YOUrALPS
Political Strategies on Education for sustainable development and Mountain-oriented Education

Path to implementation into the formal education system of five Alpine adjacent states
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Introduction

Perception of personal and professional climate change related causes and effects of future green jobbers hasn’t been explored in much detail so far.

On a global scale, human activities in the agriculture, crop, livestock, forestry, fisheries and aquaculture sectors contribute significantly to the recent human-induced climate change (Food and Agriculture Organization of the United Nations 2017, Organization for Economic Cooperation and Development 2014) by releasing greenhouse gases such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) and thus offer great potential for both climate change mitigation and adaptation measures (Smith & Olesen 2010). Lately, research investigating farmers’ beliefs and perceptions of climate change-related risks for their own business is growing (e.g. Mase et al. 2017, Menapace et al. 2015). Whilst studies reveal that farmers’ actual adaptation behaviour is rather driven by financial motives and managerial considerations (Li et al. 2017), the overall awareness of personal and professional contribution to climate change effects on non-monetary long term features of natural resources and related problems like biodiversity, soil degradation or groundwater lowering among people planning a professional career in the agriculture sector hasn’t been explored in much detail to date. Consequently, YOUtALPS project partners want to i) fill this research gap by eliciting potential future green jobbers’ general attitudes towards global change and ii) thereupon creating target group oriented education measures both in formal and non-formal education systems which will help raise awareness among youth about what is their share of global (environmental) change, both professionally and in private. Chapter B.1 of this comprehensive comparative report highlights main findings of the survey in which more than 600 young people in the Alps were interrogated.

Based on this, one of the main goals of YOUtALPS project is to raise awareness of the valorisation of the natural and cultural heritage of the Alps among youth (6-30 grades) in the Alpine space for their personal future and the one of the society by better integrating formal and non-formal education measures for sustainable development (ESD)/environmental education (EE), and thus allowing young people for more beneficial real-life experiences. This paper at hand indicates, not exclusively to interested educators and the policy making sector, which already existing structures in formal education such as system flexibility or cross-curricular teaching can be used in each of the five EU Alpine countries Austria, France, Germany, Italy and Slovenia, and secondly, if not sufficient, which new structures would need to be created in order to serve the realisation of the overall objective of YOUtALPS noted above.

Research questions

1. Which already existing structures in formal education such as system flexibility or cross-curricular teaching can be used in each of the five EU Alpine countries?
2. Which new structures would need to be created?
Technical and Vocational Education and Training (TVET) and Sustainable Development

UNESCO emphasised nearly two decades ago that "Technical and Vocational Education [and Training (TVET); annotation by the authors] as an integral component of lifelong learning, has a crucial role to play […] as an effective tool to realize the objectives of a culture of peace, environmentally sound sustainable development, social cohesion, and international citizenship" (United Nations Educational, Scientific and Cultural Organization 1999; both in the present, and in the future. The reality, however, is that permanent economic growth and increase in productivity are widely regarded as the main prerequisite and at the same time the most powerful driving forces of economic life […] subordinating various other aspects regardless of accompanying social and environmental costs (Fien & Wilson 2005).

One decade later, after having witnessed both a severe financial crisis followed by mass unemployment especially among young southern Europeans (see European Commission 2012), as well as clear effects of a human-induced changing climate, a low-carbon, green economy is recognised as one major piece of a jigsaw which is highly promising to support societies to face and shape current and future changes (see European Centre for the Development of Vocational Training & International Labour Office 2010; Organisation for Economic Co-operation and Development & European Centre for the Development of Vocational Training 2014).

While the premises of sustainable development should also be addressed through in-service TVET, the following analyses and conclusive recommendations predominantly refer to pre-workforce learning. As a whole, TVET has the potential to foster […] cultural change by presenting alternative entrepreneurial (and life; annotation by the authors) models to students (Fien & Wilson 2005).
What is MoE?

Education for sustainable development (ESD) and environmental education (EE) form the basis for mountain-oriented education (MoE). MoE emphasizes the interrelations between mountain regions and society. In the Alpine context, MoE enables youth to face and shape present and future Grand Challenges in that it strengthens capacity, competencies and resilience among them on the basis of the rich Alpine cultural and natural heritage. Participation, the capacity to act, self-determination, lifelong learning, identification with the Alpine natural environment as the most vital resource of life, and the integration of formal and non-formal education are the main principles helping to promote the change in the education system while at the same time favouring the transition of the entire Alpine territory according to the premise of sustainable development.

Mountain-oriented education

In a nutshell, sustainable development is outlined by some authors as a moral precept rather than a scientific concept (Fien & Wilson 2005). Accordingly, education for sustainable development as a vast collection of different topics with associated intended learning outcomes can be educationally implemented through a variety of ways which have to be balanced between wide-ranging abstract goals and detailed concrete objectives at any stage of each practice or activity, particularly in the context of vocational education and training (Scott & Gough 2010). What’s more is “the lack of conceptual and consequently methodological unity within the research and practice of ESD” and thus open questions about effectiveness, value and evaluation of ESD-related activities and initiatives remain (Koptuna & Meijers 2003) which are gradually tackled by nascent approaches (e.g. Paauw et al. 2015).

On a more practical level, various evaluation and assessment reports on national level indicate (e.g. Chitjian et al. 2009), and furthermore, is underlined in informal discussions with educators involved with both planning and realizing educational activities according to the key principles of ESD: educators still struggle with implementing ESD-related elements in their daily teaching routine despite all the efforts made both on national and supranational level in the course of the UN decade for education for sustainable development (2005-2014) and in its aftermath (see e.g. United Nations Educational, Scientific and Cultural Organization 2014).

Formal educators report 1 being overstrained by the challenge of breaking down something as abstract as one sustainable development goal (SDG) for didactical refinement for an identified target group and 2 not having enough internal resources to adequately explore ESD-related topics in their teaching because they compete with external offers and interests from other fields (e.g. digitalization, sports, and many more).

Furthermore, if supposed to be successfully put into practice according to the conceptualisation of competence-based education, prepared ESD-/MoE-related contents, materials and methods have to be arranged in a way that students should be able to perform an incrementally more complex set of tasks in a self-determined, self-reflected and hands-on manner by only using the provided materials and own competences.

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Why do we need MoE if there is already ESD(Gs)?

Competence-based education

Students should be able to perform an incrementally harder set of tasks in a self-determined, self-reflected and hands-on manner by only using the provided materials and own competences.

Competence-oriented education

The more measurable one activity is, the more abstract and intangible it is usually in return and therefore the less relevance to everyday life it can have.

Educators still struggle with implementing ESD-related elements in their daily teaching routine despite all the efforts made both on national and supranational level.
The present study seeks to examine relevant legal documents by answering the following research questions:

1. **What is the current status of national official documents in the domain of education for sustainable development in each country of interest?**

2. **Which structures in valid curricula, oriented at (higher) vocational schools for the alluded, would be basically appropriate for the implementation of integrated formal & non-formal education activities in the sense of MoE/ESD as outlined in the Alpine school model (ASM)?** If insufficient for the realm of the ASM: Are new structures necessary to implement the transdisciplinary approach of MoE/ESD in Alpine context?

Political agreements, financial incentives or technological solutions alone do not suffice to grapple with the challenges of sustainable development (United Nations Educational, Scientific and Cultural Organization 2014). Bearing that in mind, it has taken 30 grades, starting with the Global Assessment of the so-called Brundtland Report (United Nations Commission on Environment and Development 1987), addressing the endangerment of fragile ecosystems, reaching the milestones:

- **The final report of the UN-decade called ‘Shaping the Future We Want’** (United Nations Educational, Scientific and Cultural Organization 2014)

...that education for sustainable development has become mainstream in the education systems of the self-committed UN member states. The post-2015 document, the **Global Education 2030 Agenda** (United Nations Educational, Scientific and Cultural Organization 2015) paves the way for the attainment of the **Global Education 2030 Agenda** (United Nations Educational, Scientific and Cultural Organization 2016).

