrost here in the North is thawing, it's a mess*" was most instantly responded to by Dutch students with "*Wow, what can we do about it?*". In multiple instances like this we think to have found a distinct added value of OPEDUCA Global as a sense of connectedness fed into fellowship; the briefest of statements and notions steppingstones towards what the youngsters looked for; togetherness. Researchers from Karl Franzens Universität Graz and the University of Helsinki found the concept's strength to lie in the development of students' self-confidence when presenting their work and ideas, sharpening and building motivation for their course-work because of peer- and general outside-pressure (Mulder, 2016). This relevance of the 'real' of the exchanges can best be illustrated

by another example, the case in which 14-15 year old students from the Netherlands, Qatar and Turkey focussed on the ‘contamination of drinking water’. Each group approached the matter from a different angle (salinization, scarcity, hygiene), inspired by their cultural and social surroundings. It was a small step to further link these groups with the Lithuanian students studying the level on contamination of drinking water in the Siauliai region who had already teamed up with an expert (see the earlier example) and enrich the exchange with the element surface pollution in relation to drinking water reservoirs. Such swift real-to-purposeful connections drove students’ motivation.

The students’ respect for information exchanged remained far from bluntly accepting what they saw and heard. Critical considerations were omnipresent, if first only briefly worded in native language within the own group (“*Do you think they understood our question?*”, “*Is that really so? I thought..., let us ask.*”, etc.).

Observing, listening to and questioning students living in often quite different circumstances (geographically, social, political, cultural) provided students with the opportunity to mirror, question and adapt their own beliefs and ideas, required them to swiftly recompose, reword questions where they noted initial misunderstanding. Vice versa, being questioned about life and phenomena, students were gently forced and challenged to re-consider what they thought to know about their habitat and themselves.

However constructive and appealing for many students, the virtual exchanges in about 30% of the cases tended to be taken too lightly. Whereas (ICT-)facilities obviously need to function properly, a considerable downside risk come about due to ill prepartion following a lack of interest i.e. a too weak (token of) involvement at the moment of exchange. Furthermore, whereas in case of in person meetings emotions can be more clearly read and responded to, virtual exchanges remain ‘2-dimensional experiences’ where constructive senses can’t come to play fully. We eventually developed guidelines and a protocol to better secure a well-functioning exchange regarding these aspects, eventually worked out into a more integral script for the entire process.

5.5.2 Teachers' experiences with Virtual Exchanges

Despite occurring imperfections in facilitation as noted above, teachers involved were most positive about the exchanges, a mixture of being proud and standing in wonder themselves. Whereas a teachers' supportive and encouraging attitude was a pre-condition for students to engage in the exchanges, their role was more to the side during the exchanges as such.

An example of too well-meant support occurred when an English language teacher guided Dutch students towards their exchange with students at the east coast of Canada, finding they were welcomed in French. It was most interesting to see how swiftly the students recovered to convey the existence and function of Dutch Water Authorities in the context of Canadian regions dealing with draught. The Director of the regional Water Authority, witnessing the proceedings, stated to need no more arguments to support OPEDUCA as he resumed: *"They just explained in French halfway across the world things that I am challenged to bring across over here through expensive public awareness campaigns"*.

The observation that teachers were positioned on the side obviously follows our earlier findings regarding world strangeness and limited associative capacity, now articulated by a reluctance to use a foreign language. Remarkably, this was so whether those involved were language-teachers or not; personal experience and attitude being the discriminators. On the other hand, in about 20% of cases both students and observers stood surprised of their teacher or school leader giving proof of unexpected (language-)qualities.

5.5.3 Added value for contemporary and envisioned competence development

Stating the obvious, the exchanges added meaning, relevance and context to subjects such as Geography, History, Economy and Politics, called for the application of a range of competences such as:

- language learning,
- cultural awareness (feeding into new considerations),
- critical thinking and changes of viewpoint.

Especially the experienced closeness to region-specific matters proved to add value not only in terms of access to and relevance of information, but also from an historical and cultural perspective. Students explained each other more than asked for, going into the origins of matters and issues at hand today, how people perceived and managed these in their habitat. They proved sensitive for the (implicit) absorption of impressions in the field of culture, history and demography, peripheral to the key-theme at hand (“*We Dutch are also referred to as the ‘potato-eaters’, did you know?*”. “*Is it correct people in Amsterdam use drinking-water for washing clothes?*”).

We observed the exchanges to promote the (re-)discovery and application of local contexts, ranging from indigenous knowledge to present day challenges. Such not only in the narrower scope of content, but also relating to one’s roots and respect for the own culture and community as base to discover and exchange on; students took another and profound look at their own OPEDUCA.

5.5.4 Summary and Lessons Learned

The students’ virtual exchanges brought the envisioned local-to-global learning near, seeing them able to address the local context while bridging their learning to peers around the world.

The future defining themes were functional as cementing factor while the students’ further going curiosity and openness to take in new perspectives defined the added value of OPEDUCA Global.

Direct observation and inquiry by way of evaluation-forms showed:

- Students were capable of and enjoyed the exchange with peers cross-border.
- Contents and process, cognition and (social) competences were well balanced.
- An unforced application of language, usage prevailing over academic correctness.
- A broadening interest in historical, cultural, social and political values, students being sensitive for the (implicit) notion and absorption of impressions.
- Constructive peer- and outside-pressure that required and enhanced students’ self-awareness and -confidence.

Most prominent was the appreciation and genuine understanding of the diversity and richness of other cultures, societal constructs and systems, getting closer to people living under different circumstances (geographic, economic, societal), holding different beliefs and values.

As to the uniqueness of the local context conceptually perceived, we found a clear cross-over, noting that in the realm of ESD there is many special but more in common than unique.





6 Possibilities, Presence and Future of ESD

Following the presentation of the OPEDUCA-concept and a critical recount of its application in school-practice, this chapter takes the broader perspective of ESD again, working towards a framework that explicitly recognizes sustainable development as multi-dimensional base for education.

I will first take a more profound look at the construction and characteristics of a regional multi-disciplinary cooperation for ESD (6.1), then expand on my view on Learning and propose a learning-continuum (6.2) which informs a ‘Whole Student Approach’ for ESD (6.3). Building on practice, I present a critical-constructive look at the transition-capacity of schools to realise ‘ESD-based Education’(6.4). Because the development of formal education is affected by the progress and outcomes of research- and policy development in ESD and adjoining fields, I will share my observations in this regard and critically compare our findings and further proposals with contemporary ESD (6.5) seeking to establish an appropriate context for the recommendations presented in the concluding chapter.

6.1 A Multi-disciplinary Partnership for the effectuation of ESD

Since a multi-disciplinary partnership for ESD appeared to be an asset that contributes to its validity, it is relevant to look at its construction, defining characteristics and working. Starting out with a critical recount and analyses of the underlying process (6.1.1) complementary to the history of the OPEDUCA-project (Chapter 1), I will observe characteristics of the OPEDUCA-region in which such a partnership can unfold (6.1.2) and pay specific attention to the role and added value of the world of work (6.1.3).

6.1.1 The construction process of a Multidisciplinary Partnership

The OPEDUCA-project started out from the articulation of a holistic perspective on the development of youth and evolved towards ESD-based Education, a process requiring and enabled through a multidisciplinary partnership. Its construction consisted of hundreds of semi-structured interviews (table 1.1) with people from every sector of potential interest. It therewith involved not only the educational, academic, industrial and governmental sector, but also people active in sports, the arts, health, culture and a range of other domains. Real world concreteness and people's capacity to draw from personal experience were the determinants for the formation of a growing community, authenticity the key selector. Researchers and policy developers in the field of ESD participated in a representative number (over 120 resp. 70) yet made up a small portion of the whole ($n=1.221$, 10 resp. 6%).

The structured part of the exchanges, mostly by personal interview, consisted of a time and over again hand drawing (see fig. 1.1) of the Dimensions of ESD, followed by the visualisation of ongoing future oriented learning processes as an upward pointing line throughout the fragmented educational system and into the world of work. Argumentation regarding the future-defining themes followed from a joint reflection on what the ongoing learning process should consist of and which themes would be 'universal' and 'ever relevant'. Interviewees provided an enriching variety



of views and points of application from their perspective, experience and disposition. From there the depiction of a continuous learning processes was expanded, the breaking points between the stages of schooling and the perceived or experienced mismatch with the world of work reasoned through.

Experiences and anecdotes were shared while the rationale prevailed. The exchanges delivered an engaged and rich narrative on the substance and spirit of ESD while favourable terms that mark the discourse on sustainable development were avoided. Not more than 4% (49) of interviewees argued the envisioned perspective went too far beyond (their) contemporary practice or conviction. Seeking arguments by ways of continued debate, we noted that most of them were not led by alternative ideas but held positions they considered to become criticized or even endangered should the concept reach broader practice.

Parallel with the interviews, evolving OPEDUCA-practices were presented over 160 times to schools and a variety of larger audiences (ranging from ap. 20 to over 250, average 55) by ways of a 40-50 minutes presentation. The narrative, followed by critical interaction, was almost identical to the interview structure and remained consistent over the years. Consequently, the proposed re-conceptualisation of ESD (Chapter 3) was put to the test continuously, the principles scrutinized, criticized, analysed and eventually strengthened in an iterative process that expanded to transformative thinking and action. Since schools, industry, governmental bodies and



universities were joint in presentations and debate, the integrative reasoning challenged over and again while parties infused their views and standpoints.

Seeking further proof of concept, the presentation was used without any alteration (using the same wording, pictures, examples from practice) in expert- and practitioner meetings in over ten other countries⁹. We initially thought it remarkable to not only find the same positive response in each single case, but that also questions, remarks, challenges and hopes voiced were nearly alike.

The intensity of the process in combination with an increasing application of the instruments in practice, clenched the network and strengthened the concept. Lessons from first practice crystallised ideas and propositions. Being transdisciplinary from the beginning, the application of the concept therewith touched gradually on its validity in various sectors. As ever more convictions were incorporated, the OPEDUCA-concept became more unshakable and withstood critics ever better while understanding grew as to what people considered most relevant, regarded problematic, challenging and motivating in sustainable development.

The extensive and qualitative approach had more in common with a Delphi research than a consensus-seeking process. Since an initial vision and principles were put on the table up front and not co-constructed, the process reminds of but was not an appreciative inquiry (Bushe & Kassam, 2005)¹⁰. It is more accurate to say a normative was developed acknowledging the descriptive, proactive thinking and proposals resulting from the projection of an ideal model (Baron, 2000).

⁹ Amongst others the US, Spain, France, UK, Turkey, Germany, Austria, Finland, Slovenia, Qatar and Marokko.

¹⁰ Appreciative inquiry proposes people and organizations can evolve in whatever direction they collectively inquire about, considering the best of what is to imagine what could be, followed by collective design of a desired future state that is compelling and thus does not require the use of incentives, coercion or persuasion for planned change to occur.

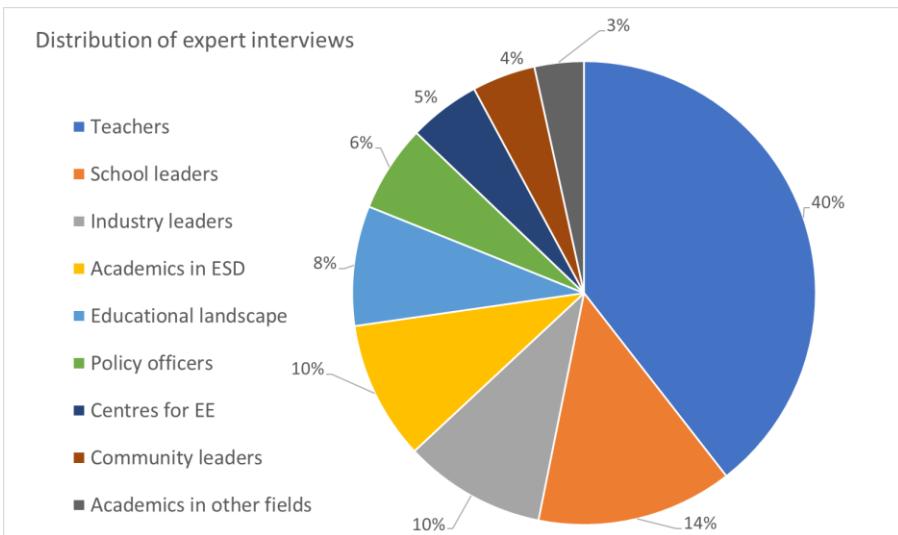


Fig. 6.1
Distribution of interviewees

Building on direct feedback, the following factors were seen as most constructive by interviewees and later participants:

- The notion of a joint interest for youth-development as cornerstone for ESD.
- The fact interviews and presentations went to the heart, the message perceived as encouraging and hopeful, thought-provoking while not avoiding inflammatory statements.
- Formal education was not trampled on, instead of popular unsubstantiated criticism a better perspective was offered, an applicable alternative envisioned.
- The layout of images of a future though near practice, enlivened by series of detailed examples, brought forth by convincing narrative and acceptable argument (a notion of realistic vistas).
- The delineation of instruments providing practical perspective, responsive to own experience.
- The depiction of ESD as a positive, the sense of an overarching purpose.
- The clear and present involvement of Teachers and Students as developers instead of spectators.

- The process not instigated by a governmental or university program, nor any other institution, provided a feeling of being of use and need, starting from 'ordinary' practice.
- The sensation of an assembled variety of people and organisations.
- The active presence of major industry providing further proof of engagement and commitment.
- The expression of the message 'with relentless energy and conviction'.
- The personal address, also participants holding substantial authority engaging on eye-level, drilling through functions, positions, roles, structures, a sensation of togetherness.
- The sensation of empathy, a well-wrought understanding of the other's occupation and business.
- The gathering and joint approach of primary, secondary and further education, thus far unprecedented in ESD.
- No upfront arrest of societal developments.

The approach had 4 weak points, inherent to its constructive assets:

- The breath, depth and style of the proceedings was conceived as laborious, lengthy and energy-draining.
- As supportive practice in schools already got underway, the ongoing process took (too) much time and attention away from it. The 'turmoil' of development did not allow for a secure caretaking of first practice.
- The approach requires the ability to build an extensive high-quality network first-hand.
- The breadth and tempo of the process left insufficient opportunity to critically address every participants' sincerity.

As to the degree in which the development of OPEDUCA was organised, it is relevant to note several organising structures were put in place over the years:

- The 'Leadership Forum Learning for the Future Netherlands' (2007-2010), each time bringing together ap. 20 industry-managers, school executives, policy developers, researchers and politicians on the national level.

- The ‘School Leaders Network’ made up of 30-40 school leaders across the board of education during the entire research-period.
- The ‘RCE Rhine-Meuse’ (1.1) that took a forefront and coordinating role in the European community of eventually 27 RCE’s. The RCE initiated, organised and hosted several RCE-meetings on the European level, started the ‘European RCE Alliance’ and held the ‘Global RCE Conference 2011’, welcoming 185 experts, researchers and policy developers in ESD from over 70 countries worldwide.

A sense of structure could also be derived from the many year presence of the OPEDUCA-project in leading Dutch Interdepartmental Programs on Sustainable Development, Environmental Education and Entrepreneurship Education through which the efforts found substantial support. Furthermore, the cooperative was present in 14 European Union projects and involved in UNECE-policy development. While OPEDUCA was moulded and forged on the anvil of practice as a multiple alloy, the instrumentarium emerged from the transdisciplinary thinking and practical relevance it proposed. As Boulding phrased it many years before, “*The inability of the real world to be compartmentalized means that any kind of problem-solving activity requires an interest in the general system that underlies the problem and cannot be confined to any one discipline - the search for the unity of human knowledge comes from the faith, perhaps a little blind, in the fundamental unity of the real world and its interconnectedness*” (K. E. Boulding, 1981).

As people consequently stated OPEDUCA ‘made sense’, a precursor for support was realised, sensemaking regarded to enable action in times of changes and shifts (Weick, Sutcliffe, & Obstfeld, 2005). Eventually, the multi-disciplinary approach founded the multi-disciplinary alliance instead of the other way around.

6.1.2 The Critical Real(m) of an OPEDUCA-region

Having pointed out the the added value of an OPEDUCA-region and the multidisciplinary partnership in its core, I add a critical a retrospect of characteristics and (inherent) weaknesses, concluding with a brief summary of qualities that overcame these.

The Patched landscape of Education

The educational potential of a region was found more scattered and at risk than eventually perceived. Metaphorically speaking, it is a ‘patched blanket’ where new ventures challenging the inertia of the system become interlocked with it or disappear altogether, patches torn loose mended in place by power structures in indiscriminate fashion. To bring all and everybody with potential value for youngsters’ development together, not only requires immense effort and persistence, but also contradicts with the societal fabric as it requires the de-patch of a blanket many stand on and live from. Moreover, since people change role and position, alter opinion, preferences, interests and reshape their disposition, the orchestration of a hornet’s nest to play Bach seems a walk in the park.

Continuing the analogy, the conceptual strength of the OPEDUCA-concept delivered a strong new yarn and sharp needle drenched in the potential of transition, therewith holding the promise to transform the societal patchwork to a coherent whole. Therewith those seeking coherence and togetherness found a joint momentum led by vision. It was however a mistake to believe that also most prominently coloured patches, namely those in the field of STEM and Environmental Education, would eventually develop along. Even though the benefits of a joint approach were acknowledged and remain undisputed until today, such proved credulous. We had to acknowledge:

- some patches in the educational landscape are intended to be and remain so,
- several yarns appeared pervaded by personal interests (mostly funding- and job related),
- what seemed patches were holes in the landscape, only noticed when stepped on or scrutinised,
- the number and variety of patches grows due to a constant influx of new fabric and (re-)designs.

The essence of Primary Partners

The effectiveness of a multidisciplinary partnership for ESD strongly correlates with the social-economic position of the constituting organisations. We gradually discerned between a primary, secondary and tertiary sphere:

- Primary, holding organisations that deliver first line tangible goods and services, such as in manufacturing but also those in greenkeeping and regional water authorities. This inner-dimension of social-economic activity proved defining in terms of relevant first-hand knowledge and experience in real-world settings as well as for the quality of the entire partnership.
- Organisations in the secondary sphere, grossly defined as those servicing the ones in primary. These provided fewer educational values, effective partnership depending on the degree in which products and services could be articulated in a tangible way.
- Organisations in the tertiary sphere, providing less tangible general services, could mostly only partner through the qualities of the persons directly involved.

Any diversion from this simple selective approach (overweighing the secondary and tertiary sphere) appeared to not only weaken the partnership but eventually deteriorate practice once underway.

We base this finding also on many yearlong studies of over 20 RCE's throughout Europe and 15 beyond, being exemplary attempts to realize regional multidisciplinary partnerships for ESD. Except for 3 besides the RCE Rhine-Meuse, most were built outside in (from tertiary), leaving them only partly functional. We observed the 'outer' spheres (service providers, University-faculties, Cities, NGO's, consultants) to smother the inner in terms of action-competence, following their claim for visibility, funding and esteem.

It proved elusive to understand a multi-disciplinary partnership for ESD as a gathering of societal actors that presently (claim to) represent regional efforts in sustainable development; claim and authenticity too often separate qualities. In general, we found the argument that a (regional) partnership for ESD should reflect societal actors in the field not valid. At its best such leads to an ill-founded bridging

of parties resting on mutual interests but not a merger of efforts. Phenomena such as institutionalised offerings, societal movements, political intervention and existing networks were found to often more hinder than effectuate an authentic development of ESD.

Stuck in the System

A multi-disciplinary cooperation reasoned and understood from the perspective of knowledge- and competence development for ESD does not result from institutional agreements and projects lined out but from the authenticity, dedication and perseverance of the persons involved. Building on our notion of a ‘patched landscape’ and the relevance of ‘primary organisations’, we found no evidence of the premise that a broad engagement of key change agents across the system and its components leads to an alignment of multiple levels and contexts for ESD. The system’s components, imagined as gears interlocking in a series of complicated cause- and effect relations, are often either too far apart or defined by single functional dependencies instead of continuously interlinked active processes embodying change capacity. Regarding persons perceived as change agents in the system’s components, ambition and knowledge appeared subject to place and position, most hanging in strings within a tightly woven whole. Strings with the quality of rubber strands that leave some room for renewal and motion but swiftly snap an agent back in the status quo.

Timing and Balance

The time- and energy consuming character of the construction of a multi-disciplinary partnership is on the one hand a condition since *qua non*, on the other a restriction for success for reasons of timing and balance. As success unfolds, a growing partnership risks to crush under the weight of its own exoskeleton when it lacks a minimum of forward energy, of movement. A more gradual progress by match of purpose while others are still coming in conflicts with earlier partners’ tendency to seek application and justification of their partnership.

Managing the variety in timing is more complex when the multi-disciplinary partnership is as boundary-crossing as envisioned, following intrinsic differences in tempo of organising and acting. Consequently, even when purpose is matched and action projected, unbalanced operational timing is seen to hinder the envisioned dovetailing of concrete activities.

As a third aspect in timing and balance, partners that ‘got the picture’ tend to ‘go for it’ while instrumental elements and operational aspects are still on the drawing board in need of orderly application. Depending on their moment of entry, they experience and generate a different practice, involvement and sense of ownership. To put this lesson learned figuratively, during the OPEDUCA-project early and most excellent adopters dived in while the pool was still being filled.

Critical Successfactors

Complementary to the factors that contributed to the formation of a regional multi-disciplinary alliance for ESD (6.1.1), the above-described critical characteristics and factors were counterbalanced by 6 distinct qualities of an OPEDUCA-region:

- The possibility of authentic personal cont(r)acts; as conceptually proposed, what is dividend or secluded by disciplinary or organisational aspects, what we artificially segregated in our societal construct and feeds polarisation and alienation, was seen joined again in the person. ‘Whole’ persons appeared more capable to (re-)establish intergenerational connections, of transboundary value-transmission and the application of a sense of history as well of social constructivism, learning by way of direct exchanges with others, co-constructing meaning.
- The learning can feed from a regional multitude and diversity of actors and phenomena beyond those placed or presumed essential to ESD; people and organisations that together embody a rich variety of educational values reach further than the institutionalized establishment.
- The sensation of empathy effected in a well-wrought understanding of the other’s occupation and business was functional for the attraction and bonding of additional partners in the primary sphere.

- Sustainability issues are more near in local habitat, can be encountered, exchanged on, effected, critically assessed as real.
- Sources of education i.e. Partners in Education can bond and interchange, local society having the potential as a learning arena for action and reciprocal exchange of knowledge (Breiting, Mayer, & Mogensen, 2005).
- Regionally connected learning can be a means to an end when students' cross-sectoral and boundary crossing learning contributes to:
 - enlarged insight in knowledge- and value structures throughout societal sectors,
 - the enhancement of togetherness between persons involved, bridging societal divides,
 - the learning of all, seeing that supporting youth in their learning has the potential to reinvigorate the contributors' learning process, awake a dormant body of knowledge in the region,
 - a regional communities' cohesion through the revitalisation of connections that decreases inequity and builds resilience for sustainable development.

6.1.3 Involving the World of Work towards ESD-based CSR

The involvement of the world of work proved of value for the effectuation of transdisciplinary learning and development of skills and competences. I will first briefly resume added values from the perspective of the learner and school, then argue there is a joint interest beyond the obvious and propose to effectuate further potential under the heading 'ESD-based CSR'.

Critical Closer Connections between Schooling and the World of Work

As recounted from practice, students:

- gain access to more relevant data and information,
- experience how knowledge is applied,
- learn to sense the relevance of skills and competences in a practical context and gain understanding of the value(s) of work and cooperation,

- gradually gain access to and understanding of society's value- and income-generating capacity, of the world of consumption and production that for a major part defines our (un-)sustainable development. Therewith they are seen to generate a foundation for the design and development of own concepts and ideas, envision how they would choose, rule, regulate, produce, trade and handle goods and services.

From the perspective of the schools, values complementary to the students' learning process manifested themselves as opportunities arise to:

- make schools less dependent from costly consult and pre-defined programs in the fields of science, technology and entrepreneurship while misconceptions in these fields can be avoided,
- expand the range of educational partnerships through a companies' own network,
- provide direct insight and a better understanding of the competence-gap between school and work,
- rationalise the relevance of knowledge, competences and transversal skills, moreover since these are less subject to inflation than presently perceived in the realm of '21st Century Skills', 'ESD Competences' and alike convictions.

Recounting how the above came to effect, we mostly observed practices that required a more profound mutual understanding between schools and companies. Complementary to the findings described in Chapter 5 regarding the manifestation of the schools in this respect, it was found relevant to discern a company's involvement from the perspective of organisational positions and the way it organises its societal involvement through Corporate Social Responsibility (CSR). Thirdly, it is both for schools and companies involved relevant to understand not every (potential) partner form industry is as authentic as likely perceived.

The already reported strangeness of schools with the world of work was paralleled by managers not fully aware of the situation in and around schools. The efficacy of a company's involvement appeared related to the way it interprets and organises its CSR.

Whereas smaller companies are obviously required to be in touch closer and on a more personal level, larger industry often places ‘education matters’ in the hands of HRM with an eye on the longer-term availability of a qualified workforce or in a separate department annex Foundation. Overviewing 48 midsize to larger companies worked with, it can be tentatively concluded that a higher i.e. stricter organisation level restricts and limits its effectiveness as Partner in Education. We thereto inquired with students in both Flight for Knowledge and BusinessClass and analysed the companies’ contributions in each case (during visits, presentations, jury-membership, etc.). Whereas a person’s dedication to the course proved important in general, participation from those in a companies’ core-business, from the CEO-level (25%) over line-management to the practical workforce (total 35%) was definitely most effective. Specialist staff (Finance, Legal, etc.) and Marketing made up for another 27% while in only 13% of cases (the) CSR(-organisation) added the value.

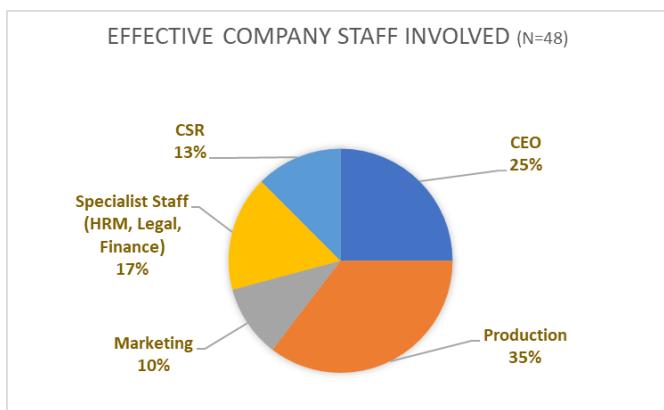


Fig 6.2
Division of dedicated company employees involved.

The widest gap between intentions and effective practice appeared when support-activities were conducted by a designated department or Foundation, working with well-rounded programs. Such especially in cases these were (even further) outsourced to third parties. Exchanging on this, they appeared not sensible for the argument of costs (own staff topping outsourcing- and delivery-costs) nor for well-

wrought quality considerations. The perceived attractiveness of the support(-tool, or -instrument) dominated the choice. We concluded on this as a substantial opportunity-loss in the effectuation of a companies educational potential.

From the side of the schools, there was little critical attitude towards the offerings as they tried to make up for own deficiencies in certain areas, being grateful for any free support offered. As a result, in most cases products of all sorts were used, although mostly temporarily to then end up on a pile of likewise materials i.e. disposed of.

Furthermore, as we observed through constellations of ESD-research, companies were hardly scrutinized for their authenticity and inert educational values. Whether it concerned firms in coffee, chocolate, clothing, local food or alike sectors, marketing hard to to differ themselves from traditional (unsustainable) industry, we regularly felt inclined to point out that there is eventually little difference where it comes to nett profit margins and the (abundent) use of scarce resources.

Companies perceived as 'sustainable businesses' and/or presenting themselves as entrepreneurs in sustainability' (mostly acting in the tertiary sphere, 6.1.2) were trusted with relative ease. One needs to understand sustainability can likely be a market(ing) approach as such, driven by commercial intentions and bare profit-making. It remains to be seen if and in how far newly crafted enterprises now profiling themselves as (leading) examples in sustainable entrepreneurship are actually so. Qualifications as 'social' and 'sustainable' in combination with 'entrepreneurship' can be a contemporary mask for exploiting a profitable business for its own sake.

