ENHANCING TEACHER COMPETENCES FOR SUSTAINABLE DEVELOPMENT: INSIGHTS FROM THE EDUSTA PROJECT

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Abstract

Integrating sustainability into education and training systems is crucial for protecting our planet and public health. Education empowers learners with the skills, knowledge, and attitudes needed to value and safeguard the environment. The Academy for Sustainable Future Educators (EduSTA) is an international project aimed at enhancing teachers' competences in sustainable development across five European countries: Finland, Sweden, the Netherlands, the Czech Republic, and Spain (Catalonia). The primary objective is to strengthen the European dimension of teacher education through the use of digital open badges, which serve as micro-credentials to perform, recognize, document, and transfer competences. Despite extensive research on teachers' competences in sustainable development, a gap persists between research findings and teachers' practical work. EduSTA's research focuses on mapping legislative frameworks in vocational education and training (VET) teacher education related to education for sustainable development (ESD). It aims to identify contextual opportunities and constraints for transformative sustainability education by operationalizing skills. The findings reveal that national policies in different countries do not legally require competences in ESD, highlighting a significant area for development. This study further discusses the potential for enhancing competences in rural development.

Keywords: Education for sustainable development, teacher competences, digital open badges, vocational education and training.

1 INTRODUCTION

Integrating sustainability into education is essential to equip future generations with the knowledge, skills, and attitudes needed to address global challenges such as climate change, inequality, and environmental degradation. The Academy for Sustainable Future Educators (EduSTA) is an international project that aims to enhance the sustainability competences of teachers across five European countries: Finland, Sweden, the Netherlands, the Czech Republic, and Spain (Catalonia). The primary objective is to strengthen the European dimension of teacher education through the use of so called Digital Open Badges, which serve as micro-credentials for recognizing, documenting, and transferring competences [1].

Despite extensive research on sustainability competences for educators, a significant gap remains between theoretical understanding and practical implementation. Teachers often lack the necessary tools and frameworks to integrate Education for Sustainable Development (ESD) effectively into their teaching practices. This gap inhibits the ability to foster transformative learning experience that promote sustainability.

EduSTA seeks to address this gap by mapping the legislative frameworks in vocational education and training (VET) teacher education, conducting workshops, and engaging with key stakeholders to understand the contextual opportunities and constraints for transformative sustainability education. The project's alignment with the 17 Sustainable Development Goals (SDGs) and Key Sustainability Competences (KSCs) defined by the United Nations underscores its commitment to promoting sustainable development through education.

The main goals of the EduSTA project are to:

- Achieve closer cooperation with training schools to engage in-service teachers actively.
- Map the contextual possibilities and restrictions for transformative learning on sustainability by operationalizing skills.
- Analyse sustainability competences frameworks of teachers.

- Develop competence-based learning modules and digital badge-driven pathways.
- Provide new badge applications for all teachers in Europe.

Simply stated, the project specifically addresses areas such as current legislative frameworks and policies related to ESD in VET teacher education in the participating countries, key competences needed for effective ESD and their operationalisation in teacher education, and opportunities and constraints for implementing ESD in different national contexts.

The EduSTA project addresses a critical need for enhancing teacher competences in sustainability, aiming to bridge the gap between research and practice. By developing and implementing Digital Open Badges, EduSTA provides a scalable and transferable model for recognizing and documenting teacher competences in ESD. This approach not only fosters professional development but also promotes a standardized framework for sustainability education across Europe.

In the context of the above-mentioned, recent studies highlight the importance of integrating sustainability into teacher education to promote sustainable development (e.g. [2], [3], [4], [5]).

However, there is a lack of comprehensive frameworks that connect policy, practice, and teacher competences [6], [7]. Research indicates that digital badges can serve as effective tools for professional development and competency recognition [8], [9].

Current literature highlights the importance of sustainability in education, but often fails to provide teachers with practical tools and frameworks [10]. Research is needed that not only identifies the necessary competences, but also provides mechanisms for their recognition and implementation in educational settings.

This study aims to contribute to the field of sustainability education by providing an analysis of legislative frameworks, teacher competences, and practical tools for ESD. The findings from the EduSTA project will inform policy and practice, helping to create a more sustainable future through education.

2 METHODOLOGY

Teachers' sustainability competences have been researched widely but a gap remains between research and the actual work of teachers. The objectives of the EduSTA research include mapping the legislative frameworks in life-long learning of vocational education and training (VET) teachers in areas of education for sustainable development (ESD) and identifying contextual possibilities and restrictions for transformative learning on sustainability by operationalising skills. The research sample consisted of head teachers (school principals), in-service teachers, ESD experts and policymakers, and pre-service teachers. Detailed data are shown in the EduSTA report called "Teacher Training for Education for Sustainable Development: Five National Cases" [11]. Insights coming from these data will provide the background information for the development of education and digital open badges.