In order to advance the ESD agenda as claimed in the Global Action Programme, YOUrALPS project consortium contributes with assistance of this document in that it reveals two main leverage points which will serve as a profound information base for policy makers. These points are (consistent with the UNESCO wording) – see chapter 2:

- **a)** Transforming learning and training environments in that we suggest how the integration of formal and non-formal education can be achieved best and
- **b)** Accelerating sustainable solutions at local level by scaling up ESD programmes and multi-stakeholder ESD networks, as highlighted by the example of pilot site activities.

Teaching is often not aiming at what it should be...
Methodology

Both on national and on supra-national level, various institutions are periodically analysing the progress of implementing ESD-related activities and topics in the formal education sector of the respective country. If accessible and suitable, key findings of recently published official documents are being summarised accordingly as a first approximation. However, some considered states have not made as strident progress as pledged due to self-commitment in the course of the post UN-decade for education for sustainable development (DESD) process (United Nations Educational, Scientific and Cultural Organization 2015).

Therefore, additional qualitative content analysis (Meyerring 2015) of auxiliary data implying the current state of implementation of MoE/ESD in the formal education system was performed using MaxQDA software (Kuckartz 2014).

The following documents are taken into account for comparative analysis of the current status of implementation of MoE/ESD in formal education in the five Alpine states Austria, France, Germany, Italy and Slovenia:

a) Official national documents comprising taken measures on national level subsequent to the ‘UN decade for Education for Sustainable Development (ESD)’ – analysis of National Action Plans/Strategies on ESD of the five Alpine countries, including second- ary literature and complementary expert elicitations where necessary

b) Legal curricula both on national/regional level (if applicable due to responsibility according to each education system) valid for (higher) vocational schools (secondary education) focussing on ‘green jobs [...] in all sectors – agriculture, industry, services and administration’ (United Nations Educational, Scientific and Cultural Organization 2012)

Previous research conducted examining the implementation of sustainable development in (higher) education curricula, publications and/or teaching contents was mainly performed in two ways:

• by screening relevant documents towards didactic principles (e.g. Waltner et al. 2017) or learning objectives (e.g. Lechner 2009) related with ESD

• by screening relevant documents towards thematic contents related with ESD (e.g. Lozano 2010)

• by analysing student teachers’ learning processes in case studies (e.g. Singer-Brodowski 2017)

While some studies predominantly do (semi-) automatized keyword search with help of predefined thematic word lists (e.g. Otte & Singer-Brodowski 2017), more in-depth research designs make use of a mixed-methods approach, combining standardised (quantitative) analysis and qualitative data acquisition and evaluation methods (e.g. Steiner 2011).

Key findings of recently published official documents are being summarised accordingly as a first approximation.

As the stage of progress in the countries covered by this study in terms of implementing ESD in formal education is uneven as is the form and characteristic of single curricula, the automatized was only appropriate for review of individual documents. In all other cases, qualitative content analysis was performed either using MaxQDA software or ‘by hand’.

When additional keyword search was necessary, text passages containing key topics defined for each Sustainable Development Goal (SDG) were identified and double checked manually in order to exclude text passages that were detected by mistake. It has to be said that due to the basic structure of the curricula, some recurrences might occur as it is distinguished between educational and teaching tasks and teaching contents themselves. Nevertheless, the chance of this redundancy can be neglected due to inclusion of one sentence before and one sentence after each sentence containing a single keyword.

Therefore, comparability between the stages of progress between the examined states is limited. The status quo of each country has to be considered as individual cases. Nevertheless, at the end of this report, the intended general recommendations as well as the developed action plan can be regarded as possible means how to reach the common vision of better anchoring mountain-oriented education for sustainable development in formal education.
Methodology

In the 2030 Agenda of the UN General Assembly, 17 Sustainable Development Goals (SDGs) should pave the way for sustainable developments of various areas, addressing (basic) human needs but also indicating concrete measures how these goals can be achieved by the year 2030. Among the 17 goals or challenges, one is Quality Education (SDG 4). Although the SDGs mustn’t seen isolated, indicative topics and pedagogical approaches are given for each Sustainable Development Goal. Focus on the following analyses will be, as indicated by UNESCO, if in the revised approaches to the implementation of ESD on the basis of the four SDGs of concern (see below), ESD is seen as a stand-alone subject or rather comprehensively integrated in the various curricula (United Nations Educational, Scientific and Cultural Organization 2017).

Selected SDGs of concern

“Climate change, biodiversity, sustainable production and consumption, and reduction of poverty are outlined as key themes within ESD” (Rieckmann 2018). The SDGs of main interest for our purpose are – with one exception, namely “Sustainable cities & communities” – identical to these key themes as follows:

SDG 11 – Sustainable cities & communities
SDG 12 – Responsible consumption & production
SDG 13 – Climate action
SDG 15 – Life on land

Educational goals entailed in the curricula related with nutrition and resources as main commodities of the ‘green jobs’ sector could also be attributed obviously to SDG 2 – Zero hunger. But in the Alpine context, they are more soundly assigned to SDG 12 – Responsible consumption & production. SDG 15 – Life on land includes all topics subsuming biodiversity, ecosystem services and neobiota issues. SDG 11 – Sustainable cities & communities here includes aspects of (circular) economy, energy and water supply, infrastructure on the one hand (economic aspect), social aspects of future resilient communities (e.g. political participation in general, but also sub-aspects as disaster management, spatial planning, waste management and many more). Lastly, SDG 13 – Climate action should be seen as a bestriding educational goal as climate change will highly probable affect all other areas of activity.
The context of ESD in Austria

Milestones in the history of EE & ESD in formal and non-formal education in Austria:


2005-2014: The so-called Interministerielle Plattform Bildung für nachhaltige Entwicklung (Interministerial platform on education for sustainable development) was established to cross-link interdisciplinary endeavours from various related actors and fields (e.g. school sector, tertiary education, research) in order to set up research-education-cooperations. The platform was then also co-host of a EU conference called “Education for Sustainable Development towards Responsible Global Citizenship”, which was held in Vienna and contributed to the first interim report on national endeavours (Austrian Federal Ministry of Education, Arts and Culture (Glossinger 2007) with regard to the UN Decade for Education for Sustainable Development; followed by the second interim report (Sulikowski-Schaller 2010) at just half-way of the decade. For 2012, the third interim report was published, this time edited under supervision of the meanwhile installed Dekadenbüro Bildung für nachhaltige Entwicklung (Austrian Decade Office Education for Sustainable Development) (see Österreichisches Dekadenbüro Bildung für nachhaltige Entwicklung 2013). In 2014, the fourth interim report on the UN Decade for Education for Sustainable Development, which served concurrently as an overview report of all initiatives and activities undertaken during the decade, as well as a foundation for the subsequent Global Action Programme (United Nations Educational, Scientific and Cultural Organization 2014) on national level (Söffler 2014). One year later, the comprehensive final report on the UN Decade on Education for Sustainable Development was compiled (Bouslama et al. 2015), concluding that, among other things, a “development potential in non-formal […] education” sector could be identified.

On a more precise and in-depth level, in 2008, the so-called Österreichische Strategie zur Bildung für nachhaltige Entwicklung (Austrian Strategy on Education for Sustainable Development) was mapped out by the at that time three competent Federal Ministries (Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, Bundesministerium für Bildung und Forschung, Bundesministerium für Ernährung, Land- und Forstwirtschaft, Verbraucherschutz und Konsumentenstandards) ( underway). The so-called Österreichischer Grünes Bildungsbericht 2012. Band 2. Fokussierte Analysen (Österreichisches Umweltbundesamt 2012) was published, addressing both education and inherent competencies to be developed among the learners as well as the main objective of realised activities – the necessary competencies and skills to be developed among the learners (e.g. United Nations Economic Commission for Europe 2012), while a third group of publications combine the just mentioned topics (e.g. Steiner 2012).

Beyond the sole educational context...

1. Sustainability as a whole, accompanied also by the commitment to both fundamental and applied research, has been elevated to constitutional law rank towards the end of the UN decade in 2013 (Austrian Federal Government 2013).