ESD-based CSR

Whereas unfamiliarity with each other's goals, means and organisations goes paralleled by a light heartedness on the side of schools as well as companies, I argue a more profound and professional understanding of each other can inform a wider range of valid and valuable opportunities to cooperate and jointly effectuate ESD-based Education.

Industries' contribution to ESD holds more potential than effected thus far, building on the complex conviction that:

- industry is an indissociable part of the fabric of society and the community in which it operates, another manifestation of what we are and do instead of a manifestation of its own,
- its huge apparatus in place not only represents a substantial amount of natural and human resources invested, by also a vast body of knowledge,
- given its use of resources and scarce means in the realm of (un-)sustainable production, induced by doubtful choices and volumes of consumption, industry represents a formidable transformative capacity,

Sharing the conviction that sooner or later the only way of making profit is being sustainable (Sijbesma, 2020) there is profound reason to more closely look at a more structured and consistent approach of industries' partnership in ESD beyond the contemporary efforts in HRM and especially CSR.

Bringing a transition in and through industry to effect can obviously be approached through the inflow of educated employees on every level to steer cause and course. However, such a longer-term gradual approach risks an assimilation of incoming talent in the current state of affairs. I therefore argue to further a companies core-business on the path of sustainable development by ways of a pro-active Educational Partnership with the entire range of (formal) education. Investing in education not only doubles back as partnerships offer opportunity to work directly on the improvement of skills of future entry-level workers (MacDowell, 1989) but also of those already enrolled. Also where it comes to future decision making and leadership, change in management education can be seen a prerequisite for achieving integrated views and practices in order to strive for CSR and sustainability (Waddock & McIntosh, 2009). A companies decision-making will have to build on multi-dimensional leadership including transformational and servant capacities (Stead & Stead, 2017), values wrought in the course of a person's development, unlikely to be taught in later life. Reaching out to, providing access, sharing data and information with students today, allowing them first-hand insights and experiences to further their learning, effectively contributes to the generation of knowledge which underpins future wisdom. Wisdom informing action, whether as employee, entrepreneur or informed consuming citizen.

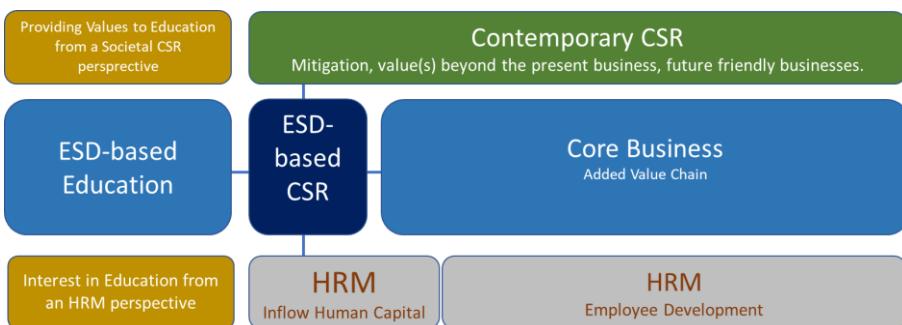


Fig 6.3
Visualisation of the positioning of 'ESD-based CSR'

It became clear that meeting(s) with(in) industry enable students to gain insight in how the world of work can contribute to their future wellbeing (personal development, happiness, fulfilment) and competence development.

A constructive step is to more profoundly see them as future entrepreneurs and employees embodying transition(-capacity). Closing the gap between schooling and work can dovetail with a company's existing HRM-efforts to (re-)educate present employees who will also be challenged to operate in a setting characterized by lesser defined problems, contradictory information, informal collaboration and more abstract, dynamic and highly integrated processes. Seeing the concept of competence strongly associated with the ability to master such complex situations (Westera, 2001).

I propose to fold formal education and company-based learning together beyond the realm of vocational schooling. Aiming at a more fluent and better fitting reconciliation of competences generated in practice with those developed through education. Referring to the well-known German 'dual system' of apprenticeships, the dovetail can be longer i.e., reaching 'back' further and applied broader. Obviously, this is congruent with the attraction of more educator-capacity for schools the OPEDUCA-concept proposes.

Overarching the HRM-perspective, re-defining a companies' CSR to meet ESD-based Education is a profound and lasting way to effectuate school-industry collaboration. Proposing ESD-based CSR I take a longer-term perspective and address a missing link between a companies' raison d'être, goals, impact on sustainable development, citizenship and education.

Overviewing the companies that cooperated during the OPEDUCA-project we broadly discerned 4 present levels and interpretations of CSR:

- The explanation and mitigation of undesirable consequences on one's business.
- Generating future friendly businesses.
- (re-)Arranging business to serve sustainable development.
- Adding value(s) beyond the present, using position, seize and influence.

The effectuation of ESD-based Education by ESD-based CSR is grounded in the latter to then develop towards the first three, given the following argumentation:



- An earlier contribution of industry to students' learning processes is more objective as the 'pay-off' will not fall to a specific company and can therefore be seen in the interest of the greater good. This sense of sincere and honest contributions to education is what we observed during the OPEDUCA-project.
- Whereas the OPEDUCA-instruments are effective to enrich and harness the students' learning, they also provide for a gate-keeping function as only suitable companies with an appropriate organisation and knowledge-sharing infrastructure can manifest their CSR this way.
- A closer and structured cooperation can provide for teachers' and school leaders' professional development.
- Speaking of information and learning objects, it is regarded a prerequisite to integrate (new) employees in the knowledge management of the organisation. Dove-tailing this both in concept and practice with formal education, one can consider a 'work-ready-plus notion; students not only being competent and able to use skills and knowledge correctly under a given set conditions but also capable to adapt to and incur change having higher levels of personal, interpersonal and cognitive intelligence (Scott & Eussen, 2020) An idea which includes being sustainability literate, change implementation savvy, inventive and entrepreneurial. Clear on where one stands on the tacit assumptions driving the 21st century agenda like "growth is equally beneficial to everyone", "consumption is happiness", "ICT is always the answer" and "globalisation is great".

The above is complementary to researchers who consider a 'Corporate Curriculum' in the course of which a plea is held for active sense making as the ultimate goal in organisations, the ability to decide and operate on the base of informed judgement in a dynamic environment and uncertainty, making use of scientific knowledge, requiring employees to be able to use a variety of information sources and confront such with scientific terms, methodologies and views (Bosch, 2003; Kessels, 1996).

The effectuation of ESD-based CSR in the realm of ESD-based Education can contribute to improving and safeguarding the integrity and quality of education in following ways:

- Discerning between companies with authentic educational values and those in the business of sustainability and/or education itself.
- If more than one company contributions to specific elements of the learning, a validation of data and information is engrained in the process; distributed contributions disperse influence and cross-validate.
- The multiple application of the OPEDUCA-instruments in various regions involves Partners in Education from alike sectors (if not competitors) which provides opportunity to critical comparison of contributions.
- The protection of the integrity and independence of formal education, whereas presently such values can be corrupted due to insufficient insight and understanding of both school and companies. Today initiatives in the fields of STEM, ICT and other assembled educations can be pressed upon schools and effect learning already in ways undetected. The perceived downside of industries' involvement in education is not to be regarded futile and should be seen against the background of presently unstructured i.e., uncontrolled influence.
- Possible ethical conflicts are better avoidable when vulnerability is mutual. The effective involvement of industry in school-based education requires such openness and in-depth understanding of a company's whereabouts, activities and moral, one cannot engage halfway. Certainly not when understanding the open character of an OPEDUCA.
- As recounted when reflecting on practice, students are able and should be continuously encouraged to 'dive' into matters while they are still questioning phenomena. That way they will per definition come across what marks todays' industry as unsustainable. Put shortly, it will be most unlikely a company with other than fairest intentions to the cause can be a Partner in Education. The stronger the involvement of companies and the wider the spread and variety across sectors, positioned open to each other, the more likely their support is authentic and qualitative.

6.2 Seeing a Learning Continuum for ESD Based Education

Positioned midfield, between the daily practice of education, the world of ESD-research and society at large, the sensation emerged that an unarticulated body of thought with apparent universal qualities underlies and informs ESD-based Education. Specifically in teachers' practice we noticed their craft might come across methodical and systemic, appeared however pragmatic when dealing with uncertainty regarding the way their students learn. Teachers also act and judge intuitively and base their doings on a deep (even unconscious) understanding (sensing) of the learning process. Their knowledge likely composed of a mix of correct and incorrect information without an empirical basis to determine which of the beliefs are correct and which not (J. Berry & Chew, 2008).



Fig 6.4
9 Clusters of the 'Learning Continuum for ESD'.

Observations and insights generated during the OPEDUCA-project point to a sub-surface existence of alike ideas and convictions, a set of complementary expertise across the board. Learning-theories and educational concepts seemed to amalgamate in the OPEDUCA-concept, including such believed to be antipodes. I refer to this as the existence of 'A Learning Continuum for ESD-based Education' that, practice informed and related to a relevant body of learning-science, may contribute to the search for the identity and added value of ESD. Focussing on salient features I observe 9 clusters of theories, seeking to provide a coherent whole for practitioners to build on and policy-developers to relate to.

6.2.1 Awake, active and Involved

As described, each OPEDUCA-instrument first sees to a mental activation of the student, to be understood as an 'awakening' for development in an involved way. Although the importance of an active state of mind was shared broadly, observations and interpretations differed. Students showed a variety of attitudes and temper,



some growing silent and for the time being pulled back into themselves while others made their active state noticeable. Social interaction by ways of the Study-Teams engaged over 80%, which however not meant they were activated. Interaction could lead to an active mode over engagement, engagement however also possibly the result of an already present active mode. If so, students' individual progress on their personal Fields of Knowledge provided an indication.

I gather the students' active participation in the learning process to result in an increase in intellectual potential to make acquired information more readily practical in problem solving, the enactment of the learning activities in terms of the intrinsic reward of discovery itself, learning the heuristics of discovery and making material more readily accessible in memory (Bruner, 1961). The manifestation of these benefits related to the limited near linear ability of our working memory to 'trickle and instil' data and their (changing) interrelations in our longer-term memory, allowing it to (unconsciously) perform the knowledge-generation process it is equipped for. The learning to take place within ourselves, not placed nor stored outside of us – one cannot be handed or look up knowledge.

Whereas the intake, storing and processing might remain subject to different convictions and remains obscure, I argue the 'outcome' by ways of reflections, reasoning and notable action allows for more objective observation. Here is a reason the OPEDUCA-instruments see to a continuous flow of expression in a variety of ways, accumulating in a constant flow of articulation through presentation. The multitude of first-hand experiences the OPEDUCA-instruments comprise always leave an impression but are regarded meaningful if they are effective openers, call for attention, awaken the student to be(come) active.

Granting students on ongoing learning process allows for longer stretches of time to let (conflicting) data trickle in, to gradually collect, interpret and store information as well as conceptual relations in memory. I see the gradual construction of vast 'roots', expanding and reaching ever deeper. A process granting students years of time to draw from and connect with real life experiences, enhance meaningfulness and build a sense of purpose. This time-element is essential for ESD as it allows the student to generate understanding of and from within herself, learning to value values. From there a youngster can gradually develop identity, sense agency to be(come) active when noticing undesirable currents depict the future. Engagement increases over

time, can manifest itself for example during Fridays for Future marches or a political debate, is however not installed there. Alike, values considered inherent to sustainable development cannot be forced upon youngsters in relative short term and from a normative standpoint.

We noticed misinterpretations between ‘active, action and activity’. When referring to an active state we consider the mind awake, open, involved. Psychical action in all sorts of activities can provide distraction the (subconscious) mind needs while impressions trickly into our working memory continuously, but it is not merely outward observable action that enhances the learning. We observed it to contribute, however for only brief time-intervals, until action became (senseless) distraction. In cases students told us they eventually felt comfortable with rest, finding peace of mind. Distraction, either by play, continuing instructions, game or hectic classrooms, seemed contra-productive as (e)motion stood in the way of contemplation, senses over-challenged.

We noted teachers, especially in secondary, only seldom installed moments of silence (to think, read). Time indicated for ‘individual learning’ practically meant students were sitting behind screens, mostly connected to the internet. Teachers frequently interpreted students’ searching, clicking, scrolling as ‘being active’, not questioning



an overload of the senses. This although the internet can be critically qualified as a two-dimensional frozen state also containing outdated and subjective information, its ever-changing continuous flow of short texts and rapid visualizations creating an illusion of action to our senses and the observer.

6.2.2 Meaningful, Motivated

It hardly needs argument motivation is a crucial driver of performance (Broussard & Garrison, 2004; Lange & Adler, 1997), a students' wanting to understand grounded in intrinsic motivation (Albanese & Mitchell, 1993). As we observed in numerous practices, teachers tend to generate motivation by means of attractive offerings, such as a game-like setting, organising 'fun science' or choosing issues of the students' liking. They therewith seem to mix-up cause and effect, reason and action, goals and means. Meaning should be understood from the perspective of the effectiveness of changes taking place in the learners' cognitive structure during the process of knowledge generation (Ausubel & Fitzgerald, 1961).

Meaning was important to the students but not per definition follows from (any) experience as such; the quantity and quality of impressions and their random appearance were seen to be relevant. The richness of phenomena in the real world functional to this, a higher retention of learning occurs (Maxwell, Stobaugh, & Tassell, 2016).

For the students usefulness was an important aspect of meaning as it fed their motivation to indulge in a learning process because of 'wanting to know' (Bransford, 2000). We came to question however if 'impact on others', which is frequently mentioned in this respect, is a selective criterium of meaningfulness and tend to keep closer to a less social view.

When the student wonders, starts a discovery to experience and then later gains understanding, I concur with the objectivistic approach the world is real, external to the learner (Ertmer & Newby, 1993). As noted, I do not regard knowledge as externally available to be acquired by a student passive to the real. Stimuli arriving at the learner's senses following active observations deepen the experience, add confirming and conflicting data to the information conceived.

Understanding that socio-constructivist and socio-cultural learning theories are regarded crucial elements of constructivism (Berger, 1966; Brookfield, 1986; Packer & Goicoechea, 2000), both the social as well as the experience-factor are preceded by reaching a ‘sense of meaning’ (Berger, 1966) to inspire activation. One can turn around the argument, proposing that (the search for) meaning is informed by participative learning environments and that social processes can guide and bring students to meaning making (D. Jonassen, Davidson, M., Collins, M., Campbell, B., & Bannan Haag, B., 1995). The meaning a student considers herself to find can be wrong, even better be incorrect first from the perspective of the (informed) observer and teacher (“*Lets melt the icecaps so we have more fresh drinking water*” as a 12-year-old advised). Learning takes place when the student gives such meaning to it, the issue close to the learner as a subjective value (Merriam & Clark, 1993). A school’s quality as safe learning environment is functional to allow for such constructive error. Following these considerations, in OPEDUCA learning can be furthered by social application but remains of and to the individual, the person - others cannot make a meaningful experience happen, only enhance the likeliness it occurs. Normative activities pressing values upon students while missing meaning, I see as a root cause of failing Environmental Education.

It is an indispensable element of ESD students’ interpretation of phenomena follows sense-making (D. Jonassen & Strobel, 2006). Building from the Dimensions of Sustainable Development, students were able to sense they are dealing with things making ‘a difference in how people live and the kind of life they are capable of living’ (Fink, 2013). Students enabled to gradually re-boot and re-bond with Earth to from there face the complexity of Wellbeing, go through a phase where cognitive development and ethical reasoning meet (“*No, let’s not melt the ice-caps but produce fewer fashion*”). This allows for a meaningfulness they take to their understanding of how Welfare relates to these encompassing value-domains. Therewith the application of OPEDUCA conflicts with contemporary ideas of ESD which, although speaking of inquiry and construction, tend to hand students a literally ‘ill-defined ‘problem’ while including a solution (“*We require more clean energy*”- “*Solar-cells can collect solar-energy*” - “*Let us have solar-panels on our roof*”).

Taking self-determination into account (Deci & Ryan, 1985), understanding that students are intrinsically motivated and that such motivation can flourish when

autonomy, relations and competences are met as psychological needs, here is reason why Flight for Knowledge starts out from a blank sheet only holding the key-word of a future defining theme. The white landscape assumed to invite students to doodle, draw, stroll around, presume, be confused and make mistakes. We therewith treasure the cognitive disequilibrium and its associated affective state of confusion to be beneficial to learning as it can promote greater effort directed at resolving the felt dissonance (Lehman et al., 2011). We don't command students to copy our 'solutions' and therewith implicitly accept our historical and present unsustainable behaviour but respect their creative power to one day construct sheets of solar-cells processing hydrogen attached to vertical constructions while leaving the horizontal to city-gardens.

The process of seeking and finding meaning, being allowed to make mistakes and appreciate the logic of critical reasoning, also regarding one's own learning process and -progress, we presume a root for the gradual development of meta-cognition. The teacher not to tread on the root but water it intermediately, touching the content and process of students' construction gently. It is therefore the OPEDUCA-instruments provide for an array of opportunities for feedback, appraisal and (joint) critical reflection.

6.2.3 Wondering, Discovering, Imagining

A sense of wonder, imagination, urge to discover and desire to understand and develop oneself, are powerful drivers to learn. Pondering the growing popularity of these terms, I am however critical regarding the 'learning'-suffix, bringing us for example to 'discovery-learning'. Such mere attributes of an encompassing Inquiry-Based Learning (IBL), following the interpretation of imagination as the tool that puts the human mind ahead of the animal (Bronowski, 1967). If a tendency to create arises from the ability to picture what is not (yet) there, the students first have to discover what is already there or not, what can be created. As 'dis-cover' says, it regards phenomena already existing, not new to the world like in 'invention', the term we noticed teachers often mistake it with (Columbus set foot on an already existing continent). When the student goes her way, wondering about what she observes and finds, open for awe, it is the consequential of the Why, What, How, Who and When,

seeking meaning of the world as it is and unfolds, what inquiry-based learning comprises. The student can only wonder when observing, discover when moving, experience when within reach of matters. As recounted, the OPEDUCA-instruments functioned as intended also in this respect, suited to map and follow the observation, questioning, reasoning, looking at an issue from multiple angles, alone and jointly.

6.2.4 Experiential, Situated, Real Life, Place-, Context- and Problem Based

Obviously the OPEDUCA-concept builds strongly on the real, is phenomenological as we see thoughts, feelings, emotions, ideas and behaviours arise because of our contact with the world. Our existence a network of relations, our being not locked up inside but spread throughout worldly interactions in which our existence continually unfolds (Fisher, 2002). Thereto each OPEDUCA-instrument entangles the learning with experiences grounded in the real, meeting the relevance of context by means of situated learning (Brown, Collins, & Duguid, 1989).

The Fields of Knowledge concept builds on the conviction a student first has to relate new observations to an existing body of information, the latter seen as qualitative footholds to pin the newly observed to, anchor it (Ausubel & Fitzgerald, 1961; Novak, 1998). A process more effective when the new set of data and information is clear and relatable, also in this sense meaningful.

We could observe that extensive experience with objects and surroundings offers a rich base for the development and application of verbal and non-verbal capacity, prerequisites for further cognitive development (J. Clark & Paivio, 1991). Such real-life learning goes far beyond attempts to have a school resemble real life; the authenticity and meaningfulness of the real with its pallet of experiences, less defined problems and multiple approaches and solutions cannot be exhibited in either material or virtual confinements. Facilitating students to not merely learn about but be in touch with phenomena and authentic problems increases sensemaking, makes relevance be felt and usefulness valued, the concept of meaning underpinned from various sides.

Amongst others the learning with(in) industry and the thematic spaces in school dedicated to Flight for Knowledge themes, which provide for context and Partners in Education going in and out, should be understood as a part of the real inside a school, being more than a classroom with windows to the world.

6.2.5 Inquiry-, Problem-, Project-, Task- and Case Based Learning

Although perceivable as separate approaches to choose from, Inquiry-, Problem-, Project-, Task- and Case Based Learning are parts of a continuum as such, ranging from a more liberal student-steered quest of inquiry to the more often observed teacher-directed assignments. Considering the variations in the implementation of the methods considered, many of the differences disappear altogether (Prince & Felder, 2006).

Inquiry Based Learning (IBL) in the context of the OPEDUCA-concept sees to learning with a mindset in the momentum of interest and focus (where the inquiry is). The student collects, interprets and assimilates data to information, the mind open to gather, place, interpret and get informed. This learning tuned to the person at the specific moment is entirely different from a school-class in which a teacher tries to meet a multitude of mindsets with a single instruction addressing a sole issue. As the term tells, IBL is about learning and should not be regarded a teaching approach. It is not a minimally guided instruction as it requires teachers and educators to guide but not channel students' learning. As observed in practice, such requires open questioning by informed educators, critical thinking and a continuous exchange of the learner also with herself. Teachers' instruction does not rest in the core of the process but is a complementary source. IBL focusses on the conditions and basic ability of the students to formulate good questions, identify and collect appropriate evidence, present results systematically, analyse and interpret these, formulate conclusions and evaluate their value (Lee, 2004). Although literature mentions that differences in the amount of guidance lead to distinctions between structured inquiry, guided inquiry and open inquiry (Biggers & Forbes, 2012; Chinn & Malhotra, 2002; Kuhn et al., 2000), I argue only open inquiry meets the intention and quality of IBL. This since moreover since 'structured' and 'guided' variations eventually offer room for teachers to escape to pure instruction.

Less strict, the same goes for Problem Based Learning (PBL) where the art lies in the application of involved guidance, not teaching or lecturing. Noting that one of the most found characteristics of an effective learning environment sees to placing the acquisition and use of knowledge-elements in the context of analysing, explaining and addressing realistic problems (Bosch, 2003) we interpret ‘problem’ as ‘realistic, relevant’. As introduced and reported on from practice, each OPEDUCA-instrument has aspects of PBL as a pedagogy, while ‘Problem-based’ as such is an underlying principle. Studies have shown a robust positive effect of PBL on skill development, of grasping interconnections between concepts, deep conceptual understanding, the ability to apply appropriate metacognitive and reasoning strategies, teamwork skills and class attendance, but have not reached any firm conclusion about the effect on content knowledge (Prince & Felder, 2006). From our practice we can relate to the latter, however it is not the method as such which gives rise to questioning its effect



on content knowledge but the way it is conducted. A meta-analysis of the effectiveness of PBL on knowledge acquisition and the development of problem-solving skills in college students, found they may acquire more knowledge in the short term when instruction is conventional, but through PBL retain knowledge longer (Dochy, Segers, Van den Bossche, & Gijbels, 2003). This notion of persistence relates to our positioning of ‘problem-based’ in principle of ESD.

The line towards domination of teaching is crossed when moving to Project Based Learning, the students being more confined and set free only temporarily. Project Based Learning is a more narrow conception, restricted in scope and time, using a more structured problem to drive the acquisition of new content knowledge (Lohman, 2002).

Task-based Learning is then to be seen as even more restricted while Case Base Learning is another grade simpler as it looks at specific well-defined matters (well-



structured, rich contextual details being provided, students called on to apply material that is already familiar).

Observing this more-fold of Inquiry Based Learning it is at least remarkable that, certainly when one states that sustainable development regards ill structured problems, ESD is mostly applied by way of Case Based Learning flavoured with Project Based pedagogy. We noted a range of ESD-practices that honour teachers' and consultants' discomfort with less predictable learning processes or strangeness to matters so profoundly, ESD is degraded to choreographed schooling, not even education. Obviously, OPEDUCA differs substantially from shallow unworldly perceptions of ESD that are little more than attempts of Case Based Learning on pre-selected 'problems' using artificial simulations of the real.

The further IBL, PBL and the derivates based on it are stipulated and pressed in a format, the less effective the approaches appeared to become in terms of student-involvement and learning outcomes. Also scholars were seen to (over-)structure and define practices by ways of a time-plan, framework and exercises, apparently answering to teachers' conservatism by offering them a straitjacket disguising conservatism. It became clear such suffocation of students' creative engagement and restriction of teacher's professional development stands opposite to ESD. As noted earlier, it is the attitude and capacity of the teacher that makes the difference, dictates the effectiveness of the approaches. I argue she better chooses for clear IBL and PBL or remains in the traditional instead of hiding an instructive regime behind a new phrase.

6.2.6 Thinking Critical, Understanding Values and Claims

Inquiry being the art of questioning and raising questions calls for critical thinking skills, such a disposition is fundamental for the student's learning and an overarching quality of ESD. Critical Thinking regards 'claims and any relationship between them, including the understanding of explanations, drawing inferences, analysing the structure of an argumentation, evaluating evidence, understanding hypothetical arguments, assessing the credibility of data and information provided. Proficiency in

Critical Thinking can be understood as inquisitive, well informed, open-minded and flexible, being prudent in making judgements, willing to (re-)consider, think orderly in complex matters, wanting to find relevant information, focussed in inquiry and persistent in seeking results (Van Den Brink-Budgen, 2011).

As each discipline, subject and ongoing studies of phenomena it consists of, is rich in elements we have thorough understanding of while others still await such, what we at a certain moment frame as ‘facts’ underpinning ‘knowledge’ not remains valid per definition. Therefore, learning is qualified to be critical, to think over again, question, debate, discuss, (re-)search, apply, reconsider, (re-)search again. Consequently, this ability or even disposition to think critically is elementary to learning, critical thinking being the nerve-system of the entire student’s OPEDUCA-based learning (Eussen, 2020; Van Den Brink-Budgen, 2011).

Seeing Critical Thinking and analytical skills also as values that respect diversity, difference and equity, they are crucial elements for raising and educating future competent citizens. As introduced in Chapter 2, it is essential to be critical about our perception of the present and future as well as about the way it is brought to us.

A critical constructive mindset enables us to unwind and untangle matters, leading to a better understanding of phenomena while preventing delusions and subjective revisions of what is true. Facing reality in a welcoming way lessen feelings of uncertainty and anxiety. Especially in times societal systems tend to waver and fail and notions as ‘alternative facts’ and ‘fake news’ came to service and effect; it is eminent students need critical minds and the skills to bring them to use. Pointing to the continuum of data to wisdom (4.6.3) it is important students realise knowledge is constructed in certain contexts, per definition questionable and contestable, partial to begin with and eventually theirs to (re-)create. This conviction I place at the heart of ESD. A critical consideration, certainly when derived from real life learning, grounds a students’ ratio, enables her to validate content and therewith enhances the competence to withstand false impressions and prejudice following their own former and others’ present ignorance. Especially in the light of ESD we should strive for a student to not be easily deceived. A spiralling sensation which led us to even more profoundly reject the idea students no longer need to truly know anymore since we do not know what the future will be like. A notion complementary to the

conviction that the facilitation and enablement of students to close a possible content-gap is strategic in the light of sustainable development (De Graaf & Kolmos, 2003).

Embedded in the OPEDUCA-concept, Critical Thinking is not a supplementary feature, having students 'exercise' it when dealing with a specific issue, but ever present to reflect on their own educational surroundings. In the case of sustainability this also means to reflect on a situation when a clear normative qualification or collective goal is promoted. The learner questioning not because she must doubt everything but to make questioning phenomena a habit to be expressed most constructively. For this will allow her to enjoy a learning process and accompanying education which takes us into the depth of things (Sterling, 2001), a condition and mindset in turn essential to make issues studied meaningful to the learner. Learning to see the meaning of things is a condition and a consequence of ESD.

What should concern us is the possible decline of people's capacity to manage competing claims, triggered by an endless supply of information via the internet and (mass-)media. To counter shallowness and further a students' critical thinking capacity, the OPEDUCA-instruments tap into the real and call for direct and personal observations through meeting a variety of people with an array of opinions, convictions, experiences, functions, roles and interests. We consider Critical Thinking



to have a countervailing effect regarding the abundance of unfiltered opinions and content a student receives. A more wide- and open-eyed real-life learning we saw to also match youngsters' inclination to not believe everything to being with, the teachers' capacity to withhold from instruction while persistently joining the questioning crucial.

I regard the Dimensions of ESD functional to critical thinking and vice versa to take students beyond the narrowness of the present and look beyond, observe the longer-term viability of today's decisions and reason back from future perspectives to critically discuss and judge them. Referring to my introductory remarks, given the many we are a smaller misunderstanding is likely to inform unsustainable behaviour with massive and therewith potentially dramatic effects.

As Partners in Education obviously had other insights and convictions to share, doing so from a different composture and choice of expression ("*This is how it is done*", "*We don't agree with that*"), and due to the fact practice often differs from (textbook-)theory, especially these exchanges proved most valuable to provoke and enhance students' critical thinking skills. It also stood out that external educators were seen to have a more natural inclination to 'echo' students' questions, next to which they (implicitly) created the fascination of a 'hidden' truth (not gone tell you everything ... unless you ask for it). Students proved sensitive for a distinct (if not concealed) transfer of disciplinary content, as if not-telling ignited a wanting-to-know.

