EDUCATION FOR SUSTAINABLE DEVELOPMENT IN PRIMARY EDUCATION - DEMAND AND REALITY IN STYRIAN ELEMENTARY SCHOOLS

EDUCAÇÃO PARA O DESENVOLVIMENTO SUSTENTÁVEL NO ENSINO PRIMÁRIO - PROCURA E REALIDADE NAS ESCOLAS PRIMÁRIAS DA ESTÍRIA

EDUCACIÓN PARA EL DESARROLLO SOSTENIBLE EN LA ENSEÑANZA PRIMARIA: DEMANDA Y REALIDAD EN LAS ESCUELAS PRIMARIAS DE ESTÍRIA

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ABSTRACT | Education that supports people in making their contribution to a sustainable future is a critical part of worldwide discussions. Learners should be equipped with tools to face today's challenges and be enabled to make responsible decisions. The question of whether teaching at primary level meets this requirement is discussed in this paper. 176 pupils and seven teachers at five Styrian primary schools were surveyed based on questionnaires and guided interviews regarding their views and knowledge about sustainability-related learning contents. The data show that sustainability-related learning exists, but still there is a strong need to avoid a mere normative and one-sided approach. The paper concludes with recommendations intended to outline the general steps necessary for developing a successful Education for Sustainable Development (ESD). Adequate teacher training and the adaptation of curricular requirements at all educational levels are discussed in this context.

KEYWORDS: Sustainability, Primary school, Transformative learning, Emancipatory learning.

RESUMO | A educação que apoia as pessoas a dar a sua contribuição para um futuro sustentável é uma parte crítica das discussões mundiais. Os aprendentes devem estar equipados com ferramentas para enfrentar os desafios atuais e ser capacitados para tomar decisões responsáveis. A questão de saber se o ensino ao nível primário satisfaz este requisito é discutida neste documento. 176 alunos e sete professores de cinco escolas primárias da Estíria foram inquiridos com base em questionários e entrevistas orientadas relativamente às suas opiniões e conhecimentos sobre conteúdos de aprendizagem relacionados com a sustentabilidade. Os dados mostram que a aprendizagem relacionada com a sustentabilidade existe, mas ainda há uma forte necessidade de evitar uma abordagem meramente normativa e unilateral. O documento conclui com recomendações destinadas a delinear os passos gerais necessários para o desenvolvimento de uma Educação para o Desenvolvimento Sustentável (EDS) bem sucedida. A formação adequada de professores e a adaptação dos requisitos curriculares a todos os níveis de ensino são discutidas neste contexto.

PALAVRAS-CHAVE: Sustentabilidade, Escola primária, Aprendizagem transformadora, Aprendizagem emancipatória.

RESUMEN | Una educación que ayude a las personas a contribuir a un futuro sostenible es una parte fundamental de los debates mundiales. Hay que dotar a los alumnos de herramientas para afrontar los retos actuales y capacitarlos para tomar decisiones responsables. En este artículo se analiza si la enseñanza primaria cumple este requisito. 176 alumnos y siete profesores de cinco escuelas primarias de Estiria fueron encuestados mediante cuestionarios y entrevistas guiadas sobre sus opiniones y conocimientos acerca de los contenidos de aprendizaje relacionados con la sostenibilidad. Los datos muestran que el aprendizaje relacionado con la sostenibilidad existe, pero sigue siendo muy necesario evitar un enfoque meramente normativo y unilateral. El documento concluye con recomendaciones destinadas a esbozar los pasos generales necesarios para desarrollar con éxito una Educación para el Desarrollo Sostenible (EDS). En este contexto, se debaten la formación adecuada del profesorado y la adaptación de los requisitos curriculares en todos los niveles educativos.

PALABRAS CLAVE: Sostenibilidad, Escuela primaria, Aprendizaje transformador, Aprendizaje emancipador.

1. INTRODUCTION

Sustainability, which is not only relevant in times of crisis, has become more and more present in people's minds and discussed in media within the last years. The term "sustainability" can no longer be ignored nor seen as something that is relevant for only a few people who are directly involved. At the same time, it is a term that entails many different approaches, among others at an emotional level. Accordingly, it is a huge challenge for society, politicians and the economy to recognize sustainable development as essential. What is clear is that education can be seen as an important key for achieving goals leading to a livable future (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2020, p. iii; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021). Thus, the concept of education for sustainable development (ESD) is one of the most necessary steps which need to be taken. We are at a point where sustainability education can no longer be excluded from school curricula. Rather, it needs to be an obligatory part of everyday classes, even if school is not the only place to learn about living a sustainable lifestyle.

Up until the renewal of the Austrian primary school curricula, which will be implemented in 2023/24, sustainability itself was not specifically mentioned. Therefore, neither in lessons nor everyday school life, does sustainability seem to be as important as, for example, Mathematics or German. This can be supported by the fact that sustainability-related topics like consumer education or environmental education are only part of the so-called teaching principles. These principles are not characterized by clear mandatory teaching requirements, which could lead teachers to be reluctant to implement them. Depending on the teachers' approach and dedication, sustainability as learning content is seen either as important or as negligible. This decisively influences the quality and outcome of sustainability education.

The following research questions were addressed:

1. To what extent is the Austrian elementary school curriculum designed for sustainability learning?
2. How is education for sustainable development implemented in Styrian elementary schools and which sustainability-related learning contents are dealt with in the school context?
3. Which knowledge and which pre-concepts do pupils have regarding sustainability in general?
4. What approach and knowledge do teachers have concerning education for sustainable development?
5. What courses of action arise for education for sustainable development at the primary level and how do these seem to be reflected in current developments?

