

Designing an online learning platform for supporting Education for Sustainable Development

– to deliver knowledge, influence attitudes and enable actions for sustainable development in secondary schools.

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ABSTRACT: Education for sustainable development (ESD) is recognized as a key foundation on which a sustainable future is built. This entails enabling acquisition of knowledge and skills, influencing values and attitudes, and aiding sustainable actions. In a two-year transnational research and development project, project partners have been engaged in designing and delivering an online learning platform (OLP) for supporting teachers applying ESD, in secondary schools.

This article discusses the design process and the challenges that arose with transforming identified research and policies to a suitable OLP for teachers to bring into their teaching, across diverse learning settings. Findings from the design process are based on observations from an initial Learning Design (LD) workshop with the involved project partners and a subsequent workshop with students interacting with the platform, together with project partner experiences on the overall design process and with teachers having applied the platform in their teaching. Discoveries from the development project unfolds challenges in designing an OLP for supporting ESD in schools, with a flexibility and sensitivity towards socio-cultural complexities and diverse learning contexts.

KEYWORDS: Education for sustainable development; Online learning platform

Educating for sustainable development and global citizenship

As stated in the Brundtland report a sustainable future encompasses “the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). These future young generations, need to be equipped with agency to address the complex issues of sustainable development, by achieving the necessary knowledge and skills and be motivated

for and capable of enabling individual and collective sustainable actions towards society and the planet. They will inherit the increasingly globalized and interconnected planet, where resources are not limitless (UNESCO, 2021), and be charged with taking better care of it than previous generations, pointing towards an early engagement in sustainable development. It has been argued that ESD needs to include global citizenship education empowering learners of all ages to take active part, both locally and globally, in building more peaceful, tolerant, inclusive, and secure societies (Petersen, 2022), while taking in the complexity of the entanglements of human relations, various cultures, as well as nature and the non-human and human relations.

Despite the UN World Decade of Education for Sustainable Development (UNESCO, 2005), there is a continued call for a systematic work with national curricula for sustainable development and global citizenship, as well as provide suitable teaching material and sufficient teacher training (UNESCO, 2016). In 2015, the United Nations member states adopted the 17 Sustainable Development Goals (SDGs). Individually they address areas within the three pillars; environmental, social, and economic sustainability, however, they are integrated and interdependent, with actions in one area affecting outcomes in the others. ESD is an essential contribution to achieving the SDGs, and ESD is addressed in target 4.7 which dictates the need for lifelong education for sustainable development and global citizenship (UN, n.d.). In addition to course-specific learning outcomes, key competencies, such as systems thinking competency, anticipatory competency, and collaboration competency, being context-independent should also be in mind when designing ESD for sustainable citizens (UNESCO, 2017). Keeping a pertinent awareness of the diversity of learning settings and socio-cultural contexts. With knowledge relating to understanding concepts, knowing facts, and thinking skills. Attitudes relating to real-life sensory experiences and discussions that influence values and attitudes and hence possibly foster sustainable actions which are necessary for sustainable development and only happen where there is the opportunity to take action (Rieckmann, 2018).

Online learning environments can be argued to be suitable for SDG education, as it provides opportunity for people to connect across borders and continents thus fostering multiple perspectives needed to understand the complexity of the world in the 21st century. Nevertheless, there is also a known unequal distribution both between and within countries, when it comes to digital literacy in students as well as teachers and availability of devices, platforms, and bandwidth, as well as a disregard for those who value and rely on indigenous, low-tech, transient, and non-commoditized forms of knowledge, which needs to be taken into account when designing for ESD in an online format (European Commission, 2022; UNESCO, 2021).

The development projects aim to develop an OLP to support teachers in applying ESD and empower students to become sustainability change agents in society fostered the question: How to design an OLP for ESD, across diverse learning settings and socio-cultural contexts.

In this article we investigate and discuss the design approach from the development project, aiming at delivering an open-access OLP for supporting teachers in applying ESD in secondary schools.

Project background and tasks

A cross-disciplinary project team joined forces in a transnational research and development project to develop and deliver an online open-access SDG learning platform for teachers to apply ESD in secondary schools. The platform was designed and developed for students to

interact with, to learn about global citizenship and sustainable development, while at the same time providing approaches for teachers to initiate and facilitate ESD in their teaching.