6.2.7 Constructivist and Instructive, Inductive and Deductive, Cognitive and Non-Cognitive

The first clusters obviously come together, characterising the OPEDUCA-concept as both constructivist and instructive, inductive as well as deductive, cognitive and non-cognitive.

As conceptualised, in practice the instruments proved to be manifestations of inquiry- and problem based individual learning in a collaborative setting, merging inductive constructivist approaches with instructive pedagogies, putting differences to complementary use. A student is not expected to learn something out of nothing nor is she regarded an empty box in need of being filled. The interplay of induction and deduction can be respected, acknowledging that in practice neither teaching nor

learning purely rests on one or the other. Students used new observations to infer rules and theories (inductive) and assessed theories to deduce consequences and applications that can be verified experimentally (deductive), good teaching helping to do both (Prince & Felder, 2006). In each of the OPEDUCA-instruments, the learner is constructing, adding new data and information to existing insights through inquiry in a continuous process of collecting, interpreting, recording, sharing and debating. Students engaging themselves in an active process of discovery and peer-supported development, a blended learning which contributes to higher forms of education (Van Merriënboer, 1997). At the same time, the ‘First Principles of Instruction’ can be considered close to the concept, reading these comprise the provision of authentic problems sequenced from simple to complex, activation as helping students to connect what they already know with what is to be newly learned, demonstration of what is to be learned, application and then integration of what is learned into their lives (Merrill, 2002). Obviously with the substantial difference the teacher leads in the latter and the student in OPEDUCA.

The OPEDUCA-concept can be classified as constructivist since it has characteristics of decades old ideas (Piaget, 1977; Steiner, 1902; Vygotsky, 1980) which consider the development of levels of increased complexity from dichotomous to reflectionist thinking, students becoming competent to reach reasoned conclusions (Bloom, 1956; Perry Jr, 1999). Although constructivist aspects can be found in each OPEDUCA-instrument, a strict classification would be too narrow because the student is not kept away from instruction in order to built learning capability. Instruction in OPEDUCA should also be understood as the instructor living by example, not only projecting what she knows but also why and how she came to know. The implicit transfer of a love for learning is an inherent quality also to enhance the effective projection of content. On the side of the student, the transmitted is seen to be absorbed in an again constructive manner. Hence, I see a teachers’ instruction as the credible performance of own skills, competences and ability to reason through concepts. Such to support the students’ evolving capability of learning by search, question and critical reasoning and to enhance their sense of metacognition. A process for which, as noted, the narrative quality of the teacher/educator is a determinant.

Findings in neurological and psychological research support constructivism and inductive teaching, noting that all new learning involves transfer of information based on previous learning (Bransford, 2000). This aligns with the students' construction of Fields of Knowledge, the ongoing expansion of the BusinessCases and exchanges in Global as they place new information, improve the link to existing cognitive structures. A process that allows for (temporary) misconceptions to surface first, to be adapted during the collaborative learning in Study-Teams by ways of peer-to-peer questioning, comparison and argumentation. An eventual intervention of the teacher only to follow after the students also observed and reflected on real world phenomena related to the matter, brought near and explained by educators. The teacher is considered capable and at hand to stimulate the students' inquiry, proposing ways to search and provide interim and half-way explanations. A role that requires extensive understanding of the matter at hand to witness the information-producing process within the learner giving birth to bits of knowledge. For this reason, the application of OPEDUCA goes beyond the idea of guiding students by coaches.

As is the case throughout the operational working of the various OPEDUCA-instruments, instructional guidance is relevant for the introduction of context for content and concepts (likely to be) addressed during the study of a theme. Further guidance primarily regards students' learning strategies and rests in the realm of personal attention. The longer stretches of time during which the students depend more on themselves and collaborate with peers and educators frees teacher-capacity for such resolute, individual, pedagogical attention and instruction.

To further clarify our notion of constructivism in relation to instruction, I proposed the term 'Constructive Instruction', also to avoid the immobilising gaze at an ever swinging pendulum between more traditional and innovative pedagogies in the education discourse and the disturbing consequences of such for practice. There is no need to denounce the relevance of instruction as long as it is not framed and scheduled in contemporary schoolish settings but seen as a craft of the teacher. Instruction as such then not the issue but its delivery in time and place. The constructive use of instruction as imbedded in each of the OPEDUCA-instruments springs from content and concepts students' can relate to through the narrative

quality of the teacher who explains elements in an applicable context, taking relationships to other disciplines into account (Biggs, 1996). In case a teacher instructs it is initiated by and functional to the students' learning process, to open a direction of questioning. It is not first instruction of content that requires change but rather the sophistication with which one tackles the theme (S. Drake, 1991). Teachers lacking that quality were on either side of the scale; on the one those considering themselves 'liberated educators' being called to coach, who had students more randomly choose issues of their own liking to study, on the other those rigidly sticking to their subject and trying to press curriculum elements in through rigorous instruction.

Since students in OPEDUCA are per definition not on the same page, a constructive way of instruction is a distributed one. The variation of students' focal points of attention and tempo not a problem of classroom-management but an opportunity for individual attention.

Constructive instruction being an educator-quality, it requires the teacher to step down from the directive and be the informed presence students call for. As students worded this most simple but clear: "*She knows what she's talking about and is near*". This teachers' 'presence' is to be understood as the continuous opportunity to join students' discussions and considerations, presence preferably comprising a team of complimentary teachers/educators. This moreover since constructive instruction builds on narrative capacity, informed by authenticity, practicability and personal real-world experiences, all such in the variety students' learning touches on.

It is understandable critics of constructivist approaches find little to no evidence that lesser guidance is more effective in terms of learning outcomes than guidance through instruction and thus claim the other way around. This however only holds if they define a student's 'performance' through the lens of education and schooling in terms of present-day tests and examinations. The machinery built for processing students through schooling functions best when using original parts, feeding it resources modelled and moulded according to the specs, for as then the traditional process will encounter the least friction, reach highest efficiency and the effectiveness imagined when putting it all to work. Reasoning from such preposition makes critics' observations self-fulfilling prophecies.

As the OECD emphasises when referring to the OPEDUCA-concept, competences should not come at the expense of content knowledge and a deep grasp of substance since both are needed when looking towards future requirements. (OECD, 2016; Paniagua & Istance, 2018). Content must be learned deeply and thoroughly understood while transversal competences are developed. As we regard the cognitive and affective the yin and yang of ESD, the OPEDUCA-concept has been seen to allow a simultaneous development.

6.2.8 Self-Steering following Self-Directing and Self-Activating – from Pupil to Student

As argued in principle, I see the seed of transition towards a more sustainable development to rest in the individual, brought to turnaround power by living by example, exerting leadership and the motivation of likely-developed minds in support of all. Joined with the principle also learning is of the person, ESD is personal.



Others can support, guide, facilitate, yet only the person can steer once the self is activated, self-direct, envision a future goal and a road towards it. In practice, the OPEDUCA-concept was seen to allow for moments of reflection for students to mirror and understand their progress in learning. Continuous participation in feedback- and feedforward loops that hold an abundance of opportunities to mirror one's position and progress provides for an introspective look at one's learning process and way of learning. I hold this functional to the development of metacognitive capacity, being the awareness of one's own learning process, knowledge- and competence-development, the ability to understand, control and manipulate one's cognitive processes (Meichenbaum, 1985). I choose not to up front judge on the existence of metacognitive ability from opposing positions and with contradictive argument as it is more important to support the learner in this regard, irrelevant of present (presumed) capacity. Whether or not the learner already has metacognitive ability is not the primary issue, what counts is its development. It is an attribute of the pupil's development towards student, first supported and guided, then becoming more self-reliant, unfolding metacognitive capacity to understand where the change originates within oneself, independent from physical age. In OPEDUCA a student does not have to be his own teacher, nor is he supposed to maliciously analyse own progress or the lack of such. What we point out is the students' gradually growing notion and interest in knowing where she stands, what is memorized, concepts understood. Such we regard part of the motivation-spectrum, believing that being aware of oneself and one's performance feeds further motivation. In practice, we found the presumption students can steer their own learning only just if not interpreted as 'student-controlled education'; the student is taught how to manage the wheel and then take it in hand, is however not required to invent the steering mechanism. Considering possible off-road adventures or worse, minimally-guided learning is not only ineffective for most learners, it may even be harmful for some (Clark, 1989). I also therefore do not promote a future in which teachers must raise their hand to speak to the students.

6.2.9 Personal, Emotional, Social, Participative, Connected, Cooperative, Collaborative

As frequently addressed, the learning envisioned sees to the students' social development by way of connections, learning cooperatively and collaborative, team- and community based. Acknowledging we cannot justify learning theories that dissociate the mind from the body and the self from the social context, I differ between the social and personal as we position the learning process more social and interactive than in traditional education, while holding ownership, process-control and results personal. The Study-Teams are to be understood instrumental as a parallel construct that joins the application of the personal and social. They offer a supportive environment for the individuals' learning to apply debate, discussions, explore misconceptions, give and receive feedback and have value for the students' development of metacognitive ability.

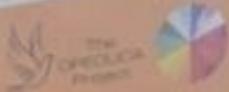
Although limited accountable, we found students working in small and varying Study-Teams, collaboratives in a cooperative process, show improved results where it comes to social skills, critical thinking as well as content knowledge (Sawyer & Obeid, 2017). Social aspects such as lending mutual support, acceptance and self-esteem were more clearly seen to improve. Operational elements, such as the omnipresent exchange of ideas and information, presenting intermediate findings to each other and the (im-)material construction of joint presentations, all contributed to more social cohesion between the students.

Despite our positive experiences, I tend to be critical regarding the positioning of 'social learning' in the function of ESD. Although it comes across sympathetic and democratic, it seems to build on a notion of 'social relevance' and 'fairness' informed by all-too-common norms and values, proposing imponderable benchmarks. As social learning positions knowledge construction as an active process conducted by groups or communities, it becomes subject to consensus achieved and (partially) the result of political struggles, to negotiations undertaken by individuals who are implicitly regarded to have knowledge in some prior or superior way.

Surely a student should not be served the picture of a future-capable stand-alone soul without continuous connections to the social; the learning as presented builds on reflections, scrutiny and critics, born from the social. However, I regard such more an aspect of valorisation, not in the first place of validation, and question the conviction that because of the need for societal interaction, knowledge is not constructed by individuals but by an interactive dialogic community (Longino, 1993). It is up to the individual to participate in the social realm to further organize and sharpen the mind, to then give back to a community which should remain open to new insights and a change of views, to new practice resulting from that, for only such would contribute to a knowledge-based society of use for sustainable development.

Progetto OPEDUCA

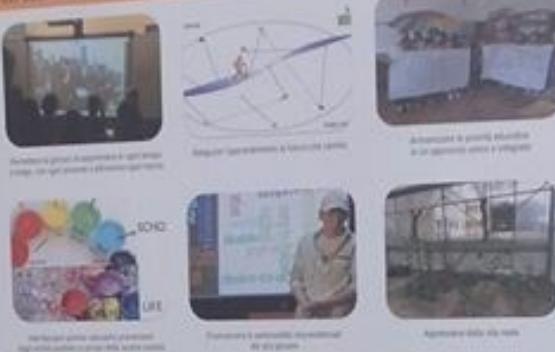
Sviluppare Regioni Educative Aperte



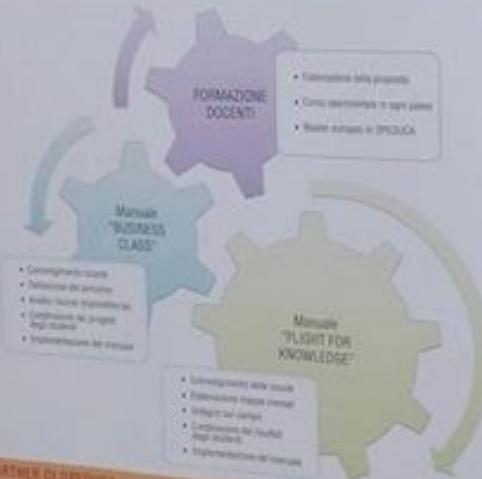
per un apprendimento e un insegnamento orientati al futuro
in ogni tempo e luogo, con ogni persona e attraverso ogni mezzo

OPEDUCA, "Regioni educative aperte", nelle quali scuole, istituzioni private, istituzioni governative e
aggregati di conoscenza cooperano da vicino per organizzare processi di apprendimento che possano
anticipare le esigenze della comunità, del lavoro e dell'ambiente

Gli elementi chiave di OPEDUCA



PRINCIPALI ATTIVITÀ E RISULTATI ATTESI



PARTECIPANTI DI OPEDUCA

19 scuole, città, università e associazioni non governative da 8 paesi
Austria, Repubblica Ceca, Finlandia, Francia, Italia, Lussemburgo, Olanda, Romania
coordinati dal Centro di Esperienza Regionale PCE Rhine-Moselle





6.3 Towards a ‘Whole Student Approach’ for ESD

Building on our re-conceptualisation of ESD, findings in practice and observation of a learning continuum, I position the OPEDUCA-concept as a ‘Whole Student Approach’. Not only did we place the development of the person at the root of the ongoing learning pathways, also each OPEDUCA-instrument starts out from the student and sees to a generation of thoughts coming from a youngsters’ disposition. I concur with Piaget where he does not place the social environment on the foreground and regards the developing child as alone, on itself, a both mentally and physically active individual in a continuous process of construction and internalization of action schemes. I thereto envision not merely socialisation in the sense of assimilation in present institutions, systems, structures and values, but a process of subjectification, the learner in continuous exchange with the natural and human environment.

The idea of a Whole Student Approach relates to the concept of inner transformation through expanded consciousness (Goleman, 1996) and accompanying notions such as the generation of self-awareness. It comes close to the idea of ‘Holistic Education’, commonly understood as an approach to develop a whole person, balancing the cultivation of all aspects including the intellectual or cerebral, physical, emotional, social and aesthetic i.e. spiritual. Extending beyond individual realization to include the actualisation of communities’ potential, possible if individuals contribute.

Across the board the pedagogy of individual learning in a collaborative setting sees to multiple moments for the discovery and wording of personal feelings, values, convictions and beliefs, prepositions, doubt and questions. Understanding it is the person who learns, the new-born good in nature and friendly to earth, moulded by society including its unsustainable attitudes, underlies the argument ESD should initially be personal and see to the integrity of the person. The individual mind holding, developing and unfolding the capacity to grow, change and be(come) makes the person the crucial actor and factor, the learning self-owned and -directed per definition.

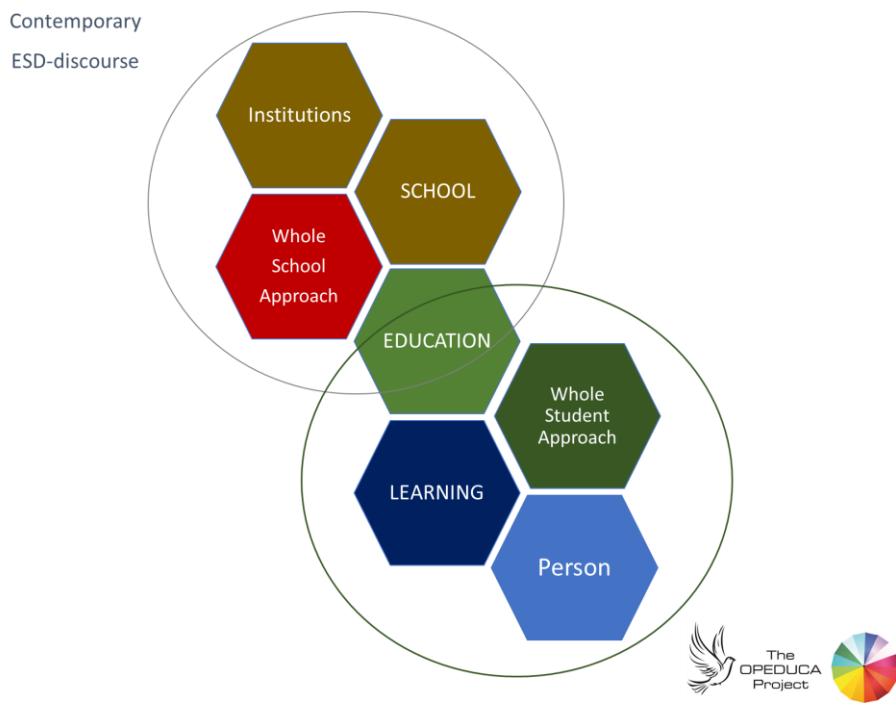


Fig. 6.5
The Whole Student Approach, learning resting in the person enhanced by education.

To mark a Whole Student Approach as distinctive quality of ESD, I reflect on 3 aspects that underline the personal dimension of the learning envisioned:

- The constant creation of inner images of the future.
- Intrinsic value-development.
- The concurrency of the pupil, student, apprentice.

6.3.1 The continuous creation of inner images of the future

As argued, youth should be allowed and empowered to envision and create a sustainable future, thereto look beyond the horizon while overseeing the breadth and depth of the present. We consider humans' constant creation of mental images of the future, emerging as hopes, fears and expectations, to influence present behaviour (Liu & Lin, 2018), present behaviour derived from future images an articulation of sustainability consciousness (Boeve-de-Pauw, Gericke, Olsson, & Berglund, 2015) served by an ongoing future-relevant thematic learning process. As contemporary ESD appears to regard 'the 'real world' and 'ideal world' differentiated (Zeyer & Roth, 2013), the concept of ongoing learning pathways addresses a missing link where it supports the establishment of a future sustainable society as a beacon casting back to the present to inform a strategic course of action. Unless we understand the future for which we are preparing, we may do tragic damage to those we teach. We have to understand the powerful psychological role played by images of the future in (de-)motivating the learner, otherwise we cannot effectively overhaul our education, no matter what innovations we introduce (Faure, 1972; Toffler, 1974).

As recounted, the Dimensions of Sustainable Development proved an effective concept for relating past en present to futures. It provided for temporal and spatial scales as well as numerous points of application to have students gradually understand Earth's presence and systems and build on the dynamic nature of interdependencies (Capra, 1996). In well over 90% of cases students could connect to what they already (believed to) know, questioned, had a general interest in or were fascinated by. From there they were capable to indulge in a thought process addressing the future which in a most natural way led to considerations in the realm of sustainable development. Also, young humans are intuitive, creative animals with cognitive-analytic reasoning abilities, able to grasp complex wholes from partial sets of facts. Whereas schools still teach imagination and intuition are virtues of the daydreamer, we need to harness both to solve world crises (E. Boulding, 1990). As the constant creation of inner images of the future is of the person, so should ESD contribute to the development of a whole student.

6.3.2 Intrinsic Value-Development

Although ESD is presented in a youth-friendly way, there are little practices that go beyond their assimilation in the present systems, institutions and value-schemes. Moreover, it appears contemporary ESD tries to steer towards the command of values, laden with moral and ethics, directing students. An important phase is overlooked as I believe that pressing values upon youngsters neglects their learning process and deteriorates the mere goal and foundation of ESD. We should be aware of the risk of social engineering, of assimilating youth in the (unsustainable) presence of our 'truth'. Pressing youngsters makes them comfortably numb as they are required to reproduce values but not expected to over and again (re-)consider and re-think their origins and meaning.

We observed in practice youngsters do not per definition hold values such as equity, democracy, compassion and empathy that tend to be positively contributed to ESD. As simple experiment, one of our standard questions to upper-secondary students (age 17-18, the age in which they head for their driver's license) was what they would



now ask if Dad came home today proudly showing his new 2,5 litre diesel SUV. Beneath the slightly amusing open-hearted response as over two-third (70%, n=680) said: "*The keys*", we noted deeper sensations as more than half did not shy away from pondering aloud why 'one' should care about sustainability at all. Similar findings were reported recently by the OECD, noting that while only 75% of youth states to consider climate change important, even fewer (a bit over 50%) also believe they could do something about it (Schleicher, 2021). The research showed awareness raising is insignificant as around 90% of 15-years in Singapore and other countries with well-developed educational systems are aware of ESD-issues but no more than half regards themselves driven or empowered to act. A consequence of ESD-related policy documents that seek social, economic, political and cultural goals to be realised in the education arena through societal change by modifying behaviour rather than supporting learners' independent thought through education (Mogren, 2019).

Although there tends to be little debate ESD should be value-driven, observations give reason for a critical reflection and warn for an all too easily adaption of value-thinking as pillar of ESD. Our culture does not automatically nourish what is best or noblest in the human spirit, cultivate vision, imagination or aesthetic and spiritual sensitivity. It does not encourage gentleness, generosity, caring or compassion. Increasingly in the late 20th century, the economic-technocratic-worldview might indeed be seen a monstrous destroyer of what is loving and life-affirming in the human soul (R. Miller, 2000). Reason why an OPEDUCA-region is positioned to offset and correct amorphous images presented by questionable (multi-)media and politically induced opinions, convinced that life-wide and -deep experiences in the natural and social realm will gradually replace otherwise induced images of the present and future.

Since the work of De Groot (1965) and later Chase and Simon (1973) we understand that our long-term memory is not merely a deposit but the most crucial part of our brain where it comes to cognition. The substantial amounts of data and information it can re-generate to judge a new occurrence, also seemingly unconscious, we see to generate different opinions following the same new 'input'. We take this into account when arguing the impossibility to lay values upon people and when underlying the

importance of a students' critical disposition and attitude where it comes to deduction and conclusions presented to them.

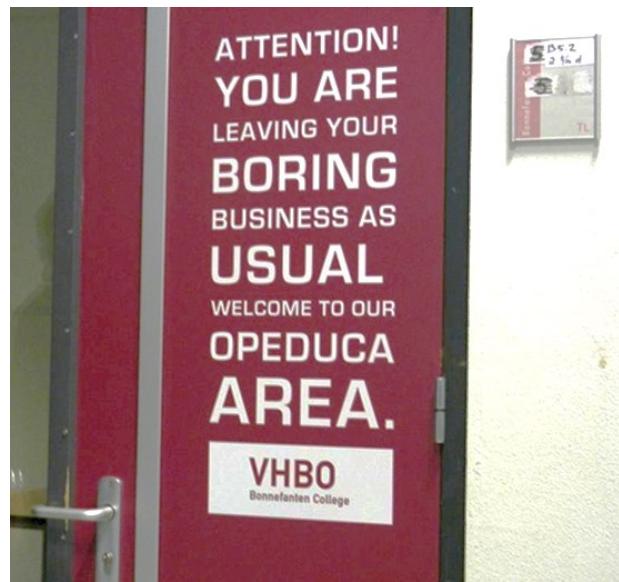
In our view, the value proposition capitalised in the sustainability (dis)course erodes the cognitive base, disregards the emotional development and leaves students with little foundation to grow wisdom. It is in sharp contrast with our conviction youth should be respected as the shapers, creators and owners of the future they embody. In our view values cannot be pre-determined and commanded; what we value today they can either take with them, change, contextualise differently, re-create. Acknowledging there is a valid diversity in perspectives on sustainable development (De Kraker, Lansu, & Dam-Mieras, 2007) youth in their capacity as students should be enabled to develop transboundary competences as well as values. We consider this congruent with the notion that a new culture contributing to the elimination of the tensions menacing life on our planet is impossible without transdisciplinary education (Nicolescu, 1985, 1997). An education which allows youngsters to holistically approach and integrally observe, discover and treasure values. As then, students are not merely informed about values but experience their meaning, re-live and re-invent them, define those their sustainable future is based on. The gradual development of transformative qualities, growing understanding of what the world was, is and can become, will bring relevance to values and generate a base for wisdom required. The development of this capacity is at the core of the OPEDUCA-concept, seeing students debate, evaluate and judge for themselves the relative merits of contesting positions, a key-principle of ESD (Jickling, 1994).

6.3.3 The concurrency of the Pupil, Student, Apprentice

The Whole Student Approach is congruent with the idea of ongoing learning processes throughout the system and takes a distance from strict boundaries in school-levels and age-categories. I see a learner to evolve from a pupil being taught towards a student when she takes over the helm of her learning process. A notion to be completed by that of 'apprentice' when taking applied learning into account, aimed at occupying a (pre-defined) place, position and later occupation in society. The point is to understand these three capacities exist simultaneously, intermittently and interwoven. We saw youngsters to both passively and actively switch back and

forth between pupil, student and apprentice in ever faster succession as the breadth and depth of OPEDUCA unfolded. When resuming OPEDUCA as ‘student-centred’ it should be appreciated in this sense, not as a mere token of leaving classroom-based instruction or degrading teachers to coaches.

The concurrency of the pupil, student and apprentice causally relates to ‘self-directed learning’ and a youngster’s capacity to envision a sustainable future, one conceivable and constructable. Understood as the growing ability to see beyond the horizon, set goals, gradually develop a strategy along which one can develop. This obviously in line with the development of an entrepreneurial sense and attitude to see such routes and acquire the means for one’s growth path. It is the pivoting point where the student takes over, evolving from a pupil listening in and reproducing to a continuous learner, embracing and wording the own learning process, formulating interrelations and dependencies of phenomena in own words, building from own experiences, interpretations and future images. A notion of freedom of development underpinned by trust we learned to see as a keystone within the students’ motivation spectrum. It is thereto we introduced OPEDUCA to the students from the perspective of meaning, of being and becoming, aiming to ‘ignite’ an often dormant internal and intrinsic motivation, install a growth-mindset. For most it proved constructive to look ahead, beyond today’s interests, worries, struggles and an often-voiced feeling of meaninglessness. Picturing oneself as the creator of a substantial part of the way ahead gave meaning, an authentic narrative and realism key elements to achieve it. We observed practices where 20-25% of students studied aspects up to 2 and occasionally 3 years ahead of systems’ schedule, able to develop from ‘consumers of schooling’ to ‘producers’ of their learning process. The idea of ongoing learning pathways was seen to bridge year-levels fluently and have students eventually overcome the harsh year- and system breaks. As example, with a group of international researchers we witnessed on the spot students in 1st and 2nd grade secondary inviting pupils from several primary schools’ upper two grades to join them for a lecture by a Pole-traveller on climate change. Teachers alike were fascinated to see the ‘smaller sizes’ suddenly march and mingle in as if this were the most natural thing in the world to do. And it might very well be.



6.4 The Possibility and Probability of ESD-based Education

Following the application of the OPEDUCA-instruments in practice, the meaning of a multi-disciplinary partnership for ESD and the notion of a Learning Continuum for ESD informing a Whole Student Approach, I will elaborate on the possibility to base contemporary education on ESD (J. Eussen, 2013). Therewith I tend to a research- and practice-informed extension of the concept, following un-orchestrated attempts of school leaders and teachers to bring their schools in transition on the flight. The schools' efforts varying between a string of discussions on the school level, over plan making for a full transition up to a concrete change in practice. These duly documented processes provided relevant insights regarding schools' transition capacity, explanatory factors deduced from detail, generalised and jointly reflected on to come to conclusions.

The need to bring sustainability to schools has been promoted for a long time, underlining that every student should at least have an understanding of sustainable development (Jansen, 1991) and that such should go beyond a too narrow 'green focus', seeking pedagogies to develop agents for change (Elliott & Davis, 2009). As we extensively studied in the Netherlands and noted in progressive oriented educations in amongst others Finland and Sweden, ESD is however hardly present in contemporary education, let alone a school is based on it. Evaluations show that ESD implementation also in Swedish schools is uneven due to the fact it is largely seen as a voluntarily activity by municipalities and local school boards, such resulting from a lack of knowledge of ESD and how it can be implemented (Mogren, 2019).

For this elaboration on ESD-based Education I use the data and findings of 32 schools that more explicitly embraced the OPEDUCA-concept, applied the instrumentarium and then developed along the axis of a less to more encompassing transformation. As visualised in fig 6.6, all these schools at least applied the instruments on an incidental bases, 21 going beyond that to generate transition-capacity in their organisation. While 14 strove to structurally imbed the instruments, 8 sought to base their whole school on the OPEDUCA-concept; 2 took a different route while incorporating aspects of OPEDUCA.

