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Environmental Citizenship in a Nordic Civic and Citizenship Education Context

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Abstract
This study uses data from the International Civic and Citizenship Education Study 2016 (ICCS 2016) conducted in four Nordic countries: Denmark, Finland, Norway, and Sweden (students, N=18,962; teachers, N=6,119; school principals, N=630). We look at students' attitudes, awareness, and behavior in relation to the educational goals and pedagogical means of teachers and school leaders working toward environmental citizenship. Drawing on the pragmatic framework of John Dewey and the contemporary experiential learning model, we identify some key school conditions and pedagogical approaches to education for environmental citizenship education. Based on the whole-school approach to environmental education, we seek to understand in what ways school environment and educational practices may positively affect student attitudes and behaviors that promote environmental citizenship. The objective is to identify the extent to which the school environment and citizenship educational activities are efficacious in fostering environmental citizenship attitudes and behaviors in students.

Keywords: environmental citizenship; ICCS 2016; experiential learning; environmental education; whole-school approach

Introduction
According to the 2017 Sustainable Development Goals (SDGs) Index score, which ranks countries' position on a scale of achievement of possible sustainable outcomes from 0 (the lowest) to 100 (the highest), the Nordic countries occupy the top four places. Although they are still considered "significantly below the maximum score of 100" (Sachs et al., 2017), the international rankings of the SDG Index indicate that Sweden,

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Denmark, Finland, and Norway have attained the best outcomes across the 17 areas of SDGs (United Nations, 2016). In comparison with the international community, the Nordic countries have prioritized and adequately invested in quality education for all citizens as a long-term strategy for achieving individual, social, and environmental well-being (UN SDG Voluntary National Review, 2017). Nevertheless, the 2017 SDG Index and 2018 Environmental Performance Index (EPI) identify underachieved outcomes and increasing disparity in the areas of environmental health and climate actions among Nordic countries. However, according to the *Voluntary National Review 2017* and *Good Practices in Education for Sustainable Development*, the Nordic countries have put forward national education agendas that foster the attributes of environmental citizenship (Dobson, 2007; CoE, 2018; ENEC, 2018). Meanwhile, the latest results from the International Civic and Citizenship Education Study (ICCS 2016), which is participated in by 24 countries (including 16 European countries), show that limited proportions of principals (38%) and teachers (51%), on average, consider "promoting respect for and safeguarding of the environment" one of the most important aims of civic and citizenship education (Schulz et al., 2017, pp. 34–36). However, most students (an average of 86%) in all these countries consider "taking part in activities to protect the environment" an important constitutive element of a good adult citizen (Schulz et al., 2017, p. 228).

The results of the ICCS 2016 show that pupils in lower secondary schools in Nordic countries are among the highest achievers in civic knowledge, but Nordic school principals and teachers (except for those in Finland) appear to lag behind their peers in other countries regarding promoting environmental citizenship (Schulz et al., 2017, pp. 34–36). In particular, school principals (10.4%) and teachers (21.4%) in Denmark consider "promoting respect for and safeguarding of the environment" one of the most important aims of civic and citizenship education (CCE). This contrasts with Finland, in which 51.8% of school principals and 55.8% of teachers consider "promoting respect for and safeguarding of the environment" one of the most important aims of CCE.

Through secondary analysis of the ICCS 2016 data, the current study aims to investigate how practices were undertaken to implement environmental citizenship education in Nordic schools associated with the behaviors and attitudes of student participants and their future personal efforts to address environmental issues. To achieve this aim, we first present an overview of the development and evolution of environmental education and education for sustainable development (ESD) and their roles in education for environmental citizenship (EEC) based on current literature. This overview will provide, first, a definition of environmental citizenship and education for environmental citizenship, and second, an analytical framework that will facilitate the analysis of empirical data later in the article. In the end, we provide discussion and the conclusions of the study based on the results of data analysis.

