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Making Sense of Sustainable Development

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Teaching through Stories
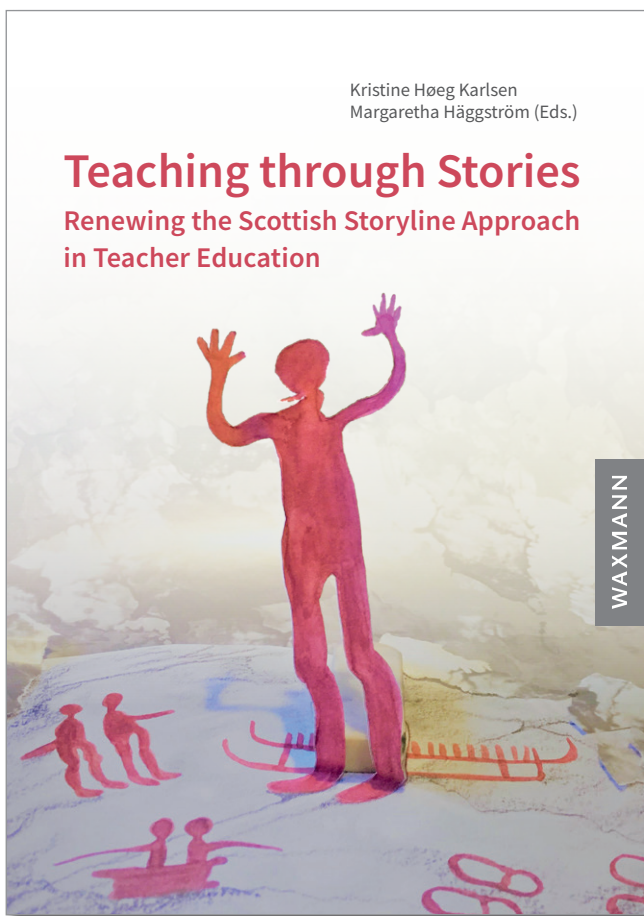### Renewing the Scottish Storyline Approach in Teacher Education

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Chapter 12

Making Sense of Sustainable Development

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Abstract. In this chapter, we share results on student teachers' experiences as participants in a Storyline on sustainable living. The aims of this Storyline project were twofold: firstly, to enhance the participants' understanding of sustainable development, and secondly to explore ways of practice-oriented teaching at campus. Enacting teaching in academic subject-matter studies provides opportunities for connecting theory and practice and to make ideas and visions for good teaching more explicit. We found that the students expressed that this project gave them opportunities to be creative and to collaborate on "real life-challenges". The students also pointed to the value of taking the role as pupils and that their own project experiences gave them an increased awareness of how to engage school children in topics related to sustainable development. The findings of this study indicate that The Storyline Approach has the potential to promote key features of Education for Sustainable Development. Furthermore, a Storyline project is composed of several core practices of good teaching. Thereby Storyline projects may offer the initial teachers experiences with an alternative to the traditional way of teaching and provide opportunities to reflect on different ways of teaching.

Keywords: Education for Sustainable Development, teacher education, practice orientation, storyline

Introduction

It is widely held that education is central to efforts to promote sustainable development for the needs of both people and the planet. Within the UN, extensive cooperation has taken place to provide policy makers with advice, tools and strategies, to facilitate education for sustainable development at all levels in the education systems. UNESCO, the UN Educational Scientific and Cultural Organisation, calls for a reorientation of education towards developing knowledge, skills, values and behaviours required for sustainable development. The overall objective is to foster active citizens who stand in solidarity and engage in reflective and co-operative learning to seek solutions to promote sustainable futures.

Initial teacher education plays a key role in the shift towards sustainability and is seen as a 'critical area' for action, as stated by an expert group set up by the United Nations Economic Commission for Europe to make recommendations to policymakers for Education for Sustainable Development (ESD) (UNECE, 2012, p.10). In a strategy document, 'Learning for the Future' (2011) the group outlined a framework for professional development to enable educators to develop and practice ESD. A main feature of the framework is transformative approaches to teaching and learning: "a transfor-

mative pedagogy that draws on the experience of learners and creates opportunities for participation and for the development of creativity, innovation, and the capacity to imagine alternative ways of living"(UNECE, 2012, p. 16-17). Therefore, a reorientation of teacher education towards ESD is not just a matter of curriculum content or the attitudes and perceptions associated with teaching and learning, but also a matter of how teacher educators actually teach and involve the student teachers in learning processes.