The project team comprised partners from five EU countries, who had different roles and tasks in the project. Some identified and revised the scientific content for the OLP. Others were in charge of supporting the design and development of the OLP. Global citizenship and the SDG topics from the OLP were mapped against national curricula across the involved partner countries, to support and enable teachers in implementing the OLP in their teaching and a teacher manual was developed in connection with the OLP.

Approach for designing the OLP

The development process of the OLP illustrated in Fig. 1. was carried out over a period of two years. The process consisted of two stages, with interventional design workshops and space of time, where the project partners developed content for the OLP. The initial workshop in stage 1 was facilitated through a LD approach to support a systematic design process, where the involved partners explicate and make pedagogically informed decisions (Conole, 2013) regarding the design of the OLP. The workshop was carried out during a two-day project meeting with the project partners. The LD approach was based on the framework “Blend for ESD” (B-ESD) (Jensen & Pilgaard, 2022) and aimed at supporting the project partners in content identification and development of learning activities for the platform and the design of the OLP as a whole. Project partners then engaged in a 6-month design and production phase. Afterwards, a workshop involving students was carried out, to accommodate the development of a platform that is recognized as interesting and relevant for the target group, being students in secondary school. Feedback from the workshop with the students was ground for further re-design of the OLP.

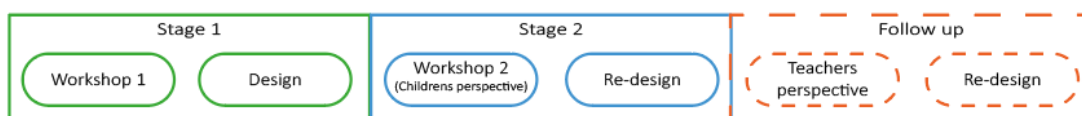


Fig 1. Illustration of the development process

To gain knowledge on the systematic LD workshops significance in the design process, participant observations were conducted and gathered as fieldnotes and documents from the workshop, such as ideas and drafts for the topics and learning activities to be included on the platform were collected and analyzed. The second stage of the design process was initiated through a workshop with students interacting with the platform. Feedback from the students inspired for re-design of the OLP. The two workshops and the design process were evaluated by the project partners in a follow-up phase, which also comprised semi-structured group interviews with eight teachers having tested the platform, to gain knowledge on teachers' use of the OLP for ESD in their teaching, across diverse learning settings.

The LD workshop with project partners and designing the OLP

The initial workshop (Fig. 1) focused on the compiled scientific material and policies for the first topic for the OLP. Prior to the LD process project partners, who were not experienced in

developing an OLP, were introduced to research on how to design for online learning and technical possibilities, as well as pedagogical attention on how to design for online learning.

The LD workshop consisted of four stages addressing: Why, Who, What, and How and was facilitated by the project partners in charge of supporting the design and development of the online learning. ‘Why’ addresses the overall objectives for the design of the platform. ‘Who’ are the expected users of the platform. ‘What’, aimed for the project partners to identify and sort topics within the compiled scientific material, using the three categories, knowledge, attitudes, and actions (Jensen & Pilgaard, 2022; UNESCO, 2017). How supported discussions and decision making on which online content and activities to create and/or apply to the platform such as videos, texts, quizzes, and reflection questions, but also on-site activities supported by engagement with the platform. Concurrently with the LD workshop, project partners started developing a teacher manual for the platform, to support teachers in using the platform in their teaching, containing pedagogical introductions, online activity suggestions, as well as in-class activities in connection with the content presented on the platform. Likewise, an approach for mapping national global citizenship and SDG curriculum was performed. Following the workshop, the project partners engaged in a 6-month design and production phase of the OLP, with continued sparring throughout the design process.

Workshop with students and re-designing the OLP

In the second stage of the design process (Fig. 1), 20 students from an international school participated in an approx. 2-hour workshop to test and evaluate the OLP. Groups of four to five students, having their own computer, were introduced to the first version of the OLP and interacted with the section on human rights on the platform. Initially, they studied knowledge about human rights on the platform, by reading texts, studying graphs, and watching videos. The students themselves decided how to approach the content on the platform. Some students reviewed the material by themselves, while others explored in pairs. Thereupon, the students cooperated in groups to solve an on-site task from the platform. The students were provided with necessary equipment such as paper, scissors, pencils, etc., while the students on their own initiative provided digital tools, using their computers. One group drew a poster, while others wrote a song, or a poem or prepared a roleplay and masquerade. All tasks were presented to the other students, their teachers, and participating project partners followed by group interviews unfolding their user experience with the platform. It included the students’ view on the content, their engagement, and the visual layout of the platform, including the length of text, number of graphs, videos, and quizzes.