School's adoption level of the OPEDUCA-concept

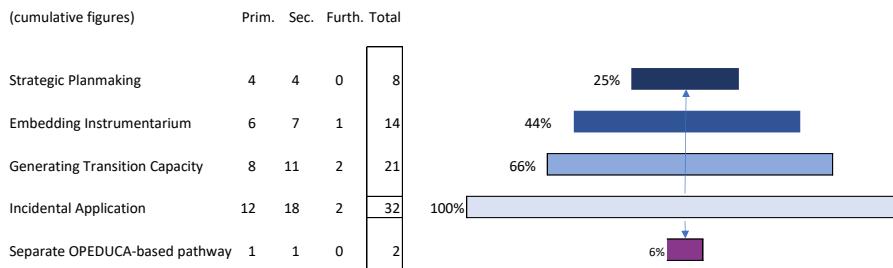


Fig. 6.6
Schools' adoption-level of the OPEDUCA-concept

I will discuss the road towards ESD-based Education by first introducing the outlines of a future school as pictured by school leaders and teachers during the OPEDUCA-project (6.4.1). Following, I point out 7 typical characteristics (6.4.2) and 3 concept-related qualities (6.4.3) we experienced to be determinants of a school's transition capacity towards ESD-based Education. Specific attention is paid to the integration of assembled educations (6.4.4) and the provision of educator capacity (6.4.5). The paragraph concludes with a brief resume of errors in practice resulting from an incomplete address of these in total 12 determinants of ESD-based Education (6.4.6).

6.4.1 Envisioning an ESD-based School

To capture and integrate the OPEDUCA-concept, teachers and school leaders developed an image of an ESD-based School, emerging from their understanding of the concept, experience and practical insights. Since this sequence was also repeated during each of the 21 MasterClasses, an insightful and realistic perspective appeared, based on the expertise of over 400 school leaders and teachers.

Practitioners imagined an ESD-based School as an open structure, a cooperative of teachers learning with their students amidst society. They understood 'School' as a community-based nexus of learning, a ground where the learner interacts with

a variety of sources and the contextualised transdisciplinary learning-process finds a home. A safe and central meeting place, an 'AGORA' where learning processes are facilitated, rest, cross-over and are enriched. It is the main location for education, the environment where students can learn by themselves, with fellow students, teachers and educators. From the school as nexus, a student's learning process physically and virtually branches out in society, involving people and organisations from the outside to the realm of education. The entirety open to and continuously connected with the local as well as global community. The students are seen to learn anytime, with anybody, at any place and through any device, consistently studying life as it is and unfolds through the dimensions of ESD.

As premises, the school facilitates a multi-functional central meeting place, forums for mini-lectures, study rooms for up to 6 persons and larger thematic areas where learning-contents and -processes unfold in a material and virtual way. These are equipped with tools, materials, multi-media devices, stages, flexible seating and an extensive multi-media library on the theme. The central meeting place at the heart of the building is marked by serenity, a place where only expressions of art, history, news and student's learning outcomes call for attention. A cantina and facilities for sports and contemplation are half out in the open, entangled in a garden-like landscape that offers space for each of the thematic areas, particularly Food(-production), Water, Energy-generation and a Construction-site.

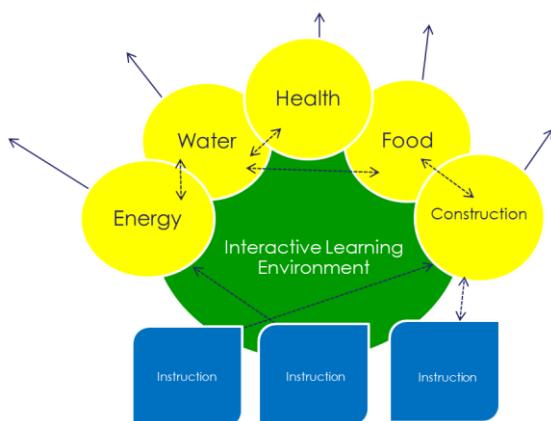


Fig 6.7
Original gross lay-out of an ESD-based School (2009).

A week in the life of the school is characterised by a series of (partly simultaneous) mini-lectures on specific topics in the morning hours, a substantial mid-day part for lunch, leisure and sports and as of then until late afternoon theme-based collaborative learning in the thematic-areas, freely accessible for OPEDCUA-certified educators representing Partners in Education. Study-Teams can roam and use the entire premises and go out in community after reverse-notification of an educator at the location to be visited.

One day a week no mini-lectures are scheduled while all other facilities are open and available for the students, whether as individual or in Study-Team constellation. The entire (Fri-)day then also available for sports, culture and arts or any combination of all.

The entire school functions from early morning until early evening for the students, available for use during the evenings as well as in the weekends and holidays for the broader regional community.



An OPEDUCA-based school has no standard classes, project-weeks or stand-alone education-projects, nor does it use programs and activities offered by third parties. All means available are infused to continuously improve the efficiency and effectiveness of the educational process. Overlooking the schoolyear there is one flow, no longer interrupted by examination-periods, study-weeks, field trips and alike disruptions.

The school as cooperative of professional teachers and educators amidst society is a highly autonomous organisation with specialist pedagogical understanding and disciplinary expertise on the highest level of secondary education. 'Through teaching we learn' is a lead motive, also referring to the teachers' will and ability to develop oneself continuously and keep track with real world developments. For the students, teachers and educators are a continuous presence that models a love of learning (Lucas & Guy, 2013) as they provide both expert- and pedagogical guidance through questioning and appraisal, raise challenges and provide constructive feedback, being discreet enough to enable students to perform (cognitive activation).

The teachers are compelled and obliged to cooperate as a community of practice, as a team to serve the students' learning, their occupation no longer isolated. They work collaboratively on the design of materials, the creation of relevant learning contexts, back each other up, reach out to and share external sources of education and jointly construct the narrative students need. The teacher is expected to be a skilled facilitator and inspired storyteller, capable of facilitating reflective conversations during the entire learning process with every student, irrespective of age.

The school supports a full-scale double-sided (merging theory and practice) initial Teacher Training program, also thereto involving a variety of educators from Partners in Education. Teacher-students work from day one on at school and gain experience in various sectors of society at least one day a week.

As background to this resume, some remarks regarding capacity. When teachers reconsidered the delivery of subject-based education in a lesson-plan setting, it was illustrative to find them conclude that presently on average 20 minutes of a traditional 50-minute lesson consisted of actual (new) instruction. Such led them to tentatively conclude they would potentially not offer that much when transferring to OPEDUCA-based education. Given the capacity of Partners in Education, the present

number of teachers would suffice. Educators were seen to deliver enough capacity when sitting with a Study-Team for on average of 10 minutes while the students intermediately worked by themselves. The brief (recurring) timeslots possible due to the direct en personal attention given, the exchanges swift and to-the-point. As the educators could spread their energy over more students, they also perceived themselves more valuable. Considerations that made teachers ponder the possibility of a divide between colleagues excelling in instruction and others functioning as educators. Furthermore, teachers concluded that, even given a school's inertia, it could be transformed to ESD-based Education within several years, equal to its number of grades. A longitudinal approach which in their view presented adequate opportunity to meticulously analyse students' unfolding learning processes through the application of the instruments, set up educational partnerships, further train and develop themselves. Teachers from secondary education envisioned 2 transition-pathways; implementing OPEDUCA full scale across a grade from year 1 on, then moving upwards in the years following, or as a 'stream' to the side, keeping all else intact, leaving the possibility open to in following years broaden the stream.

6.4.2 Countervailing determining characteristics of a school's transition capacity

The quantitative and qualitative gains i.e. the improvement of learning and education, were seen to be partly offset by the lingering pressure of schoolish characteristics that eventually limited unqualified success. School leaders and teachers shared the following 7 characteristics as explanatory factors that should be read against the background of the envisioned transition process, the listing not intended as a disqualification.

Observing schools' hardly changing organisational layout, keeping to a ridged division in levels and grades, lesson-schedules, timetables and other commodities to orchestrate day-to-day operations, it is justified to consider an overall inertia. One can value such as a suitable first line of defence against all too sudden changes, respecting a school has a (distinct) place in a systemic chain with restricted manoeuvring space for reason of continuity. Observing schools as slow-moving

organisms, changing course only gradually when needed from a longer-term perspective, inertia can also through the lens of ESD be regarded a positive trade and quality if it marks a school's consistency and solidity. If not, a school can easily be (dis-)qualified as traditional and partly worn out, a delicate system we found to crack or even break down under the pressure of external forces demanding innovations. Cracks caused then unleash change in the form of an eruption, the inert system's inflexible reaction other than a deliberate action resulting from a well-wrought vision and strategy.

In case the constellation is inert and sturdy enough to fall back into place and therewith withstand the modern time parade of disruptions, such can be seen as an (implicit) choice to "... rather bear those ills we have, than fly to others that we know not off". If a school's inertia therewith becomes the norm and backbone of staff's moral, stagnation indicates decline. In cases schools no longer intend to continuously improve the education they organise and thereto the organisation and structure they are, a as such justifiable inertia merely comes to conservative use.

In each school we experienced what we refer to as the 'school-bulwark' to be an influential and persistent factor. Not only are school-communities more closed to the outside then self-perceived, also inside the organisation interlocking walls form a partly invisible constellation of structures, conventions and practices, rules and regulations, also of representative bodies and those mending and controlling them, that all together make up the bulwark. Less so in primary (because of the smaller and more personal scale) but certainly in secondary and further education, the bulwark manifests a gap between management and practice. Of the teachers in OPEDUCA MasterClass, over 85% stated staff departments and project-structures are perceived to be leading a life of their own while responsibilities are vaguely outlined. Both school leaders and teachers commented one could sense the bulwark coming to play in case of even the smallest of moves towards transition.

When comparing an average school with a mid-size company, we experienced schools to be over-organised, the manifestation of the bulwark an exclamation of lacking professionalism to effectively and efficiently organise and act. This especially when reactions could be traced back to personal positions, attitudes and actions away from a proper organisation and far from education. Such pockets of resistance

to change appeared not difficult to trace but a challenge to address openly, certainly when dealing with undeserved courtesy. In cases the school's governance appeared more tuned to honouring exceptions than expertise and professionalism.

If a school's bulwark remains untouched, issues that matter less get most attention, frustrating a strategic course of coherent action. Pro-active teachers will face fall-and setbacks, eventually step back and leave their school behind comfortably numb, energy and aspirations drained further with each try. Seeing the school as a Christmas tree, it is not only uprooted and overfilled with ornaments, but it also stands upside down.

We extensively discussed schools' profound appreciation as a safe, secure and enduring (working-)environment, referred to as its 'womb'-quality. A sensation of comfort which becomes a weakness when changes are called for. We observed first-hand the existence of 'anchoring' (Tversky & Kahneman, 1974) rooted in deeply held biases that cause less than optimal outcomes because of an instinctive reduction of uncertainty, opting for safe pathways. Curiosity might kill the cat and certainly not all should be changed at the same time, but schools' inclination to search for acceptance and compromise while huddled in the womb, over and again generated sub-optimal results as the common denominator dictated it to remain average. Therewith a self-fulfilling prophecy came to play, the organisation perceived and thus staying a safe haven for those not appreciating all too many changes, let alone the tensions and anxiety that come along with giving birth to progress.

The 'discipline'-fortress, or 'towers of disciplines' (namely regarding schools in secondary) appeared to be a quality and (too) conservative force at the same time. Although initially considered to stand in the way of transdisciplinary education, when acknowledging the value of disciplinary integrity as a critical condition for the theme-based learning, it also provided a foothold for progress. The critical aspect and inherent risk being its possible entanglement with or even major role in the school's bulwark qualities, a not unlikely practice we have seen to unfold behind the disciplinary sc(r)enes.

A school's embedment in larger governing structures, in 'towers of schools', was found a determining aspect of its change capacity. While obviously a more dominating central management can exercise influence, we noticed that especially the larger structures in primary education (holding 20 schools and more) 'peaked' into the layers of policy- and priority development we referred to as 'layers of fog' (2.3). Four out of five of these structures we worked with and studied up close were found so strongly intertwined in this sphere, they frequently exchanged organisational governance and guidance of their schools for activities following external stimuli. Such namely concerned the development of STEM (which over the years was a key priority in the Netherlands and a source of substantial additional funding). I articulate this aspect since ESD was represented not that strong, if at all, therewith did not enjoy the larger organisations' top-down directives towards their (numerous) schools.

It was remarkable to find that an organisation whose existence builds on the organisation of education is a poorly developed learning organisation itself. Exchanges regarding pedagogical improvements often take place informally and everywhere, except where they should be held. Considering for example 'Team Learning', believed to be an important aspect of a learning organisation, we can confirm it appeared to be regarded a 'cultural aspect', not as a change in organisational structure (Van der Hilst, 2019). Acknowledging that internal knowledge sharing can provide organizational benefits but generally comes at a personal cost to the sharer (Haesbrouck, 2019), a school is still far from a judging-culture where internal competition prevents knowledge sharing (Volker, 2003). I argued the poorly developed learning-capacity to be intricately connected to the characteristics described above while it is also a manifestation of meagrely developed HRM and Management Control. Mechanisms managers use to ensure that the behaviour of employees is in line with the organization's objectives and strategies (K. A. Merchant & Van der Stede, 2007) appeared nearly absent in most schools. Consequently, practice is derived from a professional goal- and means oriented mechanism that gives reason for learning- and development mechanisms. Schools were (consequently) seen to seek resolve in (extensive) project-structures to instigate and manage change, placed beside and divided from the 'core-business'.

Therewith any learning-potential was ‘boxed’. In general, they overdid themselves by applying custom approaches for organisational development in the form of steering- and working groups and alike structures and processes that consumed teachers’ energy and restricted in stead of widened their manouvring space. Teachers argued the situation eventually contributed to a *laissez-faire* attitude if not wish to leave the organisation. Consequently, the failure to identify and take advantage of existing knowledge not only leads to reinventing the wheel, repeating mistakes and wasting resources, but also the emergence of (further) knowledge gaps as employees leave the organization or change position (Huysman & de Wit, 2003).

School leaders involved in the development and application of OPEDUCA gave proof that their role, position, convictions and disposition defined developments and their schools’ potential. Yet, of the 32 schools considered only 6 had leaders who effectuated this in a consistent and longer lasting way, next to which 12 changed position for distinct reasons. This lack of consistent leadership went hand in hand with going short on vision, mission and strategy, reflected in schools’ policy-documents and more-year plans that (consequently) offered a potporry of terms and phrases pointing to vague notions of innovation. The Dutch Inspectorate for Education (Inspectie van het Onderwijs, 2014), researching the quality of school leadership in primary and secondary education, concluded that about half of the school leaders in primary didn’t meet base competences at a sufficient level, a mere 3% scoring ‘good’, while no more than 34% of leaders in secondary systematically manages the quality of education (Van der Hilst, 2019). Although the behaviour of school leaders may have little effect on students’ results (Krüger, Witziers, & Sleegers, 2007), the lack of consistent leadership eventually will.

6.4.3 Confronting Critical Elements of the OPEDUCA-concept

The application of the OPEDUCA-instruments in daily practice was as fruitful as it was insightful from the standpoint of a transition towards ESD-based Education i.e. the development of an OPEDUCA-based School. Following and expanding on our critical recount of the application of the OPEDUCA-instruments in practice and drawing from extensive exchanges, plan making and analyses with school leaders and teachers, three OPEDUCA-specific aspects appeared most determining for a school's transition capacity towards ESD-based Education:

- The effectuation of Transdisciplinarity.
- Mastering the Curriculum.
- Exchanging testing and Examinations for progressive Assessment.

The Effectuation of Transdisciplinarity

Explicit recognition and effectuation of transdisciplinary education frees learning from the straight jacket of contemporary schooling. As soon as one truly takes the perspective of the students, each subject and entire disciplines gain importance as they become essential for thematic studies that command transdisciplinarity. We concur from an evidence-based perspective interdisciplinarity is foundational for ESD (Feng, 2012) and that sustainability as cross-cutting-priority in turn serves as a pivot for cross-curricular teaching and learning (Dyment, Hill, & Emery, 2015). Where the OPEDUCA-concept remains to differ is that it doesn't require sensations of complexity and uncertainty as motive; transdisciplinarity is a logical consequence of studying future defining themes and real world phenomena. Given the transdisciplinary essence of learning, it is not a precondition for ESD but the consequence of ESD-based education. Observing dozens of attempts for integrated and cross-curricular education in multiple countries, we concur with earlier findings that a lack of understanding makes implementation impossible (Hattie, 2008; Sparkes, 1991). In addition to findings reported earlier about the teacher's:

1. lack of associative capacity,
2. missing real world experiences and
3. poorly developed narrative skills,

we found 7 more factors limiting the effectuation of transdisciplinarity:

4. The lack of purpose driven by an underlying vision gives way to rather (playful) didactics that overrule pedagogical cause. This 'application-error' occurred when subjects were knitted together, not so much to address a complex phenomenon arousing from inquiry, but to reason towards an upfront chosen (material) manifestation of sustainable development considered interesting. Elements were addressed with little applicable value, context fabricated to serve the subject instead of the other way around.
5. A rigid schoolish focus restricts a subjects' meaning for ESD, not because a subject is irrelevant but due to a 'timing error'. In the traditional schoolish format content and concepts are mostly addressed following a textbook dedicated timeline, each subject for its own. Consequently, the subjects are (literally) not on the same page when called for.
6. Phenomena are seldom placed and studied in chronological order or sequence informed by internal logic, let alone such is done with an eye on content and concepts addressed in other subjects. Consequently, a 'relation-error' occurred, depriving the students of coherence informed by logic (reasoning).
7. Teachers tend to borrow elements from other disciplines, causing an over-accentuating of subjects. To point out relevance to the students and gain more of their interest, we saw the generation of farfetched and therewith shallow contexts. Most teachers did not realise their personal love and drive for the subject (an underlying factor) made students miss transdisciplinary learning opportunities. For example, taking along the Champagne-region in a lesson French is obvious, but not taking (seeing) the opportunity to then also address how champagne as a wine came about from a climate/season induced chemical 'error' or how it grew into a social-economic token of welfare, is an omission.
8. As concepts and values such as 'poverty', 'democracy' and 'equity' rest beyond a single subject, they are touched on incidentally or temporarily by various teachers and at the same time left in the middle. Missing such transdisciplinary concepts, students' comprehension and study becomes not only subject to a variety of interpretations but also leads to the creation of stand-alone cross-curricular projects that incur their separate assignments, claim means and teacher capacity. Therewith a vicious circle feeding a potpourri of activities is

brought to life, for the more such projects are created, the lesser the attention and opportunity for transdisciplinary education.

9. Whereas a strong disciplinary base is essential to successfully implement transdisciplinary education (Klein, 1990; Messer-Davidow, Shumway, & Sylvan, 1993), such can work adversely if subject-teachers consequently hold on to their classroom-based instruction even more profoundly, incurring a negative I refer to as the 'contradiction of disciplinary esteem'.
10. Teachers were seldom seen to seek compensation for limited transdisciplinary ability by inter-collegial cooperation. Horizontal connections between teachers appear weakly formulated and cooperation non-committal (Van der Hilst, 2019), their drive to work with students was not met with the aspiration to do so as a team of colleagues. This 'lack of complementary collegiality' can be explained as teachers were found not comfortable nor skilled at dealing with situations involving adults, particularly when conflict is likely (Evans, 1996). Although we experienced teachers eventually very well understood the complementary value of their subjects and proved not aversive to cooperation, once they applied the instruments in regular practice such did not come naturally. Teachers' feedback was frank, admitting that when facing challenges transdisciplinarity brings along, working by ways of structured lessons seemed 'not so bad after all'. Besides the peace of mind incurred by staying on one's turf, present secondary advantages (incidental fieldtrips, travels abroad) were mentioned.

Whereas the advantages of cross-curricular teaching and transdisciplinary learning became broadly shared during the years (Barnes, 2015), we concluded the challenges namely to be attributes of 'system' and 'school', not limitations to 'education' and 'learning'. The challenge of 'Constructive Instruction' (6.2.7) and other aspects of the effectuation of transdisciplinary learning were taken together most eloquently as a teacher resumed:

"So I will have to play my instrument better while walking around with it and seek harmony with the other players in the room".

A symphony of learning indeed in which students are no longer the audience but play along while writing their own composition of a sustainable future.

Mastering the Curriculum

As noted, the omnipresence of the curriculum (5.2.2) exercises dominance, leaving both teachers and students little space to breathe. Its rigidness and particularly the programmed control it exercises contradict with the natural flow of a students' learning process. It requires little argumentation curricula risk to be incoherent in time, fragmented, in standstill-mode for longer periods, intermediately diverge from real-world phenomena and suffer from third-party opinions and judgement.

Acknowledging the challenge to 'master the curriculum' implies we consider the present curriculum still relevant if the system is not altered. In terms of transition, the curriculum is an element of the 'Ist' to be mastered to reach the 'Soll' of ESD-based Education. Therewith we choose not to condemn it, also realising that those who created it over the years in consecutive processes of alteration will have had reasons to be respected or at least profoundly observed.

For the transition from traditional to ESD-based Education teachers will need to have and exploit a more profound knowledge about the contents and meaning of the curriculum. Since there are no longer amorphous learning plans orchestrated by



lesson plans based on textbooks, understanding a students' progress depends on the teachers' ability to pinpoint and point out securely when curriculum-elements are covered ('track & trace'). Moreover, teachers will have to anticipate on upcoming content- and competence demands as the students go their way, obliged to take note of the curricula of a next stage. As the curriculum should no longer obstruct or command the possibility of ESD-based Education, I will first point out how it can be mastered and then propose a new perspective to make it subject to the transition.

Bypassing unnecessary tensions and conflict, the OPEDUCA-concept provides for curriculum-delivery along the pathway of students' learning. following a simple 3-fold approach:

- First, we exercised a backward curriculum control with teachers, placing each element in a multitude of places in various Fields of Knowledge, BusinessClass and Global to lessen anxiety. Finding that ESD-based Education consumes the curriculum entirely and morefold with relative ease, it was also seen to provide for repetitive coverage of all major elements.
- Moving beyond, the challenge was pro-actively addressed by sharing the entire more-year curriculum, all tests and the final Examinations of the previous 10 years with the students. Although such appeared an idea 'beyond the box', teachers agreed it would allow for a timelier address and mastering of elements. Since students will as than gain insight up-front, expectations not being kept in wraps, it is moreover expected such openness lessens their anxiety and stress. The curriculum being laid open in a more year ever present perspective, student ownership was seen to expand and develop.
- Showing teachers that the application of the OPEDUCA-instruments allows for a continuous 'track & trace' of students' whereabouts and progress along the axes of the curriculum in meticulous detail (diminishing the urge to intermediately test) gave further peace of mind. Following argumentation and reasoning, teachers acknowledged students could as then be allowed to 'criss-cross' around subjects and go personal pathways in own tempo, apart from their year-cohort.

Concluding that mastering the present curriculum is well possible and an integral part of the OPEDUCA-concept, I further proposed to take a different view on it:

- Although one can see the curriculum as a living thing, multi-faceted and -factorial in nature, such does not mean it changes swiftly. While changes are driven and arrested at the frontside of knowledge development (for example at universities and companies' research departments), curricula for primary and secondary education can justly be seen as relatively solid and constant over time.
- Practice showed ESD-based education exceeds contemporary curriculum-requirements as it involves students in more broader perspectives while at the same time requiring more in-depth understanding of phenomena in order to comprehend their essence. From this perspective the curriculum even fails on students, its constant nature off-set by a pro-active learning process. Such opens a view on the curriculum as a set of minimum-requirements eventually addressed in the natural course of learning.



- Also since the OPEDUCA-concept sees to ongoing learning pathways as a tread throughout the presently fragmented system of year-levels and grades, a curriculum seeking to enforce a restrictive command through an artificial distribution of its elements over an arbitrary number of years will lose relevance. The argument students' crossing of (former) grades would not align with their development-age was countered by teachers as they consider the opposite to be true, acknowledging the present classification in age-years/grades to be arbitrary, the appropriateness of homogenous groups/classes only seemingly so.

These six arguments underlined our conviction that adding ESD to a curriculum is a contra-productive approach. It would be like mending and adding spare parts to a machinery no longer of these let alone future times. Mastering the curriculum while protecting it from upcoming outside modernisations is functional for the realisation



of transdisciplinary learning, frees teacher capacity for personalised education, allows for individual registration, follow-up and assessment of the learning progress and makes way for the proposed ongoing learning pathways. It furthermore allows to take a stand against a too widespread policy-focus on curricula, testing and assessment (Lingard, Hayes, & Mills, 2003).

Exchanging testing and Examinations for progressive Assessment

Complementary to transdisciplinary education and a new perspective on how to master the curriculum, testing and examination will have to follow the individual students' pathway. As recounted, a students' progress is continuously open through the application of the OPEDUCA-instruments, former marks and grading ingrained. As example, when a traditional test would include a question about the treeline in a mountainous region (altitude in meters), any satisfactory answer would ask for a reasoning of place and circumstances while in traditional testing one 'best' answer is mostly pre-set and learned by heart. In OPEDUCA-based education the student is invited to present a brief (verbal) narrative that includes the desired answer but then in a setting of factors and variances, referencing to the species of trees, geography, climate change, etc., picturing a basic knowledge structure (expanding over the years) of the phenomenon addressed. The critical remark such would be a subjective assessment is not just since the 'right' answer from the traditional test needs to be included, there is no trade-off.

Since we take the integral perspective of a students' development, assessment no longer primarily serves the school's need to evaluate and judge a students' progress but to point out personal development to the student herself. Tests are not required as 'markers' and 'moments of judgement', (final) examinations no longer impressed in students' mind as unsurmountable peaks in the distance with moments of stress implanted along the way. No more winding road looming ahead, no travel of unforeseeable duration with in-between stops, barriers and 'go back to start' moments. Sensations of unrest, fear and anxiety to evaporate instead of rooting later misery.

Furthermore, a school's annual routine of interchanging lesson-, testing- and examination periods will no longer cement the agenda, free student- and teaching

capacity for a learning process with integrated progressive assessment, individual guidance and progress-evaluation.

As pointed out before, assessment is embedded in the OPEDUCA-instruments, amongst others by ways of the students' ownership of the Fields of Knowledge and the practice of frequent presentations that are seen instrumental to this cause. Each student is expected to continuously construct narratives of the studies, then more frequently interviewed in breadth and depth, addressing all theme- and subject-related elements, interrelations, concepts and understanding. Students giving proof of the effectuation of what is learned (Duran & Kelly, 1994), knowledge respected as applied knowing.

6.4.4 Mastering the Merger of Assembled Educations

Since most schools hardly take opportunity of possibilities real life offers to give more meaning to learning (no more than 8% of all schools worked with already upheld connections of the educational quality envisioned) estrangement also distorted their judgement off opportunities being offered to compensate for such. In line with our original notion (2.3), though much more massive and persistent, schools were found to have come under the influence of an increasing variety and number of (semi-)commercial initiatives and renewals disturbing and worsening the situation. A proliferation the Dutch Inspectorate of Education (Inspectie & Onderwijs, 2019) eventually also pointed out, referring to the increasing variety of 'hip' school-innovations (AGORA, Brainport Schools, New Learning, School of Understanding, I-Pad schools, Kunskapskolan, etc.), one we see combined with programs and school-formulas focussing on STEM (Technasium), Environmental Education (ECO-Schools), Entrepreneurship (Entreprenasium) and many alike. Two categories representing questionable qualities that add to the cacophony of innovations in education, the entirety exercising a disturbing influence, also due to the omnipresence of public and private initiatives promoting and representing them. To the educations mentioned above I referred earlier as 'assembled educations' because we learned to see them as enlarged versions of subjects they relate most to, incorporating elements of other fields to meet contemporary claims, often implying the fulfilment of 21st Century Skills and alike with referral to labour market demands.

In contrast with the claim they serve education, we found them to distort learning and disrupt schooling in an uninvited and unnecessary way. This moreover since it is unclear if innovations as these are thoroughly observed and sufficiently evaluated, schools implementing ‘innovations’ even proven ineffective (Inspectie & Onderwijs, 2019).

As noted, schools’ adoption and buying into assembled educations is even more encompassing as it deteriorates their already weak development potential. Whereas this exertion of external influence was found rather gentle in case of Entrepreneurship-, Citizenship- and Global Education, namely advocacy in the realm of Environmental Education and especially STEM profoundly influence a school’s own transition capacity. Each of the 14 schools seeking structural implementation of the OPEDUCA-concept ran 2 up to 4 assembled educations, in most cases STEM (10), followed by Environmental Education (7), ICT (4) and Entrepreneurship (3), all extra-curricular. Over the board these assembled educations:

- claim interdisciplinary practice, yet do not effectuate it,
- originate and supply from the outside, not enhancing a school’s own ability,
- come with substantial labelled funding when compared to schools’ own means for improvement,
- have a link to specific sectors in society, not strange to advocacy,
- manifest themselves in the ‘layers of fog’, exercising (political) influence.