A persistent challenge in teacher education is to make the visions of good teaching practice apparent. For teacher-educators, this implies that we must give more thought to the planning of teaching. To paraphrase the Canadian teacher-educator and educational researcher, Tom Russell, "teacher-educators should think long and hard about how they teach and the messages conveyed by how we teach" (Russell, 1997, p.44).

In this chapter, we present a study of a Storyline on sustainable development designed to model teaching for student-teachers in coursework on campus. The objectives of the teaching were dual. It is about both the student's acquisition of academic content related to sustainable development and about the Storyline as an approach to education for sustainable development. The following questions guide the discussion in this chapter:

How to facilitate Storyline in campus coursework to make sense of sustainable development and education for sustainable development? What significance do the Storyline experiences have for the students' acquisition of knowledge of ESD as they perceive it themselves?

The Need for a Reorientation of Teaching Practice

Trends of Teaching in Norwegian Schools

According to an extensive survey conducted by researchers at the Institute of Welfare Research in Norway, most Norwegian youngsters appreciate their time in school, but a lot of them also feel bored in the classroom (Bakken, 2019). Data from almost 260 000 students from eighth to thirteenth grade, revealed that 70% of the students find school boring (ibid, p. 31). The research emphasises that these findings reveal a negative trend over the last seven years. The research data do not shed light on possible causes for this change, but at the very least provide reasons to assume that school content does not appear to be relevant to students, as put forward by the research leader in this field, Bakken (ibid. 2019). We do not know much about the reasons for this; however, a comprehensive evaluation study of the previous Norwegian curriculum reveals a few features of the current teaching practice that can possibly explain why the students feel bored in school. The evaluation study conducted over three years from 2009 to 2012 and it included 400 Norwegian school classes, grades 1–13 and three different subjects; social science, science and Norwegian. The research findings, based on classroom observations, revealed that teaching practices were characterised by instruction and direct teaching methods and students' activities were related to facts and concepts. In their final report, the researchers made the following conclusions: …*besides a few honourable*

exceptions, there were few examples that permitted pupils to wonder about something, alone or together with their teacher or classmates (Hodgson, Rønning, & Tomlinson, 2012, p. 188).

For the last 15 years, the Norwegian primary and secondary school has undergone major reforms, with new forms of management based on accountability and measurements. According to Imsen and Ramberg (2014), during the reform years, a shift in ideological orientations may have taken place among Norwegian teachers. They compared findings from two extensive national teacher-surveys that were administered over a period of 10 years, from 2002 to 2012. Their findings indicate that teachers' pedagogical orientations have undergone a change from a more progressive, student-centred view of teaching towards a more traditional view on learning and teaching and transmission of knowledge from teachers to students (Imsen & Ramberg, 2014).

These findings indicate the need to explore new ways of teaching in order to make the curricular content relevant and meaningful for learners. A study of Storyline in coursework in teacher education, conducted by Karlsen, Lockhart-Pedersen, and Bjørnstad stated that Storyline is a rewarding alternative approach to teaching and learning in teacher education. However, they called for further research on how this approach can prepare teachers for the demands of twenty-first century (2019, p. 157).

Teaching for Sustainable Futures

UNESCO defines ESD in the following manner: "Education for Sustainable Development empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity" (UNESCO, 2020). The definition is vague, and the use of general terms is paving the way for a multitude of interpretations. Although it is a good principle for all research to be reflective and critical towards these global policy agendas, we acknowledge that the overall aim of ESD seeks to empower individuals to become political subjects who do not passively observe what is happening in society but are able to act, intervene, and ask critical questions.

There are no fixed knowledge, solutions, or correct ways of behaving within the field of sustainability as the science educators and researchers, Mogensen and Schnack (2010) emphasise in their often-quoted article related to ESD. However, ESD literature reveals a few common features. Stevenson, Wals, Dillon, and Brody (2013, p. 2) provide a summary of five characteristics of ESD. Firstly, this education deals with normative and value-laden questions. Secondly, the relationship among people, society, and nature is interdisciplinary and, consequently, the education must be interdisciplinary. Thirdly, sustainable education goes beyond formal institutional settings and utilises informal public learning arenas. Fourthly, sustainable education must visualise both local and global dimensions. Fifthly, this education is not merely concerned with knowledge and understanding, attitudes, and values; it also includes agency of the learners and finding solutions (2013, p. 2).