The Role of Education in Environmental Citizenship

In many societies across the globe, concern for the environment and its long-term protection is increasingly shaping the politics of nation-states and the meaning of citizenship. Education has been for decades one of the long-term strategies to address the degradation of the environment and its improvement (Belgrade Charter, 1975; Tbilisi Declaration, 1978; Pizmony-Levy, 2011). First, the ideas of "education about the environment," such as nature study and appreciation in the 1960s, shifted to "education for the environment," such as conservation education and environmental management, in the 1970s. Then, the idea of "education for sustainable development" with a focus on global education and developmental education in the 1980s began including concepts of empowerment, human rights, and social justice from the 1990s onward (Pizmony-Levy, 2011; Stevenson, 2007; Hendersen & Tilbury, 2004; Palmer, 2002). Meanwhile, global recognition of environmental education in response to the natural and human environment emerged during a series of international events.[2] Specifically, the Stockholm Conference in 1972 emphasized ecological management; the Belgrade Charter of 1975 advocated education "to develop a world population that is aware of, and concerned about, the environment and its associated problems"; while the Tbilisi Declaration of 1978 clarified the goals of environmental education for future citizens to be "actively involved at all levels in working toward resolution of environmental problems."

The Tbilisi Declaration helped set forth the objectives of environmental education as "awareness, knowledge, attitudes, skills, participation" with the emphasis on students as active citizens working toward resolution of environmental problems (Stevenson, 2007). This marked a turning point for environmental education moving away from the passive acquisition of factual knowledge about the environment toward active pedagogy such as empowering the world population for critical engagement, concrete behavioral changes, and post-nationalistic environmental education curricula (Palmer, 2002; Stevenson, 2007; Hendersen & Tilbury, 2004; Pizmony-Levy, 2011). Thus, the individual actor as an agent of environmental change at local, national, and global scales and the social and political dimensions of environmental improvement became integral parts of environmental education. In the following decades, international events such as Agenda 21 at the Rio Earth Summit (1992) and the World Summit on Sustainable Development (2002) facilitated some common understanding of the need to extend and reorient environmental education toward not only behavioral changes and environmental management but also education for sustainability (EFS) and education for sustainable development (ESD) (Hendersen & Tilbury, 2004).

[2] UNESCO-UNEP International Environmental Education Programme (IEEP)
International Workshop on Environmental Education in Belgrade, Yugoslavia (1975)
Intergovernmental Conference on Environmental Education in Tbilisi, Georgia (1977)
International Conference "International Strategy for Action in the Field of Environmental Education and Training for the 1990s" in Moscow, Russian Federation (1987)
International Conference "Environment and Society: Education and Public Awareness for Sustainability" at Thessaloniki, Greece (1997)
International Conference on Environmental Education towards a Sustainable Future in Ahmedabad, India (2007)

Eventually, citizenship education curricula in many societies came to include the development of students' knowledge of the political-legal process and related skills, critical appraisal of environmental situations, and commitment to act on one's values in environmental improvement (Stevenson, 2007; Bromley, Meyer & Ramirez, 2011; OECD, 2009; Schulz et al., 2016). Out of the 42 national and local education systems in Europe, environmental protection is included in citizenship education curricula in 24 education systems at the primary school level, 21 education systems at the lower secondary school level, 20 education systems at the upper secondary school level, and 19 secondary vocational education systems. Moreover, most education systems in Europe have rather similar objectives regarding citizenship education: future citizens must be able to i) interact effectively and constructively with others, ii) think critically, iii) act democratically, and iv) act in a socially and environmentally responsible manner (European Commission/EACEA/Eurydice, 2017; CoE, 2018). Meanwhile, environmental citizenship, a concept that appeared in the 2000s (Dobson, 2005), defines the cultivation of individuals who exercise civil, political, and social rights and duties in accordance with public environmental good as a path to achieving sustainable development. As a constantly contested and evolving concept in multiple disciplines and scholarships for decades (Pallett, 2016), we find most appropriate for this study a recent and comprehensive definition of environmental citizenship by the European Network for Environmental Citizenship (ENEC, 2017–2022):

> Environmental citizenship is the responsible pro-environmental behavior of citizens who act and participate in society as agents of change in the private and public sphere on a local, national, and global scale, through individual and collective actions, in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, and achieving sustainability and developing a healthy relationship with nature (http://enec-cost.eu/our-approach/) (ENEC, 2018).