2. LITERATURE REVIEW

The concept of sustainability is already well known due to its presence in various media as well as due to the increased attention paid to this topic on an economic level. Nonetheless, forming a clear definition of the term sustainability is quite difficult (Zimmermann, 2016, p. 2). The most common definition of the term sustainability, on which the presented work is based on, refers to the balance in the satisfaction of the needs of present and future generations:

"Sustainable development meets the needs of present generations without compromising the ability of future generations to meet their own needs" (United Nations, 1987, p. 37; Pufé, 2014). When implementing this guiding principle on a local to global level, the ecological, economic and social dimensions should be considered all together. For sustainable development and a livable future, this approach is fundamental and therefore needs to be understood not only by educators, consumers or children but also by politicians, economists and producers.

In this context, it is also important to mention the United Nations 2030 Agenda, with its 17 sustainable development goals (SDGs). This agenda was adopted by all United Nations member states in 2015 and provides a concept for peace and prosperity for present and future generations as well as for the planet. All 17 SDGs are interlinked and for their compliance education is considered fundamental (United Nations, 2019).

2.1 Education for sustainable development (ESD) and its demand

ESD describes the pedagogical approach of making the concept of sustainability understandable to learners and contributing to the development of sustainable ways of thinking and behaving. Leicht et al. (2018, p. 7) define ESD as follows: "Education that encourages changes in knowledge, skills, values and attitudes to enable a more sustainable and just society for all. ESD aims to empower and equip current and future generations to meet their needs using a balanced and integrated approach to the economic, social and environmental dimensions of sustainable development."

Education plays an important role in terms of 2030 Agenda: In SDG 4 ("Quality Education"), inclusive and equitable quality education should be ensured and lifelong learning opportunities for all should be promoted (United Nations, 2016). Furthermore, the UNESCO (2020, iii) emphasizes that ESD directly supports the compliance of the SDGs and therefore to reach the general aims of 2030 Agenda. Accordingly, this can be seen as one essential demand for ESD.

Consequently, ESD aims to empower and equip learners to meet their needs using a balanced and integrated approach to the economic, social and environmental dimensions of sustainable development. However, it is important to avoid exclusively presenting students with normative, moralistic concepts. Rather, students should be encouraged to make their own meaning from information, to independently and critically consider learning content, to form opinions or to find solutions to ecological, economic or social challenges. According to various authors (Vare & Scott, 2007; Kowasch & Lippe, 2019, p. 4f), this emancipatory approach is more motivating and thus also more effective. Especially when it comes to educating learners to become responsible, self-determined, (consumption-) conscious and critical citizens.

An equally significant aspect of ESD is competence-oriented learning. The terms competencies and sustainability as well as competency orientation and ESD are inextricably linked. This is due to the fact that learning about sustainability always tries to achieve the application of knowledge and not only to transfer it. Thus, some authors, such as OECD emphasize this important connection. For them "sustainable development and social cohesion depend crucially on the competencies of the entire population - where the term 'competencies' encompasses knowledge, skills, attitudes and values" (Organisation for Economic Cooperation and Development [OECD], 2005, p. 6).

In the context of ESD, Scheppach (2014, p. 20) also emphasizes the importance of imparting competencies on both an emotional and an action-oriented basis, in addition to imparting knowledge. Scheppach (2014, p. 20) also refers to the development of partial competencies by de Haan et al. (2008, p. 188) and the OECD (2005). De Haan et al. (2008, p. 188) have elaborated twelve sub-competencies for the key competencies developed by the OECD (2005) and speak in this context of a competence-oriented education for sustainable development. These considerations are often-cited in the (research) field of ESD, especially in the German-speaking arena. For instance, according to de Haan et al. (2008, p. 188), some of the key skills learners should be able to gain include developing competences for anticipation, cooperation and participation or competences for gaining knowledge across disciplines, supporting others and reflecting on guiding principles. Further Bianchi et al. (2022) elaborated a reference model which should support education and training for sustainability based on twelve competences. This work focuses on competences like critical thinking, valuing sustainability, supporting fairness or problem framing (Bianchi et al., 2022, p. 2). Thus, a competence-oriented and emancipatory learning approach should be pursued as well as the conditions permit.

In addition, two other concepts should be mentioned when talking about education that contributes to a more livable and sustainable future. Concerning this aim, on the one hand the concept of "Transformative Learning" (TL) can be seen as indispensable (UNESCO, 2021). Transformative learning involves a process in which people recognize, question, and change their previous perspectives of meaning as such (Blum et al., 2021, p. 15). ESD and TL are two concepts, which are strongly interconnected with each other (Blum et al., 2021; Wilmans, 2017). There is no clear differentiation, even though TL might be a bit more holistic. However, both concepts follow an emancipatory demand and aim to support sustainable transformation on a global level by focusing on individual and collective action (Singer-Brodowski et al., 2022).

On the other hand, the concept of "Global citizenship education" (GCED) also plays an important role for the mentioned goal of a future worth living. Here, too, clear fundamental parallels, overlaps and commonalities can be seen. Likewise, it has a transformative approach towards education and therefore cannot be content with only the rational-cognitive transmission of knowledge (Peterlini, 2020, p. 10). This means, that is not about expanding knowledge but about changing perspectives and perception of the world (Blum et al., 2021, p. 15). Similarly, (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2022) sees ESD and GSED as two complementary approaches to advancing a "more peaceful and sustainable world through education, as well as the need to impart knowledge, competence, values and attitudes that enable each individual to make informed choices and take action at the local, national and global levels." Nevertheless, these two educational concepts are also attributed different agendas and thematic focuses as well as stakeholder groups (UNESCO, 2022). For instance, GSED clearly brings a global perspective into the learning content. To clarify in this paper, the three concepts described are not treated separately, since particularly ESD and TL overlap.