Education for Sustainable Development and the Storyline Approach

The commonly accepted definition of "sustainable development" formulated by the Brundtland Commission is "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987, p. 37). Lambert and Morgan (2010, p. 137) challenge the use of this concept of sustainable development for educational settings. They argue that the concept is far too abstract to be meaningful to young learners (2010, p. 137). In order to make sense, questions related to sustainability must be contextualised and not referred to in general terms. "There is no such thing as a global climate change[..] but instead a million climate changes of variable speeds and effects" (Lambert & Morgan, 2010, p. 138). The teacher's challenge is to define examples that may reflect a reality that learners can relate to. Moreover, connecting the concept of sustainability to the learner's life-worlds must be facilitated by examples that provide opportunities for critical reflection, relational understanding, and enable visibility into connections between human activity and the natural environment (Lim, 2015; Møller, 2001).

ESD carries the risk of becoming an indoctrination of the moral right and wrong actions (Standish, 2009; Lambert & Morgan, 2010; Mogensen & Schnack, 2010). Rather, education must *help learners make* worthwhile distinctions (Lambert & Morgan, 2010; Mogensen & Schnack, 2010). Mogensen and Schnack emphasise the importance of participatory, democratic, and action-oriented teaching, summarising the aims of environmental education: "This way of teaching emphasises the building of capacities and powers of each human individual to question preconceived opinions, prejudices, and given facts, and intentional participation in the shaping of one's own and joint living conditions" (2010, p. 61). Further, Mogensen and Schnack (2010) argue that an "action-competence" approach entails democratic participatory learning and state that this may enable students to develop the abilities and desires to find democratic solutions to problems. Then, how can TSA contribute to learning processes that promote such goals?

Originally, TSA was developed as a cross-curricular approach to meet new requirements of the Scottish curriculum, in which environmental studies were implemented. Over the years, TSA developed into an investigative approach to experience and knowledge. According to the pioneers of Storyline, the Scottish teacher educators; Bell and Harkness, the overarching aim of TSA is to engage school children in curricular content to prepare and empower them to meet real-world challenges (Bell & Harkness, 2013). Hence, the pedagogy of Storyline appears to share several features with education for sustainable development. TSA offers a learning environment to promote creative, action-oriented and critical thinking among students. In order to elaborate on this, we quote Sallie Harkness: "A key feature of the approach is the very positive way in which it depends on and builds on pupils' existing experience and knowledge. The degree of pupil involvement is also significant, both imaginatively and in practical problem solving. TSA poses problems and asks questions of pupils rather than giving them answers to questions they have never asked" (Harkness, 2010, p. 1).

As outlined in this anthology, TSA is based on inquiry and active participation of learners. The pupils and the teacher explore ideas together. Hence, this approach is essentially experiential and constructivist. "It (Storyline) draws the curriculum together using the environment and social subjects as a stimulus to explore, using expressive arts and language as a means of discussing, describing and explaining" (Harkness, 2010, p. 1). The teacher and the students create a story together, a story with an environment and characters that mirrors real-life. Based on curricular aims the teachers plan the context of the story: time, place, and certain events and the students create the characters. Fictitious, 'simplified' worlds come to life in the classroom as models, representations of the students' knowledge and perceptions. The learners are supposed to imagine how their characters will react, think, and act when challenged by the different tasks presented to them as episodes in the story. Each episode in the Storyline begin with students discussing an open key question designed by the teacher. "What do you think might happen if …?" "In how many ways do you think …?" The students put forward hypotheses to be tested through studies of literature, data searching, experiments, discussions, etc. At best, this leads to a variety of purposeful activities, including problem solving, critical thinking, and creative work. In the following, we will outline and explain how we planned "Seaside living", a Storyline on a fundamental topic related to sustainable living, with the effort to model teaching principles related to ESD.

"Seaside Living": Description and Reasons

A group of student-teachers looks at their teacher ("teacher-in-role") as she is introducing herself as a researcher and project leader from the Norwegian Centre for Climate Research and Sustainable Development. Some of the students look astonished, some of them are smiling. You can tell from their facial expressions that this kind of behaviour was rather unexpected in a coursework context. The project leader presents the master ideas of a new and green housing project entitled "Seaside Living".