2. In 2016, based on the legislation just outlined, the so-called Grundstzlerl G ohne Umweltbildungen für nachhaltige Entwicklung (Basic degree on environmental education for sustainable development) entered into force, summarising the boundary conditions of a globalised world with its accompanying challenges and needs for society and thereby emphasising the relevance of environmental education and inherent competenc(…).
Results

Results regarding SDG 11 Sustainable cities & communities

All but one curriculum, namely the one for higher educational institutions for bio-medical and healthcare engineering, contain paragraphs in which topics related with SDG 11 – Sustainable Cities and Communities – are thematised. As the name already implies, the so-called higher educational institution for commercial professions “environment and economy” exhibits the biggest share of text passages dealing with themes subsumed under the label “sustainable cities and communities”. Whereas curricula qualifying for rather specialised professions such as agricultural engineering or horticulture do not have much emphasis quantitatively on SDG 11, there is a second group of curricula (n=5) showing around 30 mentions of any of the keywords listed above.

Another group, comprising of the curriculum entailing general provisions for agriculture and forestry curricula, and the curricula for environmental and resource management as well as the one for agriculture and nutrition, encompass between 30 and 60 text passages. Interestingly, the syllabus for HEI for tourism entail the second highest number of codings covering the depicted keywords.
Because of both, their dichotomous structure – teaching contents on the one hand and educational tasks on the other hand – and their orientation towards qualifying specialists in a rather narrow field, they cannot be designated as competence- or output-oriented learning objectives in the sense of ESD in that they address, for one thing, the different dimensions, viz. knowledge, skills and attitudes, and secondly, involving the cognitive domain, the socio-emotional domain, self-competence as well as shaping competence. Nevertheless, single or partial competences are already entailed in the examined curricula and just have to be complemented in order to be brought up to date.

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Learning tasks or contents of higher complexity are not primarily intended.

Results regarding SDG 12  
Responsible consumption & production

Text passages containing one of the keywords regarding topics with reference to SDG 12 – Responsible Consumption and production - as outlined above could be retrieved in each of the examined documents ranging from 10 codings in the curriculum for higher educational institutions for bio-medicine to a total of 105 in the curriculum for higher educational institutions for agriculture and nutrition. Some redundancy in the detected text passages might occur due to the fact that the framework of both the role of producers and consumers and change of perspective is only addressed in the curriculum for higher educational institutions for tourism as well as in the one for the higher educational institutions for commercial professions, specialisation environment and economy. In contrast to the examined curricula of higher vocational schools in Germany, the global perspective of consumption and production, e.g. food security or its situation in other world regions is only covered in the curriculum for higher educational institutions for agriculture and nutrition.

It can be concluded that there are a lot of potential contact points for implementing SDG-related learning objectives and contents in the already existing curricula, but there is also the danger that all teaching contents could also be covered in a poor sustainable way with emphasis on economic aspect only or its prioritisation at least – only attached with the nice label of being “ecological” or “sustainable”. This assumption is proven by the fact that in many cases, skills directly related with production processes are described which should be analysed towards their economic and ecologic consequences – as if these two would also be opponents. As a result, the social aspect of sustainability is nearly entirely missing, addressed only in the curriculum for higher educational institutions for agriculture and nutrition, where e.g. socio-cultural aspects of nutrition are Thematisiert. Regarding the didactic perspective, second level operators are prevailing, but the lack to a great extent of third level operators indicate that learning tasks or contents of higher complexity are not primarily intended. This result ties closely with the observation that the contents of the curriculum predominantly address the acquisition of knowledge and skills, but exhibit very little emphasis on other learning objectives or rather competences such as the critical thinking competency or the integrated problem-solving competency or the collaboration competency (see United Nations Educational, Scientific and Cultural Organization 2017).
Results regarding SDG 13
Climate action
All but one curricula, namely the one for higher educational institutions for bio-medical and healthcare engineering, contain paragraphs in which topics related with SDG 13 – Climate action – are thematized. In the 14 analysed documents as listed below, in total 221 text passages (=codings) could be identified in relation to climate (action) relevant themes. Unsurprisingly, the just recently established curricula for higher educational institutions for environmental and resource management exhibits, as the name might implicate, the highest number of codings related with climate action. In addition, it is one of the few curricula explicitly incorporating competencies according to the demands of learning outcomes claimed by several UNESCO documents aiming at developing sustainable development relevant skills.

Besides that, a lot of tagged codings represent learning objectives which are assigned to the lowest require-ment area in the hierarchy of competencies-oriented learning tasks, where students e.g. have to describe, recall, summarize or define some special facts (Hofmann-Schneller et al. 2014). These basics should not be neglected, but emphasis in modern curricula should be also or even more on generic competencies and on more complex areas. With regard to key competencies, one can conclude that the priority of learn-ing outcomes as defined in the sections covering postulated competencies, the priority is given to the areas knowledge and skills rather than attitudes (cf. European Commission 2018). If general schooling exhibits a deficit of action orientation, then one could argue that higher vocational schools in Austria with emphasis on ‘green job’ education show a tremendous need to catch up in terms of humanistic education.

Results regarding SDG 15
Life on land
Main results of relevance for our pur-pose taken from a study carried out in 2016 on behalf of the Umweltbundesbeh-örde regarding the implementation of biodiversity-related learning topics in each school level in Austrian voca-tional school curricula with emphasis on ‘green jobs’ as follows (Friesen-bichls et al. 2017):

• Generally speaking, the launch of the revised curricula which came into effect for the school year 2016 curric-ula entailed a shift towards enabling students a deepened exploration of the importance of biodiversity issues.
• The curricula of two very special-ised types of school, the higher educational institution for food- and bio-technology (Höhere Lehranstalt für Lebensmittel- und Biotechnologie) as well as the higher educational in-stitution for biomedical and health-care technology (Höhere Lehranstalt für Biomedizin- und Gesundheits-technik) by name, don’t include any references of biodiversity neither directly nor indirectly.
• No consistency as a result of the level of final qualification can be documented, while some higher edu-ca tional institutions, finishing with both a professional qualification and a general High School Certificate deal biodiversity in their curricula some of the same type don’t.
• Compared to the curricula of types of schools with general education which all deal biodiversity issues, curricula of (higher) vocational schools show a high variability regarding the direct mention or indirect but detailed description of the topic. What though should be stated is that the so-called superstructure curricula which is valid for every type of higher vocational school in agriculture and forestry, show clear improvements regarding the implementation of biodiversity compared to former curricula.

• When teachers were asked how they put biodiversity issues into practice, many stated that they highlight every single person’s responsibility for the protection of biodiversity by pointing out the link between the students’ own consumption and its impacts on biodiversity (loss). In this regard, SDG 15 – life on land – is highly connected to SDG 12 – responsible consumption and production.

Keywords used for automated search:
klima anpassung kohlenstoff ausstoß
wasserqualität nahrungsmittel
metabolismus schwermetalle
widerstandsfähigkeit

SDG 15 – life on land – is highly connected to SDG 12 – responsible consumption and production

- Most of the consulted teachers are debating the issue with their students during regular in-school lessons, while less than half of them cover it through (outdoor) projects, excursions or in the scope of school events.
- Biodiversity as a well embedded topic in the Grundfachkurs Umweltbil- dung für nachhaltige Entwicklung (Basic degree on environmental education for sustainable development) serves as a guiding principle for edu-cators regarding the implementation of the topic in every type of school level and grade.

| HLA for Umwelt- und Ressourcenmanagement | HEI for environmental and resource management | 22 |
| HLA for Forstwirtschaft | HEI for forestry | 18 |
| HLA for Landtechnik | HEI for agricultural engineering | 16 |
| HLA für Landwirtschaft und Umwelt | HEI for commercial professions “environment and economy” | 16 |
| HLA for Chemieingenieure | HEI for chemical engineers | 13 |
| HLA für Gartenbau | HEI for horticulture | 12 |
| HLA für Wein- und Obstbau | HEI for viticulture and pomology | 10 |
| HLA für Landwirtschaft | HEI for agriculture | 9 |
| HLA für Landwirtschaft und Ernährung | HEI for agriculture and nutrition | 9 |
| HLA Land- und Forstwirtschaft - Allgemeine Bestimmungen | HEI for agriculture and forestry - general provisions | 5 |
| HLA für Garten- und Landschaftsgestaltung | HEI for garden and landscape design | 3 |
| HLA für Lebensmittel- und Biotechnologie | HEI for food science and biotechnology | 3 |
| HLA für Tourismus | HEI for tourism | 3 |
| HLA für Biomedizin- und Gesundheitstechnik | HEI for biomedical and health-care engineering | 0 |
General findings & shortcomings

In the realm of the UN-Decade on Education for Sustainable Development (ESD), a lot of activities have been launched as well as a decent number of (interim) reports and reviews have been published. It can be stated that the establishment of the office has helped much in order to coordinate all efforts taken on national level.