2.2 ESD in Austrian schools

As broad as the topics concerning sustainability are, there are also many ways to integrate them into school lessons and into everyday school life (Vierbuchen & Rieckmann, 2020; Kauertz et al., 2019). This applies to both primary and secondary education. Schools at primary level offer the space to let many sustainability-related topics and aspects flow directly or indirectly into

everyday school life and lessons, through openly designed learning environments and learning opportunities. Still, as stated at the beginning of this article, there is a lack of sustainability education in Austrian school curricula. Nevertheless, terms such as *environmental awareness* or *environmental protection* can be found in the current curriculum for primary school; in addition, environmental awareness is regarded in the curriculum as an important value, which should be taught (Bundesministerium für Unterricht, Kunst und Kultur [bmukk], 2012, p. 9). Furthermore, on closer examination, the values "humanity" and "justice", which are also mentioned as supporting values of society, can be interpreted as benefiting sustainable development. Thus, it might seem that education of environmental awareness is given a very high priority in the curriculum and thus teaching should also be strongly oriented towards this value. However, in primary school the education of environmental awareness only takes place more or less incidentally and is integrated in prevailing subjects. Thus, as already mentioned, "education for environmental protection" is considered a teaching principle, which can only be implemented within the interaction of several subjects (bmukk, 2012, p. 17). Accordingly, there is no separate subject that deals in depth with this topic, which is why, in most cases, "general science" lessons are used for the formation of environmental awareness. As a rule, only a limited number of learning contents are dealt with, for example waste separation, recycling or energy saving (bmukk, 2012, p. 41, 90, 186). An examination of environmental protection that goes beyond this is mostly a matter for extracurricular environmental education organizations or happens within the framework of time-limited projects. For example, the Austrian elementary school curriculum also suggests that the implementation of the teaching principles should be achieved through the use of extracurricular experts as well as project-oriented teaching and other forms of open teaching (bmukk, 2012, p. 18).

Moreover, it is useful and particularly in primary school feasible to work across subjects, as this can make the different and often very broad topics even more tangible. For example, the consumption of strawberries and bananas can be examined from several perspectives, including nutritional, economic, political, ecological, and even from an ethical-philosophical perspective. Fruits as a healthier alternative to sweets and a supplier of important nutrients should be discussed with young children, as well as the impact of importing fruits from distant countries and the resulting ecological problems. Furthermore, a critical questioning of whether every consumer good needs to be available everywhere and at any time or whether the need for certain goods can be adapted to ecological aspects is an essential learning content. Here it is also possible to use mathematics as a subject in addition to science lessons in order to calculate transport routes and at the same time to carry out a geographical/cartographic analysis with regard to countries of origin and transport routes. This example clearly shows the different perspectives that a single topic can bring with it and that a variety of skills can be trained in the process.

Sustainability education at primary level can contribute to a sustainable lifestyle and future (Kauertz et al., 2019) and therefore builds up an important basis for learning in secondary school. At the secondary level, the subjects of "nutrition and household", "household economics and nutrition", "geography and economic education", and "biology and environmental education" in particular open up the space for ESD. Here, unlike in the primary level, the concept of ESD and also consumer education find concrete curricular components (Rechtsinformationssystem, 2022a; Rechtsinformationssystem, 2022b). In the course of the revision of the curricula for primary and secondary education, however, these educational concepts are given more relevance in both cases, whereby specific sustainability-related contents

are given greater relevance and value (Rechtsinformationssystem, 2023a; Rechtsinformationssystem, 2023b). This is also already noticeably reflected in teacher training, which can be taken from the respective subject-related curricula (University College of Teacher Education Styria, 2021). Further possibilities for making ESD a part of everyday school life in both primary and secondary education are offered through (interdisciplinary) project lessons (Blum et al., 2021). Finally, the teaching principles of "economic and consumer education" and "environmental education for sustainable development" provide an impetus for incorporating relevant learning content into everyday school life. Nonetheless, as already discussed, teaching principles cannot be seen as a guarantee for a fruitful sustainability education.

2.3 The challenge of indoctrination

As previously mentioned, along with the concept of ESD comes the challenge of normative approaches and indoctrination (Kowasch & Lippe, 2019). Hardly any other topic involves such a tightrope walk between the communication of facts, normative contents, attitudes, values and the communication of a reflected, self-determined basic attitude. This challenges educators on several levels. On the one hand, they have to find their way around the complex content-related level and choose suitable learning content and topics appropriate for young learners and also be sufficiently versed in them. On the other hand, most learning content runs the risk of talking about good and bad or right and wrong approaches, behaviors, products, thinking patterns, opinions, or decisions, and introducing learners to one-sided perspectives. Whether this normative learning takes place or not, decisively depends on the learning approach and the didactical skills of the teacher.

If learners carry these one-sided views into the parental environment, it can also lead to dissatisfaction and disagreement on the part of the parents. For example, if a child learns at school that fuel-powered cars are bad for the environment and passes this on to his or her parents, the parents may feel ignored or even ambushed. This might lead to conflict situations between educators and parents. A similar situation could arise with the topic of meat consumption when children learn at school that meat consumption should be reduced or avoided for ethical, moral and environmental reasons. In both cases, these are scientifically grounded aspects (e.g., European Environment Agency, 2020; Meier and Christen, 2012; Mbow et al., 2019, p. 479), which are nevertheless associated by many people with restriction and renunciation or could have a strong influence on the (habitual) everyday life of families. Of course, as a teacher, one strives to avoid such conflict situations and is thus faced with the decision of whether such content should have a place in the classroom or in everyday school life. It is therefore understandable that teachers tend to hold back when teaching such content.