This was the way this particular Storyline was introduced to the student-teachers. The project leader explained that this was a so-called epitome project for housing development with the participation of future residents who are willing to live in sustainable ways. Further, the student-teachers were informed that this project, is financed and supported both by the government and private stakeholders. The residents are promised affordable housing prices and other benefits in exchange for active collaboration. At the end of the introduction, the audience was invited to apply to become participants in the "Seaside living" project. The student-teachers were then posed their first key question: "Who do you think would be interested in participating in the project?" The characters in the Storyline came to life while the student-teachers discussed the need and value orientations of their characters. After the presentation of the character gallery, the student-teachers began searching for sustainable solutions for cutting-edge technologies related to housing and transport as well as ideas for a socially inclusive environment. While they were working, an event was introduced to them as a debate post in a local newspaper. Two so-called climate sceptics attacked the "Seaside Living"

Img. 1: The characters were visualised as collage faces, along with biographies.

project and claimed that it was nothing but a waste of money. The student-teachers were required to respond to the article on behalf of their participants and began exploring the arguments of the climate sceptics searching for knowledge on climate change. In order to support their inquiries, a physicist gave a lecture on global warming and its consequences. This created ground for discussions in the groups, which were required to agree on arguments that were to be presented in an answer to the climate sceptics.

During the Storyline, the student-teachers were given opportunities to discuss certain fundamental aspects of sustainability and lifestyle. The participants agreed on a field to explore; housing, transport, commerce, food and social gathering areas. In the final episode, the groups presented their findings and ideas in a plenary session, with models and visuals for sustainable solutions.

Tab. 1: Storyboard for "Seaside Living"

Day	Episode	Key questions	Activity	Content	Criteria
1	Introduction "Teacher-in-role" as project leader of "Seaside living 2025" invites individuals, 25–60 years old, to participate	What kind of individuals do you think could be interested in participating? What kind of motives could they possibly have?	Groups of four Brainstorming on motives: individual, group, plenary		

Day	Episode	Key questions	Activity	Content	Criteria
	Information provided by the project-leader: The following project fields must be developed: 1. Housing 2. Social meeting spots 3. Transportation; green mobility 4. Green consumption and leisure activities	Who are the participants? What do you think life-quality means to your character? What kind of fundamental values do you think are essential to your character? Which project field does your group wish to join?	Students make one character each. Collage in A5-format Creating biographies. Request for participating in the project. The group decides on a field	Values and needs My need and other people's needs. Economic growth and sustainable development. Democratic processes	Trustworthy characters. Diversity; age, social and cultural background 1. Low emissions 2. Circular economy 3. Green mobility 4. The needs of different groups must be considered
	The characters		Presentation in plenary		
2	Inquiries the new living area	What characterises good and less good sources?	Source critique		
	Newspaper article is distributed Some politicians and climate sceptics attack the project The project leader asks the participants to write an answer to the newspaper article	What do you need to know to respond?	Discussions	Communication to the public on climate change	
	Expert lecturing on climate change and global warming	Students listen to and pose questions to the expert		Global warming. Causes and consequences	
	Newspaper article fulfilled Inquiries continue	How to create a debate article for the newspaper?	Writing an article to the newspaper.	Writing skills, argumentation.	Structure for a debate article
	Inquiries into the project tasks continues	How can you present your ideas for the audience?			Digital presentations
	Sharing ideas in cross-groups	What can you learn from listening to others' ideas?	Cross groups		
	Presentation of ideas		Plenary		
	Evaluation				

Participants and Sources of Data

This study is based on a Storyline in social science coursework, with 61 student-teachers as participants. These students were specialising to become teachers in grades 5–10 and were in their fourth semester of a five-year master's programme. During the Storyline project, the student-teachers were divided into two groups that were assigned to work with two equivalent urban living projects. The empirical base for this study comprises mainly two written sources in addition to our observations as teachers and researchers. The first written source is a simple evaluation form with questions on the student-teachers' general experiences. These forms were filled out immediately by 49 students after finalising the Storyline. The forms were anonymous and 11 of the student-teachers did not answer due to absence. The second source is 61 individual reflection texts. A week after finalising the Storyline, the student-teachers wrote individual reflection texts regarding their learning outcomes and how TSA could be related to ESD. These texts were returned in a non-anonymous manner. All the student-teachers agreed to participate in the study and were informed that they could withdraw from it at any point.

Methodological Considerations

The two of us who worked on this study participated as teachers throughout the Storyline project. It can be challenging to keep a distance from the evolving project when one is a part of it (Hammersley & Atkinson, 1987, p. 27). In exploring our own practice, we were aware of our dual role as researchers, participants in the Storyline work, and the relationship we have to the group of students as their teachers. Interpreting written sources from our students regarding our teaching practice, we took into account that their statements may be influenced by asymmetrical power relations and as their teachers we are the authorities in position to assess their individual academic performance. This is a matter of *trustworthiness* of the study, which must be reflected in the presentation of the process and in the interpretation of findings (Lincoln & Guba, 1985).