As ESD-based Education no longer requires assembled educations and is even restricted by their presence, we looked to build understanding of their nature, presence and influence to further empower schools to let go of buy-ins and build own capacity, free human and financial means. To illustrate our reasoning, I will briefly recount it for Environmental Education and STEM.

Environmental Education

Overlooking all schools involved in OPEDUCA, except for 4 of the 15 in Primary and 8 of 25 in Secondary, Environmental Education (EE) was a next to school and stand-alone set of activities, mostly conducted by regional Centres of Environmental Education (CEE) who behaved as service-providers of well-rounded activities.

Across the board the CEEs took an anthropocentric protection- and value perspective, connecting to (local) issues of a more popular nature, their choice often related to the availability of 3rd party funding. With the rise of ESD we observed CEE's conducting projects such as the 'warm-sweater-day', 'plant-a-tree-day', 'clean-the-river-shores-week', etc., activities rather shallow when considering the experience and knowledge generally available in the centres. Although we did not research the CEE's clear shift in activities, we got the distinct impression more classical nature-oriented activities suffer from the service-provider concept of the centres. Complementary to our findings, a Belgian study examining the effectiveness of Eco-Schools¹¹ with regard to their students' environmental values and environmental behaviour (1.287 students from 59 schools, 38 eco-schools and 21 control schools), showed the schools' pedagogical approach stresses utilisation- and not preservation values which are seen relevant for students' environmental behaviour (Pauw & Petegem, 2013).

Environmental education should not be seen as a separable package but as a movement for fundamental educational reform to bring environmental and social systems together into a single conceptual structure (Smyth, 2006). Thereto we tried in practice more intensive learning experiences by ways of an involved approach, positioning the learning in and through nature to realise genuine connections between students and Earth and raise non-anthropocentric awareness. Going out in nature not because an environmental activity was scheduled but driven and steered by the students' inquiry, offering opportunity to be out there, sense nature. During personal exchanges with 56 students (age 11-17, 11 Study-Teams from 8 schools), they spook of the environment being 'pushed upon' them, of 'nagging' adults. Aware of their disconnectedness, views and values instructed by ways of EE-activities fed resistance. Not so much since these missed catching the students'

¹¹ Eco-Schools is a sustainable schools program (<https://www.ecoschools.global>).

interest but because they did not bridge to (their) feelings. Students asked why they needed to “.. *spend precious off-line time on this*” (71%), spook off a ‘burden’ put on their shoulders due to constant referrals to ‘manufactured misery’ (“*And what can we do about it, nothing isn’t it*”). The negative image of environmental education, burdened with indoctrination and instrumentalization (Jickling & Sterling, 2017) reminded of the notion we unconsciously associate nature with doom while disassociating the outdoors from joy and solitude (Louv, 2008).

Looking this in the eye, results were quite different when we for example joined students to a riverside without any goal, sensing their active mode became served by silence, simply walking through nature without the sound of conscious interaction. Merely standing there until observations fed sensations (smell, dirt, a duck landing on the water) the students tried to express (“*Then to imagine we eventually gone drink this*”, “*No, stupid, we do not drink river water, or do we?*”). Without rigorous analyses, experiences like these made us considerer the importance of staying away from any paternalistic intention, realising ESD and underlying EE in the interest of children does not mean it has to be done in a childish way. As argued (6.2.2) others cannot make a meaningful experience happen, only enhance the likeliness it occurs. As a small experiment, we questioned 21 students from 7th primary (11-12 years old) having taken part in the ‘National Plant a Tree’-day one month earlier. Not referring to that activity, we challenged class to go out with their mobiles and swiftly app a picture of a water-pump. On return we clarified the ‘mission impossible’ by pointing out nearby oaks being most magnificent water-pumps. Following which a student hesitantly said she had inquired with her teacher when planting the trees (“*You know,*



we had this celebration, and the mayor was there and cake") if these would not one day cause the neighbouring cornfield to fall dry. A question that had not made it back to the classroom. Such apparent lack of meaning of EE-activities we noticed numerous times, feeding into weak notions of ESD whereas it should regard "concerns which differ substantially from those of litter, nature study and the planting of trees in the school grounds and other apolitical and aesthetic work that has often been the focus of much school-level environmental education in the past" (Fien & Tilbury, 2002).

An encouraging example taken from a Flight or Knowledge on Water can be recounted when students in secondary picked up from a narrative that the population of female fish in a nearby river was large. Guided by the explanatory reasoning of a biologist of the regional Water-authority, who led them via the concentration of medicine residues in wastewater to an understanding of the biological, chemical and mechanical filter-systems, the students' attention was captured as they noticed their own (presumed) behaviour as an underlying cause (the use of birth-control medication). Obviously, the OPEDUCA-approach later also led to discussions why an abundance of female fish was relevant to begin with.

Whereas Environmental Education in the meaning of the OPEDUCA-concept is close to the original joint complex of ecology and human life, such seemed to have withered away from present day Environmental Education. A development not corrected but worsened by weak interpretations of ESD, presenting social issues which may or may not be related to the environment (Kopnina, 2012) and not linking environmental protection to intrinsic values of non-human species (Johannesson, Nordahl, Oskarsdottir, Palsdottir, & Petursdottir, 2011). As found, people feeling ill or unjustly informed, lacking a sense of ownership, try to make up their own minds where it comes to the harm and protection of nature, (Macnaghten & Urry, 1998). Students' sensation of nature as 'problem-zone' relates to a missing connection with the encompassing dimension Earth. While their minds are open for the positive, wanting to hold a cheerful outlook and see the future in terms of opportunities, possibilities and hope, nature is pushed upon them as a negative. A recent German study showed only 66% of youngsters see nature as an attribute of a good life while only 46% state to be happy when being in nature (Mole, 2021).

How does one find time and opportunity to save a glacier in the Himalayas or care for the wellbeing of penguins, when facing young hopes, uncertainties and puberal needs? Does it activate constructive learning and inform action to march the streets on a Friday, watch the cuddly Disney-resolve bringing animals to life in most bizarre ways and trample around with GPS-assignments?

In summary, we have seen Environmental Education to drift away from its roots, CEE's becoming budget-driven service providers who grasp the opportunity of ESD to re-label and survive, however follow anthropocentric ideas and programs of others that are contra-productive to its course.

STEM

Although we acknowledge technology rests in the core of many phenomena, we do not consider it the core of education. Experiencing dozens campaigns on the local, regional and national level from nearby, STEM appeared dominantly present in terms of advocacy, funding and time programmed in schools. A push for a STEM-agenda not per definition meeting the needs of employers and graduates, nor in the interest of students (A. Gough, 2021). Seeking to better understand expectations, meaning and relevance, I argued a division of STEM in 6 elements:

- Scientific thinking and reasoning.
- Science as (academic) field of expertise and work.
- Science as collective term for disciplines and subjects
- Technology in the sense of 'hardware', tools, machines.
- Technology in the field of 'Information and Communication', ICT (overlapping 'hardware' technology through embedded systems).
- Engineering as the design of technological constructs and processes.

The addition of Math I consider superfluous to the course to begin with, respecting it as a universal concept of logical thinking and applied calculus, feeding into a variety of disciplines. The enlargement of STEM with the Humanities and Arts, coming to 'STEAM', preposterous.

The already presumptuous promotion of STEM as a multidimensional discipline invokes an entanglement if not chaotic compound of issues, one reflected in schools' policy papers and STEM-projects we saw to come about in all possible constellations and variations. In practice, the interpretation and formulation of STEM is a potpourri, nearly indicating an 'all goes' as long as the term is favourably mentioned. While the STEM-phenomenon is still campaigned and branded strongly and its merits shady, it became an ever broader and deeper basket to collect issues of different order, adding to the cacophony we observed (2.3).

The proposed segmentation proved a valuable impetus for reflection. In 43 cases studied up close there was eventually little more unique reason to justify the profound presence of STEM than the justifiable argument schools should better match labour-markets' demand for more technically skilled workers. STEM not a visionary notion for a profound and balanced improvement of education but a broad scale attempt to correct for the consequences of earlier policies which deprived especially lower levels of secondary education from their practical orientation. Where we noted (in no more than 15% of cases) more epistemological viewpoints concerning students' understanding of science as a human product, it was mixed up with notions about 'knowledge in science', 'knowledge of available science', 'learning the way of scientist does' and 'performing scientific research'.

Schools' argumentation to take part in STEM-programs originated from political and upper-level managerial pressure in combination with (substantial) additional funding that came along with (external) programs (Dutch schools being offered up to 7 programs simultaneously). The latter at least partly a misguidance, for what schools perceived as additional funding was mostly a re-routing of educational means through (newly established) intermediate organisations that in the process also sell consultancy. Analysing the essence and perceived added value of STEM-activities with (science-)teachers and overlooking practice, especially primary schools could be sold 'backed air' for progress since their judgement was too brittle to countervail. In Secondary and further education more aware teachers were critical, as one in the airline maintenance industry (vocational education) noted: "*We are being sold yesterdays' views wrapped in 21st skilled paper*". Although students' attitude towards STEM-aspects might eventually benefit following the overall attention it receives, the impact varies according to particular characteristics of the activities (Vennix, den

Brok, & Taconis, 2018), schools too often relying on the false notion motivation follows activities instead of intrinsic sensations.

Understanding a reimagined science education should be socially reconstructive and transformative, the content transdisciplinary and the pedagogy interactive, project-based, learner-centred and participatory (A. Gough, 2021), it would be wise to reconsider STEM within the larger realm of ESD.



6.4.5 Transforming the Teacher to Professional Educator

As recounted, teaching capacity required for ESD-based Education is presently insufficient. The application of the OPEDUCA-concept requires another disposition, a different position in a new school-setting, a professional handling of present day blockades and cooperation with colleagues as well as Partners in Education in unfamiliar ways. Teachers are challenged to grow into an educator who can overlook what makes the world go round, find own understanding and engulf oneself in the students' learning process. Although the majority of teachers participating in OPEDUCA MasterClass confirm all this (*"This is exactly why I wanted to be a teacher in the first place"*), the challenges they face to realise ESD-based Education are profound.

Teachers' autonomy being largely restricted to their classroom and suffering under an accountability too much based on standards (Buchanan, 2015), we noted their resistance to change also relates to the comfort of the traditional. As noted, teachers' preference to remain with compulsory courses and subjects, pre-scripted books and pre-defined activities should not be underestimated. Those who dare to make a move risk the organisations' rubber bands will snap them back in place, cautiousness condemning progress. Earlier negative experiences take their toll as teachers assured us such lingers on for years. We frequently saw teachers exceed formal requirements in order to help their organisation (Organ, 1990) but efforts remained largely informal, were inherent to the person, temporary and lacking profound and continued acknowledgement and support by management as well as colleagues.

Although it sounds well to state that in a teacher the seed for change and action should lie, we came to doubt if present teachers embody agency as capacity to act independently and make own free choices (Barker, 2003). It became clear over 70% are primarily there for education, not to play an organisational role, nor were they eventually interested in the school as such with its slings and arrows, let alone in the system governing it. Although this seems to point to an independent professional positioning, it was mostly not. Dispositions and attitudes point to their functioning as part of the machinery in the fabric (of) school within the constraints of the system. Teachers discuss, gently push but not rattle the box. For the majority, change was

welcome as long as not much would change. Keeping to the terminology I introduced before, many appeared to enjoy the womb and hold out with the bulwark. When a joint metamorphosis was attempted, the population divided itself in fractions looking for their own right and good while others laid back to wait and see. Organisational aspects that on the one hand were regarded restrictive and contributing to pressure and stress, were on the other brought to the table swiftly when arguing the impossibility of change. Although teachers' reinvention and reinterpretation of the work environment might create opportunities for change, these are denied as threatening to the institutionalized practices and routines (Weick, 1995). Agentic action by teachers might be overestimated, opportunities neglected or perceived as restricted (Priestley, Biesta, & Robinson, 2012). We found that no more than 20-25% of teachers embody sufficient capacity to work along, let alone carry, the transition envisioned. Such in line with another comprehensive study, involving over 1.000



teachers, concluding ap. 25% could be identified as meeting change-agent characteristics in a relevant degree (Van der Heijden, 2017).

Teachers across the board summarised time spend in practice was unbalanced as they had to divide their attention between general school matters (30-35%), the organisation of projects and (standalone) educations (15-20%) and net lesson-time (35-40%), leaving at most 5-10% of capacity for longer term improvements (2-4 hours per week). Given the schoolish way of organising, this remainder of capacity was spent on project meetings and internal communication. Here we should also realise that if one is mentally out of breath all the time from dealing with the present, there is no energy left for imagining the future (E. Boulding, 1978).

The quality and capacity envisioned would for most teacher's require a considerable shift of boundaries, one building on personality, attitude and the inert will to change oneself and develop. We assessed the gap between the present-day teacher and the educator sought for amongst others by stating during MasterClass that any teacher, being an educated and experienced adult, should out-master any 10-year-old student in every field of knowledge. All participants (> 320) confirming, when raising the bar to the age of 15 a bit over 70% remained while no more than 15% stood straight when it came to mid-level secondary (age 18). Alike, when questioning participants about keeping themselves informed through media (newspapers, documentaries), we recorded less than 20% did so on a daily basis whereas over 30% openheartedly stated to make no frequent use of such sources for their general development at all.

We came to conclude the differences between traditionally trained teachers and experienced educators are qualities that go combined in the person. Educator-quality rests on deeply held assumptions and living the essence of learning one-selves while rooted in the practice of everyday life, being more inclined for fast-paced change as their composition is already nearer to ESD-based Education. They are hardly in need of incremental change, on the contrary: when forced to follow the inertia of their school they 'burn down' due to intrinsic tempo and mass.

Unsurprisingly, it was the 25% of teachers with (initial) educator-qualities who, when finishing MasterClass, reached out their hand stating: "*When your school opens tomorrow, I'll be there 7AM sharp*".

6.4.6 Some errors in practice

Schools that did not embrace a vision on ESD, critically reflect on their own limitations or tried to implement OPEDUCA-instruments half-way, left educations as STEM and EE lingering on and neglected the development of teacher capacity, incurred a mixture of factors frustrating their wish to still somehow realise ESD-based Education. Best summed up as attempts to jump halfway across a canyon, their own weight pulled them down as they kept their system of trusted operations in place. Most typical errors were:

- Starting out in upper- instead of lower secondary.
- Schools overtaking themselves by starting with up to 4 classes (ap. 140 students) at once, a mass too large for teachers to manage, pressuring organization and facilities, demanding a too swift inflow of numerous Partners in Education, etc.
- Opting for 1 theme in Flight for Knowledge instead of minimally 2, caution killing the cat.
- Keeping assembled educations in place, consequently double-claiming capacity of the limited amount available, making transition capacity wither away further.
- Rephrasing the OPEDUCA-concept under an own ‘brand’, then promoting a stripped-down version widely for own benefit and questionable esteem while seeking to hide it was a mile wide and in inch deep.

In general, whereas the involvement of so many schools as a cooperative was constructive for the generation of trust in development (not standing alone), it in cases worked out adverse when application was underway. Whereas schools in first instance appeared in need of seeing and hearing each other to incur the sensation of togetherness, this positive made way to a mostly unfounded aggregation of uncertainty and doubt when school leaders and teachers tended to overestimate and overweight their neighbours’ troubles. A manifestation of the school-characteristics (6.4.2) which invoked a summing up of challenges and failures that stood in the way of an unbridled celebration of success and progress.

6.5 Meeting Contemporary ESD

Having had the chance to study the course, organisation, progress and outcomes of research- and policy-development in ESD for over 10 years from nearby, I can critically compare process and outcomes with the OPEDUCA-project and -concept. Taking it research- and policy development are an important determinant for the effectuation of ESD as they are intended to eventually inform and improve practice.

The OPEDUCA-project and -concept were welcomed by researchers as well as policy-developers as a vision with adhesive qualities, the multi-dimensional view on sustainable development materialising in a multi-disciplinary partnership effectuating transdisciplinary education that meets contemporary encompassing definitions of ESD:

- *"to empower learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning and is an integral part of quality education. ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy, and the learning environment. It achieves its purpose by transforming society"* (UNESCO, 2014).
- *"all learners acquire the knowledge and skills needed to promote sustainable development...through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development"* - SDG 4.7 (UN, 2015).

I will analyse the OPEDUCA-concept against UNESCO's 'ESD for 2030' as most recent manifestation of policy development (6.5.1), then critically observe several ideas held high in the ESD research community (6.5.2.) including a critical analyses of the world of ESD as such since I see its constellation and operation explanatory for the previous.

6.5.1 A comparison with UNESCO's "ESD for 2030"

Seeking to analyse OPEDUCA against the fruits of research- and policy development in ESD, I take UNESCO's now most recent framework, 'Education for Sustainable Development: ESD for 2030' (UNESCO, 2020, 2021a) as benchmark, understanding the ideas of the ESD-community are worked into this overarching policy-document, as was the case with its predecessors, the DESD 2005-2014 and the GAP 2015-2019.

Priority-areas UNESCO formulates in 'ESD for 2030'

- Area 1 on policy:
ESD must be integrated in global, regional and national and local policies related to education and sustainable development.
- Area 2 on education and training settings:
Attention is required to promote the whole-institution approach to ensure we learn what we live and live what we learn.
- Area 3 on building capacities of educators:
The focus is on empowering educators with the knowledge, skills, values and attitudes needed for the transition to sustainability.
- Area 4 on youth:
recognize young people as key actors in addressing sustainability challenges and the associated decision-making processes.
- Area 5 on local level action:
emphasizes the importance of actions in the communities as they are where meaningful transformative actions are most likely to occur.

Table 6.1

Education for Sustainable Development: A Roadmap (UNESCO, 2020)

Analyses and remarks are also placed against the actual finding that despite over 20 years of apparent efforts, 45% of national education policy and curricula documents still make little-to-no reference to environmental themes including sustainability, climate change and biodiversity, less than half mentioning climate change and only 19% makes reference to biodiversity (UNESCO, 2021b).

As ESD for 2030 can be read as an extensive confirmation and acknowledgement of the OPEDUCA-concept, I will focus on distinguishing features and examine where outcomes might appear alike, but principles, approaches and concreteness differ. UNESCO's priority-areas appear to match the re-conceptualisation of ESD we proposed, OPEDUCA(-like) elements surfacing in the framework. I see 8 similarities:

1. Positioning of ESD from a holistic perspective, encompassing learning content and outcome, pedagogy and the learning environment itself.
2. Acknowledgement of the individual, including the need to expose learners to reality regarding their influence on societal transformation.
3. Seeing ESD as a lifelong learning process and an integral part of quality education that enhances cognitive, social, emotional and behavioural dimensions.
4. The employment of an interactive learner-centred pedagogy,
5. Emphasizes being put on actions in local communities as places where '*Meaningful transformative actions are most likely to occur*', noting that '*Educators, learners, and administrative staff should cooperate with community-based local leaders, families, as well as non-governmental and private sector actors working for sustainability to engage the local community as a valuable setting for interdisciplinary, project-based learning and action for sustainability*'.
6. The recognition of youth as key actors, now also including their entrepreneurial competences.
7. Building capacities of educators, reading that '*Educators should be facilitators who guide learners through the transformation as well as expert builders and transmitters of knowledge for a sustainable future. Educators can employ innovative pedagogies to empower learners to become change agents*.
8. The notion that critical thinking and sustainability values become ever more relevant.

Although it is confirmed the OPEDUCA-concept was 15 years ahead of time, there are still considerable disparities:

1. Regarding (formal) education, the framework presents a set of activities aimed at the promotion of the SDG's, ESD brought to use for transfer instead of building on its transformative potential. This positions ESD on slippery ground, moreover since the SDG's as such can be observed quite critical, the rapid spread of the SDG-supporting institutions probably due to little more sinister than indifferent management and a dull-minded rehearsal of received "truths" rather than a serious effort to rein in alternative visions (Kopnina, 2020). Their embrace in the realm of sustainable development a self-limiting response to the imperative to be pragmatic or inclusive of all issues that society considers important, a logical outcome of pluralism and democracy (Jickling & Spork, 1998).
2. This service-idea of ESD more concerning as UNESCO's framework repeatedly speaks of 'education and sustainable development'. Alike, it reads economic growth and sustainable development, a pertinent issue pointing to the idea sustainable development is seen as a separate realm, if not identity.
3. As the framework holds on to a People, Planet, Profit-like balance ('*How can ESD support the balancing act between economic and sustainable development?*') root causes of unsustainability such as population- and consumption growth are not readily addressed. While accents appear to lie in elevating poverty and raising living standards (which are certainly worthy objectives) such framing can be seen as woefully inadequate due to a robust anthropocentric bias, excluding concerns about the welfare of all but one single species (Kopnina, 2014).
4. Although UNESCO more profoundly positions youth, I question both motive and approach when reading that: '*... young people must be fully included in the design, delivery and monitoring of policies and programmes on education and sustainable development. Secured seats for youth representatives in the decision-making bodies of institutions at all levels are one of the ways to achieve this*'. UNESCO appears to prelude on a further manifestation of (their) existing institutions in which youth is to be(come) assimilated. Taking youth seriously I consider different from giving them a seat and say in the present constellation.

5. Most importantly, the ‘how’ of ESD is still not provided, stays nebulous at its best. An applicable pedagogy remains untouched and any sense of a coherent strategy in the field of education is missing. UNESCO’s statement that *‘ESD raises questions on the inter-linkages and tensions between different SDGs and provides learners with the opportunity to navigate the required balancing acts with its holistic and transformational approaches’*, summarises it’s vagueness and leaves the how open. ESD as then remains eclipsed by superficial notions of learning and education, staying in an incomplete state as the framework articulates itself by formulating essential questions outstanding:

- *What are successful pedagogical practices to achieve the 17 SDGs?*
- *How can ESD address the inter-linkages and tensions between and among different SDGs?*
- *How does individual transformation take place and how can education facilitate a tipping point for a learner to undertake transformative actions for sustainability?*
- *What is the role of communities to promote transformative action for sustainable future?*
- *How can ESD encourage learners to explore alternative values to consumer societies?*
- *What kind of ESD best connects with and supports learners’ daily challenges?*
- *What are the implications of artificial intelligence and the 4th Industrial Revolution for ESD?*
- *How can innovative technologies be harnessed to educate for sustainability?*

If such questions remain, one can wonder where the framework is and guidance should come from.

6. Taking due note of the vagueness, lack of vision, direction and resolve, it is alarming the editors of ESD-for-2030 propose quality assurance criteria to ensure that education institutions can be monitored. UNESCO speaks of a ‘big transformation’, implying changes in individual behaviour are intertwined with the reorganization of societal structures, then positions ESD to track the transformation. Using the term ESD by then as a personal pronoun implies the ESD-community, despite its poor delivery on pedagogy and lack of strategy, sees itself compelled and able to check other people’s efforts where they failed themselves.

I can only consider this a most worrying development, my initial observations (2.4) as to institutional failure proven profoundly valid. The stage seems to be set for another decade of consultancy-driven research, the justification of which is already formulated by ways of ‘key-indicators’ to monitor the progress of ‘ESD for 2030’, addressing the extent in which:

- *legal frameworks and policies are in place to promote ESD,*
- *learning environments promote ESD and its whole-institution approach,*
- *educators are trained to be able to teach ESD and apply whole institution approaches to ESD in learning situations,*
- *youth are engaged in ESD,*
- *ESD is promoted in local communities,*
- *ESD for 2030 is implemented in countries around the world.*

The latter obviously the launch and continued legitimation of a senseless consultation circus circling the world for another decade.

Although UNESCO’s ESD for 2030 is presented as a framework, it comes across as a loose assembly of ideas, staying far from a coherent vision and guiding strategy. As an apparent lack of intermediate thought seems to spring from a missing perspective on learning and education, appropriate wording turns into hollow phrasing.

Moreover, UNESCO’s notion of ESD remains institutional as its principal thinking concerns systems, structures and programs, mentions actors yet stays far from a notion of action. Consequently, ESD withers away while those seeking direction are led astray.

The slow turn of ESD-research towards the fields of practice which can now be observed, to collaborate with schools, acknowledge the role of industry and honour the perspective of youngsters, can be seen as hopeful. Yet its sincerity should be observed critically if not doubted given the over two decades lengthy process it took to come this far and get nowhere.

6.5.2 A Critical Encounter with Contemporary ESD

Seeking explanatory factors why still today the transformative potential of ESD remains untouched in broader policy and practice, I conclude on a deterioration of meaning and course resulting from a different understanding and relevance contributed to ideas and concepts such as:

- Systems Thinking,
- (ESD-)Competences,
- Social Learning,
- a ‘Whole School/Institution Approach’,
- ESD in Teacher Training and Education.

Underlying, I experienced that larger parts of the world of researchers and policy-developers most involved are characterised by an awkward mix of involvement and distancing, warm heartedness and haughtiness, paralleled with sensations of strangeness to the real and other realms of research than their own.

My reflections in this paragraph should be regarded as both constructive and critical, seeking for the better of ESD.

Systems Thinking, System Dynamics

a too profound claim

Since Forrester brought his original 1950’s concept ‘Systems Dynamics’ to the Club of Rome in 1971, it became a paradigm in the realm of sustainable development to address the predicament of our socio-economic system. As the mapping of interrelations between amongst others population, production, food and pollution was worked into “The Limits to Growth” (Meadows et al., 1972), it would be a neglect not to consider System Dynamics in ESD, even despite the questionable predictive quality of the model(s) used. The idea that our system’s elements are interrelated in a cyclical rather than a linear cause and effect can be valuable for learning about complex systems and of use for transdisciplinary education. Already in the 1980’s schools in Arizona cross-connected content, following the efforts of Brown, Forrester’s former mentor at MIT (MIT, 1996). However, considering its principal

notion and the inherent quality of learning, I find it difficult to justify System Dynamics a concept for education as such. Amongst others Economy, Geography and Medicine could not have been studied without the notion of complex systems and their circular interdependencies, thus hold the idea for centuries already. Although it is rational and educationally relevant to better understand the relation, dependency, coupled nature and mutual influence of systems, certainly between those manufactured and ecology, System Dynamics and Systems Thinking do not qualify as a ground-breaking insight or the emergence of a new methodology or pedagogy, let alone an encompassing approach to ESD. Moreover, Systems Thinking provides little foothold how to interpret sustainability and tends to observe and understand present day systems while from the perspective of sustainable development addressing their future usefulness should prevail.

ESD Competences and 21st Century Skills

a pontifical presence of pretentious policy advice

One of the repeated, seemingly endless, efforts in the world of ESD is the listing of ESD-competences with an eye on the adaption of present curricula. In our reasoning (6.4.3), it makes little sense to manifest ESD by ways of adding elements to curricula to match system segments when the learning within each segment remains as it is. Advising to add ostensible ‘21st Century Skills’ or specific ‘ESD-competences’ to each segment and overarching curricula is like adding sprockets to an already failing engine. Moreover, such efforts to ‘pimp’ curricula distract from true improvements and therewith reinforce the status quo of present education as an agency to colonize technologically and economically deterministic futures (Gough, 1990) the system is lined out for now.

Questioning what the various skills and competences listed¹² mean, there is little evidence of their added value besides raising awareness that requirements for life

¹² 1. The ability and willingness to cope with uncertain, new, and rapidly changing conditions 2. Complex communication/social skills—interpreting both verbal and non-verbal information from others to respond appropriately 3. Non-routine problem-solving skills—using expert thinking to examine a broad span of information, recognise patterns and narrow the information to reach a diagnosis of the problem. 4. self-management/self-development—the ability to work remotely, in virtual teams and to be self-motivating and self-monitoring. 5. Systems Thinking—the ability to understand how an entire system works, including

after school tend to differ. An over accentuation of which blurs the view since they largely remain the same. The claim of ‘difference’ can be gathered pretentious, as if qualities as ‘cooperation’ and values as ‘empathy’ have been strange to our ancestors. The listings therewith present a false promise, claim transformative value where they offer none. Prescriptions like these are seen to distract schools and diffuse their priority-setting when they frantically seek activities to comply with such ambiguous and non-committal notes then surfacing in their curricula. As teachers explained, pressure to comply takes hostage of their own inclination to think soundly and consider the essence of ESD. The listings are witnessed not to inform change, for after 20 years or more talking about 21st Century Skills and higher order learning objectives, we are still stuck, unable to break out of the old patterns of teaching and learning (Goldspink, 2015). Despite long year efforts by the ESD-community, I argue that a persistent listing of terms and rather loosely stitched phrases rewording long standing skills and values as ‘ESD Competences’, also when newly (un-)packed from ‘21st Century Skills’ (Capelo, Santos, & Pedrosa, 2012; UNECE, 2011; Vare et al., 2019), will not bring the effectuating of ESD nearer. On the contrary, a profiling through competencies of such broad quality they apply to any field obstructs essential discussions and brands ESD with a limited perspective. The range of overlapping and recurrently funded projects, seminars and conferences, the substantial spending on numerous international exchanges for only a small group of people, hardly delivered new insights while stubborn preaching obstructs progress through the defection of attention.