Despite that, due to the heterogeneity of the formal school system in Austria, basically providing educators with comparatively much freedom in terms of prioritisation, both thematically and methodically, in comparison with some of the other depicted countries, education for sustainable development hasn’t seen as much formalisation as one would actually conclude in consequence of the ongoing debate on competencies. Neither an encompassing screening on activities and implementation has been carried out as indicated in the Global Action Programme, nor have curricula and other legal documents been sveepingly transformed as education for sustainable development would claim in fact.

Recommendations for implementation

- Elevating Education for sustainable development and mountain-oriented education as its regional correspondence, into the rank of a teaching principle.
- Establish subjects which cover exclusively generic competences or integrate these competences more striding in the existing canon of subjects as a function of granted autonomy status of each school (type) and field of specialisation.
- Analogous to some Swiss cantons, generic competences as outlined in the hierarchy comprising of general didactic goals, didactic principles, teaching principles and didactic concerns could be graded separately in the school reports but should be cleared up and tightened first (see Eder & Hofmann 2012).
- Topics and themes more in line with recent discussions in specialised research such as invasive species or ecosystem services are only covered in three curricula, namely higher educational institution for horticulture, higher educational institution for garden and landscape design as well as higher educational institution for forestry. In order to allow future curricula to adapt and incorporate topics evolving through the constant current discussion of related technical disciplines, some space in the education standards of each grade should remain reserved for covering current approaches and topics.
- The distinction between educational tasks and teaching duties on the one hand and teaching content on the other hand should be abolished – competencies should be defined in much detail and relevant topics should be cited illustratively.
- Curricula should be exclusively put student-centred rather than being a mixture of guidance for teacher and containing besides also learning outcomes in the form of required competencies for students.
The context of ESD in France

In a nutshell...

ESD was structured in France in the 1970s and 1980s, at the initiative of professionals in education, nature conservation and popular education. Since 1977, and especially in the 2000s, it has formalized within the National Education, first in a phase of experimentation, then generalization. From now on, ESD covers a wide range of topics and involves various partners. It includes global settlement procedures with ESD establishments (in sustainable development process). In the field of non-formal education, ESD is a priority objective for the Ministry of Youth, which supports the training of educators (several ESD diplomas) and the development of youth projects in local education policies.

Mountain (oriented) education (MoE) in general does not exist as such in school curricula – it is considered to be included in the different disciplines, dealt for example as natural habitats. There is a network in the French Alps, Educ’alpes, which has been working for several years to develop mountain (oriented) education in formal and non-formal education in collaboration with state services (Ministry of National Education, Higher Education and Research) and regional services in terms of rules and regulations, publications, trainings, etc. Mountain education as is the case here, is now part of the so-called Alpine Massif Policy Convention (Inte Massif des Alpes - CIMa et POEA).

In French higher education, the orientation of education for sustainable development took off several years later than for primary and secondary schools. It was only in 2009 that a national law “Grenelle 1” was voted by the Parliament demanding for the adoption of a “green plan” (Legifrance 2011) This “green plan” should favor sustainable development in the overall mandate of the institute. Given the competence of self-determining capacity building every institution proceeds autonomously regarding the concrete integration of sustainable development. However, this integration requires that the question for the educational objectives are clearly outlined in order to correspond to the envisaged professions (Segalàs et al. 2009).

Screening of possibilities for implementation of ESD/MoE in curricula of vocational schools

Selected relevant documents considered for assessment

Document ERTGD Grade 11, 12, 13 Écologie, Agronomie, Land Use and Sustainable Development HOURS:
This reference document of the General Education and Research Department, officially introduces experimental learning on ‘ecology, agronomy, territory and sustainable development (EATDD)’ in 2010 in secondary schools with general technological and agricultural focus. In practice, 3 hours per week are dedicated for this focus, teachers can also decide to accumulate these hours for a specific period. There is a repartition of hours per subject (biology, agronomy etc.).

Documents 2ème phase de généralisation de l’EEDD Enseignements élémentaires et secondaires and 3ème phase de généralisation de l’EEDD Enseignements élémentaires et secondaires: These documents summarize the progress of implementation of sustainable development in school curricula. The principles of sustainable development have already been integrated in education programs of primary secondary and vocational schools. Education for sustainable development is represented by schools activities and integration of the local territory. The challenge now is the development of partnerships and governance issues.

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Education for sustainable development is represented by schools activities and integration of the local territory. The challenge now is the development of partnerships and governance issues.

In French vocational schools, technological and professional learning represents 40–60% of the working time of a student.

Depending on the specialization these learning forms are carried out either in a laboratory or a building site. They contents of general teaching (French, Maths, History-Geography, Sciences and English) occupy an important place. Generally vocational schools prepare youth for a professional high school diploma which allows them to insert themselves either directly in a profession or in university.

The professional high school diploma “baccaulauréat professionnel” is prepared during three years in the “lycée”. This diploma enables to perform a professional activity in 75 specialties.

A new label has been developed, the “lycée des métiers” – vocational school of professional. This type of high school combines different forms of education: basic education, dual education, further training and validation of already gathered experience. They prepare the basis for professional and technological diploma. CAP, BEP, professional high-school diploma (Bac Pro), technological high-school diploma (Bac technologique), preparatory university courses and bachelor degrees with a specific technical orientation (license professional).

In the context of the analysis, 26 different grades ranging from vocational schools to University degrees were analyzed.
Results

Results regarding SDG 11
Sustainable cities & communities
14 degrees make explicit reference to sustainable cities and communities even though not employing the term ‘sustainable’. The descriptions focus rather on innovative material and new technology in order to save resources and raw material. Moreover, topics such as waste management, recycling and air quality are considered to constitute part of this SDG. In addition, aspects focusing rather on the social pillar of sustainable development can be found in some curricula, explicitly focusing on social integration, viable public space without barriers and working place organisation.

Results regarding SDG 13
Climate action
14 degrees make explicit reference to climate relevant topics. In this context we can situate technical courses regarding energy efficiency, environmental diagnostics, eco-construction, pollution, wood construction techniques and the durability of materials. Moreover, social ecological aspects referring to the human impact on nature, sustainable mobility and upcycling are part of some courses.

Results regarding SDG 15
Life on land
18 of the analysed degrees can be related to SDG 15, Life on land. In this context courses on biodiversity and ecosystem services, different ecosystems and nature protection can be considered. Moreover, it is dealt with agronomy, agricultural techniques, farming and irrigation methods. Again, topics on pollution and waste management can be situated in here.

Results regarding SDG 12
Responsible consumption & production
17 of the analyzed degrees refer in different extents to SDG 12. In this context, reference is made to the promotion of local value chains and short economic circuits. Moreover, the focus on sustainable agricultural practices, land and water use becomes evident; in addition, professions focusing on handicraft and artisanal working can be displayed. Also the topic of environmental degradation and environmental education may be considered in this respect.

Mountains oriented education needs to be given ...

... a formal structure in educational system in France.

General findings & shortcomings

• Mountain oriented education needs to be given a formal structure in educational system in France. Nowadays, projects and formal education is oriented toward sustainable development at national level.
• Some ideas, projects close to mountain education are sometimes implemented depending on the institutional context and student pathways.
• Actors (teachers, mountain actors) would need to be trained in order to be able to step in Mountain oriented education.
• Some initiatives don’t exist no longer. There used to be a national resources center (FDEESAC) about Mountain on this topic in national education.
• National education in France is very centralized in Paris where all the decisions makers are.