The *confirmability* of the findings is also in question. As teachers and researchers, we believe in TSA and are enthusiastic about it. Therefore, we had to be aware of research bias in the interpretation process of the student-teachers' texts and what we perceived from observing their reactions and interactions. We were left to ourselves in two different classrooms with each of our groups and we did not observe each other's work at any time. We attempted to take advantage of being teachers and performed the same Storyline, with identical storyboards, in two separate groups. Our work was analysed, and the findings were interpreted through our two different lenses and subject to critical discussions. This probably helped in strengthening the *credibility* of our findings.

When analysing the written data, we found no significant differences between the two groups of student-teachers, the data expressed the same patterns. Hence, the data from the two groups are not separated in our analysis. Given that the students in the two groups reported much of the same experiences suggests possibilities for the *transferability* in our findings. However, we are fully aware that this study deals with a specific context and that our findings may not be valid in other situations.

We analysed the two sources of data inductively in order to ensure that the student-teachers' perspectives were represented as well as possible in the results (Lincoln & Guba, 1985). The analysis began with the evaluation forms and we followed the same procedure for the analyses of the reflection texts. Firstly, we began with multiple readings of each participant's complete response from both the groups. Then, we read the entire text content and identified key points, common aspects, and divergent statements (Creswell, 1998). Based on the common and distinct features, we created a preliminary set of codes and collected responses from the two data sources and placed them into distinct units that could be meaningfully coded. Next, we discussed the samples of the responses and compared our coding efforts; we agreed on some codes or created additional codes to represent their meaning as appropriately as we could. Finally, we organised the coded data into overarching categories that we assumed would be representative of the complexity of the data and respond to the study's research questions in the best manner.

Findings

The Evaluation Forms

The evaluation form answered by forty-nine students had four open-ended questions formulated in two pairs on a sheet of paper with four columns: What did you like about the Storyline coursework/why? What could be improved/how? Although the evaluation forms were anonymous, there are still reasons to question the credibility of these responses and whether the student-teachers reported to their own teachers what they really meant and felt. However, the fact that the evaluation forms were not subject to any kind of formal assessment will probably strengthen the credibility. The student-teachers were aware that the purpose of the evaluation was to improve this Storyline's design and it is likely that they believed that they would contribute for that reason. We can add to this that the experiences put forward in the forms are in line with our observations of how they responded to and worked out the tasks given to them throughout the Storyline process.

Going through all their written statements and arguments, we distinguished and counted a total of 148. We counted 110 different statements for the first question on approvals and 38 statements for the second question on improvements. From this material, we developed categories of experiences that emerged from the evaluation forms. An analysis of the responses to the first question (what they approved and why) revealed two main themes/categories: The relevance of Storyline experiences to their *future professional practice* (Table 2) and the relevance to their *own learning process* (Table 3). In Tables 2 and 3, respectively, we will give examples of the two categories and related sub-categories.

The second question about improvements (what could be improved and how) is the third category. The students' views related to improvements revealed three sub-categories as shown in Table 4.

Future Professional Practice

Most of the students commented on how they perceived TSA as relevant to their future professional practice as well as for their own outcomes related to content specific matters and to outcomes on a personal level (Table 2).

Tab. 2: Examples of sub-categories related to future professional practice

Sub-category	Student-teachers' experiences and arguments
Transferability	"Teaching topics on sustainable development is a challenging task and now I have got ideas on how to teach such topics" "I think this design can be transferable to all school levels when working on complex questions related to Sustainable development" "I will bring these experiences of how to teach SD into my own future classroom"
Facilitating creativity	"Through this experience I learned how to support creativity in children" "I learned to know the importance of engaging students in creative and explorative learning activities"
Content specific knowledge	"I learned a lot about sustainable development that I will make use of in my daily life and as well as in the teaching of my own pupils" "I learned a lot about climate scepticism and a way to facilitating different perspectives in my future teaching" "I got a deeper understanding of climate change"
Future optimism	"We realised that there are possible sustainable solutions to ways of living" I will bring these experiences with me to school" "I think knowledge of possible solutions contributes to future optimism in young people"

Several students reported, as their first comments in the evaluation forms, that their own experiences had given them an increased awareness of how to engage school children in topics related to sustainable development. They expressed enjoyment with the creative aspects of Storyline, and they claimed that they had acquired ideas on how to foster creativity in children through their own experiences.

Learning Process

A large number of the students (36 out of 49) highlighted the opportunity to work in a creative and autonomous manner with the content matter (Table 3). Almost half of the students underlined that their experiences with collaboration in groups felt unique and authentic. We observed that they worked eagerly and that there was a good atmosphere in the classrooms. Their facial expressions and seemingly eager discussions indicated that their experiences with collaboration were positive.