Although it is still in the process of evolving and developing, the ENEC's definition of environmental citizenship includes the essential elements of citizenship competencies for democratic culture, that is, the knowledge, skills, values, and attitudes emphasized in a common reference framework by the Council of Europe (CoE 2018). Most education systems in Europe have shared similar objectives regarding citizenship education for future citizens aiming to support the development of environmental citizenship through formal and informal education:

> To empower citizens to exercise their environmental rights and duties, as well as to identify the underlying structural causes of environmental degradation and environmental problems, develop the willingness and the competences for critical and active engagement and civic participation to address those structural causes, acting individually and collectively within democratic means, and taking into account inter- and intra-generational justice (ENEC 2018).

Pedagogical Framework on Education for Environmental Citizenship: A Whole-School Approach

Some common attributes derived from successful examples of citizenship education across European countries (European Commission/EACEA/Eurydice, 2017) are active learning by doing, interactive discussion and debate, relevant real-life issues facing young people and society, critical thinking, collaborative group work and cooperative learning, and participative and student self-directed processes. The guiding principle of education for environmental citizenship also aligns with the ongoing, extensive scope of research on environmental education curricula and learning, which has claimed to underpin constructivist and socially critical environmental education approaches. In particular, considerations such as eco-philosophical, place-based, culturally situated, and phenomenological perspectives have been central (Lotz-Sisitka et al., 2013) by taking into account the interdisciplinary and contextual nature of environmental discourse as well as grasping and grappling with the cultural fabric and dynamic human interaction in relation to a core set of environmental issues. Looking more closely into these attributes of environmental citizenship and educational goals demonstrated by the CoE and ENEC, education for environmental citizenship encapsulates the development and extension of the role of education in the environmental movement since the early 1970s (Payne, 2015).

Having as its origin Dewey's notion of an "educative experience" (Dewey, 1916, 1938), a traditional citizenship education school environment and teaching and learning transaction is to be structured in a way that learners engage in democratic processes through a community of inquiry, experiments, and reflection upon learning and actions. However, scholars of education for sustainable development brought up critiques charging that the Deweyan approach and previous environmental educational approaches are insufficient in fostering critical engagement for social reconstruction and radical reform that may rectify socio-economic and environmental injustice (Stevenson, 2007). As the traditional school approaches require school leaders and teachers to create and structure the conditions for learning, they often lack critical pedagogical considerations and tend to maintain the status quo. Meanwhile prominent scholars of environmental education caution against the persistent underemphasis of experiential learning and the lack of incorporation and lack of balance between indoor and outdoor learning in curricular, pedagogical, and school practices (Payne, 1995, 2006, 2015).

Nevertheless, previous citizenship education, environmental education literature, and research have contributed to pedagogical considerations for environmental citizenship such as the socially critical approach, experimental education curricula (i.e., problem-solving or solution-based learning), and inclusive and collaborative experiential learning spaces that go beyond education indoors (Rickinson, Lundholm, & Hopwood, 2009). Under the influence of the environmental movement, more and more societies have adopted new school models, such as Eco-Schools aiming for educating new generations (Tönük & Kayihuan, 2013) and green schools for environmentally subjective well-being (Kerret, Orkibi, & Ronen 2014). However, we consider the most relevant for

environmental citizenship to be the whole-school approach developed by scholars of education for sustainability (e.g., Hargreaves, 2008; Hendersen & Tilbury, 2004; Tilbury & Wortman, 2005; Mogren, Gericke, & Scherp, 2019). A whole-school approach for sustainable development is a holistic concept of importance at all levels and in all parts of the school organization (Gough, 2005) to ensure that curricula, programs, practices, and policies of an educational institution contribute in concert to build a sustainable future. "In this approach, sustainability is lived as well as taught" (McKeown & Hopkins, 2007, p. 22). A whole-school approach promotes critical reflection and improvement of current non-sustainable lifestyle choices and behaviors as well as socio-economic, inter-generational, and environmental justice across global communities. A whole-school approach includes not only school leaders and teachers but also students in decision-making and co-creating learning spaces for all members of the school community and beyond, which offers continuous experiential education, cumulative experience, or eco-restoration of the sustainable school (Scott, 2013; Pizmony-Levy, 2011).