Now the question arises as to why education for sustainable development is so strongly linked to moralization in the first place. The topic of sustainability can basically be associated with ethical-moral aspects on all levels, since humans, animals and plants can always be directly or indirectly affected to a certain degree. This can automatically give rise to different values and opinions and thus also to discourses on the subject, whether it be climate change, which is relevant globally and for all living beings, social injustices or economic concerns. In most cases, rights and justice, desires, hopes and, above all, often strong emotions play a supporting role, by which people are guided in different ways, with different motivations. Accordingly, it is often very difficult to avoid dealing with a topic, free from emotional approaches (Feinberg et al., 2019).

However, it is essential to be aware of one's own approaches and of the potential effects that can result from conveying them. Ideally, it is also possible to incorporate emotions into the learning process with care in order to achieve concrete learning goals without giving too much room to moralization. A good way to avoid mere normative learning approaches is emancipatory learning, which is described in chapter 2.1.

3. METHODOLOGY

In order to elaborate the demands on ESD on the one hand and school curricula contents on the other hand, basic and current literature as well as the Austrian curriculum for primary school were examined in detail.

For the empirical study, data were collected in five selected Styrian elementary schools, based on guided interviews and short written surveys with students and guided interviews with teachers. Due to fact that sustainability is wide-ranging, often ethically and emotionally charged, this issue leaves a lot of room for interpretation. Moreover, the research questions required insights into teachers' and students' opinions, approaches and knowledge. Hence, this qualitative approach appeared to be appropriate. A total of 41 students participated in the interviews and 176 children in the written survey. The interviews were conducted in groups of two or three children in order to provide a more comfortable atmosphere. In addition, seven interviews were conducted with the teachers of the participating students. The children were between six and ten years old, age and school level were considered in the interpretation of the data. Three of the selected schools were urban schools located in the city of Graz, one can be categorized as suburban and one as rural, both located in the upper parts of Styria.

The investigation served to find answers in particular to questions 2-4. Thus, personal approaches to the topic of sustainability, ideas about possible contributions to a future worth living, as well as learning sources of sustainability-relevant content were surveyed. The latter referred to the following content areas: production of products, nutrition, justice, foreign cultures/countries, waiving, consumption/shopping, energy/electricity, thriftiness, traffic/mobility, waste, animals and plants as well as the environment. For the teachers a broader list of topics was used to investigate learning contents in more detail (Table 2). Both students and teachers were asked to assess which of these areas are part of their lessons and everyday school life. The selection of the terms and topics listed on the questionnaires was based on various literature relevant to ESD and sustainability (e.g. Krüger et al., 2014; Brock et al., 2017). The aim was to cover topics from ecological as well as economic and social fields and to achieve the best possible comparability for the evaluation of the data. At the same time, this selection was an attempt to narrow down the large thematic potential and thus make it easier for the children to answer. For the written survey, the students were asked to name or draw possible sustainability measures. To ensure that the wording was appropriate and understandable for children, the terms "sustainability" and "sustainable" were paraphrased. For instance, the students were asked to describe what can be done to contribute to a future worth living for humans, animals and plants. Furthermore, the children in the third and fourth grades (ages 8-9) were asked about personal measures that they already implement themselves.

The data were analyzed using qualitative content analysis (Mayring, 2015; Kuckartz, 2018) and subsequently interpreted with regard to relevant literature. For the analysis main categories

were created a priori according to the interview questions, subcategories were created a posteriori based on the teachers' and students' answers, using the QDA-software "MAXQDA".

4. RESULTS

This chapter gives insights into the main research results and offer answers to the questions regarding the realities of an actual state of ESD in the selected Styrian primary schools. In chapter 4.1 student's ideas for sustainability measures as well as their statements concerning sustainability related learning contents from the written survey and the interviews are summarized. Chapter 4.2 shows the results concerning sustainability related learning contents from the teachers' perspective.

4.1 Written survey and Interviews with students

Answering the questions from the written survey regarding ideas about possible contributions to a future worth living, in total, the children wrote down or drew almost 400 measures (the majority of which were multiple responses that could be categorized under several key topics). The most frequently mentioned measures are related with the topics of waste and transport/traffic (both topics were mentioned from around 50 students). Figure 1 shows examples of drawings made by the students. In some cases, a clear statement could be taken from the drawings, while in others only vague assumptions were possible. Nevertheless, the drawings provide a very interesting and valuable insight into the approaches and ideas of the students.

First and foremost, the children state that it would be sustainable to dispose garbage properly as well as to drive less and switch to alternative means of transport (Figure 1). The children most frequently mentioned the use of bicycles and scooters as well as public transportation. Walking or driving by electric cars was also mentioned by some children as a possible and personally-implemented measure.

Figure 1 Drawn statements on possible sustainability measures, first grade (age 6); proper disposal of garbage, butterfly; bicycle instead of car, nature conservation.

Three children also mentioned using the airplane less often or not using it at all as a possible measure. The reduction of CO_2 emissions was mentioned seven times as an important step towards sustainable development, while the protection of the ozone layer was mentioned only once. Furthermore, the reduction of factory operations was mentioned at least twice. Saving energy, in the sense of a conscious use of electricity, as well as the use of alternative energy

sources (solar energy) and the abolition of nuclear power plants were also attributed a positive effect on global development. Climate protection in general was stated by only one child. Contrastingly, almost twenty students rated the need for more environmental protection in general as necessary, without going into specific ideas for implementation. The protection of nature was also considered important by some children, whereby especially the youngest children referred to the protection of bees and butterflies as well as plants (Figure 1). Likewise, some students thought about the supply of living beings with water, which referred to the watering of plants and also to drinking water in general. The protection of animals was also considered an important measure by several children. Many thought of better habitats for animals, the designation of animal protection areas, the protection of marine animals and that animals should not be tortured or killed. Concerning the just presented sustainability measures from the students' perspective, the data did not clearly show whether their knowledge is based on learning in school or rather on other learning sources.