Tab. 3:   Examples of sub-categories related to student-teachers' learning processes

Sub-category	Student-teachers' experiences and arguments
Meaning	"Sustainable development in a fictitious, but realistic context, motivated real dialogues in the groups" "This is concerning us" "This is a project for our time"
Collaboration	"This is real collaboration, not the traditional kind of group work we are used to" "Through collaboration, everybody engaged in searching for information and creative solutions to ways of sustainable living"
Creativity/ Autonomy	"We had time, space, and felt free to search for creative solutions" "I learned from being creative working with content knowledge; drawing, designing and discussing"
Joy	"It was fun to learn in a completely different way" "I was motivated by having fun"

Improvements

It is of great importance to take the critical comments into account (Table 4). A few student-teachers questioned the amount of time spent on Storyline at the cost of ordinary "lecture-time". Requests for more lectures can be interpreted as a need for more reviews of the curriculum on subject matter because they consider that to be the most urgent matter related to their professional practice. As teacher-educators, we share their concern because they sorely also require content knowledge to become teachers.

Further, certain statements made by the student-teachers suggest that the criteria for certain portions of the Storyline could have been clearer. However, some uncertainty is partially because they were unfamiliar with TSA. The formulation of clearer and more distinct criteria for the learning process is not necessarily desirable, while we intended to give the students freedom to react independently and unfold creativity. However, we do believe in good frames and structures in terms of ideas, models, and tools necessary to support creativity. Further, some of the students claimed that the characters should have been more involved in the project. They are certainly right. Developing key questions, which more directly involve the characters in purposeful ways, is essential. From these critical comments, we learned about the importance of structures and criteria and of sticking to a tight time-schedule. The need for predictability and strict routines will always be present in any classroom and some pupils have a greater need for structure than others do. A couple of students also felt the need for more didactical reflections during the project.

Tab. 4:   Examples of sub-categories related to improvements

Sub-categories	The students-teachers' experiences
Time spent	"Too much time spent at the cost of other activities on the cost of lectures"
Facilitation of the Storyline; Structure Criteria Content	"I think the Storyline characters should have been more involved" "I wanted more distinct criteria for the tasks given during the coursework" "I wanted more didactical reflections during the Storyline work" "I wanted to focus more on dilemmas connected to different solutions to climate problems"

The Reflection Texts

Shortly after finishing the presentations of their project work in the last episode of "Seaside Living", we conducted a review of the Storyline work and the pedagogies of TSA. Finally, the student-teachers wrote individual reflection texts on their experiences with "Seaside Living".

The reflection texts were limited to 2000 words and the student-teachers responded to the following three questions:

1.   What is your learning outcome from the Storyline project?
2.   How can TSA possibly promote the overarching curricular aims related to ESD?
3.   How can your Storyline experiences possibly be transferred to ground school teaching? Choose a grade and discuss an idea of a possible Storyline topic.

Before beginning the analysis, we anonymised these texts and followed the procedure as described earlier. The first question in the reflection texts reflected the common themes in the evaluation forms. The texts deepened the categories derived from the evaluation forms and a better understanding of how "Seaside Living" promoted creativity, problem solving and collaboration and the manner in which the student-teachers considered TSA to be transferable to the classroom. From the second question, we were able to glean their thoughts and views on TSA and ESD, and from the Storyline ideas that they put forward as responses to the last question, we obtained a few concrete indications of their knowledge of TSA. Together, these reflections provide a basis to discuss whether this approach made sense to the student-teachers and whether they consider it relevant to them as future teachers.

Creativity and Collaboration on Real-life Challenges

The words most often repeated in the evaluation forms were 'creativity' and 'collaboration' (36 out of 49 students). In the reflection texts, the student-teachers elaborated on how the sense of creativity and genuine collaboration influenced their learning outcomes. They described feelings of autonomy and space to unfold creativity. Moreover, they emphasised the possibilities of developing ideas and products, both individually and in collaboration with fellow students: "Teachers must be creative and it is an op-

portunity for us to experience creative teaching and the joy of learning, without concentrating on memorising a lot of content" (Student 28).