When conducting education for environmental citizenship, it is essential that the whole-school approach includes considerations such as eco-philosophical, place-based, culturally situated, and phenomenological perspectives (Lotz-Sisitka et al., 2013). In addition, the interdisciplinary and contextual nature of an environmental discourse, as well as the cultural fabric and dynamic human interaction required to grasp and deal with a core set of environmental issues should be included. It is important that a pedagogy of environmental citizenship organize a learning process for and with students through which knowledge, values, and practices accumulate and readjust according to the learners' experiences with others, with societies, and within and through mutually constitutive relations with the environment. It is important to recognize that learning happens when learners interact with objects and the subject matter in their contexts to disrupt, build, and refine the constructed knowledge (Kolb & Kolb, 2005). With these considerations, in the current study, we use a whole-school approach complementing Dewey's ideas[3] of shaping democratic experience by structural conditions[4] and experiential learning in school to serve as the analytical inspiration on education for environmental citizenship. In this pedagogical framework, school principals, teachers, and students collaborate and share responsibilities[5] in pragmatic inquiry and fostering the knowledge, skills, values, attitudes, and actions needed by all members of the school community for safeguarding the environment and sustainable development.

[3] Dewey's work on Experience and Education (1938) and Democracy and Education (1916) emphasize on democratic school conditions that enable students to foster habits of mind through experiential learning and pragmatic model of inquiry (Dewey 1916, pp 152 - 179).
[4] In Dewey's term "environing conditions" (Experience and Education, 1938, pp. 44)
[5] reduce the hierarchical nature in education and increase shared understanding and personal meaning making in relation to experiential education and collective undertakings in sustainable initiatives (e.g. environmental protection, social justice, intergenerational justice)

Data and Methods

We use data from the International Civic and Citizenship Education Study 2016 (ICCS 2016) initiated by the International Association for the Evaluation of Educational Achievement (IEA). The ICCS 2016 dataset (Köhler et al., 2018) from four Nordic countries contains responses from students (N=18,962), teachers (N=6,138), and school principals (N=630) from 669 lower secondary schools. Table 1 provides the data and results from the ICCS 2016 study across the four countries. Table 1 also presents descriptions of the student background variables, such as student age, gender, migrant background, parents' highest educational attainment, and student civic knowledge achievement. The organizing principle of discerning environmental citizenship education from the ICCS 2016 study suits a whole-school approach. The ICCS 2016 questionnaires focus on the contents of environmental citizenship education, school environment, and student-led and teacher-led activities.

Table 1 Descriptions of the Data Used in the Analyses

	Denmark	Finland	Norway	Sweden	Total
Number of schools	185	179	148	155	669
Number of school principal participants*	175	172	142	141	630
Number of teacher participants	489#	2,097	2,010	1,542	6,138
Number of student participants*	6,254	3,173	6,271	3,264	18,962
Average age of students	14.9	14.8	14.6	14.7	14.8
Percentage of female students	51.3 (0.8)	47.4 (1.1)	49.5 (0.6)	49.3 (1.0)	49.4 (0.4)
Percentage of students with migrant background (1st and 2nd generation) (standardized error)	8.6 (0.8)	3.5 (0.5)	11.4 (1.1)	18.1 (1.6)	10.4 (0.5)
Percentage of students having parents with higher educational attainment (standardized error)	24.8 (1.0)	41.8 (1.1)	59.6 (1.2)	58.9 (1.0)	46.3 (0.5)

Participation rates for the teacher survey were below the ICCS 2016 standards in Denmark

* Participation rates for the school principal survey and the student survey fulfilled the ICCS 2016 standards in all four countries.