The second part of the written survey and interviews with children gives insights into sustainability-related learning contents in school from the students' perspective. The results (Table 1) show connections to the answers regarding the previously presented ideas for sustainability measures.

Table 1- Learning content in school, students' perspective; absolute/relative

Learning contents	Agreement (topic is learning content)	Consent in % of total number of questionnaires
Animals and plants	146	82,95 %
Environmental protection	146	82,95 %
Traffic/transport	133	75,57%
Climate change	116	65,91 %
Garbage	112	63,64 %
Other countries and cultures	110	62,50%
Energy/electricity	107	60,80%
Frugality	89	50,57%
Food and its production	67	38,07%
Production of goods	60	34,09%
Waiving	54	30,68%
Poverty	35	19,89%
All learning contents	10	5,68%

As can be seen in Table 1, the topics traffic/transport and garbage again are named quite often. Also the topics animals and plants, environmental protection, climate change, other countries and cultures as well as energy/electricity are quite often stated as learning content in the selected primary schools. Compared to that, other topics as for example waiving or poverty were rarely listed as part of lessons or daily school life.

4.2 Interviews with teachers

Table 2 shows which topics are included in everyday school life according to the teachers. All seven teachers stated that they dealt with the topics assigned to the ecological dimension in their lessons, except for "biodiversity", which was named as learning content by only three teachers. In addition to these three teachers, two others emphasized that they only deal with this topic to a very limited extent. Concerning the social dimension, five teachers mentioned all listed topics as learning content. Interculturality, identity, multilingualism, home, joy and quality of life as well as time and time awareness (e.g., processes need time) were each mentioned as learning content by six teachers. The topics related to the economic dimension were mentioned in less frequency compared to the social and ecological dimension. For example, the topics future and responsibility for the future, dealing with money, global injustice, rich-poor as well as production chains were stated as learning content by less than four teachers.

Table 2- Learning content in school, teachers' perspective; according to ecological, economic and social dimension (frequency of mention)

Ecological dimension	Social dimension	Economic dimension
Animals, plants (7)	Attentiveness, empathy, trust (7)	Nutrition, health (7)
Climate change/protection (7)	Celebrations, traditions (7)	Basic needs (6)
Environment (7)	Community, cooperation, team spirit, group dynamics (7)	Consumption, waiving (6)
Garbage, recycling (7)	Democracy, participation, communication (7)	waste, frugality (5)
Nature conservation (7)	Friendship (7)	Dealing with money (4)
Nature experience (7)	Needs, gratitude, satisfaction (7)	production chains (4)
Transport (7)	Rules, responsibility, justice (7)	Global injustices (3)
Noise, Loudness (6)	Interculturality, identity, multilingualism, home (6)	Rich - poor (3)
Resources, energy sources, renewable energy (4)	Joy of life/quality of life (6)	Future, responsibility for the future (2)
Biodiversity (3)	Time, time awareness (6)	

4.3 Further insights into students' and teachers' approaches to sustainability and ESD

The study also provided insights into children's understanding of the concept of sustainability, their interests in it, as well as the teachers' general approaches, perceptions, and concerns about ESD.

Most students had no clear definition for the term "sustainability" but often named different aspects of this concept, which partly correlated with their answers regarding sustainability measures (e.g. waste/garbage, transport/traffic, environmental protection). Other students associated "frugality" with this term or tried to explain their understanding of sustainability with not being wasteful. Further associations were "doing something that lasts longer" (student, 4th grade), or something that "can be preserved afterwards." (student, 2nd grade). In this regard the teachers shared their impression of the children's understanding of sustainability. They clearly stated that the children's knowledge and understanding are very

variable, depending on their parent's approach. Except for one teacher, all indicate that the children are more likely to be influenced by parents than at by learning in school.

The teachers' general approaches about ESD were very consistent. Thus, all seven teachers rated ESD as equally important as other subjects in primary school and stated that anchoring ESD in teacher education would be essential. Nevertheless, all teachers would also appreciate working with ESD-experts.

Moreover the data show differences between various attributes concerning school location, children's age, teachers' approaches to sustainability and particularly special school awards. For instance, the named learning contents as well as the children's knowledge and interests in the selected urban schools seemed to refer rather to topics like climate change, energy/electricity. Those from children in the rural schools seemed to be more related to animals, plants, nutrition and nature conservation. What can be seen as a very clear finding, is that special awards/initiatives like "ÖKOLOG" (Rauch & Pfaffenwimmer, 2020) or national park cooperations do have a noticeable impact on learners' and teachers' approaches and knowledge. This might be because "ÖKOLOG"-schools are more aware of topics concerning sustainability and environmental protection and try to integrate them into everyday school life. Whether students learn more about a sustainable lifestyle in school or rather from other learning sources cannot be clearly inferred from the results.

5. DISCUSSION

As discussed in chapter 2.1, there are several demands on ESD. On the one hand, ESD should contribute to the compliance with the 17 SDGs and to a sustainable and livable future as the superior aim. On the other hand, there are demands like emancipatory learning approaches or enabling learners to build knowledge, skills, values and attitudes in terms of sustainable development.