If one seeks further understanding of the belayed quality of ESD Competences and the like, there are for example the ‘Issues and Directions’ in which the Ministry of Education of Ontario in 1980 already described the learner as “*self-motivated, a self-directed problem-solver, aware of both the processes and uses of learning and deriving a sense of self-worth and confidence from a variety of accomplishments*”, “*a methodical thinker who is capable of inquiry, analyses, synthesis, evaluation, as well as a perceptive discoverer*” (Ministry of Education, 1980).

how an action, change, or malfunction in one part of the system affects the rest of the system (National Research Council, 2011).

Social Learning

discarding the Student

As elaborated on in 6.2.8 , I tend to be critical of Social Learning as a carrier, let alone a concept for ESD. The way we envision learning and applied it in practice, the process is obviously infused by continuous social interactions and positioned in the social domain, an essential characteristic and function of an Open Educational Area. Such is most logic, inextricable yet not per definition indispensable since it is not the (young) learners' assimilation in the present but their vision and effectuation of the future that defines the transformative quality of ESD.

Although Social Learning might come across sympathetic and democratic, I tend to be critical when it is profiled as a pillar of ESD if such builds on a conviction of 'social relevance and fairness' informed by all-too-common norms and values. When Social Learning positions knowledge-construction as an active process conducted by groups or communities, it is subject to unqualified consensus, the result of political struggles and negotiations undertaken by individuals who are implicitly regarded to have knowledge in some prior way. I argue such should be critically questioned during and through the learning process, it cannot define it. Moreover, since we found supporters of Social Learning agents of own specific interests in the ESD-discourse, the generation of standpoints and vistas taking place in secluded subcommunities to then be inflicted on others, it made me ponder how authentic and true hearted Social Learning as then remains. We grew specifically critical during the years when it was brought to the stage as an essence of ESD with the argument sub-optimations resulting from compromise should be accepted – a position exposing a numbing characteristic of contemporary research- and policy-development in the field. Seeing the slow progress and insignificant effects so far, ESD-research might have fallen victim to Social Learning itself.

Furthermore, positioning Social Learning as a common good for ESD by romanticising the social realm as per definition positive and constructive, risks that undesired or destructive exchanges are insufficiently considered. It needs to be seen if the social life and reach of a (young) person is rich enough in terms of the presence of people with relevant competences, experiences, attitudes and will to exchange. Regarding the larger social realm, aspects as manipulation, people being steered around,

indoctrination and the unfair use of say and power over others, are concerns far beyond any cuddly conception of Social Learning. The world also includes places and situations where real life enfolds in ways that can hardly be regarded a benevolent educational environment. Also for this reason, while concurring with the basic principle of social constructivism (Vygotsky, 1980) that interactions with others can play an essential role in the construction of meaning, I consider such not exclusively so since meaning can be derived through personal observation and interpretation. For that I hold the persons' individual development, growing roots and standing strong, key to ESD.

Should Social Learning be positioned as a component of the learning context beyond school, we first need to acknowledge that experiential and social learning by way of first-hand practices and interactions, are widely known and practiced in school systems around the world for decades through internships, field research, service-learning and the like. As we found, such learning should not be organised as a service for but arise from the students' learning processes and is certainly not in need for a new naming.

The Whole School Approach

a choice for Systems and Structures over Students

The OPEDUCA-project had the idea of a Whole School Approach (WSA) emerge from practice in its earlier years between 2004 and 2008, integrating the corporate (organisation), campus, curriculum and community, schools being places where sustainability-principles are embedded and embodied (J. Eussen, 2007b; Leusink, 2015). As extensively described in previous chapters, it should however not be confused with present notions of a WSA as these appear more oriented on systems, structures and covenants. Whereas these reason from systems to schooling, the OPEDUCA-concept starts from learning to effectuate education. As we learned along the way, the organisation of education by a school should be supportive and not directive, enabling and not commanding the learning process. Instead of gearing up a school organisation we proposed 'school' as a nexus of learning (J. Eussen, 2007b; Goedmakers, 2007, 2008) enabling a Whole Student Approach' (6.3).

One should realise a WSA is not a new insight to begin with since it was stated already 15 years ago sustainability is relevant to all aspects of school life including formal and hidden curricula, school leadership and management as well as teacher development, encouraging schools to practise what they preach (Ferreira, Ryan, & Tilbury, 2006). It should give reason to consider why these days hardly any successful examples of a WSA can be found and UNESCO positions the idea as key in its ESD for 2030, ambiguously stating: *"For priority action area 2 on education and training settings, attention is required to promote the whole-institution approach, emphasizing the importance and necessity for schools or other education institutions, at all levels from early childhood to higher education and lifelong learning in communities, to work together. There have to be strategic policies and measures to reinforce the interaction and cooperation of the formal, non-formal and informal educational settings."* Although this formulation resembles the OPEDUCA-concept, the emphasis is on institutional corporation, speaking of 'reinforcing' interactions. Besides, even this more organisational approach is not new to ESD as it was already promoted by Van Ginkel for the creation of UNU-RCE's (Fadeeva & Mochizuki, 2007). Back then and apparently still today the conviction is held learning can be effectuated through the cooperation of institutional segments. Such is obviously far from continuous learning throughout and beyond the system.

As observed, an institutional approach of ESD contributes to an ossified practice as the various institutions' existence is taken as starting point. As we witnessed, position(ing), roles, hegemony, political arguments and perceived supremacy of certain actors eventually leads to compromises in every area, at its best resulting in weak forms of ESD. The WSA now presented seems to be built on the illusion learning and ESD can be commanded through rigorous control and the accounting of systems and structures attempting to organise education. Such ignores educational practice and is far from the essence of students' learning, making ESD become even more stuck in the confinements of the present apparatus.

I furthermore see more recent ideas of a WSA to include thus many elements and actors, it apparently commands an integral reorientation of schooling while only referring to matters and relations schools are regarded to have in place to begin with.

Each element not new in itself, nor is the notion that a school should consider them parallel and interrelated makes the promotion of a WSA for ESD presumptuous, the disregard of history and disrespect for school reality amalgamating in an overbearing proposition.

As weak and wavering approach of ESD, the WSA becomes reflected in needless attempts to dress up schools. As if for example placing solar cells on a school's rooftop or a bee-hotel in its yard are more than optical illusions of ESD, lukewarm ideas functioning as fig leaf. The way the WSA is worded and positioned seems to result from a multi-faceted vagueness of subjective ESD, seeking to anchor it(self) in a broken system. A 2-year WSA-project in the Netherlands (Wageningen University and three schools in secondary) was found to impoverish ESD, the schools not making progress (NRO, 2019), a school leader phrased it correct when stating: "*They heard the clock ticking but have no idea when midnight will strike*".

What is most worrying in this regard is when 'school' is qualified as a socialisation-machine. While UNESCO's ESD for 2030 on the one hand acknowledges that students should have opportunities to launch critical inquiry and be exposed to realities, it is on the other hand nearly frightening to read that: "*There has to be more attention to individuals and how they are transformed*". The authors apparently the same as those advocating the WSA, this reveals an underlying hegemonic conviction contrary to any OPEDUCA principle and points to a haughty perspective of policy developers and researchers. It would be wiser to take a critical position and be aware the way education is interpreted defines the thin line between the enhancement of students' explorative thinking and indoctrination (Biesta, 2013). Students cannot be 'taught' a worldview from out an academic ivory tower but they can be guided to develop one, a mission however requiring capacity and understanding wrought in life's practice. Since ESD cannot be arranged by building further structures and the reshuffling of roles in institutions, not commanded by research and policies strange to life itself, with regard to the WSA I can only hope good teachers wil not choose structures over students.

The failure of ESD in Teacher Training and Education

Despite claims constructed decades ago and the laudation of those tambouring its importance, bringing ESD to initial teacher training failed thus far entirely. An omission of strategic importance when truly respecting the role and position of teachers, the challenges they face and the potential the profession represents to effectuate ESD-based Education.

Confirmed by researchers who observe the situation more specifically, ESD is at best limited to separate courses and modules while no integral structural changes can be identified (Brandt, Barth, Merritt, & Hale, 2021; Pickard, 2020; Rieckmann, 2017). The embedding of ESD in teacher education an ad hoc or neglected area of practice and scholarship (Ferreira, Davis, & Stevenson, 2016; Ferreira et al., 2014), teachers lacking systematic support which constraints change (G Pickard, 2011; Steele, Steele, & North, 2010). A remarkable failure when observing over 30 years of academic writing, research and conferencing on the matter, supported by national and intergovernmental attention and funding, the matter prominent on the ESD-agenda since. Although also UNESCO's ESD-for-2030 commands that '*Training institutions for educators systematically integrate ESD*', it offers no critical retrospect of the actual development during the preceding DESD- and GAP programs that held alike statements.

Whereas experiencing ESD can be seen as an essence of becoming a teacher, the 'add-on' approach to pre-service teacher education misses the point of what ESD is all about (Garth Pickard, 2008). In all countries studied, including Sweden being renowned for its quality education, national curricula appear to include ESD but in-service training for teachers and school leaders doesn't suffice (Friman, 2018). Following a range of deliberations and cooperation with four leading Universities in Initial Teacher Training in the Netherlands, taking in the practice and opinions of several more across Europe and building on direct exchanges with Teacher Training Institutes presented in the RCE's around the world, including those holding UNESCO Chairs, we could only conclude ESD in Teacher Education thus far failed.

The Small-Town World of ESD

Having been active in ESD in the Netherlands and beyond since 2008, I experienced the community of researchers and policy developers to have a profound if not defining influence on the way ESD is seen and practised. As the sum of all did not have ESD deliver on its transformative promise, I could not but develop a critical perspective, one addressed in this and previous chapters but also shared and brought to debate open heartedly over the years. As notions and arguments appear still valid mid-2021, I briefly recount and summarise to indicate explanatory factors for the failure of ESD in the interest of the future discourse and progress required.

For good order, various researchers before (Blair, 2009; R. C. Moore & Wong, 1997; Somerville & Green, 2011; Stine, 1996; Titman, 1994) and also more recently uttered their concerns (Berglund, Gericke, & Chang Rundgren, 2014; Boeve-de-Pauw et al., 2015; Warner & Elser, 2015), while academics in the field are seen to not conceive of sustainable development holistically (Sinakou, Boeve-de Pauw, Goossens, & Van Petegem, 2018) and consequently only few good examples can be found (Laurie, Nonoyama-Tarumi, McKeown, & Hopkins, 2016).

Overall, the critical-constructive academic debate for the better of ESD is ill developed and even discouraged if not resisted by most esteemed researchers and policy developers who over the years generated an influential position and dominated plan making and reporting. Although most ESD-researchers (72% of 141 directly consulted on the matter) concur with the OPEDUCA-concept and findings, then contributed along the way, others fall silent when jointly observing a critical perspective (21%) while an until now defining minority (7%) is seen to seek solace in a continuation of movements behind the scenes. Respecting that ideas and opinions can and ought to differ, this finding, however sensible, makes it unavoidable to not only take the ‘what’ and ‘how’ into account, but also the ‘who’ when questioning the failure of ESD thus far. The notion that a concentration of power and influence in major global efforts, such as those by UNESCO through its consecutive DESD, GAP en recently ESD-for-2030, have resulted in little progress if any, must give one pause.

A critical observation is called for and appropriate, not only for academic reasons but also given the fact that around the world billions of euros in time and funding have been invested in ESD-research while more is likely to follow in coming years. Thousands of people in science, government and practice deserve to one day see the results and pick the fruits of all what has been espoused so strongly.

I found an interrelated set of 18 characteristics of the ESD-discourse, the summation of which intends to benefit the future discourse:

1. Since it is the home of many scholars later adopting ESD as their domain of expertise, playing on the heritage of Environmental Education leads to a distinct positioning that does not meet the broader essence of ESD.
2. ESD is not positioned as an integrative or underlying educational concept.
3. ESD is placed next to assembled educations like STEM in senseless competition, disqualifying its value.
4. Most efforts are seen to press ESD into schooling instead of respecting its value for learning and education.
5. Contemporary ESD appears to steer towards the command of values and competences laden with moral and ethics designed behind a desk, profiling it by way of general concepts offering endless opportunity to remain in vagueness – a circumvention of concreteness that makes ESD de facto doubtful.
6. Pluralistic perspectives, even when promoted as democratic and social, thin out and decimate the discourse.
7. Multiple perspectives and visions are less democratic than they appear as the discourse is dominated by international organizations (Kopnina, 2012), access to science restricted (Shephard et al., 2021).
8. A false sense of relevance and progress is inflicted by ESD-conferences routinely concluding with self-congratulatory remarks while no new insights or activities are recapitulated, progress indicated or plans laid out. Conferences, projects and long year programs appear characterised by and endless re-affirming and re-conforming, a repetition of concepts and principles, of beating down phrases that all together create the illusion of relevance and achievement where there is none.

9. Not seeking for or unable to generate a transferable approach, ESD is promoted as the constellation of an array of phenomena, 'letting a thousand flowers blossom'. The resulting potpourri of approaches and projects generates a continuous noise, as if multiple languages are broadcasted simultaneously, consequently distracting practitioners. A practice that also seems to provide for hide-aways and coverups for leaders lacking vision and strategy.
10. Over 47% of our representative global network in ESD appeared to be active in the area for 15 years and more, a gloomy notion for the innovative sensation of ESD, indicating conservatism and standstill.
11. We saw financial motives drive research-projects and -programs, funds sought and obtained for a range of alike and even identical activities, merely varying in formulation and the constellation of consortia. As if a humanitarian mission of great proportion underlies the incomes, positions, roles and esteem of those who dominate the discourse, cross-reference each other's importance and wrap the status-quo in a colourful bow.
12. ESD-researchers were seen to lack professional experience or will to look through a masquerade of NGO's and consultancy-agencies, coming forth with 'entrepreneurs' who wear sustainability like a loosely fitting jacket.
13. A leading body of ESD-researchers over the years either disapproved of the role of industry in ESD or not utterly understood its potential. Overviewing the many cooperated with, less than 3% appeared to believe in the reality of an authentic cooperation, yet nowadays many seem to have turned around entirely, making motives questionable, endangering the essence of school-company cooperation.
14. Research- and policy-development appears dominated and controlled by a small community, closed, self-congratulatory, self-containing and self-referring. Consequently, access to the ESD-discourse is limited, the influx of innovative ideas restricted, the constructive response to critical opposition avoided.
15. The concern that ESD rests in the realm of research and policy-development at a relative distance, if not alienated from practice, is hardly addressed, let alone discussed. It should as then come to no surprise that 'pushing' ESD top-down from the policy-level towards the fields of practice delivered only weak indications it had any impact on students' knowledge (Olsson, 2018).
16. The ESD-discourse is seen to disregard the challenges schools presently face.

17. The DESD, GAP and other frameworks as well as programs on the national level, appear to be softly analysed by those who strongly influenced if not initiated and wrote them. Acknowledgement of ample progress in recent years (Poeck, König, & Wals, 2018) appears to come with the notion the phenomenon lies outside the researchers' own influence. 'Omissions and remaining challenges' worded as if some amorph anonymous presence made them so.
18. A failing sense of urgency and resolve appears intrinsic to the ESD-discourse, as if ESD-development were a lifelong occupation and not a goal to be reached. Discourse leaders claiming their value and seeking laude for an ongoing development of ESD apparently aim at their transience instead of targets.

An explanatory factor for these characteristics might be that leaders in the ESD-community did not originate from practice or forgot about its relevance and reality. Furthermore, individual researchers but also policy developers in ESD have limited experience in any other field than academia and within that realm in other disciplines than their own. Less than 5% of over 140 researchers met and worked with appeared to be in touch with schools' practice regularly, while not even 1% upheld regular contact with or had any experience in industry. A lack of relevant experience, practical perspective and progressive attitude that likely explains a lack of vision, strategy and pedagogical understanding beyond the generalities and platitudes dominating the discourse.

Although contributions to the articulation and promotion of ESD should be acknowledged, such cannot legitimate a lasting solitary adoption for such equals an unjust claim of ownership. As those who advocated ESD became acknowledged to call the shots but missed target over decades now, it is most concerning they still tend to keep it to their chest until all life is out.

We observed scholars to stay safely in the woods, huddling together in conference claiming precious space on so fertile soil. No longer seeing the wood for the trees as they look down from the hill on those seeking their way to learn in practice on the plains. From the lush green deciduous academic forest, distant futures are profiled by means of involvedly worded competencies the plains' farmers etched in their clay already generations past.



'If learning involves all of one's life, in the sense of both time-span and diversity, and all of society, including its social and economic as well as its educational resources, then we must go even further than the necessary overhaul of 'educational systems' until we reach the stage of a learning society'
(Faure, 1972).

Graph 6.1 Acknowledgement of the OPEDUCA-concept and -project by the Austrian UNESCO Commission as Decade Project.



7 Conclusions & Recommendations

Reflecting on the research question, the central hypotheses:

"ESD can be realised by means of student owned ongoing thematic learning processes on future defining themes throughout the entire formal educational system, connected with educational sources in the region to from there base a local-to-global learning space that affects the transformative potential of education for a more sustainable development",

can be regarded true.

7.1 Reflecting on the Research Questions

Research Question 1

Is the envisioned learning process acceptable and reason for application by formal education?

The OPEDUCA-concept was found to install a learning process acceptable and wished for in present day education as it proved to meet contemporary challenges and schools' search for improvements. The many years long participation of over 40 schools in daily Dutch practice provided proof of concept, acceptance and application. Schools embraced the learning process and contributed significantly to the establishment of a joint vision, multi-disciplinary partnership and insightful practice. Schools participated irrespective of additional funding, most on a weekly basis while involving their students during regular practice. 80% of schools from primary and secondary education (32 out of 40) found reason and argument to

execute the envisioned learning of which 44% (14) sought structural implementation solely from own conviction. 25% (8) entered a transition process to base their school on the concept, a development initially not planned for nor supported. Inspired and motivated by the envisioned learning process, over 300 teachers from primary, secondary and further education participated in intensive 4-day MasterClasses (in groups average 15), mostly paid for by the schools themselves and highly rated.

Determinants for the schools were:

- The logic and clarity of the concept.
- The parallel address of contemporary challenges, priorities and innovations sought for.
- The re-conceptualised encompassing approach of ESD, integration educations.
- The executable quality of the multi-disciplinary partnership around the schools.
- The ownership teachers experienced.
- The gathering and parallel involvement of primary, secondary, further and higher education.
- The involved and effective way students accepted and managed the concept and instrumentarium.

We conclude the breadth, depth and length of participation as well as the positive practices justify an affirmative response to research question 1.

Acceptance was furthermore related to the notion the OPEDUCA-concept answered to contemporary demands for innovation through an integrative instrumentarium and therewith countervailed pressure put on schools. Teachers were positioned and enabled to cooperatively work on the envisioned learning and apply it in regular practice with their students, taking it from the cradle and put it to the test in an owned and pro-growth way.

From a process-perspective, distinguishing between Learning, Education, Schooling and the (educational) System proved effective to entangle thoughts, discussions and opinions. It gave way to a constructive assembly of experiences and opinions, avoiding a muddled debate over practitioners' heads.

The positioning of ESD as a joint and unifying concept underlying education proved valuable as it provided the joint sensation of a larger and longer-term goal.

The OPEDUCA-project and -concept accepted as a conducive framework and promising approach to realise transformative learning while not losing out on the transmissive.

The multi-disciplinary partnership in education was supportive both for belief in the concept and its application since it was genuine; parties external to the schools gave material proof of their support and offered schools a promising environment for development and transition. The sensation of being connected in a larger whole contributed by way of awareness, the schools' drive however commanded by their own needs. Motivation and acceptance were, contrary to earlier expectations, only marginally related to the establishment of governance structures and embedment in the larger whole of interdepartmental, European and UN efforts in ESD which were more a comforting background than a motivator.

To incur structural change, a more-year school development is required to internalise the vision and consequences of a well-wrought transition, moreover since the instruments cannot be implemented half-way. In this, the fortitude of the school leader and the systems' allowance to grant bottom-up transition a change without further intervention, are decisive factors.

In the setting of an OPEDUCA-region not the systems' support, policy-measures or whole-institution-like constructions are called for but a relative tranquillity around the school.

We found no relevant disparities between primary and secondary education, the concept fitting every cognitive level, nor was there any reason to differ between Dutch schools and those worked with in other countries, acknowledgement and acceptability being alike for alike reasons.

During the years the OPEDUCA-concept met ever more support, understanding students shall learn in a transdisciplinary learning environment, steadily researching and integrating real world needs and perspectives to develop competencies that enable them to solve complex sustainability problems in their further careers (Biberhofer & Bockwoldt, 2016; Dlouhá, Barton, Huisingsh, & Adomssent, 2013; Kolenick, 2018). Seeing ESD to develop towards a more transformative, cooperative, learner-driven education (Brezet, 2009; A. Gough, 2021; Herranen, Vesterinen, & Aksela, 2018; von Koerber et al., 2018).

Research Question 2

Can pupils and students comprehend and effectuate the instruments proposed?

Students effectively combined inquiry-, problem- and community-based learning, the OPEDUCA-instruments providing structured means for observation, contemplation, interpretation and storage of their learning process. Differentiated learning, the merger of individual and cooperative aspects, effectuating activation and socialisation could be clearly observed. The integrative approach matched student's associative disposition. Work ethic, posture as well as willingness to learn improved according to the students themselves as well as their teachers.

Across the board 25% of the students swiftly engaged with the instruments from a near natural comprehension, a further 40% grew in the concept following the collaborative quality of the student-oriented pedagogy. Ap. 15%, mostly those also challenged by traditional education, especially benefitted from BusinessClass, however required more personal guidance to oversee the entirety of the concept due to lacking study skills. For 10% of students (specifically in pre-vocational secondary education) the instruments did not proof sufficiently more attractive than traditional (classroom based, instructive) education.

Students very well understood and found meaning and motivation in learning on bases of future defining themes, their relevance and the challenge of own inquiry being felt as a relief from (all day) instructions. The development of Fields of Knowledge was hardly a problem while they enjoyed working in (small) teams doing so, finding joy in cooperation, in- as well as outside school.

Driven by curiosity and constructive activities while not limited by programmed instruction, textbooks and curriculum control, the array of issues students addressed was broader than prevailing curricula prescribe while elements were studied more in-depth, including complex interdependencies not spelled out in advance.

Student empowerment proved an essential quality of OPEDUCA BusinessClass following youngsters' need to gain a solid personal foothold to start building ability.

The empowerment phase proved effective through its focus on the re-discovery of meaning, preceding motivation. BusinessClass was overall an experience that strengthened personality, enabled students to discover (hidden) abilities, gain faith in who they are and can be(come). A general conclusion, worded best by the notion BusinessClass stands for 'the recognition of unexplored capacity'.

Whereas Flight for Knowledge can be considered to better serve those more talented and BusinessClass those more challenged, both instruments as well as Global were effective for students in the entire age-range of 10-18.

Each instrument was seen to support the development of students' metacognitive ability as lines of reasoning could be made visible again, the learning process re-visualised to retrace thinking and reasoning. The fact the instruments call for but also enable students' activation of prior knowledge proved more important than conceptualised as it provided for additional intermediate guidance and assessment of progress by their teachers. Honouring students by trusting them with a critical and reflexive position about both content and competence development proved essential for their involvement. The presentation-element of each instrument was a main driver as it allowed students to give proof of ability and development-status. The concurrency of the pupil-student-apprentice continuity proved to be an asset since it made students aware they were respected from these various perspectives simultaneously. Explicitly wording and discussing they were no longer merely approached as subject(s) to schooling but as students working on their development, generated attention, involvement and perseverance.

Decisive for the students' understanding of the pedagogy, effective participation and progression in learning was the ability of the teacher to refrain from a prominent role yet radiate a comforting presence. Allowing students a notion of initial ignorance gave an active mode of learning a chance to awaken.

Where the narrative ability of the teachers lacked, students were seen well equipped and willing to benefit from the narratives Partners in Education shared. They proved sensitive to a real-world learning environment as it invited and allowed their senses to reach out in a more varied way, retrieving meaning while searching for applicable data and information. A deep, profound understanding of matters by way of a constant combination of theory and practice, placing subject-elements in a real-world context, was essential through its meaning-giving quality and students' sense-

making. Regionally embedded learning furthered with peer-to-peer exchanges abroad proved invaluable.

For the students, sustainability issues were constantly present without explicit guidance, the spectrum exceeding contemporary interpretations of ESD. As issues become related to matters and themes at hand, students addressed sustainability out of own (learning-)account. Therewith the application of OPEDUCA also exposed how present curricula fall short on ESD.

Open argumentation inherent to the re-conceptualisation of ESD ("You are the future") was an effective activator as it supported ownership and established the sensation in students to be defining. Keeping far from education as an obligation, students came to formulate the pay-off: "*OPEDUCA - Discover Your Development*".

The students' involvement gave way to 3 added values initially not part of the concept:

- students gave explicit proof of their existing body of knowledge, adding pedagogical value as it allows to mark a starting point and better progress assessment.
- the process made students show their external/explicit as well as hidden/implicit conceptual and propositional ideas, convictions and interpretations, underpinning the value-dimension of learning.
- the variety of activities gave way to not directly foreseen soft and transversal skills, agilities that otherwise likely remain in stealth mode (care for the progress of peers, graphic talent, interrogation tactics).

Research Question 3

Can teachers understand, accept and apply the teaching strategy and instruments proposed?

Working directly with over 300 teachers in daily practice, initial understanding and acceptance of the instruments was profound. The combination of an upfront coherent pedagogical concept then opened for their insights and preferences was effective, OPEDUCA MasterClass strategic for teachers' understanding and acceptance of vision and concept.

For 25% the pedagogy and didactics followed their natural composure which already harboured educator qualities based on life experience and associative capacity. For a middle group of grossly 40-50% effective application following acceptance depended on these colleagues' lead and school leaders' consistent support. Whereas 15-20% of teachers remained wavering back and forth, 10-15% embodied a silent force reluctant to change, an inertia forming a stronghold in the school's governance. This small fraction we saw able to effectuate decisive negative influence once the school leader lacked steadiness and resolve.

The role, position and professionalism of teachers is more prominent than one might presume given the student-centred approach of the OPEDUCA-concept. As classroom-based instruction is not merely exchanged by coaching, any idea of obsolescence makes way for an upgrade of the profession, the teaching more demanding in terms of the development of a worldly view, transdisciplinary understanding and collegial cooperation. The concept requires another disposition, a different position in a new school-setting, a professional handling of present day blockades and cooperation with colleagues as well as external educators in unfamiliar ways.

As students went beyond textbooks and regular materials, teachers had to support in a more diverse and articulate way, being best positioned when becoming students again themselves. Students very well felt a teacher's disposition, requiring presence and not a roleplay, the teacher challenged to be a catalyst for the students' explorative senses, a clear though silent presence with an expanded horizon in a student dominated learning environment. As teachers' questioning preceeds

explanations and explanations precede instructions, they were required to in briefest of moments observe, raise (exploratory) questions, compliment and point out where logic and understanding tends to fail, add to the construction of meaning. An interplay that calls for an expert-perspective on both content and process, teaching beyond mere guidance or coaching. Encouragements and clarifications to be understood as coming from a potentially better-informed student.

Effectuation of the theme-based transdisciplinary learning depended on the teachers' inclination to become deeply involved, fearlessly look beyond the own subject and break down disciplinary silos, the willingness to cooperate with colleagues and be open to the senses of their students.