Another excerpt from a reflection text indicates creativity and autonomy as major factors in their learning process:

> "Coursework of this kind, with creative and open tasks, was unfamiliar to me. After a while at the university, we got into routines with reproduction of academic texts, strict formalities and structure. Therefore, I appreciated so much having this opportunity to find my own way to solve problems and create products. We all interpreted the questions in different ways and in the groups, we made meaning together and then we learned from the other groups how many different solutions of sustainable living there are" (Student 34)

This excerpt emphasises critical thinking as a natural part of problem-solving: "We were supposed to find sustainable solutions and explored alternatives and critically evaluated them" (Student 12). The following excerpt illustrates how this kind of open inquiry served as a catalyst for creativity:

> "I was really challenged to think creatively and to find solutions to problems I never had reflected upon before. I would not be so engaged if this topic were presented to me in a lecture. I have really experienced the positive sides of the Storyline method" (Student 52)

The following excerpt illustrates a student's experience of collaboration in the process of problem-solving:

> "It was difficult to discuss and to find arguments. Luckily, I had a capable group. They helped me to understand the expert lecture on climate change and they made it possible for me to understand the arguments of the climate sceptics and what is really happening regarding global climate change in the world. […] we were challenged to discuss, to be creative and search for possible solutions […]." (Student 37)

A multitude of perspectives will always be present in a Storyline context. Several student-teachers emphasised this aspect as being important for their learning outcome: "Because the characters had diverse characteristics, beliefs, and personality, I learned about different ways of thinking, views, and beliefs. I had to argue for views on behalf of my character; views I do not share myself" (Student 13). The same student also reflected on an outcome at a more personal level, as he/she claimed that as a result of the Storyline, he/she had begun reflecting more upon own consumption and own ability to act.

Cooperation, like creativity, is probably fundamental to teaching in ESD. As Sandri (2013, p. 768) claims, "the teachers should focus more on supporting their students to ask questions in order to find new solutions rather than providing them with answers'. In the evaluation texts, numerous student-teachers expressed the joy of doing practical, creative, and varied activities together along with their fellow students. A few students characterised the collaboration as unique or real; in the texts, they elaborated how the

collaboration worked to enhance their learning outcomes. One student phrased it in the following manner:

> "According to my experience, group work is often a burden with little learning outcome. In this project, however, it has been quite the opposite. We worked on meaningful, concrete tasks together. I want to bring this perspective to my future classroom" (Student 45).

The following excerpt indicates how they supported each other in their individual learning processes:

> "From the very beginning, Storyline engaged me because creativity and collaboration unfolded plenty of resources in our group. According to my experiences, traditional teaching makes pupils passive and the teachers do not make use of the pupils' resources" (Student 39)

Several students attributed their positive experiences of collaboration to a meaningful context and content that felt relevant to them. In the evaluation forms, one of the students expressed, "Sustainable development in a fictitious, but realistic context, motivated real dialogues in the groups" and another one stated that this is a "project of our time".

Transferability to the Classroom

Statements made in the evaluation forms (22 of 49) indicate that taking the role as pupils made them reflect upon their roles as future teachers. One of the students elaborated this in the reflection text: "This Storyline was a positive experience and useful to bring along into my future classroom on how to include children, building relations and friendship among them". (Student 54). The following excerpt reflects challenge in teacher education, bridging the gap between theory and practice:

> "The use of creativity, imagination, cross-curricular approaches are what the teacher-educators tell us to do, but we get little of the practical guidance or opportunities to experience on how to do it" (Student 39)

Participating in the Storyline as learners, and not merely receiving a lecture on the method provided opportunities for critical reflection and finding ways to deal with the pitfalls of Storyline: "For us as student-teachers an important factor is that we became aware of potential problems in the Storyline project and possible solutions to these problems". (Student 38)

The student-teacher quote below emphasises how first-hand experiences are advantageous:

> "You learn from 'hands-on' experiences, to feel it on your body. I think it will be easier to implement SL to your future classroom, especially because it was connected to our own acquiring of new content knowledge […]. You get ideas and thoughts to build upon. I appreciated the combination of creativity, collaboration and in-depth seeking

for knowledge. Storyline embraces different pupils. Somebody likes to do more creative work while others prefer to dig into subject matters" (Student 47).

In the evaluation forms, approximately half of the students (32 students) made statements related to specific outcomes in terms of content matter. The following excerpt indicates how one of them considered the Storyline-work to be supportive of perspectives on sustainable development, as outlined in the national curriculum and in the literature on ESD:

> "We worked in a way that I think corresponds well with the competencies [for ESD] listed by Sinnes (author of curricular literature on ESD, Sinnes, 2017) as significant in her book. Therefore, this topic feels so relevant to me" (Student 8)

Our findings indicate that the content matter as well as the teaching approach turned out to be meaningful and relevant to the learners. The reasons provided by the student-teachers have a lot to do with engaging in tasks and facing challenges in a context that made sense to them.