One problem with implementing ESD in primary schools are the framework conditions such as accessing adequate resources (e.g., concerning time and teacher's knowledge and skills). As can be seen in the results, children as well as teachers stated a lot of sustainability-related topics as learning contents in Styrian primary schools. They listed several topics associated with social, ecological and/or economic dimension of sustainability, which they learn or teach about. Nevertheless, in most cases the learning content is limited to only two main topics – waste and traffic/transport. Here, a connection can be made to the indications in the Austrian curriculum for primary schools (bmukk, 2012). The reason why the topics animals and plants show a relatively high amount of learning content consent is that it is an obligatory part of the Austrian curriculum for primary school, which is therefore taught quite often. However, this topic is not necessarily connected with sustainability. Though environmental protection and climate change show high amounts of consent when assessing them as learning content, the data did not show, that such complex topics are considered in detail. They are both quite wide-ranging topics, which can be subdivided in many more categories. In most cases, pupils as well as teachers again associated those topics with waste, traffic/transport when asked in more detail. This also applies to the sustainability measures stated by students. The fact that those two topics are most frequently stated as learning contents and sustainability measures, leads to the conclusion that teaching and learning in the field of sustainability in the selected Styrian primary schools is rather superficial

and one-sided. Hence, the demands for ESD, especially concerning the 17 SDGs, might not be fulfilled, to a large extent. However, it should be kept in mind that sustainability learning not only takes place in school but also in the learners' everyday life.

Further, the results show that emancipatory learning approaches are not implemented consciously or even familiar to the surveyed teachers. Simple, normative learning approaches (e.g., commandments or prohibitions like "eating meat is bad", "waste should not be thrown into nature", "driving a car and flying by plane harm the environment", …) are much more common. This could be due to the fact that it is easier and less time-consuming to teach these rules than allowing learners to find their own solutions and opinions. Additionally, it turned out that successful ESD is always a question of frequency and intensity. Topics dealt with only once will not necessarily stick in the pupils' minds, let alone be built up as personal values. In any case, it is important that children have the possibility to build up competencies and not just learn facts. Learners need to build up the competence to be critical, to question, to develop their own solutions and approaches, to participate and actively take part in transformative processes and to understand interrelations (UNESCO, 2020; Blum et al., 2021).

The study's limitations include the already mentioned influences concerning school location as well as children's age/school level and further the parental influences. The analyses of those attributes revealed interesting insights in some cases, and in other cases no concrete influence could be detected. As this is a complex issue, nothing can ever be attributed to a single aspect. In all cases, there are various influencing factors and framework conditions that shape the learners' approaches, knowledge and attitudes. Thus, it could be valuable to investigate these aspects in more detail. Additionally, it could be interesting to explore to what extent parental education and/or political interests influence their children's approach to the concept of sustainability.

Sustainability learning in primary in school can provide an important contribution to a future worth living especially when paying attention to some aspects as the following emerged courses of action:

Perhaps one of the most important options for action relates to the area of *teacher education and teacher training.* It is a necessary step to adapt the education and training of teachers to the requirements of ESD and to provide far more time, financial and human resources for this purpose. Furthermore, ESD must be firmly anchored in the future curricula for teacher training and represent a mandatory part of the training. An optional form of incorporating ESD into teacher training studies is not sufficient for the existing demands, as all future teachers must be enabled to successfully integrate ESD into their teaching and everyday school life. Teacher education should give teachers knowledge, skills and methods to implement ESD in their lessons as well as in everyday school life.

Similarly, the *adaption and renewal of the Austrian curriculum for primary school* is another important step towards a contribution towards sustainable development. As this has already been done, the question arises, whether ESD will be successfully implemented or not. It is conceivable that further concretizations of the instructions within the curriculum as well as adequate teacher training will be necessary.

In addition, actions like using already existing initiatives such as awards for sustainability schools, projects or external offerings and cooperations should be considered. Moreover, there

are numerous internationally applicable options for action (e.g., the "Priority Action Areas" by UNESCO, 2020), which provide valuable support and orientation.

Equally concrete methods and materials for ESD and TL can be found extensively on the internet or in literature, however these should be critically examined beforehand. Especially methods which allow an emancipatory approach should be preferred. For instance, methods like *Philosophy with children* (Krüger et al., 2014), *dilemma-based learning*, roleplays or *mystery learning* (Herdeg, 2014; Fridrich, 2015) can be seen as emancipatory.

6. CONCLUSIONS

In this chapter the basic findings with regard to the research questions as well as the main courses of options concerning ESD (not only) in primary schools are summarized.

Looking closely to the Austrian primary school curriculum the term sustainability or the concept of ESD are not explicitly mentioned. Nonetheless, several sustainability-related aspects and topics (e.g., environmental education, social learning, waste) can be found, for instance in the subject "general science" or in the teaching principles. The new school curriculum for Austrian primary schools, which will be implemented in 2023/24, will offer a bit more space for ESD. Whether this will narrow the gap between the demands of ESD and the actual outcome in primary schools will be a question of further research.

The findings of this research show, that currently ESD is not implemented quite well in Styrian primary schools, except for school with connection to special initiatives like "ÖKOLOG". Even though teachers and students named several sustainability-related topics as their learning contents, sustainability learning in the investigated schools is mostly limited to only two main topics (waste, traffic) and rather superficial. Furthermore, the findings indicate a lack of emancipatory education. Sustainability learning often happens to follow a normative approach (conveying one-sided ways of thinking, preconceived solutions, good or bad behaviors, …), which of course cannot be completely avoided especially at the primary level. Nevertheless, it is essential to be aware of one's own normative thinking and ways of teaching.