A teachers' more profound knowledge of the present curriculum and examination-demands is required to keep track of students' progress, matching the new with the traditional. A substantial challenge since textbooks appeared to have taken over own insight in the composition and contents of the curriculum. The idea of a collaborative web-based application to real-time track, trace and guide the students as they zig-zag across subjects in various tempo and depth, went beyond most teachers' familiarity with ICT.

Teachers in general favoured that the OPEDUCA-concept requires an orientation on actual, practical and real-life developments, bringing ones subject to life interlinked with others. A full embrace and pro-active position however made way for a reticent approach as over 85% were sooner than later confronted with a lack of associative capacity and consequently too limited transdisciplinary thinking. Teachers' confinement in schoolish life and limited life experience underly too shallow narrative qualities. Consequently, they are challenged to convincingly position future defining themes and re-fuel the students' learning by applicable practice. Although this can be compensated by attracting educator-capacity, the same strangeness to the world prevents the creation, upholding and expansion of relationships with Partners in Education. As teachers were also found to have limited attention for, if not missing fascination with, societal developments and phenomena outside the perimeter of school which further restricted their ability to allocate educational sources in the real. For BusinessClass the teachers' personality stood out as another challenge since life skills and own entrepreneurial experience are called for. Consequently, a structural involvement of educators from industry proved necessary for a strict and therewith

effective application of the instrument. The involvement of Partners in Education was a distinct value for Flight for Knowledge and indispensable in BusinessClass. Although the virtual exchanges in OPEDUCA Global could be managed by the students, the teachers' constraints accumulated as the instrument required all the above when going beyond a mere virtual exchange.

In cases teachers gave way to adapting OPEDUCA-instruments due to personal shortcomings or organisational conservatism, such in each case eventually frustrated the application. Teachers who lacked confidence to let go of schoolish aspects of education and drew back to the traditional by approaching students merely as pupils, incurred a downward spiral themselves - a lack of courage leading to a self-fulfilling prophecy.

Teachers were found to have become executers of education caught in the restrictions of the institute school. Next to a lack of trust in own capability, school characteristics such as the sense of a safe and steady working environment, stood in the way of a more liberal application of the improvements embraced. We noticed a vicious circle, teachers being trapped in the present constellation while their overall gentle nature, weak organisational positioning and demanding day to day operations restrict further professional development.

OPEDUCA MasterClass was indispensable and highly valued by participants to generate understanding and a skilled application of ESD-based Education. It delivered on the effectuation of ESD by observing a teacher-development from operational actor to strategic factor.

Since a deep conviction about student-centred learning cannot be taught and instrumentalised (OPEDUCA is not an automat), ESD-based Education at least requires a pro-active attitude. It however became clear teachers are generally not eager to develop beyond their profession. Collegial exchanges about learning and education as well as joint work will have to expand to at least 20% of time while presently most contacts are restricted to matters of the school as organisation.

Overall, teachers can not be regarded change-agents due to their composition, lack of professional experience and organisational setting in the school. It can be seen as a weakness of the concept it inherently counts on a self-development potential of teachers.

Research Question 4

Can a professionalisation course enhance teachers' capacity for ESD-based Education?

The realisation of ESD-based Education requires a thorough upgrade of teaching capacity. Such in parallel with the requirement to change the school's daily process in order to facilitate teachers' setting of theme-based learning, mini-lectures, the valorisation of learning outcomes, assume inter-collegial learning and engage in professional relationships with Partners in Education.

Building on our findings and conclusions from OPEDUCA MasterClass, which developed into a professionalisation course for teachers, it is possible to enhance teacher's capacity to understand and operationalise ESD-based Education. The instrument proved a key value to equip teachers with a thorough understanding of the concept, awaken a sense of ESD and work on their professional development. It moreover allowed for indispensable insights in the present practice of schooling, educational challenges and the students' learning, therewith provided essential building blocks for the transition pathway. The course proved to be a clear mirror for a teacher's perceived and present competence-level. It became obvious the envisioned multi-faceted competence-development of students requires teachers not to merely teach different but embody such in a credible way.

Determining for the success of OPEDUCA MasterClass was the choice to have it take shape and substance in accordance with the concept, making the process, content, style and setting 'part of the message'. It became clear MasterClass must precede every other activity in OPEDUCA, the teachers' role being more determining than that of school leaders.

Having been qualified and rated highly, OPEDUCA MasterClass can stand model for a professionalisation course for teachers, taking in some defining characteristics such as an extensive interplay between concept and practice, the involvement of expertise and experience from outside education and the generation of a clear distance from daily concerns to have participants think and act freely, reconsider and construct

jointly. The sense of a safe environment is elementary and functional as it allows to carry through a variety of mental and physical activities, addressing amongst others creative thinking, the narrowness of present mindsets, the essence and values of collaboration, goal setting and the will to achieve. The approach needs to provide a mirror for participants' present disposition and perceived competences as it is essential that, when back in practice, teachers embody the envisioned multi-faceted competence-development of their students.

A professionalisation process is far from a training, let alone a conference. It requires an immersive setting in order to go into the depth of ESD-based Education while opening up to the backgrounds of practice. Participant's notion "*We are not tempted to think out-of-the-box, you are telling us there is no box*", indicates the manifestation of a mental image, picturing an emerging reality clearly beyond the(ir) present.

It is an essential condition school leaders allow for teachers' participation without prior insight in the content and operational working of MasterClass as participants should have the chance to most freely re-think education, their profession and position in school, consider a 're-invention' of their work and setting.

A variety of deliberations with managers, teacher educators and students at Teacher Training Institutes, seeking comparison with the results of MasterClass, led us to conclude and underline teacher education should challenge itself to become the highest arena of exploration of teaching and learning. The teacher students' meaningful learning experience to include a much wider range of real-life learning, emotions and profound personality development.

We grew the concerning insight initial teacher training and regular teacher education are ill equipped to work towards a new reality of ESD-based Education. During our global (re-)search together with experts active in the field for decades, we found not a single institute that structurally incorporates ESD. About 30% mentions sustainability aspects though shows no more than superficial practice. The teacher students' future way of teaching will be challenged as their own study is not enough meaning-oriented, combining an application-oriented with a reproduction-oriented

learning pattern (Gordon & Debus, 2002). Where the students we worked with felt emotionally thrilled or threatened, whether experiencing a more positive or negative feeling, the essence was they ‘felt’ to begin with. Directors of Teacher Training Institutes confirmed they are likely educating their students for a future ‘in the womb of a school’, not as independent professionals. Following, there is a considerable gap between present day teacher training and the development of the professional called for.



Research Question 5

What is required to realise a multi-disciplinary partnership for ESD and make it functional?

Determining for the realisation of a multi-disciplinary partnership for ESD proved the availability of a vision that informs action, starting out as the grain of sand in an oyster, then growing due to a stream of diverse contributions.

Finding that a large variety of people from different professions could embrace the same concept partly proved our notion right we created an un-human subdivision of society. People finding unity outside their role in the system indicates we split ourselves through artificial contradictions that generate conflicting interests, feed polarisation and open spaces to imperfect solutions. The converging quality of the OPEDUCA-concept made it possible to face this self-created imperfection. Openly exchanging that we came to think in divides, but all are inextricably part of the same manifestations and can be approached as individuals indissolubly bound together, offered a strategic human perspective. Re-stating togetherness by ways of a joint vision on youth development defined the OPEDUCA-project.

As obviously insufficient interactions among stakeholders in networks and insufficient coordination of actions may not support integration of sustainable development to educational organisations (Vargas, Lawthom, Prowse, Randles, & Tzoulas, 2019), it is essential to first observe the positioning and relevance of such (perceived) stakeholders. The functionality and effectiveness of a transformational collaboration to drive change does not originate from linking present institutions but by projecting a committable course of action.

Those most active in ESD (NGO's, Centres of Environmental Education, service providers in education) at the end of the day proved hardly prepared, ill capable and in cases even unwilling to ally for a common course. Our initial notion the educational landscape is scattered proved just, those comprising that patched societal fabric not the agents of lasting change as each remaines caught in their respective system-part serving own interests. The system's components, imagined as gears interlocking in a

series of complicated cause- and effect relations, are often either too far apart or defined by single functional dependencies instead of continuously interrelated processes with change capacity.

The OPEDUCA-project had a transition quality intrinsic to the concept as it is a non-institutional approach with the potential to engage the broadness of society, self-enforcing through the accumulation of authentic competences and representative mass.

Authenticity proved an important condition, finding that more effective manifestations of collaborative learning correlate with the degree in which people and organisations embody primary societal functions – the closer to the core of the societal value chain, the more intrinsic the energy and fortitude to spiral up efforts and progress. The transition set in motion was inward out, bottom-up, and as such relentless enough to break through the ‘layers of fog’, address the ‘cacophony of educational priorities’ by sound reason and dampen if not prevent the ‘waves of change’ schools suffer from.

For a positive sensation of trusted improvement, scale proved relevant as the notion of broader support provided trust. Especially school leaders and teachers grew more convinced they could take a critical constructive look at their present practice and surroundings, encounter external claims with confidence and reason. The multi-disciplinary partnership provided manoeuvring space for schools as they found relevant supporters to their course. This in turn secured the quality of the partnership since each would eventually be called to deliver.

Depicting ESD as a positive underpinned with realistic vista’s provided for the sense of an overarching purpose. The re-conceptualisation of ESD delivered defining arguments for the participation of a diversity of people and organisations as it already held the multi-disciplinary quality within it. It supplied a sensation of being of use and need beyond mere gathering or networking. Societies’ constituting parts became involved not because of present positions but through the contribution of authentic added values born from more year relevant experiences. Consequently, further qualitative insights added to the converging quality of the concept, folding ever more authentic interests into a whole. Concept and approach benefitted from the power

of reasoning and validity of argument, resting in relevant experience collected and joined.

The personal address, exchanges on eye-level also with participants holding substantial authority, made it possible to drill through functions, positions, roles and structures, enhanced the sensation of commitment and togetherness, provided further ground for bonding and expansion of the cooperation. Hereto empathy based on a well-wrought understanding of the other's occupation and business appeared critical and functional for the establishment of interconnectivity between parties. Building this way, the vision on ESD and the OPEDUCA-instruments became qualities that gave reason for a variety of societal actors to contribute capacity by ways of people, facilities and finances – enabling the further development of the whole through dedicated involvement. For ESD-based Education a multi-disciplinary partnership is not a condition to be (institutionally) arranged nor an arrangement to be carried through, but the result.

It proved possible to gather, bring and bind people together on a regional scale from a multi-disciplinary perspective for the effectuation of ESD while simultaneously meeting contemporary challenges in education. Picturing the future school as nexus of learning provided a solid foothold as partners could understand and practically effectuate their added value by ways of first-hand contact and effective activities. At the same time this drove schools to not only concur with the approach but also follow-up on promises made to themselves. A most natural self-strengthening constructive process only hindered by the patched blanket of the educational landscape which was found to be occupied by half-hearted parties and overgrown by weed due to governmental policies that promote a thousand flowers to blossom. Students gave proof not to be waiting for playful activities, sensed when being treated as children instead of youngsters working on their development. The more relevant the themes and context and the more primarily authentic the Partners in Education, the more likely students grow understanding of where to look further, what to inquire and with whom. As they asked for knowledge they sought for the revelation of wisdom, touching on the bare essence of ESD.

Research Question 6

How can the role of industry in ESD be understood and conceptualized?

A structural conditioned participation of industry in ESD-based Education is a requirement for the quality of the learning (process) through the adding of meaning, purpose and volarisation. Projecting ESD as an ongoing tread, as a learning process throughout the formal educational system interchanging with the world of work, there is sufficient reason to adopt the idea that an extended backwards dovetail of schooling and the labour market enriches students' competence development and contributes to a conviction of life-long learning.

ESD-based Education takes industries' interest beyond the HRM-perspective towards a meaningful application of a companies' CSR and in the longer run contributes to the rise of entrepreneurs able to engage in both consumers' and industries' transformation towards sustainable consumption and production. Seeing industry as indissociable part of the fabric of society, it can profoundly expand its role and be(come) a major supporter and enabler of ESD.

As experienced in the construction of a regional multi-disciplinary partnership for ESD, the presence of the world of work is also a value as such since it indirectly provides trusts for schools and attracts organisations from other fields of society. Moreover, expertise present in industry can protect schools from needlessly disruptive external influences, empower school leaders and teachers to see through and take a stand against educational innovations by gaining understanding of amongst other Portfolio-Analyses, Added Value Chains, ICT, Planning & Control Cycles and HRM. More important, schools can gain a profound realistic insights in the relevance of knowledge, competences and transversal skills, qualities that appeared less subject to inflation than perceived in the realm of '21st century skill' convictions. Industries involvement enabled the development of students' non-routine cognitive skills, accentuating human qualities more valuable in the longer term. Directly cooperating in the education process as educators, practitioners from industry also expanded a school's teaching capacity in quantitative and qualitative ways.

There is a notable difference between companies active in the primary, secondary and tertiary domain, the first able to deliver more authentic insights and experiences, being closer to phenomena most relevant in the light of sustainable development. Also, in terms of applicability it appeared important students could touch and study concrete manifestations, sense the generation of products and services, relate to things they can grasp. Mostly being goods made by industry (including clothing, farms, bakeries, chemistry) but also services such as the maintenance of a wheelchair, organisation of an open-air or a food-delivery service. Here the interplay between learning about and through manifestations of regional society and the development of personality stood out.

Whereas industry is in general a sector able to provide a broad spectrum of tangible knowledge-domains, especially manufacturing companies are of key importance for the effectuation of ESD-based Education as they:

- provide access to first-hand data and information,
- generate most open views on reality,
- have students experience the application of knowledge and the relevance of skills and competences,
- provide insight and first understanding of (the world of) works i.e. the labour market,
- contribute to students' understanding of society's value- and income-generating capacity,
- materialise the effects an entrepreneur can exercise over sustainable consumption and production.

Participation as Partner in Education required and enabled companies to share and embrace the vision and instrumental approach as they could evidence the operationalisation of a qualitative learning process they understand and can add value to. The interplay with school leaders and teachers essential to bridge two separate worlds that clearly hold and manifest a separate set of values and attitudes. Especially for schools a cooperation demands the development of a worldlier understanding and consequent behaviour to match expectations and operational handling.

From the company perspective, collaborators mostly found initial reason for cooperation from an HRM perspective, getting involved to secure a well-equipped workforce, seeking to close the competence gap between schooling and work. Looking at knowledge-sharing and learning-development, most companies' CSR-function appeared ill developed, involvement mostly organised in an indirect way by outsourcing efforts i.e. buying into programs service-providers offer. Companies that overcome an underlying strangeness with the world of education can win substantial ground through the effectuation of ESD-based CSR.

There appears to be a substantial difference in case either the management and employees from the core of a company are involved or a designated staff established for the course, 'sending' a service-provider the least effective practice. Without exception, direct involvement of people active in the core added-value chain of a company proved to effectuate the educational partnership sought for. Across the board, entrepreneurship can only be transferred by entrepreneurs while students' meaningful learning correlates with their access to primary value-chains.

We found no sign any of the companies involved ever took part from a (hidden) commercial perspective, cooperation was seen to rest on dedication to the course of education.

Research Question 7

How can ESD-based Education improve learning and formal education?

The OPEDUCA-concept meets the transformative promise of ESD, matches present policy requirements, invokes improvements of formal education and contributes to the notion of a learning continuum that touches on the essence of sustainable development. The re-conceptualisation of ESD and corresponding instrumentarium were seen to come natural to students and found broad support with teachers as well as school leaders. It answers to the decades long search of researchers and policy-developers for an integrated vision, applicable strategy and workable practice. The entirety of this study offers comprehensive practice- and science informed insights ESD-based Education enhances students' learning process while providing outlines for an ESD-based School. As apparent contradiction, this joint capacity requires a vision on education away from schooling to have a holistic approach materialise in concrete pedagogy.

From a societal perspective the OPEDUCA-concept realises a multi-disciplinary partnership in the social-demographic region with the potential to underpin a local-to-global learning space for sustainable development. Therewith it contributes to a deep, complex and integrative knowledge generation that contributes to solving problems humanity faces. With the development of entrepreneurship in the foundation of the study of future defining themes, students were seen able to grow into future-critic constructive youngsters, better prepared to manage developments occurring. Since entrepreneurship development is delivered from practice, the students' learning includes numerous opportunities for higher level thinking, varying from elaborating on the fair price of a jeans, over honest coffee to the power of commerce, finance, fairness, access to scarce resources, trade and negotiations. Critical thinking applied when observing markets, products, services, location, funding, environmental effects, consumers, employees, sales and a series of other aspects that are accentuated and articulated during the process.

The OPEDUCA-concept makes it possible to involve external expertise in a more structured and structural way. Through the (student-)developed OPEDUCA the learning can feed from a regional multitude and diversity of actors and phenomena that embody a variety of educational values that enhance students' understanding of society's composition, functioning and possible further development. Consequently, the students' learning is informed by different perspectives and a variety of practices that gradually acquaint them with transversal competences. They construct a life-wide curriculum which exceeds the formal as the fantastic complexity of life enters their learning. The more the learning remained close to the future-defining themes as 'anchors', the stronger the educational bonding since context and applicability improved.

The availability and accessibility of authentic, nearby and therewith more meaningful experiences, makes real-world aspects part of the learning. Aspects that also contribute to intra-generational justice, participatory decision-making and citizenship. The possibility for students to build a notion of the future, one's adult (working-)live and potential roles and responsibilities stood out. The learning process appeared to bring near again what became disconnected in our societal construct.

The learning has been observed to be more actual and valid as each element of every (school-)subject is eventually (re-)placed from a more logical, contextualised and transdisciplinary perspective. ESD-based Education also gives way to working-in, placing, more recent and further-going scientific insights and phenomena. Students were seen to be occupied with and applicate curriculum-elements in a larger variety of contexts and at multiple moments, giving proof of a deeper understanding during discussions and presentations. Specifically, the instrument Field of Knowledge proofs fluid to content as it is layered, grounded and more actual than textbooks can be. It therewith also exposes how present curricula go short on ESD.

The de-composition of subjects makes the learning integrative and generates deeper understanding by way of as then contextualised subject-elements. Therewith a revaluation of disciplines follows from enhanced relevance and usefulness, the transformative re-valuing the transmissive.

There is no reason to differ between the development of ‘soft’ and ‘hard’ disciplines and competences in the course of ESD, seeing these can and should be approached as integrated and mutually enforcing per definition. Specifically in the more basic reconnection of youth with Earth but also in the Dimensions Wellbeing and Welfare, we touched on the essence of understanding, of students literally ‘grasping’ meaning, feeling phenomena and holding objects in one’s hand. The evolutionary explanation that the way we learn causally relates to the way our learning developed from out viewing, beholding, witnessing, then recognising, appeared a most valuable insight. Like experiencing our 3-dimensional world cannot be replaced by 2-dimensional paper or screens, students’ development is not served when the learning of content is placed apart from personal sensing. In this respect also the construction of a Field of Knowledge by hand, drawing, doodling and taking notes irrespective of the outwardly presumed focus, was seen to exploit the special capacity of our brain to imagine. Consequently, laptops, tablets and the like were found to be better positioned secondary as ‘logistical support’ (for sharing, multi-media coverage of elements, physical library function) and not occupy a principal place in the learning process.

Characteristic for OPEDUCA appeared the opportunity for students to present themselves as humans, as social creative beings generating and trying out ideas. Aspects of this being the Study-Team setting which provides opportunity to self-organise and the external visits that require planning, presentation, composure, constitution of an approach, evaluations in direct contact with others. As empathy and personal attention require personal contact, conversation and discussion realising convincing communication, the on first sight old fashioned people-based learning proved invaluable.

The effectuation of the concept of Partners in Education contributed substantially as the exchanges infuse applicable (subject-)content, see to skill-development in a practice informed way, supply a sense of reality and enhance if not ignite a student’s motivation. Further people-to-people settings such as the presentations to peers and live-audiences highly motivated students and offered additional pedagogical value as they were required to re-capitulate the learning itself. The various moments of presentation furthermore worked effectively for the development and training of

competences such as public speaking, the formation of attitude and composure, the ability to listen to, understand and respond to questions, to hold ground when ones thinking and position is critically challenged.

During BusinessClass students were seen to practice Arts for the design of products and services, expressions of value, the design of a logo – not by way of tasks set out for them but resulting from their tries for useful application.

Although it can be argued the failure of school leadership to establish fruitful external educational relations calls for internal quality structures (Mogren, 2019), we found connections with society to be condition for such as they inform what qualities inside school are called for and offer crucial support in the accommodation of the educational relationship and later transition. Building internal quality structures around incapable actors will contribute to school's inertia. As ESD-based Education makes it possible to opt for a Whole Student- over a Whole School Approach, choosing students over structures, valuable educational connections that merge school and society will result from the learning process. Alike, it is important not to (over-)value Social Learning as an approach to ESD but as an inherent quality of such learning.

ESD-based Education furthermore improves formal education as it:

- realises efficiency-gains through the integration of otherwise stand-alone projects and assembled educations such as STEM and Environmental Education,
- absorbs otherwise separately organised educations that seek to meet the bewildering array of unconnected renewals and innovations, the 'Learning Continuum for ESD' useful for the prevention of paranoia on missing out,
- incorporates the development of transversal skills and any listed under the guise of 21st-century skills and ESD-competences, saving teacher- en student-capacity for the core of the learning process,
- re-evaluates traditional subjects, resolving inefficient tensions between the disciplinary silo's,

- increases teaching capacity following the re-valuation and re-positioning of the profession in combination with the introduction of educators from Partners in Education,
- has a dampening effect on the prevailing conflict between constructive and instructive pedagogies, freeing scarce capacities from an ongoing polarised discussion,
- can in principle be built from present practice given teachers' close involvement in its conception and testing, therewith avoiding unnecessary and drastic changes to reach innovations sought for.

The curriculum-independence of ESD-based Education makes it stand clear from influences and alterations by political, religious and other motivations. Put otherwise, it realises a more objective, science- and experience-based curriculum. Not commanding a 'learning of knowledge', students engage in a process that includes moments of self-clenching when first comprehension requires correction to obtain fuller understanding. Being wrong, misinterpreting, running into walls, offered opportunity to from there even more profoundly grasp meaning and develop own ideas, values and critical judgement. A quality of ESD-based Education that allows students' creativeness, fantasy, openness and courage to be deployed, to face the future with broadest of opportunities. Thereto a school should enable them to develop trust in oneself and strengthen own judgement, not through prefabricated activities but by accepting a natural, divers, if not 'wild', learning process.

Certainly when Flight for Knowledge and BusinessClass expand to Global and students literally unfold their wings and senses further while having obtained firm ground to stand in, grew roots in regional society, the cross-border spread of ideas and exchanges delivered further proof of concept ESD-based Education has the potential to bind us in a local-to-global perspective for the effectuation of ESD.

Research Question 8

What are requirements and blockades to effectuate ESD-based Education?

The main requirements for effecting ESD-based Education are the operationalisation of a multi-disciplinary alliance that provides for Partners in Education, a school's determination to organise education on its own in an integrated way and the development of educator-capacity through an ongoing professionalization of its teachers. The construction of a multi-disciplinary partnership demonstrated that a wide variety of cultures and people encaptured in different nations en systems can embrace a joint perspective on ESD, pointing to a common if not universal pedagogical core. The articulation and sharing of this core can be seen an important requirement for ESD-based Education as it strengthen a school's belief in own capacity. Underlying, ESD appeared in need of an education of itself, leading to a re-conceptualisation that provided for a vision and applicable strategy. Approaching ESD as truly interdisciplinary, both on content (the variety of fields of knowledge and disciplines) and pedagogical (merging learning philosophies and ways of teaching) enables ESD-based Education, bringing ESD to the core of human development through education.

The blockades being the mirror image requirements, government policy can be a complementary hinder if the cacophony around schools it not profoundly curtailed. Schools being criticized and scrutinised per definition, require public, if not otherwise private, protection against a multitude of double-faced and hypocrite initiatives dominating what has become an educational marketplace.

ESD-research and policy-development can play a critical role in this regard if able to take distance from any sanctimonious attitude themself. Students and their educators cannot be 'taught' a worldview from out an academic ivory tower but can be guided to develop one, a mission requiring people with personality and understanding wrought in life's practice, tried and assessed in the world themselves. Such qualities cannot be arranged by building further programs, structures and the reshuffling of roles in institutions, not commanded by research strange to life itself.

We concluded there is no reason to approach ESD as an add-on to regular education or a mere modern-day version of Environmental Education. Nor is it sensible to create a place for ESD in the confused constellation surrounding and penetrating formal education; such is a strategic mistake as it tempers its potential to deliver a coherent pedagogy. The constellation around schools presents a clear and present danger as it disqualifies contemporary education without supplying better, erodes a school's transition capacity and leaves it behind worn out in need of more external consult and services. We observed from nearby how a delicate system bursts under the pressure of external influence, chasms allowing for eruptions of deceptive innovations.

A school leader can be a main supportive factor if she has an unobstructed vision and consistently demonstrates managerial qualities in sound relationship with her teachers. In 15% of cases we experienced the risk of building on school leaders who, encapsulated in the presence, tried to meet innovations spelled out by others. It is more important the school leader is the backbone the transition than the promotor of ESD. Also from a managerial perspective, the road of progress is founded on self-confidence to be(come) self-sufficient. A challenge that can effectively addressed by application of the OPEDUCA-concept, being built and accepted by practitioners as a better pedagogical alternative.

Starting an innovation program with an effort that centres on curriculum and instruction is the most effective strategy for getting teachers effectively interested and involved. Even where organizational variables, such as morale or climate, need to be worked on, these should usually come after teachers have been excited about an innovation that reaches into the pedagogic core (Louis & Miles, 1990).

Instead of worsening the pressure the curriculum exercises by burdening it with ESD-competences, ESD-Based Education can and should be allowed to 'crack' the curriculum through the introduction of transdisciplinary learning that also protects it from upcoming outside modernisations. Present day curricula can be respected, should not be perceived as a blockade and certainly not made into one. The power of contextualisation, therewith the generation of relevance which in turn feeds students' motivation, causally relates to the re-conceptualisation of ESD informing

learning from an overarching natural order of phenomena. As students experience a ‘re-built’ while they study along the dimensions Earth, Wellbeing and Welfare, logically place and gain understanding of natural and social phenomena, they touch on every curriculum element and perceived ESD-competence in a most ordinary and effective way.

A ‘Whole School- or Institution Approach’ appears not an ‘ESD approach’ but a typical institutional response of a system not conscious of itself, having fallen to pieces and trying to glue itself back in place. Pressing such a pretentious idea on present day schools as a concept for improvement comes down to overplaying a too vague, overly complex and therefore costly concept, risking circumvention of the essential focus on learning and therewith standing opposite to ESD. A school should not merely consider but face society and seek the integration of its education, not becoming encapsulated in even more formal relations, structures and processes that have the capacity to grow into new parts of a system justly criticized. Where a lack of vision and missing pedagogical understanding informs such escapes away from a true transition, modern day preaches in ESD can become a magnificent blockade for progress.

Although the OPEDUCA Project can be regarded successful in terms of a shared vision, commitment, the applicability of the concept and the alignment with schools’ own as well as (inter)national policies, a full-fledged implementation requires schools to withstand a multitude of external influences and demands to maintain focus on the joint learning process of the teacher and student. Seeing the school as supportive thus ancillary to the students’ learning and teachers’ manifestation of education, its initially restrictive organisational weight needs to be exposed, faced and dealt with. At the end of the day the effectuation of ESD in formal education is not about the curriculum, any understanding of ESD-competencies or about the overarching system. Progress towards ESD-based Education is about effectively addressing the lack of professionalism to properly organise the transition and thereto stay upright in an over-demanding world in which social validation rules educational quality. A school’s inclination to over-organise ESD or by default add superfluous (project-

)structures, cuddly activities or rules of engagement, drains capacity, suffocates teachers' efforts and neglects students' potential.