The online learning platform

The product of the design process was an interactive OLP framing five topics, casing the economic, social, and environmental pillars. Each topic covers three to four subtopics. The topics consist of; 1) an introduction to the topic, 2) three to four subtopics, with subsequent sections, presenting factual knowledge and perspectives through text, interactive graphs, and videos. Within each subtopic questions and quizzes are provided, for reflections and discussion. These can be exercised alone, in small groups, or with the whole class and 3) an on-site task, with a variety of learning activities, both analog or digital, such as making an infographic, comic strip, roleplay, or a song, developing a recycling system to be used in the classroom or

at home or engaging in creating or developing a strategy to grow vegetables with a lower CO2 footprint in the local area. Each topic and subtopic on the OLP can be used consecutively over a longer teaching period or as a stand-alone learning activity and “pick and mix” in a few lessons. To support the teachers in applying ESD in their classes the developed teacher manual found on the OLP introduces ways of utilizing the platform and inspires on-site activities in conjunction with the content presented on the OLP. The mapping of national curricula in the project partner countries against global citizenship and sustainable development was also made available at the platform, to support the teachers in ESD and applying platform topics and content in their teaching.

Discussion and conclusion

ESD encompasses facilitating the youth to reflect through multiculturalism, globalization, and future-oriented ways, to impact future decision-making and behavior and possibly create occasions for the students to learn from one another and value one another across differences. People's willingness to live and act pro-sustainable is closely related to their belief, that it will affect their well-being (Nygaard, 2019), which points to an attention toward including content and activities focusing on distributing knowledge, but also aims at skills, attitudes and encourage and enable actions in the students' everyday life when designing for ESD. With the project's aim to design an OLP for ESD, this leads to the question: How to design a global OLP that provides students with both knowledge 'head', the attitudes and values of the 'heart' and provide them with the ability and skills to take sustainable actions, such as by the 'hands' and simultaneously support the teachers across various and alternative cultures and futures of education in implementing this in their teaching.

Research has shown that people with little experience in implementing new technology and integrating online learning can benefit from both technological and pedagogical discussions and feedback from a Learning designer consultant (Buus, 2015). An LD approach was developed and facilitated as a systematic approach for Stage 1 of the project's design process (Fig. 1), where pedagogical values, sustainable development, and platform content were discussed and concretized. With the B-ESD framework (Jensen & Pilgaard, 2022), discoveries from the initial LD workshop, addressing why, who, what, and how identified some awareness points, that are relevant to address and discuss when designing an open access OLP for ESD. First, the project partners were given the possibility of getting to know each other and discussing each other's perspectives on SD, ESD, and the purpose of the project. This led to reflections on the design approach for an open access OLP, with attention towards cultural and contextual diversities, such as diversities in education and understanding of learning. When addressing who the students in secondary schools are, it emerged how diverse the target group and their cultural and contextual lives are, both within and between the European project partner countries, and even more so globally. In line with discussions on who are students in secondary schools, project partners expressed concerns on designing content for children in secondary schools, when not trained in this. These discussions and reflections supported the design choice, to include a student workshop in the design process (Stage 2, Fig. 1), to learn from the students and bring their perspectives into play in the design of the OLP. When designing with children, Alison Druin (2002) points to the different roles children can have, i.e. user, tester, informant or design partner. At the time of the student workshop, the develop-

ment of the platform was at an early stage, and the students were invited as testers of a prototype of the platform to explore perspectives on their experiences with the platform as input for further iterations. Retrospectively the project could have involved the students as design partners for gaining more input on the design and development. It could also have been interesting to gain knowledge on the students use of existing online platforms both in educational contexts and leisure time.