The desk and qualitative research exploited the following areas:

- Characteristics of an educational institution that is working on ESD
- ESD teachers: competencies, knowledge, and praxis
- Teacher education for ESD
- Situation of ESD in each country
- ESD in academic institutions
- Connecting educational institutions to their surroundings and communities
- ESD in the context of educational change
- ESD policy

The political-legislative (and curricular) frameworks provide and define the context in which teachers and teacher educators enhance sustainability in their work. These have been surveyed nationally through literature searches and interviews of key representatives as they form important background conditions for developing the proposals in this project. Each project partner has interviewed key stakeholders of ESD policy development and implementation in January and February 2023. The stakeholders have been chosen independently in each country to provide information on the situation regarding knowledge on sustainable development competences and future literacy in the partners' educational systems and higher education institutions, particularly concerning teacher training institutions and programmes.

Table 1. Sample of individual interviewers.

	Finland	*Sweden*	*Netherlands*	*Czech Rep.*	*Spain*	*Total*
In-service Teacher	3	5	0	0	1	9
Policy Maker	1	0	1	0	3	5
Expert / Head Teacher	1	0	3	5	1	10
Academic Staff	1	0	0	1	0	2
Total	6	5	4	6	5	26

The voice of teachers was researched by organising workshops for teachers and teacher students. Each project partner has organised at least one workshop in cooperation with teachers or teacher students from January to March 2023. In addition to providing important information, the workshops have served both as a consultation mechanism and as a first step to engage schools in this project and as a capacity-building platform for teachers. The workshops discussed what teachers should know to identify themselves as professionals who are actively constructing a more sustainable world and be able to educate students to be change makers. The competencies to be strengthened represent only the most often mentioned examples of characteristics, knowledge, skills, and values by the interviewed in-service teachers.

Table 2. Sample of workshop participants.

	Finland	*Sweden*	*Netherlands*	*Czech Rep.*	*Spain*	*Total*
In-service Teachers	21	0	15	8	9	53
Pre-service Teachers	5	0	1	12	0	18
Total	26	0	16	20	9	71

3 RESULTS AND DISCUSSION

3.1 Legislative Frameworks of ESD

The analysis revealed varying legislative frameworks governing Education for Sustainable Development (ESD) across the five countries.

In Finland, the Strategy of the National Commission for Sustainable Development 2022–2030 and the Ministry of Education's policies emphasize the integration of ESD in all levels of teacher education, although legal competency requirements for ESD are not mandatory. This integration is facilitated through funding for further education by the Finnish National Agency for Education [12], [13].

In Sweden, ESD is incorporated into all teacher education courses, including vocational training. Teachers are required to integrate ESD into their subjects, guided by the Higher Education Ordinance and national curricula that emphasize social, ecological, and economic perspectives [14].

The Netherlands addresses ESD through the “DuurzaamDoor” national plan, promoting formal, non-formal, and informal learning. However, the integration into core curricula is still rare, and teacher preparation programs often lack a formal ESD component [15].

In the Czech Republic, ESD is a part of broader educational strategies and cross-curricular themes mandated by national law. However, the practical implementation is inhibited by the lack of comprehensive ESD training materials and institutional support (Strategy 2020 - 2030+).

Spain (Catalonia) relies on initiatives like the Green Schools Program for ESD integration, which is not systematically embedded in educational structures. Teachers highlight the need for specific guidelines and training modules to implement ESD effectively (Programa Escoles Verdes).

3.2 Situation of ESD: Possibilities and Restrictions for Transformative Learning

In Finland, the government's program mandates teaching sustainability as a cross-curricular theme. This approach is supported by various initiatives and certification programs, such as the OKKA foundation

and the VASKI project, which emphasize the importance of comprehensive and integrated ESD strategies [16].

Sweden's ESD strategic plans include mandatory teacher training with specific learning objectives and assessment criteria. Challenges include motivating young students and ensuring that companies act as role models for sustainable practices [14].

The Netherlands has introduced the Green Ambassadorship program to promote ESD, yet the overall implementation remains inadequate. Teachers need more resources and institutional support to effectively incorporate sustainability into their teaching practices [15].

In the Czech Republic, ESD-related roles are often voluntary and not legally mandated. The lack of comprehensive documents and methodology available on ESD inhibits the effective integration of sustainability into the curriculum (Strategy 2020 - 2030+).

Spain's ESD initiatives are largely driven by individual schools and educators. The need for structured training and clear guidelines is evident, as current efforts are often project-based rather than integrated into everyday teaching (Programa Escoles Verdes).

3.3 Operationalizing Teacher Skills and Competences and Developing Competences in Rural Development

Teachers across all five countries emphasized the need for specific skills and competences to effectively teach ESD. In Finland, critical thinking, systems thinking, and creativity were highlighted as essential competencies. Teachers also need to utilize digital tools and foster a positive attitude towards sustainable development [13].