Making Sense of Storyline and Education for Sustainable Development

The findings of the study suggest that Storyline facilitated the student-teachers' encounters with the essentials of the content and made these accessible to them. There are reasons to assume that several student-teachers gained fundamental learning experience from insight into real-world challenges, both personally and professionally, related to both ESD and TSA. The didactical metaphor "double unlocking" derived from the theories of Wolfgang Klafki (Klafki, 2000) may characterise these learning processes, in the sense that the "Seaside Living" unlocked the students to the knowledge and the knowledge was unlocked to them. The search for solutions motivated "genuine cooperation" according to some of the students. The Storyline offered a learning environment to explore real-life problems and to engage in dialogues on values and possible solutions for future living. In the literature on education, authentic learning is often characterised by activities that mimic real-world situations, meaningful contexts as extensions of the learner's world, and by the learners being personally and emotionally involved (Rule, 2006). This is at the heart of transformative pedagogy and ESD. It is much about how well we succeed in organising students to plan and act with others, to learn from each other, and seek to make collective decisions (Adomßent & Hoffmann, 2013). One of the student-teachers explicitly indicated the experience of the teacher-educators discussing visions of good teaching and how these visions remained unclear to them. This is a seemingly enduring challenge in teacher education and is aptly described by Peck and Tucker: ""Do as I say, not as I do" is a poor formula for getting people to act the way you want them to" (Peck & Tucker, 1973, p. 955 in Loughran & Hamilton, 2016). This paradox calls for critical self-reflection among teacher-educators who do not see practical work in the classroom as their responsibility. According to a research study

on six teacher education institutions in Norway, teacher-educators tend to look upon schools as the primary site for student-teachers to learn about practice and consider that questions of practice must be delegated to schools (Hammerness, 2013, p. 412). The manner in which teaching is perceived and the ways in which learning about teaching is experienced differs substantially among teacher-educators. This is a challenge at the general level of pedagogy, but it becomes even more challenging in terms of subject specialisation as highlighted in studies of "pedagogical content knowledge" (PCK) (Loughran & Hamilton, 2016, p.5). Teaching involves constant priorities and time is a crucial variable in coursework and increasing the amount of time spent learning in, through, and about practice is likely to take time away from other aspects of teacher education. Certain scholars have raised questions regarding whether it can be at the cost of development of specialised content knowledge (Ball, Thames, & Phelps, 2008). This is a key issue in the pedagogy of teacher education – the activity that teacher-educators engage student-teachers in to support their learning of content knowledge as well as of practice. Our experiences with "Seaside Living" indicate that it may be worth the time spent.

Enacting teaching in subject studies on campus as means of connecting theory and practice is a possible method to make the visions of good teaching more explicit to student-teachers. We made our teaching a site for inquiry and made it possible for the student-teachers to gain an insight into practice. "Seaside Living" also created a site for inquiry to support the student-teachers in developing pedagogical content knowledge.

Conclusion

It is evident that ESD calls for alternative educational programmes and transformative pedagogy. The findings of this study indicate that TSA has the potential to promote key features of ESD according to the guidelines of the UNECE expert group – transformative pedagogy that draws on the experience of learners and creates opportunities for the development of creativity and the capacity to imagine and examine alternative ways of living. Storyline is also worth time spent for numerous purposes in teacher education. The approach is composed of several core practices of good teaching. For example, consequently taking the students' prior knowledge into account and supporting students with frameworks for learning, structures and criteria. Further, Storyline uses open questioning to enhance the students' hypotheses, thereby enabling them to explore and examine information. TSA offers the initial teachers experiences with an alternative to the traditional way of teaching and opportunities to decompose and reflect on different ways of teaching.

Relevance and choice in the Storyline project, along with discourse within a community of learners appeared to motivate and empower student-teachers to increase their knowledge. The findings of this study indicate that "Seaside Living" promoted the student-teachers' understanding of sustainable development and ESD. Modelling Storyline provided opportunities to see teaching from a student's perspective and reflect upon and discuss the principles of teaching and learning in the context of sustainability. In this sense, enacting pedagogy in coursework can serve as an alternative "field expe-

rience", offering students the opportunities to yield new insights and understanding of teaching and learning and, thus, forge links between theory and practice.

We put considerable effort into planning this Storyline project, and found it rewarding, particularly in terms of engaging the student-teachers in meaningful learning activities, as we observed how creativity, inquiries, and dialogues unfolded in coursework on the university campus.

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