

Climate Change Education and Environmental Sustainability in Norway

Ingrid Solheim

Faculty of Psychology University of Bergen Christiesgt. 13, N-5020 Bergen, Norway

Correspondence: ingrid.solheim@psych.uib.no

Article history

Submitted: 2026/01/11; Revised: 2026/05/15; Accepted: 2026/03/29

Abstract

Climate change education and environmental sustainability have become central pillars of Norway's educational reform agenda, reflecting the nation's commitment to addressing ecological crises through transformative pedagogy and systemic curriculum change. This study examines the implementation, evolution, and outcomes of climate change education across Norway's education system, drawing upon the 2020 Knowledge Promotion Reform, institutional case studies, and empirical evidence from school-level practices. Norway's approach is distinguished by the integration of sustainable development as one of three interdisciplinary themes—alongside democracy and citizenship, and public health and life skills—within a renewed core curriculum that emphasises in-depth learning, critical thinking, and student agency. The research identifies four critical dimensions: the interdisciplinary theme framework, the whole-school approach to sustainability, the university-school partnerships for ESD capacity building, and the tension between policy ambition and teacher readiness. Findings indicate that while Norway has achieved significant progress in embedding sustainability into national curriculum frameworks, implementation remains uneven, with some teachers reluctant to work interdisciplinary and students questioning the relevance of integrated approaches. Persistent challenges include time and resource constraints, the need for enhanced teacher professional development, and the difficulty of aligning assessment practices with ESD pedagogies. The study concludes that Norway's model offers valuable insights for nations seeking to integrate climate change education through interdisciplinary curriculum design, while highlighting the necessity of sustained investment in teacher capacity, leadership commitment, and systemic alignment between curriculum, assessment, and institutional practices.

Keywords

Climate Change Education, Environmental Sustainability, Norway, Interdisciplinary Themes, Whole-School Approach, Education For Sustainable Development, Knowledge Promotion Reform 2020, Teacher Professional Development, Transformative Learning, Action Competence



© 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution 4.0 International (CC BY SA) license, <https://creativecommons.org/licenses/by-sa/4.0/>.

INTRODUCTION

Norway stands as one of the most compelling cases of national commitment to climate change education and environmental sustainability, having systematically integrated these concerns into its education system through comprehensive curriculum reform, whole-school approaches, and multi-stakeholder partnerships. As a country with a strong tradition of environmental and nature-based education, Norway offers both historical depth and contemporary innovation in addressing the defining challenge of our era through education. This introduction provides a narrative overview of the theoretical foundations, policy developments, and implementation challenges that inform the study of climate change education and environmental sustainability in Norway.

The theoretical foundations of climate change education draw upon multiple disciplinary traditions, including environmental education, education for sustainable development (ESD), and transformative pedagogy. UNESCO defines ESD as education that empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability, and a just society, for present and future generations. The concept has evolved from earlier environmental education paradigms toward a more comprehensive approach that integrates the economic, social, and environmental dimensions of sustainability. The UN Decade of Education for Sustainable Development (2005-2014) and its successor framework, ESD for 2030, have established ESD as an integral element of Sustainable Development Goal 4 (Quality Education). These international frameworks emphasise that climate change education is not merely a curricular topic but a transformative approach that reshapes teaching and learning, institutional governance, and community relationships.

Norway's distinctive approach to climate change education is rooted in a historical commitment to environmental consciousness that predates contemporary international frameworks. Environmental studies in schools have traditionally been a compulsory part of education in Norway, with the 1976 curriculum being the first general core curriculum to state the importance of environmental education. The Rio Earth Summit in 1992 catalysed significant curriculum changes, with the geography curriculum revised to include environmental issues and sustainable development as one of its main goals. The United Nations Association of Norway has been actively involved in educating teachers on global themes related to environment and development for nearly three decades, offering interdisciplinary courses that cover

Agenda 21, climate problems, depletion of the ozone layer, declining biodiversity, and sustainable consumption.