Recommendations for implementation

• Develop the topic of MoE in projects of educational institutions (during regular school time and during leisure time) and in the PEDT (educational programs of the territory).
• Relaunch a training and resource space for teachers on mountain issues in the context of the SCEREN/Canopé network (close to Ministry of National Education).
• Develop educational excursions and trips on mountain topics outdoor (e.g. classes on discovery issues).
• Develop advanced and further training for educators and teachers regarding pedagogical activities in the mountainous context.
• MoE could/should be formalized in official documents of the Ministry of National Education and Youth.
The context of ESD in Germany

Description of history of EE & ESD in formal and non-formal education

The history of environmental education in Germany goes back a long way starting with the origins of the nature conservation movement in the 19th century. With the paper of the Club of Rome 1972 different approaches emerge: environmental education, ecological learning, and, in the 1990s, education for sustainable development. The discussion about the concept of ESD in Germany was characterised by huge educational policy projects – like Transfer 21 and BLF 21, just to name a few – as well as a project to establish a framework in the field of global learning in the scope of ESD.

In Germany, (lifelong) vocational education and training is one of the areas of activity of ESD with its main goal to instill a so-called Beschäftigungsfähigkeit ("sustainable employability") among apprentices.

In Germany, lifelong vocational education and training is one of the areas of activity of ESD with its main goal to instill a so-called Beschäftigungsfähigkeit ("sustainable employability") among apprentices. It is geared towards sustainability and ecological learning, and, in the 1990s, education for sustainable development. The formal education system with regard to vocational training in Germany is strongly marked by two cornerstones: the federal structure and competence of the federal states and the dual system. In 2002, 93% of a cohort of secondary school II underwent vocational training (Hippach-Schneider et al. 2007) in a company and a school in parallel (= dual system). Apart from this, there are also Berufsfachschulen (initializing vocational schools) organized as full-time schools from grade seven onwards, either preparing students for a professional activity or vocational training, the latter mostly realized then in the dual system.

Young people who have already undergone a professional training in the dual system or have a Mittlere Reife (intermediate school-leaving certificate) can thenupon attend one of the two different forms of upper vocational schools, either the Berufsfachschule (BFS; higher vocational school) or Fachoberschule (FOS; technical college), both focusing either with the general matriculation standard (13 grades of schooling in total) or subject-related entrance qualification (12 grades), usually only allowing for university access at universities of applied sciences or university studies directly connected to the followed educational direction (Hippach-Schneider et al. 2007). Staatsinstitut für Schulentwicklung und Bildungsforschung, München 2018, online source: https://www.isb.bayern.de/berufliche-oberschule/uebersicht/.

Selected relevant documents considered for assessment


Available online here checked on 05/30/2018.


Available online here checked on 05/30/2018.

At the time of compilation of this document, the legislation for higher vocational schools in the Federal States of Bavaria underwent a thorough revision coming gradually into effect in the school grades 2017–2019. While the main body of the expiring curricula with their basic structure distinguishing between learning objectives, learning contents and indications for teaching, was geared towards the classic didactic phase structure, where the exact number of teaching hours for each field of knowledge is determined, there has been a clear shift in the recently issued curricula towards competence-oriented learning expectations. Besides, the corresponding learning contents are now kept broader with emphasis on less detailed descriptions of single teaching contents. The focal...
There has been a clear shift in the recently issued curricula towards competence oriented learning expectations.

Accordingly, students should develop digital literacy, just to name a few.

Education for sustainable development (ESD) is explicitly listed as one of the general educational goals alongside others such as professional guidance, intercultural education or media/digital literacy.

Results regarding SDG 11 – Sustainable cities & communities

Keywords used for automatized search

- Sustainable cities & communities
- Results regarding SDG 11 – Sustainable cities & communities
- Results for educational direction BOS

For reasons of clarity, the following analyses do not contain curricula effective for so-called Fachklasse (specialist classes) of the BOS curriculum/specialisation agriculture, bio- and environmental technology, nor do they include guidelines for the subject-related practical training of the FOS curriculum/specialisation agriculture. The mere reference of education for sustainable development as a general educational goal of one of the subjects was therefore the sole selection criterion for the consideration of each subject for further analysis.

Results for shared subjects in BOS & FOS

Due to the broadly formulated learning contents, the revised curricula exhibit less matches than expected with the detailed thematic key word list used for investigating the occurrence of SDG 11 – Sustainable cities & communities – relevant text passages. Naturally, natural sciences subjects such as Biology or Chemistry have less emphasis on topics addressing SDG 11 than do social sciences subjects as Ethics, History, Sociology or even Technology.

Results for educational direction BOS

In the subject History/ Social studies of grade 12 of the BOS, the reunification of Germany is covered in a separate study area. By depicting the consequences of the unification process on politics, economy, society and culture, there is a possibility for anchoring ESD 11-related activities potentially by means of a regional example.
Results for educational direction FOS

Regarding occurrence of any of the key words in the subject curricula genuine for the specialisation “agriculture” for technical colleges (FOS), only the one for Technology, grade 11, exhibits text passages picking up the topic, e.g. current trends of the local labour market or closed production loops are broached.

Results regarding SDG 12 – Responsible consumption & production

Keywords used for automated search: kapital nachhaltig nachhaltige kapitalen konsum deklation ökologie effizienz bruch energy
nachw verursachen abfall fossile benzine treibhaus gentelebenszyklus markt versagen
freibaut renumer resource produkt neupfl hilfsorganisationen
Nachhaltigkeit: verantwortung wirtschaften

Results for shared subjects in BOS & FOS

Biology, grade 13, and Technology, grade 12, exhibit the highest number of text passages related to SDG 12 – responsible consumption and production. Whereas in Biology, these identified codings refer to sustainable, often organic cultivation methods, as well as to the critical discussion of fertiliser application or herbicide use, in both upper grades of Technology (12 and 13), specialised competencies by means of learning contents such as analysis, calculation or examination of various processes and operations related to renewable energies, waste management or raw materials, are to be developed by students.

Results for educational direction BOS

The subject of History/ social studies of the strand BOS has the highest numbers of text passages associated with competencies and contents directly or indirectly related to SDG 12. Therein, in the section where latest challenges are addressed, students have to analyse the effects of regulatory policies on the economy in different societies, in order to assess these consequences for a single person’s lifeworld.

Results for educational direction FOS

Regarding the stand-alone subjects of FOS which address the general educational goal of sustainable development, all analysed subjects contain at least one text passage indicating possible points of contact for implementing SDG 12-related contents, teaching units or competencies in the spirit of mountain-oriented education. Apart from chemistry: where text passages could be retrieved in the subject curricula of both analysed grades, all other analysed curricula contain codings only in either grade 11 or grade 12 of the respective subject. In the subject Technology of grade 11, various aspects of production processes, product quality and environmental and social costs relating thereto represent the identified text passages and thus offer points of reference for SDG 12-related teaching. Interestingly in grade 12, the Chemistry curriculum of FOS, both in the competencies and contents sections, decision making competency is outlined in connection with the ethical relevance of chemical issues or its meaning to sustainable development and related other topics.

Results regarding SDG 13 – Climate action

Keywords used for automated search: klima erwärmung emission treibhaus ko2 schadstoffen fossile dauer austausch energie

Results for shared subjects in BOS & FOS

Only three subjects show one or more matches in their curricula with one of the keywords used for the automated search for points of contact for SDG 13-related education, whereas in Technology, grade 12, five text references of eight codings. In the subject Biology classes, the two have occurred in one subject each, namely Chemistry covers the acid-base buffer system, the effects of soil compactation versus heavy machinery and related other points of contact for tuition geared towards education with regard to the respective SDG 14 examined in more detail, e.g. in Biology, grade 12, site conditions at forest locations from a sociological point of view is cited or damage symptoms of domestic trees as a function of pollutant emissions or browsing by game are listed.

Results for educational direction FOS

Regarding the subjects exclusively applicable for FOS, two text passages in one subject each, namely Chemistry grade 12 and Technology grade 11, could be detected. The one in Chemistry covers the acid-base buffer capacity and its application in biologic systems such as the function of soil as carbon reservoirs. In the study area mechanical engineering in the subject curriculum of Technology grade 11, the consequences of the development of specific tools or machines on the environment are addressed. In that respect, the effects of soil compaction through the use of heavy machinery on arable land could be thematised.