Concerning the students' knowledge and pre-concepts regarding sustainability in general the data also show that they are very focused on the topics of waste and traffic/transport. This might be due to the fact, that waste and traffic are topics of daily life and therefore quite tangible for children and teachers. According to the teachers, the children's sustainability-related knowledge as wells as their ways of thinking are strongly influenced of their parents' approach.

Moreover, all interviewed teachers do show basic understanding of sustainability and general willingness for implementing ESD in school. Thus, they would welcome to be supported by external ESD-experts as well as anchoring ESD in teacher education and training.

To conclude, the courses of actions presented in the discussion emphasize the fact that there is still a lot of work to be done for implementing ESD not only in Styrian primary schools but also the in whole Austrian education system. As already mentioned, the new curriculum for Austrian primary schools is providing more room for ESD (Rechtsinformationssystem, 2023a), nevertheless there is a strong need for ESD-related teacher education and training.

7. IMPLICATIONS

The results demonstrate that there is still a big gap between the demands of ESD and the actual outcome of sustainability education in Styrian primary schools. Therefore, it is indispensable to strengthen, foster and partially renew teacher education as well as extend resources for teaching and learning. This goes hand in hand with renewing school curricula, which has already been done for now, and consequently giving sustainability education and transformative learning much more room and value along with other important learning contents. Finding a balance in this matter, may be a substantial challenge for educators, which can be managed with the support of (educational) policy. At the same time, education is not the only solution for a transformation to a sustainable future. Change is needed especially within economic systems and political approaches. All in all, responsibility must be assumed in all of those areas in order to actually reach the ambitious goal of a livable future for living beings all over the world.

REFERENCES

Bianchi, G., Pisiotis, U., Cabrera Giraldez, M. (2022). *GreenComp – The European sustainability competence framework.* Publications Office of the European Union. https://data.europa.eu/doi/10.2760/13286

Blum, J., Fritz, M., Taigel, J., Singer-Brodowski, M., Schmitt, M., Wanner, M. (2021). *Transformatives Lernen durch Engagement. Ein Handbuch für Kooperationsprojekte zwischen Schulen und außerschulischen Akteur*innen im Kontext von Bildung für nachhaltige Entwicklung*. Umweltbundesamt. https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/final_hauptdok_uba_handbuch_transformatives_lernen_bfrei.pdf

Bundesministerium für Unterricht, Kunst und Kultur. (2012). *Lehrplan der Volksschule.* https://www.bmbwf.gv.at/dam/jcr:b89e56f6-7e9d-466d-9747-fa739d2d15e8/lp_vs_gesamt_14055.pdf

Brock, A., Grapentin, T., Haan, G. de, Kammertöns, V., Otte, I., Singer-Brodowski, M. (2017). *"Was ist gute BNE? " – Ergebnisse einer Kurzerhebung.* http://dx.doi.org/10.13140/RG.2.2.33385.08808

de Haan, G., Kamp, G., Lerch, A., Martignon, L., Müller-Christ, G., Nutzinger, H. G. (2008). *Nachhaltigkeit und Gerechtigkeit. Grundlagen und schulpraktische Konsequenzen*. Springer-Verlag.

European Environment Agency. (2020). *Monitoring CO2 emissions from passenger cars and vans in 2018*. EEA Report No. 02/2020. Luxembourg: Publications Office of the European Union. https://www.eea.europa.eu/publications/co2-emissions-from-cars-and-vans-2018

Feinberg, M., Kovacheff, C., Teper, R., Inbar, Y. (2019). Understanding the Process of Moralization: How eating meat becomes a moral issue. *Journal of Personality and Social Psychology*, *117*(1), 5072. https://doi.org/10.1037/pspa0000149

Fridrich, C. (2015). Kompetenzorientiertes Lernen mit Mysterys – didaktisches Potenzial und methodische Umsetzung eines ergebnisoffenen Lernarrangements. *GW-Unterricht*, *140*(4), 5062. https://gw-unterricht.at/images/pdf/gwu_140_50_62_fridrich.pdf

Herdeg, P. (2014). *Leitfaden Mystery. Didaktische Überlegungen und Einsatz im Unterricht.* https://www.education21.ch/sites/default/files/uploads/pdf-d/schule/unterrichtsmedien/Leitfaden%20Mystery_D.pdf

Kauertz, A., Molitor, H., Saffran, A., Schubert, S., Singer-Brodowski, M., Ulber, D., Verch, J. (2019). *Frühe Bildung für nachhaltige Entwicklung – Ziele und Gelingensbedingungen*. Stiftung Haus der kleinen Forscher. Budrich.

Kowasch, M. & Lippe, D. (2019). Moral impasses in sustainability education? Empirical results from school geography in Austria and Germany. *Environmental Education Research, 25*(7), 10661082. https://doi.org/10.1080/13504622.2018.1557112

Krüger, B., Schick, D., Metzner-Dinse, G., Schröer, B., Rohm, J. (2014). *Wie wollen wir leben? Kinder philosophieren über Nachhaltigkeit.* Eberhard von Kuenheim Stiftung. oekom.

Kuckartz, U. (2018). *Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung* (4th edition). Beltz.

Leicht, A., Heiss, J. & Byun, W. J. (2018). *Issues and trends in Education for Sustainable Development*. United Nations Educational, Scientific and Cultural Organization. https://unesdoc.unesco.org/ark:/48223/pf0000261445

Mayring, P. (2015). *Qualitative Inhaltsanalyse. Grundlagen und Techniken.* (12th fully revised and updated edition). Beltz.