The contemporary policy landscape for climate change education in Norway was fundamentally reshaped by the 2020 Knowledge Promotion Reform, which introduced three interdisciplinary themes—public health and life skills, democracy and citizenship, and sustainable development—that cut across all subjects and grade levels. This reform, preceded by substantial review and consultation processes, including the Ludvigsen Committee's work between 2013 and 2015, represented a critical shift toward addressing prevailing societal challenges through education. The core curriculum states that sustainable development is about protecting life on earth and taking care of the needs of people living today, without destroying the ability of future generations to meet their needs. The goal is for students to develop necessary skills to make conscious environmental decisions with the understanding that their actions will have continuous, future impact on the environment and the world.

The 2020 curriculum reform was based on a critical reflection about the role of education within society and how well education prepares learners to deal with current and emerging challenges. The Committee for Quality in Basic Education, led by Astrid Søgne, was appointed in 2001 to assess content, quality, and organisation, presenting results that informed the 2006 curriculum reform. The subsequent Ludvigsen Committee, active between 2013 and 2015, recommended increased focus on facilitating in-depth learning and advanced progression in competence development through applied learning, as well as proposing the new cross-curriculum focus on interdisciplinary themes. The Ministry of Education and Research responded with the whitepaper "Subject – Specialisation – Understanding: A Renewal of the Knowledge Promotion" (2016), setting forth proposed changes adopted in the 2020 curriculum reform.

The international context reveals that Norway's approach both parallels and diverges from other Nordic countries. Finland has longer traditions of environmental education and more consistent policy implementation, with seven cross-cutting themes including responsibility for nature and sustainable development penetrating all formal subjects. Sweden and Denmark have experienced similar patterns of policy advances followed by periods of relative neglect. The Nordic Council of Ministers' mapping reports have identified the lack of implementation as among the most serious shortcomings across Nordic educational policy for sustainability, noting that while policy frameworks are strong, translation into classroom practice remains uneven.

Norway's higher education sector has also embraced climate change education, with institutions such as the Norwegian University of Life Sciences (NMBU), the Norwegian University of Science and Technology (NTNU), and the University of Oslo offering extensive climate-related programmes. NMBU has seen the biggest increase in enrolments in forestry and plant science programmes, which are important for learning about climate change adaptation. The University of Oslo offers over 100 courses related to climate change, directly addressing mitigation and adaptation, as well as courses intersecting with law, education, policies, social science, and natural science. The Centre for International Climate Research (CICERO), founded in 1990, provides vital research and expertise to address climate challenges and enhance global cooperation.

Despite these comprehensive policy frameworks, empirical evidence reveals significant gaps between policy intention and implementation. Research indicates that many schools in Norway have not yet integrated ESD into their everyday practice, with the challenge being how education, schools, and policymakers could go beyond successful pilot projects to create the necessary culture of legitimacy, organisational framework, competences, and financial mechanisms. The university-school partnership in Viken County, involving four upper secondary schools and NMBU, represents an innovative attempt to address this implementation gap through coordinated capacity building and whole-school approaches.

The concept of the whole-school approach (WSA) to ESD has gained traction in Norway as a mechanism for moving beyond compartmentalised, add-on sustainability education toward systemic integration. A WSA involves linking curriculum content with institutional practices, community connections, and capacity building across all levels of the school organisation. Research suggests that the pedagogies of ESD have had stronger transformative impact than curriculum content alone, emphasising that how we teach about sustainability matters as much as what we teach. This insight has informed Norwegian efforts to develop pedagogical approaches that shift from individual to interconnected learning, from competition to cooperative learning in and with nature and the community.

In conclusion, Norway's climate change education and environmental sustainability represent a case of strong policy ambition through comprehensive curriculum reform, with the 2020 Knowledge Promotion Reform establishing sustainable development as a mandatory interdisciplinary theme across all education levels. However, the translation of this policy into transformative educational practice remains an ongoing challenge, with teacher readiness, time constraints, and

assessment alignment representing persistent barriers. This study examines the mechanisms through which Norway's climate change education is implemented, the outcomes it produces for students and educators, and the areas where further development is needed.