Especially the subjects such as Biology, Technology, and Sociology already show various possibilities for putting ESD/ MoE into practice without adding extra load on both students and teachers.
General findings & shortcomings

Compared with the now expiring versions of the inspected curricula in the Federal State of Bavaria, a general shift of current curricula applicable for higher vocational schools in the green jobs sector (BOS & FOS) for ASU towards more flexibility with regard to both learning contents and competencies to be acquired can be stated. Whereas in the old curricula, an exact amount of hours for each study area or even learning topic has been prescribed, the present loose structure and the seemingly non-exhaustive list of learning contents definitely allow for more freedom of teaching and individual adjustment with regard to the needs and interests of the students. The identified sections of evaluated curricula as outlined above offer straight away potential for the implementation of teaching contents and activities according to the premises of ESD/ MoE and the respective learning objectives.

While especially the subjects such as Biology, Technology, and Sociology already show various possibilities for putting ESD/ MoE into practice without adding extra load on both students and teachers, other subject curricula such as for Mathematics, Physics or Chemistry which also incorporate the overarching purpose of education for sustainable development, only provide few or sometimes even no opportunities to realize ESD in the sense of MoE.

Recommendations for implementation

Persons concerned with formal education (for sustainable development) in Bavaria report a high degree of formalisation and standardisation of the higher schooling system. In the course of the revised curricula for higher vocational schools (BOS) and technical colleges (FOS), a certain detected relief of the rigid structures could be used wisely to implement MoE, especially by cooperating with external experts from NGOs, protected areas in the region or business representatives, just to name a few. In order to be able also to meet the ever increasing demands from society, nevertheless, these partnerships have to go way beyond simple out-of-school pastime or occasional school visits by experts. To ensure a fruitful and deepened partnership, the intended framework of the so-called Alpine School Model (ASM) has also to incorporate non-formal education measures and activities and focus on the interface of these two forms where learning in the spirit of ESD actually takes place.

To sum up, the already well established aspect of Global Learning/ Global Citizenship in the analysed curricula could be extended by the promising approach of MoE. The two would work together perfectly as the opposite poles of the lifelong students, including the effects of their knowledge, values and action, from local to global scale.

Steps in formal education for introduction of EE and ESD through the recommendations of the following formal documents:

National indications for Individual learning plan (2006)

Environmental education is introduced in the 1st cycle of education within a learning area called Civil Cohabitation, defining knowledge and skills to be achieved by the students within the fifth class of the primary school and within the third class of 1st grade secondary school.

Indication for the curricula (2007)

Education for citizenship whose objectives are underlined in several places indispensable are ‘the construction of the sense of legality and the development of an ethics of the responsibilities, which are realized in the duty to choose and act in a conscious way and imply the commitment to elaborate ideas and to promote actions aimed at the continuous improvement of the own context of life’. These indications are distributed in the three disciplinary areas linguistic-artistic-expressive; historical and geographical; mathematic-ical-scientific-technological I skills development goals and related learning objectives to education for the environment and sustainable development.

Document of Address for experiencing and teaching Citizenship (2009)


Guidelines for Environmental education and ESD (2009)

With the aim of providing some innovative guidelines for the development of curricula by schools and for the organization of educational and teaching activities, the Guidelines emphasized the provisions of Citizenship and Constitution and provided for the
A strong involvement of the school world in the deepening of the knowledge of environmental issues, stimulating the sensitivity of children and adolescents to make them protagonists of experiences in direct contact with nature.

Environmental education guidelines by the joint Ministry of Environment and Education (2014) In the guidelines are articulated the environmental themes considered priority in didactic itineraries, declined for the different school orders, in coherence and according to the modalities of the scholastic order structure.

National Conference on Sustainable Development act (2000) It is a general document of address presenting the outcomes of thematic working groups during a national conference which took place in Rome on November 22nd 2016, organized by the Ministry of Environment and Ministry of Education. In the working groups where working civil society and institution representatives. The focus was on the role of education about thematic issues and both involved Ministry affirm their engagement in the development of those outcomes.

Memorandums of understanding on environmental education and sustainable development in schools within the framework of the PON Scuola 2014-2020. Second national conference on environmental education and sustainable development (2016) at the end of which two ministers signed a national charter on the subject, drawn up with the contribution of hundreds of authoritative experts and senior representatives of institutions, institutions, associations, companies and universities.

Indications for the Curricula: new scenarios (2018) The document gives greater importance to the issue of citizenship, as a true background integrator and reference point of all disciplines, competing to the definition of the curriculum of the kindergarten and the first cycle of education in a vertical perspective.

National Strategy for Sustainable Development (2017) Strategic framework of reference of sectoral and territorial policies in Italy, drawing an important role for institutions, companies and universities. The strategy is the first step towards declining at national level the principles and objectives of the 2030 Agenda for Sustainable Development, adopted in 2015 at the UN level of Heads of State and Government.

Education for sustainable education plan of the Ministry of Education (2017) The aim is to transform the education and training system into an agent of change towards a model of sustainable development, making sure that each of the areas of intervention of the Ministry should be coherent with the 17 objectives of the Agenda 2030. The Sustainability Education Plan was drawn up in 20 actions, grouped into four macro-areas: structures and construction; teaching and training of teachers and teachers; university and research; information and communication.

Screening of possibilities for implementation of ESD/MoE in curricula of technical and professional institutes PROFESSIONAL Institutes The paths of the professional institutes foresee that, at the end of the school cycle, the students are supposed to be able to:

- Recognize the geographical, ecological, territorial aspects of the natural and anthropic environment, the connections with the demographic, economic, social and cultural structures and the transformations that have occurred over time.
- Master the use of technological tools with particular attention to the protection of the environment and the territory, knowing how to apply the regulations that influence the processes for the protection and enhancement of the environment and the territory.

For a more detailed depiction of the possibilities of implementation of MoE at various curricula of professional institutes, please refer to: https://www.ouralps.org/en/
Results

Learning Outcomes – general findings

TECHNICAL Institutes

Results regarding SDG 11 – Sustainable cities & communities
- Provide access to safe, convenient and sustainable transport for all, improving road safety expanding public transport and paying particular attention to those in sensitive situations.
- Reduce the negative environmental impact per capita, paying special attention to the air quality and waste management.
- Support positive economic, social and environmental reports between urban, sub-urban and rural areas through the strengthening of urban planning at national and regional level.
- Sustainable resilient buildings and spatial planning (building materials, energy saving, planning processes).

Results regarding SDG 12 – Responsible consumption & production
- Eco-friendly management of chemicals and waste through their life cycle, according to international standards, and substantially reduce the release of these in the air, water and soil, so that their negative impact on human health and the environment be minimal.
- Encourage companies, especially multinationals or large ones, to adopt sustainable practices and to integrate sustainable practices.
- Improve the use of technological tools with particular attention to the protection of the person, the environment and the territory.

As regards the paths of the technological sector, it is expressly recalled that the student is able to orientate himself in the legislation that governs the production processes, with particular attention to the protection of the environment and the territory.

Results regarding SDG 13 – Climate action
- Strengthen resilience and adaptability to climate and natural disasters in all countries.
- Integrate measures to combat climate change in national policies, strategies and plans.
- Improving teaching and awareness raising, enhancing the capacities of citizens and institutions on climate change in terms of mitigation, adaptation, impact reduction and early warning.

Results regarding SDG 15 – Life on Land
- Ecology: competition, predator-prey, community dynamics, energy flow through food webs, dispersal and ranges.
- Specific ecosystems – local and global native ecosystems and also human-made ones, e.g. managed forestry plantations.
- Threats to biodiversity habitat loss, deforestation, fragmentation, invasive species and overexploitation (caused by unsustainable production and consumption practices, unsustainable technologies, etc.)
- The dangers of extinction: Individual level endangered species: how extinction is forever, the long time needed to form species, and the six mass extinctions.
- Restoration of wildlife and saving humans as a healing force.