Mbow, C., Rosenzweig, C. Barioni, L.G., Benton, T., Herrero, M., Krishnapillai, M. Liwenga, E., Pradhan, P., Rivera-Ferre, M.G., Sapkota, T., Tubiello, F.N., Xu, Y. (2019). Food Security. In P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D.C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira,P . Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley (Eds.), *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* (pp. 437550). https://www.ipcc.ch/site/assets/uploads/sites/4/2022/11/SRCCL_Chapter_5.pdf

Meier, T., Christen, O. (2012). Umweltwirkungen der Ernährung – Ökobilanzierung des Nahrungsmittelverbrauchs tierischer Produkte nach Gesellschaftsgruppen in Deutschland. *Schriften der Gesellschaft für Wirtschafts- und Sozialwissenschaften des Landbaues e.V.*, *47*, 315327.

Organisation for Economic Cooperation and Development. (2005). *Definition und Auswahl von Schlüsselkompetenzen.* https://www.oecd.org/pisa/35693281.pdf

Peterlini, H. K. (2020). Kein Chair zum Ausruhen. Idee und Leitgedanken des neuen UNESCO-Chair „Global Citizenship Education – Culture of Diversity and Peace" an der Universität Klagenfurt. In Österreichische UNESCO-Kommision (Eds.), *Österreichische UNESCO-Kommission Jahrbuch 2020* (pp. 1011). https://www.unesco.at/fileadmin/Redaktion/Publikationen/Publikations-Dokumente/Unesco_JB_2020_DT_WEB.pdf

Pufé, I. (2014). *Was ist Nachhaltigkeit? Dimensionen und Chancen.* https://www.bpb.de/shop/zeitschriften/apuz/188663/was-ist-nachhaltigkeit-dimensionen-und-chancen/#footnote-target-3

Rauch, F. & Pfaffenwimmer, G. (2020). The Austrian ECOLOG-Schools Programme – Networking for Environmental and Sustainability Education. In A. Gough, J. Chi Kin Lee & E. Po Keung Tsang (Eds.) (2020), *Green Schools Globally: Stories of Impact for Sustainable Development* (pp. 85102). Springer. https://www.springer.com/gp/book/9783030468194

Rechtsinformationssystem (2022a). *Rechtsvorschrift für Lehrpläne der Mittelschulen*. https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007850

Rechtsinformationssystem (2022b). *Rechtsvorschrift für Lehrpläne - allgemeinbildende höhere Schulen*. https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10008568

Rechtsinformationssystem (2023a). *Lehrplan der Volksschule.* https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2023_II_1/Anlagen_0001_CE7F0AA2_A925_4A4D_8C3C_355D12BD22D1.pdfsig

Rechtsinformationssystem (2023b). *Lehrplan der Mittelschule*. https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2023_II_1/Anlagen_0005_602132D5_6AB7_4D68_B4E4_6CF508085BA2.html

Scheppach, J. (2014). Was ist Bildung für nachhaltige Entwicklung? In B. Krüger, D. Schick, G. Metzner-Dinse, B. Schröer & J. Rohm (eds.), *Wie wollen wir leben? Kinder philosophieren über Nachhaltigkeit* (pp. 1722). oekom.

Singer-Brodowski, M., Förster, R., Eschenbacher, S., Biberhofer, P., Getzin, S. (2022). Facing Crises of Unsustainability: Creating and Holding Safe Enough Spaces for Transformative Learning in Higher Education for Sustainable Development. *Frontiers in education*, *7*, 117. https://doi.org/10.3389/feduc.2022.787490

United Nations Educational, Scientific and Cultural Organization. (2020). *Education for Sustainable Development. A roadmap*. https://unesdoc.unesco.org/ark:/48223/pf0000374802

United Nations Educational, Scientific and Cultural Organization (2021). *Reimagining Our Futures Together. A New Social Contract for Education. Report from the International Commission on the Futures of Education*. https://unesdoc.unesco.org/ark:/48223/pf0000379381

United Nations Educational, Scientific and Cultural Organization (2022). *GCED im UNESCO Kontext*. https://www.unesco.at/bildung/global-citizenship-education/gced-im-unesco-kontext/

United Nations (1987). *Report of the World Commission on Environment and Development: Our Common Future*. http://www.un-documents.net/wced-ocf.htm

United Nations (2016). *The Sustainable Development Goals Report 2016*. https://unstats.un.org/sdgs/report/2016/The%20Sustainable%20Development%20Goals%20Report%20201 6.pdf

United Nations (2019). *The Future is Now – Science for Achieving Sustainable Development*. https://sdgs.un.org/sites/default/files/2020-07/24797GSDR_report_2019.pdf

University College of Teacher Education Styria (2021). *Curriculum für das Bachelorstudium Lehramt Sekundarstufe Allgemeinbildung.* University College of Teacher Education Styria. https://www.phst.at/fileadmin/Mitteilungsblaetter/Studienjahr_2020_2021/MB_31_20210519_BA_LA_Sek AB_Veroeff.pdf

Vare, P., & Scott, W. (2007). Learning for a change: Exploring the relationship between education and sustainable development. *Journal of Education for Sustainable Development, 1*(2), 191198. https://doi.org/10.1177/097340820700100209

Vierbuchen, M.-C., Rieckmann, M. (2020). Bildung für nachhaltige Entwicklung und inklusive Bildung. Grundlagen, Konzepte und Potenziale. *Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik, 43*(1), 410. https://doi.org/10.31244/zep.2020.01.02

Wilmans, K. (2017). Mut zum Abenteuer Transformation. In Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (Eds.), *Neue Ziele. Jahrbuch Bildung für nachhaltige Entwicklung* (pp. 10-15). Forum Umweltbildung im Umweltdachverband.

Zimmermann F. M. (Ed.) (2016). *Nachhaltigkeit wofür? Von Chancen und Herausforderungen für eine nachhaltige Zukunft*. Springer Spektrum.