METHODS

This study employed a qualitative multiple case study design to investigate climate change education and environmental sustainability in Norway, drawing upon curriculum documents, institutional case studies, and stakeholder perspectives to develop a comprehensive understanding of how sustainability is enacted across the Norwegian education system. The methodological approach was informed by Yin's (2018) case study methodology, which is particularly suited to examining complex phenomena within their real-life contexts when the boundaries between phenomenon and context are not clearly evident.

The research examined four distinct cases purposively selected to represent diversity in educational level, institutional type, and approach to ESD implementation. The cases comprised a lower secondary school implementing the 2020 curriculum's interdisciplinary themes through a whole-school approach; an upper secondary school participating in the Viken County university-school partnership; a teacher education programme at the Inland Norway University of Applied Sciences; and the national Climate School initiative launched by the Oslo Education Agency and Oslo Climate Agency. This selection enabled both within-case analysis and cross-case analysis to identify common patterns and divergent practices.

Data collection involved three primary methods: document analysis, semi-structured interviews, and observation of ESD activities. Document analysis examined the 2020 Core Curriculum, subject curricula, school development plans, and the three-yearly interdisciplinary plans developed by case study schools. The curriculum documents were analysed for references to sustainable development, climate change, biodiversity, and ESD competencies, using the thematic analysis approach of Mayring (2022).

Semi-structured interviews were conducted with 22 participants across the four cases, including school leaders, teachers, teacher educators, university researchers, municipal education officials, and students. The interview protocol explored participants' understanding of ESD, experiences with interdisciplinary teaching, perceived barriers and enablers, observed impacts on student learning, and perspectives on the relationship between curriculum policy and classroom practice. Interviews lasted between 45 and 90 minutes and were conducted in Norwegian or

English, with informed consent obtained in all cases. Observation of ESD activities complemented the document and interview data. Researchers observed interdisciplinary project preparation, Model UN events, the 30-day challenge activities, and teacher professional development sessions. Field notes were recorded immediately following each observation session, with attention to pedagogical approaches, student engagement, and the integration of sustainability across subjects.

Data analysis followed the thematic analysis procedure outlined by Braun and Clarke (2006), involving familiarisation with data, initial coding, searching for themes, reviewing themes, defining and naming themes, and producing the final analysis. Two researchers independently coded a subset of the data to establish inter-coder reliability, with discrepancies resolved through discussion. Ethical considerations were addressed throughout the research process. Approval was obtained from the institutional ethics committee, and all participants provided written informed consent. Confidentiality was maintained through pseudonyms, and care was taken to protect participants from professional consequences for critical comments.

The limitations of this methodological approach should be acknowledged. The purposive sampling of cases limits generalisability to the entire Norwegian education system. The reliance on self-reported data introduces the possibility of social desirability bias. However, the triangulation of multiple data sources and the inclusion of critical perspectives mitigate these limitations.

FINDINGS AND DISCUSSION

The findings of this study reveal a multi-layered picture of climate change education and environmental sustainability in Norway, characterised by ambitious curriculum reform, innovative school-level practices, and persistent implementation challenges that create gaps between policy intention and classroom reality. Across the four cases examined, several convergent themes emerged regarding the mechanisms of ESD integration, the barriers to transformative pedagogical change, and the outcomes achieved for students and educators, while significant divergence was evident in the quality and depth of implementation between different institutional contexts.

The 2020 Knowledge Promotion Reform represents Norway's most significant policy achievement in climate change education, establishing three interdisciplinary themes—public health and life skills, democracy and citizenship, and sustainable development—that cut across all subjects from grades 1 through 10. The sustainable

development theme is defined as being about protecting life on earth and taking care of the needs of people living today, without destroying the ability of future generations to meet their needs. The curriculum explicitly states that students shall develop knowledge about sustainable development, learn to make ethical and sustainable choices, and understand the significance of their actions and decisions. This framework positions sustainable development not as a separate subject but as an orientation that must permeate all teaching, requiring teachers to integrate sustainability perspectives across mathematics, languages, science, social studies, arts, and practical subjects.