Swedish teachers require knowledge of ESD goals, professional competence, and the ability to handle conflicts and ethical issues. The lack of government programs to advance vocational teachers' qualifications in ESD remains a challenge [14].

In the Netherlands, teachers need to develop soft skills such as communication, empathy, and critical thinking. They should also promote interdisciplinary and multidisciplinary learning to address sustainability issues comprehensively [15].

Czech teachers identified the need for practical experience and open discussions to promote ESD. Institutional support and comprehensive training materials are critical for effective implementation (Strategy 2020 - 2030+).

Spanish (Catalan) teachers need training in project-based learning and interdisciplinary collaboration. The absence of a formal certification process for sustainability competence is a significant barrier (Programa Escoles Verdes).

Building on the findings of the EduSTA project so far, especially from the Context and Competence Analysis across the participating countries, it is evident that enhancing competences in rural development requires not only voluntary measures but also legally binding competence requirements and other administrative tools. This can be achieved as follows, as also outlined e.g. in the following analytical report [17]:

- Implementing legally binding competence requirements: Countries can develop and enforce legal frameworks that mandate specific competences related to sustainable rural development for educators. This ensures that all teachers are equipped with the necessary skills and knowledge to promote sustainability in rural areas.
- Administrative tools and support: Providing structured administrative support, such as continuous professional development programmes, funding for sustainability projects, and access to educational resources, can help teachers integrate ESD into their curricula effectively.
- E-Portfolio systems: As seen in Hungary's approach, an online e-portfolio system can be used to assess and document teachers' progress in attaining ESD competences. This system allows for continuous monitoring and evaluation of teachers' skills, providing a clear pathway for career progression and professional development.
- Community and network support: Establishing communities of practice and professional networks can facilitate the sharing of best practices and collaborative learning among teachers. Initiatives

such as Italy's Green Community and Hungary's whole-school ESD network demonstrate the effectiveness of such approaches in promoting sustainable practices.

3.4 Summary of Key Findings in Relation to the EduSTA Project

The gaps identified in the legislative frameworks and practical implementation of ESD highlight the need for comprehensive and mandatory training programmes. The EduSTA project's approach to using Digital Open Badges can significantly enhance the recognition and transfer of ESD competences among teachers. This method can address the current gaps in training and support, providing a standardized framework for sustainability education across Europe.

For future research, it is recommended to explore the long-term impact of digital badges on teacher professional development and student outcomes in sustainability education. Additionally, implementing pilot programmes in various educational contexts can provide further insights into the effectiveness of this approach.

4 CONCLUSIONS

The EduSTA project has provided valuable insights into integrating Education for Sustainable Development (ESD) within teacher education across five European countries: Finland, Sweden, the Netherlands, the Czech Republic, and Spain (Catalonia). The study identified significant variations in legislative frameworks, highlighting the need for more consistent and comprehensive policies to support ESD in teacher training. By implementing legally binding competence requirements and providing structured administrative support, countries can enhance the competences of teachers in rural development and promote sustainable practices effectively.

Key findings also reveal that while countries like Finland and Sweden have more integrated ESD policies, practical implementation remains inconsistent due to inadequate resources and institutional support. In contrast, the Netherlands, Czech Republic, and Spain face greater challenges in embedding ESD comprehensively into their educational systems. Teachers across all countries emphasized the need for critical thinking, systems thinking, and digital literacy skills to effectively teach ESD. The study also identified the importance of fostering a positive attitude towards sustainability among educators.

The EduSTA project's innovative use of Digital Open Badges presents a scalable and transferable model for recognizing and documenting teacher competences in ESD. This approach not only addresses current gaps in training and support but also promotes a standardized framework for sustainability education across Europe. The project's alignment with the 17 Sustainable Development Goals (SDGs) underscores its potential impact on promoting sustainable development through education.

The significance of this study lies in its comprehensive analysis of the gaps between policy and practice in ESD. By providing practical tools and frameworks for integrating sustainability into teacher education, the EduSTA project contributes to the ongoing efforts to enhance teacher competences in this crucial area. The findings support the need for mandatory ESD training programmes and the development of structured guidelines and resources to assist teachers in implementing sustainability practices.

Future research should explore the long-term impact of digital badges on teacher professional development and student outcomes in sustainability education. Additionally, implementing pilot programmes in various educational contexts can provide further insights into the effectiveness of this approach. Schools and educational institutions should also provide ongoing support and resources to teachers for ESD implementation, fostering a collaborative environment for sharing best practices.

In conclusion, the EduSTA project highlights the critical need for enhancing teacher competences in sustainability and offers a viable solution through the use of digital badges. By addressing gaps in policy and practice, this study provides a roadmap for creating a more sustainable future through education. The findings and recommendations have the potential to inform and transform teacher education, promoting sustainability at a systemic level across Europe.

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