As recalled by the educational, cultural and professional profiles of the student at the end of the second cycle of education and training for technical institutes, the learning outcomes common to all the paths foresee that the students are able to:
- Recognizing the geographical, ecological, territorial aspects of the natural and anthropic environment, the connections with the demographic, economic, social, cultural and transformational structures that have occurred over time.
- Mastering the use of technological tools with particular attention to the protection of the person, the environment and the territory.

For a more detailed depiction of the possibilities of implementation of Md in various curricula of technical institutes, please refer to: https://www.procosal.org/en/ resources/research-technicalinstitutes/technicalinstitutes/

General findings & shortcomings

At the current state, the institutional framework on Sustainable Development (ESD) and Education for Sustainable Development (EESD) at national level in Italy is characterised through various documents but still not articulated in documents refining the implementation phase within a systemic set of criteria and indications. Both at formal and non-formal educational context can be anyway registered several best practices provided by scholastic institutions and non-formal organizations in education of Sustainable development.

Recommendations for implementation

- Facilitate networks and collaborations between those involved in sustainable development and of sustainability education also in order to promote concrete actions for the dissemination of knowledge and skills, lifestyles and production model sustainable consumption;
- Formulate proposals for the dissemination of sustainability education addressed to each degree of higher education and training;
- Propose actions for the development and support of research and teaching university oriented towards sustainability;
- Provide informal and non-formal educational tools on ESD;
- Training of teachers, from the central administration to access to the University from teaching to research;
- Setting guidelines for Sustainable Development Education.
The context of ESD in Slovenia

Education for Sustainable Development (ESD) was developed in 2005 as the foundation of a pre-existing curriculum for Environmental education. A grade later, Slovenia received a translation of international documents from the UNECE on Strategy for Education for Sustainable Development and the Quality Criteria for ESD—Schools (Beitinger et al. 2006). These two documents led to the establishment of the ESD Group, which developed the Guidelines for Education for Sustainable Development (2007), which is still the core national document in this field. On the basis of this document, the Ministry of Education then authorized the National Education Institute to incorporate the elements of sustainable development into the new and renewed curricula for elementary and secondary school. Thus, in 2006–2010, an ESD umbrella document was created as well as proposals for curricula (objectives and standards of knowledge) divided into three-grade plans for elementary school and gymnasium. Environmental education, which was a cross-curricular thematic area with its own goals and content, had to be included in individual subjects, inter-curricular discussion and various out-of-school activities (Marenzi Potamnik 2010).

When doing that, the interweaving of environmental, social, economic and cultural aspects and the complexity of objectives was greatly considered, e.g., developing the ecosystem and creative thinking (Orel 2011). Optional subjects prepared for this topic were: environmental education for elementary schools and environmental studies for gymnasiums. Despite the fact that the subjects enable pupils and students to gain knowledge of all sustainable development aspects, the review group rejected the proposed title which was Environment and sustainable development. The subjects are carried out in a small number of schools, which means that not all pupils and students have equal education in the field of sustainable development.

Screening of possibilities for implementation of ESD/MoI in curricula of vocational schools

Selected relevant documents considered for assessment & findings

In addition to the documents listed below, the implementation of the ESD concept in formal education has also been significantly influenced at national level by the Sustainable Development in School and Kindergarten magazine (which ceased publication in 2014), the consultation on the principle of sustainable development (2010), a sub-regional international meeting of UNECE (on the topic of teacher competence for the quality of ESD); various innovation and research projects; and seminars for teachers and educators on the subject of ESD.

1 Kriteriji kalovsoti za šolo, ki vpadajo v izobraževanje za trajnostni razvoj (Vodnik za izobraževanje za trajnostni razvoj) (Quality Criteria for Schools that Train and Educate for Sustainable Development (A Guide to Raising the Quality of Education for Sustainable Development)) by Zavod RS za izobraževanja za trajnostni razvoj, 2008 (National Education Institute Slovenia, 2008)

The publication is intended for school authorities and schools dealing with education for sustainable development (ESD + VITR). It presents a list of quality criteria that should serve as basis for thinking and discussion and future development in the field of ESD. The list is intended for representatives of school authorities, teachers, principals, parents and pupils/students. The proposal of quality criteria is one of the results of the project in the Comenius III European Network “School Development through Environmental Education” (SEED).

2 Slovenske vemo in izobraževanje za trajnostni razvoj pre-šolske vemo in izobraževanje za trajnostni razvoj (Educational guidelines for sustainable development from pre-primary to post-secondary education) by Ministarstvo za šolstvo in šport, 2007 (Ministry of Education and Sport, 2007).

The document explains that education for sustainable development has a central place in the development of education in the Republic of Slovenia. The main purpose of the guidelines is to emphasize the importance of education for sustainable development and to demonstrate the opportunities for achieving sustainable development in formal, non-formal and informal learning. The guidelines set out goals that will contribute to the realization of education for sustainable development; the principles that we take into account in achieving the aforementioned goals; explain how the proposed guidelines can be used in education at the level of kindergartens and schools. It explains how the written guidelines will be implemented at the Ministry of Education, various public institutes, non-governmental organizations and local communities. The document also contains the proposed measures for various stakeholders in the field of education for sustainable development (for kindergartens and schools, education of professionals etc.). The document states that when implementing the content of sustainable development in education, Slovenia relies on the following international documents:


Not all students in Slovenia encounter equal education according to ESD
For the purposes of the optional subject Sustainable Development, which includes 102 hours in secondary vocational programs, a catalogue of knowledge and a textbook were prepared.

The competencies students should gain in the field of sustainable development were developed and confirmed as part of vocational standards for VET (2011 – 2015, Centre for Vocational Education). The competencies were developed on the basis of the belief that all the jobs can become ‘greener’, and therefore competencies for sustainable development, which include environmental, social and economic responsibility, can be integrated across-the-board in VET.

For the purposes of the optional subject Sustainable Development, which includes 102 hours in secondary vocational programs, a catalogue of knowledge and a textbook were prepared. The latter comprehensively comprises the aspects of nature, economics and society along topics such as mobility, consumerism, healthy lifestyle, preservation of natural and cultural values, social inclusion, and participation. It is designed to include experience-based tasks for students (Klemen et al. 2010).

There were also several school network projects that promote the goals and principles of sustainable development – among which one is composed of secondary and higher education centres that establish a holistic approach to sustainable development (Community of Higher Vocational Schools of Slovenia – also project observer of YOURALPS project).
Results regarding SDG 11 – Sustainable cities & communities
SDG 11-related so-called Key Alpine sustainable development goals are implemented in the following subjects in technical and vocational schooling in Slovenia:
- Sustainable development
- Civil engineering structures

ESD is formally included in curricula of primary educational programs, gymnasium and vocational educational programs and adult education programs.

Results regarding SDG 12 – Responsible consumption & production
SDG 12-related so-called Key Alpine sustainable development goals are implemented in the following subjects in technical and vocational schooling in Slovenia:
- Sustainable development
- Environmental protection
- Environmental protection and the economy
- Management of natural resources and residues
- Management of potable and industrial water
- Modern economy
- Natural landscaping and urban planning
- Organic waste treatment and maintenance of biological wastewater treatment plants
- Renewable energy technologies and environmental impacts
- Soil quality and spatial management
- Basics of landscape design
- Waste management Wastewater management

Results regarding SDG 13 – Climate action
SDG 13-related so-called Key Alpine sustainable development goals are implemented in the following subjects in technical and vocational schooling in Slovenia:
- Sustainable development
- Animal husbandry
- Agricultural machinery for crop production and animal husbandry
- Plant protection
- Crop production
- Agricultural machinery for crop production and animal husbandry
- Biological analyses and monitoring
- Ecosystem, implementation of activities in an area and biomimicry
- Environmental protection
- Technical environmental protection
- Forest ecology
- Forest farming and protection
- Forest landscape management
- Materials and the environment
- Management of natural resources and residues
- Nature guiding
- Protection of natural values
- Study of earth’s crust
- Wood and its properties
- Woody biomass production

In 2016 the Education Institute of the Republic of Slovenia carried out an analysis of curricula and curricular documents. The findings showed that:
- Sustainable development is predominately included as an additional/optional subject, or topic in the curriculum and textbook, rather than pervading other topics and intertwining through the entire program.
- Sustainable development is not taught as a coherent comprehensive concept, and the topics of environmental protection predominate. Certain environmental categories are poorly represented or are not adequately addressed (sustainable mobility, sustainable construction, and circular economy), but are defined only in one or two curricula (ecosystem services, planetary constraints, green technology and green jobs). The social and economic component of sustainable development is neglected, in the latter, it lacks the inclusion of recent theories and the critical treatment of consumer behaviour.
- There is a prevalence of lower taxonomic levels of teaching goals in relation to higher ones.
- On-off environmental campaigns prevail at schools, only a small part of the activity is aimed at changing the thinking and introducing the so-called systematic approach of the area of sustainable development.