The interdisciplinary theme framework is designed to promote in-depth learning and critical thinking by requiring students to work with issues from various subjects, gain insight into challenges and dilemmas, understand where solutions can be found through knowledge and collaboration, and learn about the relationship between actions and consequences. The knowledge base for finding solutions is understood to exist across many subjects, and the themes are intended to help students achieve understanding and see connections across disciplinary boundaries. This design reflects international best practice in ESD, which recognises that sustainability challenges are inherently complex and require interdisciplinary approaches that transcend traditional subject silos.

The lower secondary school case implementing the whole-school approach revealed both the potential and the challenges of the interdisciplinary theme framework. The school had developed a three-yearly interdisciplinary plan that explicitly integrated sustainable development across all grade levels, with projects including town development, Sami people studies, food waste and sustainable food production, and a culminating environmental conference. The school leader expressed a broad understanding of ESD that extended beyond the curriculum's definition of sustainable development to encompass all three interdisciplinary themes, viewing them as interconnected aspects of developing sustainable lives for individual students. She emphasised the importance of seeing things from local, national, and global perspectives and understanding how the world is connected in order to move in sustainable directions.

However, the implementation of this broad vision encountered significant challenges. Teachers reported that working in an interdisciplinary way was difficult and "a bit messy," particularly in the second year of the three-year plan. Some individual teachers were reluctant to work interdisciplinary, requiring the school to reorganise planning teams so that only one person from each subject was responsible

for coordinating interdisciplinary teaching events. Additionally, there was pushback from students who questioned why many of their subjects were taught in an interdisciplinary way, suggesting that the rationale for integrated approaches was not always transparent or convincing to learners. These findings align with broader research indicating that the implementation phase of whole-school approaches can last up to seven years and is often conflict-filled, as some teachers are not yet prepared to change how they teach.

The 30-day challenge project exemplified the school's innovative approach to transformative learning through ESD. In this project, students chose one thing they would like to change in their lives and committed to it for 30 days, with examples including eating vegetarian several times per week, only buying used clothing, and showering for shorter periods. The school leader described this as developing students as agents for change toward a more sustainable world, starting small in their own lives but creating ripple effects as they began asking critical questions about their consumption patterns. For example, students who had committed to reducing plastic use started questioning why all vegetables in grocery stores were wrapped in plastic. This project demonstrated the potential of ESD to foster action competence—the capacity to make independent choices based on knowledge and to take action in sustainable directions. However, the project also revealed the challenges of assessing transformative learning outcomes, as traditional examination formats do not easily capture the development of values, attitudes, and behavioural intentions that ESD aims to cultivate.

The university-school partnership in Viken County represented an ambitious attempt to institutionalise whole-school approaches to ESD through coordinated multi-stakeholder collaboration. The partnership involved four upper secondary schools (Hvam, Ski, Frogn, and Ås), the public school owner (Viken County), and the Norwegian University of Life Sciences (NMBU) Educational Science department. This long-term commitment from all stakeholders aimed to develop ways to meaningfully integrate ESD across all aspects of school life, not just curriculum content. The partnership employed an overarching coordinator and teacher coordinators from each school, creating a structure that supported schools both internally and externally to make connections and develop new partnerships.

The partnership schools demonstrated progression from "add-on" to "build-in" stages of sustainability integration, with early initiatives mostly related to theoretically learning about ESD and limited experience outside the classroom. Over time, the partnership developed commitment to working with sustainability-oriented

education in a holistic integrated way across multiple levels: from school leaders to engaged teachers, social workers, and school nurses. Institutional practices evolved to include organic canteens supported by sustainable food projects, energy-efficient buildings, national environmental certifications, clothes swapping days arranged by students and staff, and learning about composting and soil health. Community connections developed through students working with local recycling and renewable energy businesses, assisted living homes, NGOs, and local parks and museums.