The platform was designed in English and many of the linked resources were in English. The workshop with students raised attention to the high English level, as well as the language complexity and literacy level. This feedback was brought back into the design process, leading to adjustments, such as reducing text complexity on the platform. The project partners also chose to translate the project-created platform content into the project partner languages in the final stage of the project. The quickly developing technological and digital solutions for issues such as language barriers and web accessibility can hopefully help equalize inequalities due to language issues or impairments when designing OLPs. Teachers having used the platform in their teaching reported that the students appreciated the interactive possibility of the OLP. But again, attention to the high degree of diversity in the digital and technological skills of students, both nationally and globally is needed. In accordance with reflections on students in secondary schools as the target group for the OLP platform, there were discussions on what should be included on the platform and how. One point of awareness emerging regarding the socio-cultural differences of the students using the platform was the layout of OLP, such as what pictures to include on the platform. Project partners were very attentive in assuring that photos did not only represent European native people or include settings or activities primarily targeting students from industrialized countries. The described reflections on who is the target group and the socio-cultural diversities from the project's design process are in line with the issues raised by UNESCO in the *Reimagining our Future together: a new social contract for education* (UNESCO, 2021) on how digital technologies can pose significant threats to knowledge diversity, cultural inclusion etc., which can challenge ESD. With Druin's (2002) perspectives in mind, it will be relevant in future projects to explore how co-designing with students can contribute to the development and transformation of ESD. Exploring if and how more co-design workshops with students during the design process, as well as using more socio-cultural diverse groups of students could positively benefit the approaches for designing for ESD.

Human – Nature connectedness (Barragan-Jason et al., 2022, 2023) focuses on how people experience themselves as part of nature and is essential for and enhances pro-environment behavior and human welfare and that learning environments are where learners learn what they live and live what they learn, which argues that emotions must be brought into play when designing ESD. Identifying subjects from the compiled SD research material and rethinking them communicated to students, making it relevant to them and something they can relate to, was done through what and how in the LD workshop. Project partners were facilitated in keeping 'head', 'hands', and 'heart' in mind and designing towards both delivering knowledge, influencing attitudes, and encouraging to bring sustainable actions into play in the students everyday life e.g. in schools, home, or local areas through. Young people are concerned about our planet's problems and reflections on how to create learning activities from sustainable development themes without bringing fear into the students minds or perhaps more so, how to handle the already existing concerns (Jensen & Schnack, 1997) were discussed during the design process. Ojala (Ojala & Bengtsson, 2019) describes a gap between the worry of young people about the climate and environment and their pro-environmental behavior, with the

young feeling a lack of sense of empowerment and agency regarding the climate threat. Learning activities for the platform were designed without aiming solely on delivering and testing knowledge and skills but aimed at addressing their concerns and influencing pro-environmental attitudes, while achieving key competencies (UNESCO, 2017), such as collaboration and critical thinking through discussions and shared reflections, as it is known that peers matter in terms of engagement concerning environmental problems in young people (Ojala & Bengtsson, 2019). Hence fostering a personal position with respect to overarching and global environmental issues, while inspiring the students to take action and responsibility for the environment in areas where they themselves can exercise direct influence (Jensen & Schnack, 1997).

Besides an orientation towards ‘head’, ‘hands’, and ‘heart’ in ESD, attentions are made to addressing the diverse learning settings and contexts in education, rooted in historical pedagogical variations, national and organizational agendas, and cultural differences (Cars & West, 2015). This became evident during the project and a mapping strategy of the curriculum in the participating countries and a teacher manual for the platform content was developed to aid in addressing these challenges. The curriculum mapping was designed as a tool for teachers to identify where sustainable development and global citizenship content from the OLP for ESD could be applied in their teaching. The teacher manual introduces the platform and supports the teachers in framing tasks and activities both with ICT tools and materials such as paper and pencils, aimed at inspiring blended learning and ESD over a variety of cultures and different economic terms and technological conditions. Shared experiences and discoveries from the follow-up stage (Fig. 1) with teachers having used the OLP in their teaching, such as using it for a few lessons versus in longer courses, using it for flipped learning, using it primarily on class or the variations of group formations and knowledge sharing could be used in a further iteration, which was not possible within the project timeframe.

The current development project revealed attention points when designing an OLP for supporting ESD in schools, with a flexibility and sensitivity towards socio-cultural complexities and diverse learning contexts and there is a need for more research on how to support the design process.

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