In short, ESD is formally included in curricula of primary educational programs, gymnasium and vocational educational programs and adult education programs.

Results regarding SDG 15 – Life on Land
SDG 15-related so-called Key Alpine sustainable development goals are implemented in the following subjects in technical and vocational schooling in Slovenia:
- Sustainable development
- Animal husbandry
- Agricultural machinery for crop production and animal husbandry
- Plant protection
- Crop production
- Agricultural machinery for crop production and animal husbandry
- Biological analyses and monitoring
- Ecosystem, implementation of activities in an area and biomimicry
- Environmental protection
- Technical environmental protection
- Forest ecology
- Forest farming and protection
- Forest landscape management
- Materials and the environment
- Management of natural resources and residues
- Nature guiding
- Protection of natural values
- Study of earth’s crust
- Wood and its properties
- Woody biomass production

Teaching contents
Integrating crucial issues in curricula such as climate change, biodiversity, disaster risk reduction, sustainable consumption and production.

Pedagogy and learning environments
Choosing interactive and learner-centered curricula services, which enable action-oriented teaching and learning. The learning environments: both physical and virtual - to inspire learners to work towards sustainability.

Learning outcomes
Promoting learning and developing key competences such as critical and systemic thinking, collaborative decision making, and taking responsibility for the present and future generations.

Social transformation
Empowering learners of all ages, at any learning situation, to transform themselves and the society in which they live.
- Facilitate the transition to greener economies and societies.
- Equip learners with the skills necessary for green jobs.
- Motivate people to adopt environmentally sustainable lifestyles.
- Empower people to become “global citizens” who engage and take an active role, both locally and globally, to face global challenges and solve them, and ultimately become those who proactively contribute to creating a more just, peaceful, tolerant, inclusive, safe and sustainable world.
Clearly, the status quo of MoE and ESD is different throughout the Alpine territory. However, there are some crucial recommendations, which are valid for all countries and all types of schools. Establishing MoE in the public school system will be a complex process, which can be regarded as a transition itself. Since school systems and political structures are massively diverse even throughout the Alps, it is only possible to give general recommendations and highlight directions in which the national actors should steer in order to advance the formalisation of MoE. The following five directions will be critical if MoE is to be established successfully in the public school system:

1. From learning about nature to learning in nature
   Instead of solely cognitive and theoretic knowledge acquisition, MoE should be included in projects of educational institutions during regular school time as well as during leisure time. This requires updated training and resource spaces for teachers (virtually and physically), educational excursions and pedagogical activities in mountain regions. The learning potential of nature in general and mountains in particular is far from being exhausted.

2. From input-oriented to outcome-oriented curricula
   Instead of being an input guidance for teachers, curricula should exclusively be designed as student-centred documents which deliberately describe the learning outcomes and competencies which are to be developed. Rather than addressing teachers, curricula should be primarily addressed to students and their concerns.

3. From learning about nature to learning in nature
   Instead of solely cognitive and theoretic knowledge acquisition, MoE should be included in projects of educational institutions during regular school time as well as during leisure time. This requires updated training and resource spaces for teachers (virtually and physically), educational excursions and pedagogical activities in mountain regions. The learning potential of nature in general and mountains in particular is far from being exhausted.

4. From rigid and sluggish to flexible and adaptive
   Recent scientific discussions, current societal challenges and critical issues take too long to find their way into formal education. Invasive species, ecosystem services, climate change adaptation are only some of many examples which have a direct impact on young people’s lives but will take decades until they are covered in school books. Hence, some space in the education standards of each grade should remain reserved for current approaches and topics.

5. From nice-to-have to absolute-must-have status
   MoE and ESD should be formalised in the school system, which could result in obtaining the rank for a teaching principle (AT), having a particular space in the PSED (FRI), being legitimized through official documents of the Ministry of National Education and Youth (FRI), established in individual subjects (AT) or with establishing partnerships with external experts from NGOs, protected areas or business representatives (GER).
Building a theoretical fundament
Based on extensive research it is crucial to build a theoretical fundament which shall act as the basis for future developments. The point of orientation for resources, lesson plans, activities, trainings and argumentative backbone of the MoE approach. MoE is not to be understood in competition with EE or EE but rather as an approach to valorise the regional EE learning potential in mountain regions. In the context of a sustainable and updated concept, it is of utmost importance that all subsequent developments are not only informed by the theoretical fundament but also indicate feedback loops which help to theoretical progress. If the theoretical fundament is instable, the success of the rollout of MoE is endangered. School authorities in order to ensure that MoE is understood similarly throughout the Alpine territory and the advancement of MoE in diverse. However, it is certainly commendable in all countries to build coalitions with various stakeholders and together demand a stronger position of MoE through formalising it in the public school systems. Possible coalitions certainly include formal and non-formal educators, NGOs, protected areas, small- and medium business (SMEs) but may also involve churches, universities as well as political parties. While an entry point to teacher education and teacher training is usually not connected with bigger obstacles, advancing MoE towards the curriculum requires endurance, promising networks and regular pitching.

Collecting practical experiences and co-developing resources
Theory and practice should not be regarded in their dichotomous relation but as interdependent and complementary perspectives and sources for bilateral programs. In the early stages of rolling out MoE, practical experiences, practitioners’ points of view and the aspect of co-development is crucial to ensure that MoE will not be limited to an academic audience but find its way into the hands of educators. Therefore, consortia and coalitions between theoretically firm and practically experienced individuals are key. Also, collecting practical experiences should inform the theoretical development, especially in the early stages.

Co-designing programs for teacher education and teacher training
Rolling out MoE requires an entry point into the formal education system. Teacher education programs are usually linked to universities and therefore close to cradles of innovation. Confronting future teachers with new techniques, new approaches and tools and the opportunities of MoE as a default setting, might be more promising than changing long established routines of experienced educators. In order to ensure that MoE is understood similarly throughout the Alpine territory, a collective development of a teacher training program at international level is necessary. It is critical for the success of such a training program to highlight the fact that MoE is not just another EE approach but has the potential to link all subjects under the umbrella of sustainable developments, lift the regional learning potential of a region in the mountains and trigger the development to make outdoor education elements a standard in students’ everyday life.

Continuous measures aiming at formalisation and political acceptance
Since the education systems are diverse, the options to formalise MoE at national level are manifold. Obviously, there is no one-size-fits-all solution at this level. Education is regulated very differently throughout the Alpine territory and the advancement of MoE is diverse. However, it is certainly commendable in all countries to build coalitions with various stakeholders and together demand a stronger position of MoE through formalising it in the public school systems. Possible coalitions certainly include formal and non-formal educators, NGOs, protected areas, small- and medium business (SMEs) but may also involve churches, universities as well as political parties. While an entry point to teacher education and teacher training is usually not connected with bigger obstacles, advancing MoE towards the curriculum requires endurance, promising networks and regular pitching. Since the progress in establishing new educational practices and approaches is closely linked to the political strategy and colour but also to the organisational responsibility, political authority and societal debate in a country, there are tangible differences in the advancement of MoE throughout the alpine territory. The following actions can be regarded as a plan valid for all countries, yet, the starting point as well as the level of detail might be different. However, it is understood as an iterative and adaptive process for all national contexts and should not be understood as a linear path but rather as a cyclical process. The authors of this report propose the following steps in order to implement MoE in formal education.

**Action plan**

1. Building a theoretical fundament
2. Collecting practical experiences and co-developing resources
3. Co-designing programs for teacher education and teacher training
4. Continuous measures aiming at formalisation and political acceptance
5. The perfect is the enemy of the good

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