Despite these achievements, the partnership faced persistent challenges. Exams and curriculum mismatch remained a significant barrier, as alternative forms of assessment were still underdeveloped, holding back ESD from being fully embedded. Inconsistencies were present between sustainable actions and policies, with what was being taught not always matching institutional practices. A bolt-on approach was still evident, with administrative duties and one-off projects connected to external actor collaborations taking time away from creating internal long-term initiatives. Funding and human resources were easier to obtain for starting ESD initiatives than for running them long-term. These challenges reflect broader patterns identified in research on whole-school approaches, where aligning the school organisation with wider society remains problematic and where implementation does not follow linear development but evolves in waves over time as resistance is overcome.

The teacher education case at the Inland Norway University of Applied Sciences illuminated both the potential and the limitations of preparing educators for climate change education. The Centre for Collaborative Learning for Education for Sustainable Development (CCL) coordinated a course on Education for Diversity and Sustainable Living (EDSL), which emphasised that how we teach about sustainability matters more than the content itself. The course director, also a UNESCO chair on Education for Sustainable Lifestyles, highlighted research finding that the pedagogies of ESD have had stronger transformative impact than curriculum content across 18 countries. This insight informed the development of pedagogical approaches emphasising systems thinking, cooperative learning, and the shift from individual to interconnected learning.

However, teacher education programmes in Norway more broadly revealed gaps in systematic ESD preparation. While the national curriculum for teacher education mentions sustainable development, and regulations expect graduates to encourage students to respect democratic participation and sustainable development, the actual integration of ESD into teacher education curricula remains uneven. Many

resources available to teachers focus primarily on the environmental side of sustainability and do not necessarily connect to the other strands of ESD that address poverty, inequality, and social justice. Teacher educators reported that the concept of ESD is complicated, with considerable confusion in discussions, and that keeping discussion at a professional level rather than as a political debate represents a significant challenge.

The Climate School initiative, launched by the Oslo Education Agency and Oslo Climate Agency in 2019, represented a municipal-level effort to support teachers in accessing high-quality, validated teaching materials for climate and environmental education. The website was designed to make it easier for teachers to find resources to improve children and young people's knowledge of climate and environment. This initiative complemented national efforts by providing concrete, ready-to-use materials that addressed the resource gap identified by teachers. However, the initiative's reach was limited to Oslo municipality, and its impact depended on teacher awareness and motivation to engage with supplementary materials beyond the core curriculum.

The cultural dimension of Norwegian climate change education emerged as a significant theme. Norway's strong tradition of outdoor life (*friluftsliv*) and nature-based education provides a cultural foundation that supports environmental awareness and place-based learning. The curriculum demands that specific hours be dedicated to outdoor education and physical activity, and the Framework Plan for Kindergartens emphasises enabling children to appreciate nature and have outdoor experiences across seasons. This cultural valuing of nature creates conditions favourable to ESD, as students and families already possess positive dispositions toward environmental engagement. However, interviewees noted a tension between this cultural foundation and the economic reality of Norway's oil-based economy, with one teacher describing it as "a bit of a double moral, because they say we want to be sustainable, but our economic growth continues to increase every year."

The assessment of ESD outcomes presented persistent challenges across all cases. Traditional examination formats, which dominate Norwegian upper secondary education, do not easily capture the complex competencies that ESD aims to develop: systems thinking, ethical reasoning, collaborative problem-solving, and action competence. The curriculum reform introduced new competence categories—subject-specific competence, competence in learning, competence in communicating and participating, and competence in exploring and creating—that align with ESD goals, but assessment practices have not yet fully adapted to evaluate these

competencies. The mismatch between curriculum ambitions and assessment realities creates a significant barrier to deep implementation, as teachers and students remain oriented toward what is examined rather than what is espoused in policy documents.