ESD-based Education offers a coherent and steady development if it is understood as a foot-and stronghold to awaken and strengthen a school's natural dedication for future relevant education. However, since a transition eventually touches on multiple aspects of present institutions and the system, it in principle cannot be undertaken incremental as such will lead to a wavering and eventually faltering process. The 3-fold of interventions around the schools (the 'layers of fog', 'cacophony of innovations' and 'waves of change') stapled on a school's natural inertia, protective environment and limited professionalism, delivers a cocktail of mutually reconfirming restrictions on the schools' transition capacity. The existing plethora of ideas, concepts, approaches, products, services and alike that swarm education and schooling, together with an administrative fungus layer in which ideas and interests are entirely cross-linked (Bommeljé, 2020) eventually make the 'waves of change' become a perfect storm. Teachers not hiding in towers of disciplines and school leaders keeping their feet on the ground despite the array of external demands, are confronted with working conditions that drive good teachers and principals to become renegades or out of the system altogether (N. Stone, 1991). Consequently, external parties' business cases can be deployed, further divert a school's course and impoverish its cause. At the root of this we observed and directly experienced too meagre managerial capacity and professional identity of both school leaders and teachers, poor self-governance leading to a proliferation of managers, advisory firms, councils and experts who intertwine and live in symbioses with the governmental system. Consequently, school development from out the present can be regarded a near unsurmountable challenge. As we observed a culture resisting change able to neutralize energy (Cuban, 1984; Sarason & Sarason, 1982), resting within a self-inflicted culture that deteriorates transition potential, I argue it are not new governance models and structures what is called for, but a good scrubbing and decomposition of the present constellation in and around schools, for as then not much will remain in need of such new models and structures.

Since the OPEDCUA-concept springs from present-day education, combining best of knowledge and experience in the fields of learning, education and schooling, it offers a framework for improving formal education by ways of a gradual and consequent transition, maintaining proven values. The 'Soll'-position thereto needs to be outlined and communicated openly and persistently while bringing ideas to practice as swiftly as possible. Keeping options open will lead to a wavering, ever more doubtful process and eventually abandoned improvements. Releasing that the history of education reform is one of consistent failure (Pogrow, 1996) the pathway of progress cannot be built with the same bricks nor laid by those walking on it. Although OPEDCUA was not intended to be and cannot serve as a readymade program (the concept is not an automat), it can initiate movement and momentum to break free from present structures and limitations, guide a strategic development. Embedding the OPEDCUA-instruments, folding them together the way conceptually intended, sees to a consistent development of ESD-based Education as an organic whole that makes each come to full effect. Once the cooperative of teachers and Partners in Education is in place, the effectuation of Flight for Knowledge will be the first and most invasive change as it already manifests a student-centred setting of the learning process, sees to Study-Teams, requires adaption of facilities, involves educators and opens regional society to students' learning. Implementing BusinessClass is then less demanding and disruptive, Global following naturally and requiring the fewest of additional changes. After it initially served as introduction and training in the application of the other instruments, OPEDCUA MasterClass is to be positioned as starting point and ongoing manifestation of teachers' further development.

A schools should set itself free for ESD, meaning unproductive pressure should be lessened, also on teachers' short-term performance. If not, qualitative gains suffer from quantitative requirements, the lingering pressure of schoolish characteristics eventually limiting unqualified success. In case teachers are (implicitly) required to intermediately 'show for what they are doing' by material evidence, they are seen to create metaphor-projects, activities that go from initially energy-collecting to attention-distracting, up to a level where the metaphor takes the place of the more profound education envisioned.

Overlooking practice in over 16 countries, schools are poorly if at all guided in ESD. National programs aiming for more-year perspectives were seen to lead to numerous short-lived initiatives leaving no imprint. When a lack of vision is covered up by a potpourri of projects ('letting a thousand flowers blossom'), ESD-researchers and policy-developers become a major blockade for the implementation of ESD as they deliberately create and uphold delusions. Initiatives originating or resulting from (semi-)governmental programs, including Centres of Environmental Education as well as various from the private sector supported by public means, too often add to and benefit from a self-installed phenomenon that positions schools as needy and incompetent, a sad practice leaving both ESD-policy and -practice in a weak state.

*And thus the native hue of resolution
Is sicklied o'er with the pale cast of thought,
And enterprises of great pith and moment
With this regard their currents turn awry
And lose the name of action*

William Shakespeare

Research Question 9

In how far is the concept in line with present-day science and policy-development in ESD?

The OPEDUCA-concept is in line with a vast body of research and scientific reasoning, namely stemming from the era before ESD reached the spotlights. It concurs with publications in the earlier years of the field that plea for a link between (formal) education and sustainable development and is confirmed in a range of publications since then. Although the non-conformist approach generated frictions with(in the world of) contemporary ESD, it opened defining new insights and horizons. Contrary to mainstream ESD, the OPEDUCA-project included the construction of a vision, strategy and instrumentarium, putting academic knowledge to work and in service of practical validity. It was the first approach to see ESD as an ongoing learning pathway throughout formal education, a clear focus on youth, not reject industry, materialise the key-role of teachers and put learning for sustainable development at the base of education.

The OPEDUCA-concept is in line with the notion interdisciplinarity is a foundation for ESD (Feng, 2012) and sustainability a cross-cutting-priority that can serve as a pivot for cross-curricular teaching and learning (Dyment et al., 2015). The ESD-based Education the concept effectuates has the potential for a comprehensive reform through the reinvention, reorganisation and revitalisation of the entire school into an equitable and educationally excellent place (Borman, Hewes, Overman, & Brown, 2003). It allows to take a stand against a too widespread policy-focus on curriculum, testing and assessment (Lingard et al., 2003). OPEDUCA being built by teachers acknowledges that collegiality and collaborative engagement are important parts of teacher development (Emihovich & Battaglia, 2000), professionalisation a conditio sine qua non.

Starting out from a penetration vision and in collaboration with local surroundings the OPEDUCA-project and -concept see to the incorporation of sustainability instead of fragmented add-on's, enhancing the students' capacity for independent and critical thinking (W. Scott, 2013), real-life learning elements giving way to continuous

associations and references between what is lived, experienced and conceptualised while also allowing for more concrete observations (Paivio, 2013).

Where the OPEDUCA-concept remains to differ is that it doesn't require sensations of complexity and uncertainty as motive, positioning transdisciplinarity learning as a logical consequence of studying future defining themes and real world phenomena, not visa versa. Given the transdisciplinary essence of learning, it is not a precondition for ESD but the consequence of understanding ESD-based education.

By comparison, contemporary ESD remained entangled in the academic discourse, became institutionalised and needlessly normative and descriptive. Given a lack of vision and an applicable pedagogy it seeks resolve in skills- and-competences listings, lets a thousand flowers blossom despite the risk of a proliferation with weed. In desperate search for a (funded) role, ESD became positioned in competition with (semi-commercial) add-on solutions like STEM while denouncing the roots of Environmental Education to remain with the refurbishment of schools through a system- and institution-driven 'Whole School Approach'. While still neglecting the learning- and ownership perspective of youth, the failure to bring ESD to initial- and further Teacher Training- and Education stands out as the most prominent failure thus far and most magnificent challenge ahead.

Contemporary ESD's focus on system elements I regard a try to add components to an ill functioning machinery, a disregard of challenges schools faces already. There are countless efforts seeking to 'screw' ESD into the educational system by ways of defining competences in their own right, degrading it to the promotion of the SDG's or trying to influence the composition and contents of curricula and textbooks. Furthermore, we continuously met argumentations to build on the importance of Systems Thinking and Social Learning, ideas kicking in wide open doors. Although I underline the need for integrative thinking, multidisciplinary perspectives, awareness of system dynamics and learning with, from and through each other, these qualities are not unique attributes of ESD given their universal logic and application in an array of older disciplines and practices.

Seeking a place under the sun, researchers- and policy-developers try to place ESD as another assembled education, tambouring its importance by ways of stressing the urgency of sustainable development, lately headlining Climate Change, Equality, the eradication of poverty and the like. Next to our finding that the drive and motivation to articulate the importance of ESD in all possible ways is not strange to scholars and consultants in search for funding or position (practices that truly put the cart before the horse), such shopping around with ESD leads to misunderstanding and its devaluation. The promotion of ESD as such is not a wise course since it, unlike other domains (like STEM, Culture, ICT or Language-promotion), per definition lacks a single disciplinary relationship, nor does it serve a specific interest group, factors relevant for popularisation, positioning, funding and esteem. To formulate it otherwise, there are no specific teachers, customers or sponsors ESD can be sold to. And that is exactly why education can be built on it.

Depriving ESD from its essence and depraving it to a tool by creating and promoting ready-to-go and take-away activities, merely contributes to the outer appearance of the students' learning process. Selling ESD out to STEM or reverting it to Environmental Education will lead to its degradation, as does UNESCO's recent choice to put ESD at the service of SDG-promotion. This moreover since, despite transformative language used throughout the discourse and agenda, also the SDGs primarily espouse a pro-growth model of development and a utilitarian approach to education. For SDG 4 to contribute to sustainable development and transformation, there must be a shift in the dominant educational discourse so that issues of social and environmental justice are placed at the heart of educational priorities (Brissett & Mitter, 2017). A longer-term focus on the essence of learning in the context of sustainable development can inform a practicable education as the essence of ESD. The ESD-based Education proposed sees to a normative based on an education strategy that includes practical instruments to effectuate learning from experiences, students being and becoming more involved in addressing real-world sustainability problems (Brundiers & Wiek, 2011; Cortese, 2003; Rowe, 2007).

The OPEDUCA-concept was seen to address each and meet most conditions and characteristics proposed by ESD-researchers and policy-developers over the years yet differs in grounding principles and provides for a more practical orientation, a multi-disciplinary reality and applicable pedagogy. Namely the direct people-based approach proved to be an advantage over a sole academic development as it was beneficial by ways of direct and continuous access to daily reality. Literally developing at the inside of schools, industry and other organisations, allowed for a multitude of diverse observations and exchanges that without further ado led to a wide and deep involvement of practitioners. Two aspects characterising an effective bottom-up approach of ESD.

In contrast with the amount of research between the start of the OPEDUCA-project and now (J. Moore, 2005; Van der Dussen Toukan, 2018), policy papers speak of the importance of youth yet hardly regard their interest. Students seen to be taken serious only in the smallest pockets of policies and too often as objects of assimilation in our present way of doing or to promote adults' efforts in the realm of sustainability. Now that youth at last becomes more central in ESD, also the contribution of the OPEDUCA-project and -concept to a local-to-global learning space by way of virtual school-to-school exchanges is finally acknowledged (Hopkins, 2021), although such took over a decade.

Contrary to a broadly held idea in the ESD-research community visions are per definition situated as schools and communities are inserted in unique cultural and social contexts (Espinet, 2014), the OPEDUCA-project proved the importance and effectiveness of a joint vision on ESD. The idea that school-community collaboration should require a diversity of mandates and regulations through norms and legal instruments, obstructs and smothers ESD, restricts its transformative potential. Contemporary thinking challenges can be met and improvements realised by adding structures, processes and institutions, is one of the most profound differences with the OPEDUCA-concept which follows the natural process of students' learning in a less unregulated way, acknowledging the value to learn about and with cultures, living languages, learning to relate and learning to belong (Pike, Selby, & Selby, 1988).

Presently, ideas are converging, amongst others reflected in recent OECD-publications (OECD, 2016; Stengel, 2020) or by way of for example the 'Holism-Pluralism-Action-orientation ESD framework' (Sinakou, Donche, Boeve-de Pauw, & Van Petegem, 2019) which also addresses the lack of an integrated conceptual framework in the field of ESD and builds on action-taking, students' leadership in their learning, community involvement and interdisciplinarity.

Questioning to what extend OPEDUCA is in line with present day research- and policy development in ESD, it also needs to be concluded there is a profound difference in openness and cooperative attitude. Since we stood open to and welcomed contributions of practice and the broader world of science, ever more critical-constructive standpoints entered the scene and continued to do so also after this study was formally concluded. Having been ahead of time for likely 10 years or more, insights and convictions that already found their way to the formal realm of ESD will likely be followed by further values found and then broadly shared in the years to come.



7.2 Recommendations

The following 7 recommendations I deem prominent to take ESD from an enduring promise to tangible results, provide answer to the 10th and final research question: '*What main challenges need to be addressed to pave the way for ESD-based Education?*'.

For reasons of academic rigor, I keep these brief and to the point, inviting the reader to the core of this study for backgrounds, reasoning and polarisation.

1. Settle on a Joint Vision on ESD and tend to Practice

To deliver on the transformative promise of ESD a joint vision on learning and education is required as it allows for the realisation of a multi-disciplinary partnership, the development of strategy as a set of coherent activities. ESD no longer needs to be seen as a goal to be reached through multiple pathways but the pathway itself. An applicable vision informing a practical perspective is essential to avoid schools remaining distracted by vaguer notions of ESD and focus on their natural course of future relevant education. Respected learning philosophies and pedagogies that have proven their value decades before the notion of ESD was manifested, offer universal principles and applications to build on. ESD is not in need of being invented, nor should it be diluted by seemingly innovations, profiled through general concepts or made needlessly complicated by branding it as complex. All such circumvents concreteness, offers near endless opportunity to remain in vagueness and makes ESD de facto doubtful.

2. Position ESD as Future Defining Learning through Education

Instead of pressing sustainability on education and seeking a place under the sun in the educational system, as if it were just another priority, ESD should be positioned as strategic opportunity in the realm of learning and development, placed at the base of education. The students' learning process respected as ongoing transdisciplinary

study of future defining themes that hold the capacity to bring learners and educators together on the local and global scale. Themes such as Water, Food, Energy, Construction and Health follow naturally when observing the Dimensions of Sustainable Development, constituting Earth, Wellbeing and Welfare as dimensions of logical relevance and meaning.

3. Do not innovate Schools but Improve Education

At the beginning of this study in 2007, the idea to base education on ESD was unprecedented, as it is today. This paradigm-change proved instrumental to its course as it positions students as the sole beneficiary of education, their learning the essence of ESD. The holistic perspective topping the OPEDUCA-concept merges most logical and universal convictions, stating learning is per definition personal, lifelong, an inquiry-process demanding an active modus, meaningful when addressing relevant themes and valuable when Earth- and society-oriented. Humans learn from the moment they are born and such doesn't stop, it comes naturally, takes place anytime, anywhere, with anybody and through any device. One can stimulate and facilitate learning, help people but not take it from them. Respecting education as the



facilitation of learning, school as the organisation of education and the educational system as the institutionalisation of schooling, is instrumental to entangle discussion and debate, dampen the cacophony of innovations, views, initiatives and priorities. Regular education is not in need of innovation but of a joint strategy of coherent, consecutive and consequent improvements. The concept 'School' is not superfluous when understood as the nexus of a multi-disciplinary cooperation. It is already an impressive step forward if the harsh boundaries between primary, secondary, further and higher education can be removed, making way for untroubled progress. Educations in the realm of STEM, Citizenship, Environment, Entrepreneurship, Sustainability, and Internationalization become integrated in the transdisciplinary ESD-based Education proposed. Such provides focus, depth and sensemaking for the students while freeing school- and teaching capacity. If one seeks to hold on to the idea of innovation it should be found in the transition, not in the system and structures.

4. Exchange a Whole School- for a Whole Student approach

The region- and community-based learning the OPEDUCA-concept proposes builds on the presumption that bringing students in direct contact with the ecological and social reality, actively and passive, is a determining factor if not prerequisite for personal development. A 'Whole School Approach', taking the institutional perspective, is seen to put an additional burden on schools by ways of superfluous relations and resulting redundant governance, putting structures over students. Acknowledging the strategic development of youth, a wiser course is to dismantle the constellation around schools and embrace a 'Whole Student Approach', understanding learning per definition occurs (with)in the transdisciplinary reality of the student, takes place Anytime, Anywhere, with Anybody, through Any device. Such AAAA-learning should not be seen as a facility but as the promising result of unrestricted learning. A Whole Student Approach answers to a youngsters' natural inclination to seek a way forward in life, one per definition ongoing and no longer commanded by institutionalised sequences and structures.

5. Operationalise an independent Teacher Professionalisation Program

As we learned through OPEDUCA MasterClass, understanding and effectuating ESD-based Education is within reach of and contributes to the professionalisation of teachers, lifting them from operational actor to strategic factor, from a soldier of schooling to an Educator for the future. As already noted in earlier years of ESD-development (Shallcross & Robinson, 2007) bringing ESD into teacher education is strategic, though has failed altogether. Also recently 60% of participants at a UNESCO meeting (preparatory for 'ESD for 2030') ranked the need top of the list, followed by the panel's acknowledgement ESD is still sorely lacking in Teacher Education around the world (UNESCO, 2021c). A magnificent challenge to address through a joint professionalisation of school leaders, teachers and higher potential student-teachers, merging initial Teacher Training with continuous professional development. Referring to our findings regarding the in general limited associative capacity of teachers, relative strangeness to real world phenomena and the need for personality development, such goes beyond a re-conceptualisation of present-day faculties and can only be realised amidst the real of society. The development of teachers towards educators in a professional setting is the most decisive aspect to focus on in the realm of ESD and the core for the realisation of ESD-based Education.

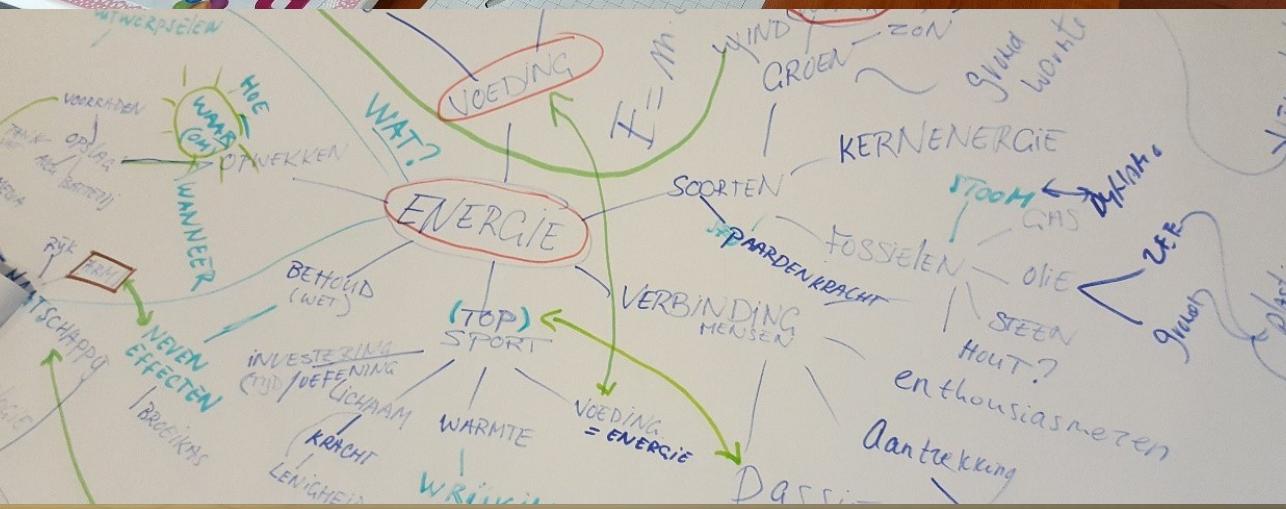
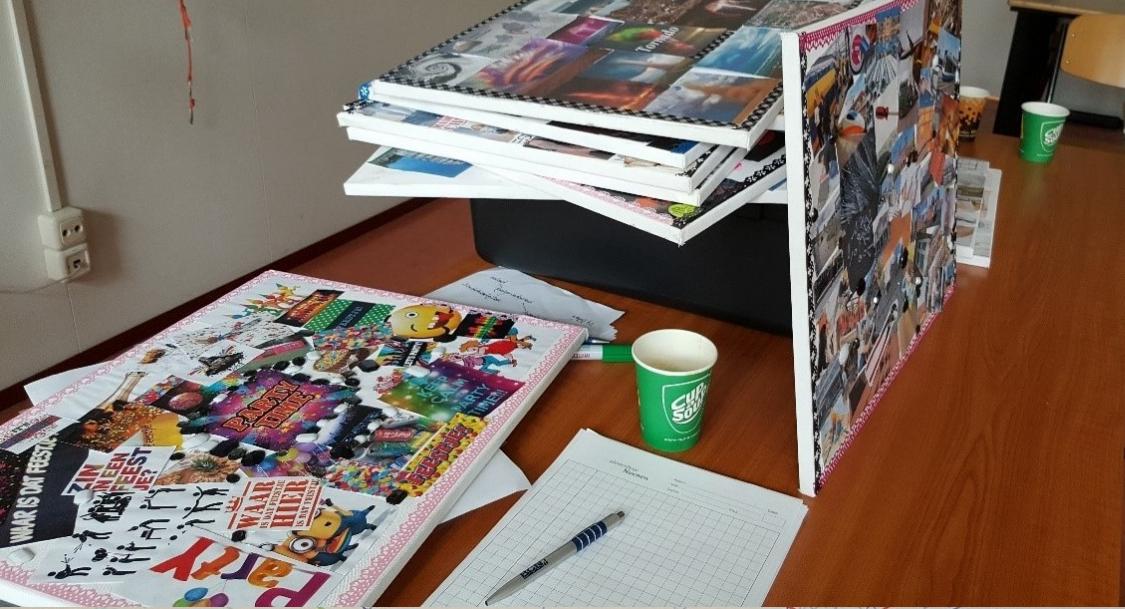
6. Have Industry Support and Participate in Education for Sustainable Development

As mentioned at various places throughout this study, presently partnerships, both studies and practice in the field of ESD lack the participation of industry, therewith miss the variety of content and competences embedded and exploited in this sustainability defining manifestation of society. A qualitative structural participation of industry in education is a decisive value for the effectuation of ESD-based Education. Qualitative to be understood as the participation of industry from the primary realm, the sector manufacturing the goods and services our wellbeing and welfare build on, to enhance learning regarding the entire added value chain by ways of the continuous involvement of true entrepreneurs. Understanding the values,

conditions and operationalisation of a professional and structural school-industry partnership, ESD-based-CSR is a promising development as it merges the Dimensions of Sustainable Development with future relevant learning of youth, contributing to multidimensional leadership including transformational and servant capacities (Stead & Stead, 2017). An understanding found intrinsic to industry-leaders who do not require to be taken by the hand in sustainable development, not by SDG's or otherwise.

7. Re-align ESD-research and democratize Policy-development

In our search for the meaning and effectuation of ESD it appeared in need of vision and strategy as it thus far remained in the transmissive due to a lack of original thought to build a pedagogy out of learning. Keeping too far from practice, a stable constellation of researchers and policy developers over the past 20 years held ESD vague in purpose, leaving its transformative potential idle. Whether it regards the limited progress made in the last twenty years since the start of UNESCO's DESD (Theodore, 2020), the lack of evidence of good cross-curricular teaching practice in sustainability education (Dyment et al., 2015) or the fact less than 10% approach ESD in a significant way (Lambrechts & Hindson, 2016), the system is found irresponsible, therewith acting irresponsible. Also recent reflections speak of a "... hegemony that has created the circumstances in which only some academics thrive, and that will surely limit higher education's contributions to the SDGs" (Shephard et al., 2021). If not open for a true multidisciplinary cooperation and welcoming critics, the world of ESD will keep treading in circles, re-affirming, re-confirming and re-addressing own thoughts. Challenging the hegemony of an entrenched establishment during this study was a formidable undertaking, yet one called for since a tokenistic attitude with characteristics of tribalism harms the essence of ESD. It is advised to re-form both research and policy-development in ESD towards participatory approaches aimed at validation, carried through by those with multi-disciplinary well-informed experience to realise applicable values and volarisation in service of society. A democratisation of the field is called for to end the present solitary narrow approach of a secluded inward turned community that is seen to create a potpourri of world-strange ideas that risk to turn ESD into another patch in the educational landscape.



8 Volarisation and Impact

Since this study was not conducted in academic seclusion but amidst and by ways of a cooperation of people and organisations in practice supported by scientists, volarisation and impact are underpinned and accounted for.

A range of hypotheses and proposals have been worked out in concrete activities and instruments, applied and evaluated, volarisation following participatory research.

Having started out from zero, the OPEDUCA-project validated the underlying concept, put the proposed re-conceptualisation of ESD to the test and saw it continuously questioned by a variety of leading experts and practitioners in different circumstances and from multiple perspectives. Proof of concept has been delivered as numerous demonstrations in principle supported its feasibility.

OPEDUCA was welcomed by an array of denominations, found a wide-spread participation of practitioners in schools and beyond as well as from academics. Therewith numerous applications in daily practice could be realised, each instrument passing extensive testing, providing proof of concept and offering further insights as to how and under what conditions ESD-based Education can be further developed in synergy with school development and contemporary policy priorities.

It was demonstrated in an impactful way the OPEDUCA-concept gives reason for a multi-disciplinary partnership to further explore and expand the concept and execute the instruments jointly. Of the 40 Dutch schools that took part during the research period 80% found reason and argument to executive the envisioned learning in their daily practice while 44% of these sought structural embedment, 25% entering a transition process while such was initially not planned for. It can be regarded an achievement of school leaders and teachers ideas were brought to action, doing so from their own conviction, not commanded by any authority, not originating from within the system, not on instigation of any governmental program, but for the sake of improving education on the grounds and in the way described in this study.

Validation was established as schools got in motion and industry, governmental organisations and others provided actual, material and financial support.

During the study, the OPEDUCA-concept found acknowledgement and support of three Dutch inter-departmental programs (Learning for Sustainable Development, Education & Entrepreneurship and Environmental Education), 6 EU-funded projects, 80 companies and dozens of (semi-)governmental organisations. 'The OPEDUCA Project Europe 2014-2016', that involved 19 partner organisations from 8 European countries, over 60 teachers, ESD-experts and scholars, was awarded good to excellent by third-party evaluation.

As the process and contents of this study proved relevant in the various realms it brings together, public as well as private stakeholders invested by ways of capacity, facilities as well as financially. The outcomes of the research obviously served all those persons and organisations mentioned, primarily schools, policy developers, politicians, managers in industry, NGO's active in ESD, parents and students.

The study was presented at various occasions, mostly as keynote in conference setting, amongst others for the City of Grand Rapids, the Oxford Academy, the Government of Morocco, the UNESCO Ambassadors Meeting in Paris, the City of Madrid and the Province of Istanbul, the latter two consequently seeking implementation of the concept by written invitation based on formal governmental decision. The concept stood model for a global Conference on ESD in cooperation with United Nations University, welcoming over 140 academics from 42 countries, resulting in intermediate peer reviews of the concept and instruments.

Experts in ESD took example of and built further on this study's propositions and findings, the research being brought to service of the academic community as well as policy developers on the regional, national and international level.

The study generated coverage in traditional and traffic on social media, including the manifestation of a network of over 450 scholars and government officials from 24 countries, members of a virtual OPEDUCA-community of over 20.000 persons in more than 110 countries. Still today, years after the completion of the last operations underlying this study, the daily number of unique visitors on the dedicated website exceeds 1.100 .

While we are grateful the OPEDUCA-project and -concept added value to the existing body of science and knowledge in Education and Sustainable Development, we see realistic potential for its continuation and expansion following the publication of this study as of 2022, hopefully for years to come in the interest of the young.

Jos Eussen

June 1st, 2021

*The one time I took a lie-detector test,
the machine confessed everything it knew.*



Curriculum Vitae

J.F.G. (Jos) Eussen

August 21st, 1965, Sittard, Netherlands

English, German and Dutch (fluent), French (moderate)

Postgraduate Organizational Development and Strategy (2002)

University Degrees in Business Economics and Marketing (2000)

Control and Accounting (1986)

Secondary modern school (Atheneum) (1982)

2017 – 2022 Lecturing Sustainable Development Maastricht University

2007 - present Initiator and global coordination of The OPEDUCA Project

2008 - present Director of the RCE Rhine-Meuse

2004 - present Founder KidsLive! Foundation (development-learning / education)

2002 - 2004 CFO Media Group Limburg / Corporate Finance Telegraaf Media Group

1996 – 2002 CFO Licom NV (multi business, 6.600 employees)

1992 – 1996 Finance Director Municipality of Landgraaf

1989 – 1992 Assistant Corporate Finance Manager DSM N.V. (Chemical Industry)

1986 – 1989 Assistant Control(ler) DSM N.V. (Chemical Industry)

Additional past positions:

Chairman Advisory Board University of Applied Science Zuyd (1994 – 2014)

Examination Committee for Vocational Training Institutes (2010-2012)

Director of the National Foundation for Training Entrepreneurship (NFTE) (2008-2012)

“You have a vision, thought out a concept, put it on the table, presented it in headlines time over again, discussed it in most meticulous details with determination and perseverance with every expert and practitioner you could possibly reach, never stopped doing so with infinite energy, brought it to practice in a wide and varied array of activities, to eventually find it was right from the beginning”.

George Heartwell
Mayor of Grand Rapids, USA

Introduction of Eussen as keynote speaker at the Grand Rapids Conference on Sustainable Development 2020.

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