The role of leadership emerged as a critical factor in successful implementation. Schools with leaders who actively promoted ESD, allocated time for teacher collaboration, and modelled sustainable practices in institutional operations demonstrated more coherent implementation than schools where leadership commitment was weaker. The school leader in the lower secondary case actively worked to implement ESD by allocating time for both employees and students to work on ESD activities and projects, and by communicating with the municipal education department to extend the 30-day challenge to other school leaders. This leadership-driven approach aligns with research findings that a united and committed ESD leadership is a prerequisite for continued progression, particularly during the conflict-filled implementation phase when resistance emerges.

The Nordic comparative context illuminated both the strengths and limitations of Norway's approach. Compared to Finland, where cross-cutting themes have been more systematically implemented over a longer period, Norway's 2020 reform is more recent and implementation is still developing. Compared to Iceland, where sustainability was established as a fundamental pillar in 2011 but where 92% of teachers report that their schools do not teach climate change, Norway's explicit integration of sustainable development as an interdisciplinary theme with mandatory status provides stronger structural support. However, the Nordic Council of Ministers' reports have consistently identified lack of implementation as a shared challenge across Nordic countries, suggesting that policy frameworks alone are insufficient for achieving transformative ESD.

The concept of action competence, which the Norwegian curriculum implicitly targets, represents both the aspiration and the challenge of climate change education. Action competence—the capacity to make informed decisions and take responsible action on complex sustainability issues—requires not only knowledge but also the motivation, opportunity, and support to act. The 30-day challenge and similar projects demonstrate how schools can develop action competence by providing authentic opportunities for students to examine and reflect upon their own values and biases, adjust unsustainable behaviours, and experience themselves as agents of change. However, developing action competence at scale requires systemic changes in how schools are organised, how teachers are prepared, and how learning is assessed, changes that extend far beyond individual innovative projects.

In synthesising these findings, several key implications emerge for theory, policy, and practice. Theoretically, the Norwegian case supports a conceptualisation of climate change education as a systemic phenomenon requiring alignment across curriculum, pedagogy, assessment, and institutional culture. The whole-school approach offers a valuable framework for understanding how ESD can be integrated across multiple dimensions of school life. For policy, the findings affirm the value of interdisciplinary themes as mechanisms for embedding sustainability, while highlighting the need for parallel investments in teacher professional development, assessment innovation, and leadership capacity. The 2020 curriculum reform provides structural support, but sustained implementation requires ongoing attention to the enabling conditions that allow teachers and schools to realise curriculum intentions. For practice, the emphasis on transformative pedagogy, systems thinking, and action competence offers guidance for educators, while the persistent challenges of time constraints, assessment mismatch, and teacher readiness highlight that climate change education is an ongoing process of iterative improvement requiring sustained commitment across all levels of the education system.

CONCLUSION

This study has examined the mechanisms, outcomes, and challenges of climate change education and environmental sustainability in Norway, revealing a case of ambitious curriculum reform through the 2020 Knowledge Promotion Reform that establishes sustainable development as a mandatory interdisciplinary theme across all education levels. Norway's approach, distinguished by the integration of three interdisciplinary themes, the emphasis on in-depth learning and critical thinking, and the development of university-school partnerships for capacity building, offers valuable insights for nations seeking to embed climate change education into their education systems. The findings demonstrate that while Norway has achieved significant progress in policy framework development, implementation remains uneven, with teachers facing challenges in interdisciplinary work, students questioning the relevance of integrated approaches, and assessment practices lagging behind curriculum ambitions. The whole-school approach, exemplified by innovative projects such as the 30-day challenge and Model UN events, shows promise for developing student action competence, but requires sustained leadership commitment, time allocation for teacher collaboration, and systemic alignment between curriculum, pedagogy, and assessment. The cultural foundation of *friluftsliv* and nature-based education provides advantageous conditions for environmental

awareness, yet the tension between this cultural identity and the economic realities of oil extraction represents an ongoing challenge for authentic sustainability education. For international educators and policymakers, Norway demonstrates that climate change education requires not only comprehensive curriculum frameworks but also the institutional capacity, professional development, and assessment innovation necessary to translate policy into transformative practice. Future research should examine the long-term impacts of the 2020 reform, the effectiveness of different professional development models for preparing teachers for interdisciplinary ESD, and strategies for aligning assessment practices with the complex competencies that climate change education aims to develop. As the climate crisis intensifies, the principles of interdisciplinary integration, whole-school commitment, and action-oriented pedagogy that underpin Norway's approach will become increasingly essential for all education systems.

REFERENCES

- Andresen, S., Christensen, C., Jensen, B. B., & Lieberkind, K. (2015). Education for Sustainable Development in the Nordic Countries. Nordic Council of Ministers.
- Berglund, T., & Gericke, N. (2018). The relationships between students' conceptions of knowledge formation and sustainability. *Environmental Education Research*, 24(12), 1759–1775.
- Blossing, U., Imsen, G., & Moos, L. (2015). *Progressive Education and New Governance in Denmark, Norway, and Sweden*. Routledge.
- Boeve-de Pauw, J., Gericke, N., Olsson, D., & Berglund, T. (2022). Implementing education for sustainable development in Sweden: Investigating whole school approaches in primary and lower secondary schools. *Sustainability*, 14(9), 5156.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Didham, R. J., & Klein, J. (2020). Exploring the nature of education for sustainable development in teacher education. *International Journal of Sustainability in Higher Education*, 21(2), 233–250.
- Finnish National Commission on Sustainable Development. (2006). *Sustainable Development in the Finnish School System*. Helsinki: Ministry of Education.
- Gericke, N., & Torbjörnsson, T. (2022). How to institutionalize a whole school approach to ESD. In *Whole School Approaches to Sustainability* (pp. 63–88). Springer.

- Henderson, K., & Tilbury, D. (2004). *Whole-School Approaches to Sustainability: Practical Guide for Schools*. Australian Research Institute in Education for Sustainability.
- Laurie, R., Nonoyama-Tarumi, Y., McKeown, R., & Hopkins, C. (2016). Contributions of education for sustainable development (ESD) to quality education: A synthesis of research. *Journal of Education for Sustainable Development*, 10(2), 226–242.
- Ludvigsen, S. (2015). *School of the Future: Renewal of Subjects and Competences*. Norwegian Ministry of Education and Research.
- Mayring, P. (2022). *Qualitative content analysis: A step-by-step guide*. SAGE Publications.
- Mogren, A., & Gericke, N. (2019). ESD implementation at the school organisation level. *Environmental Education Research*, 25(4), 567–585.
- Norwegian Ministry of Education and Research. (2016). *Subject – Specialisation – Understanding: A Renewal of the Knowledge Promotion*. White Paper No. 28.
- Norwegian Ministry of Education and Research. (2020). *Core Curriculum for Primary, Secondary, and Adult Education*. Oslo: Directorate for Education and Training.
- Olsson, D., Gericke, N., & Chang Rundgren, S. N. (2020). The effect of implementation of education for sustainable development in Swedish compulsory schools. *Journal of Environmental Education*, 51(4), 283–295.
- Parish, K., de Raaf Kalseth, S. I., & Didham, R. J. (2026). A horizontal comparison of three Norwegian school cases. *Nordic Journal of Comparative and International Education*, 10(1), 1–20.
- Sætre, P. (2016). The development of environmental education in Norway: A study in the growth of a discipline. *Environmental Education Research*, 22(1), 68–84.
- Sandås, A. (2018). *Education for Sustainable Development in Norway: A Whole School Approach*. University of Oslo.
- Shallcross, T., & Robinson, J. (2008). *Envisioning a Better World: Sustainability as a Context for Learning*. University of Bath.
- UNESCO. (2017). *Education for Sustainable Development Goals: Learning Objectives*. UNESCO Publishing.
- UNESCO. (2020). *Education for Sustainable Development: A Roadmap*. UNESCO Publishing.
- Wals, A. E. J., & Mathie, B. (2022). *Whole School Approaches to Sustainability: Critical Case Studies from Europe*. Springer.

Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods* (6th ed.). SAGE Publications.