Outcome Variable: Student Environmental Citizenship

We used six items from the student data to measure environmental citizenship as an outcome of education. First, knowledge of environmental citizenship, is a subjective measure from student responses to the following question—"At school, to what extent have you learned about how to protect the environment (e.g., through energy-saving or recycling)?"—with four response alternatives (1=*not at all*, 2=*a little*, 3=*to some extent*, 4=*a lot*). Next, two items measure the values and attitudes of environmental citizenship from the students' responses to the question "How important are the following behaviors for being a good adult citizen?" The items are i) "taking part in activities to protect the environment" and ii) "making personal efforts to protect natural resources," which have

four response alternatives (1=*not important at all*, 2=*not very important*, 3=*quite important*, 4=*very important*). The fourth and fifth items are two questions asking about student participation in environmental actions at school or in organizations outside school during the past year or before that, with three response alternatives (1=*never*, 2=*before the past year*, 3=*during the past year*). In the sixth item, intended future behavior of environmental citizenship is measured by student responses to a question asking "When you are an adult, what do you think you will do to 'make personal efforts to help the environment'?" with four response alternatives (1=*I would certainly not do this*, 2=*I would probably not do this*, 3=*I would probably do this*, 4=*I would certainly do this*).

Table 2 Descriptive Data of Questions and Measures of School Activities and Student Environmental Citizenship from ICCS 2016 Data

Data structure	Items of interest	Denmark		Finland		Norway		Sweden	
School level	*Principals' responses to the questions "To what extent are the following practices implemented at this school during the current school year?"(Q9) and "To what extent do students participate in the activities?" (Q4) (lowest 1–4 highest*)	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	Activities related to environmental sustainability	2.7	1.1	2.8	1.2	2.6	1.2	2.8	1.1
	Campaigns to raise people's awareness, such as about environmental issues	1.9	1.0	3.6	0.7	2.7	1.3	2.4	1.0
	Differential waste collection	2.8	0.9	3.6	0.6	3.2	0.8	3.1	0.9
	Waste reduction	2.3	0.9	3.6	0.6	2.8	0.7	3.2	0.8
	Purchasing of environmentally friendly items	2.8	0.9	2.7	0.8	2.9	0.7	3.1	0.7
	Energy-saving practices	3.4	0.6	2.9	0.7	2.9	0.8	2.9	0.8
	Posters to encourage students' environmentally friendly behaviors	2.6	0.8	2.7	0.8	2.3	0.8	2.2	0.9
	Teachers' responses to the questions "During the current school year, have your students taken part in activities?" (Q8 & Q12) (Yes=1, No=0), percent	Yes	No	Yes	No	Yes	No	Yes	No
	Activities related to environmental sustainability	38.7	61.3	44.8	55.2	35.1	64.9	39.2	60.8
	Campaigns to raise people's awareness, such as about environmental issues	15.6	84.4	61.1	38.9	42.7	57.3	32.8	67.2
	Writing letters to newspapers or magazines to support actions affecting the environment	2.2	97.8	1.1	98.9	1.4	98.6	4.5	95.5
	Signing a petition on environmental issues	0.5	99.5	1.1	98.9	1.5	98.5	0.9	99.1
	Posting on social network, forum, or blog to support actions affecting the environment	3.4	96.6	1.6	98.4	2.9	97.1	2.5	97.5
	Activities to make students aware of the environmental impact of excessive water consumption	23.9	76.1	37.3	62.7	15.0	85.0	23.7	76.3
	Activities to make students aware of the environmental impact of excessive energy consumption	31.3	68.7	49.7	50.3	26.2	73.8	28.9	71.1
	<Cleanup activities> outside the school	14.3	85.7	20.5	79.5	49.2	50.8	7.2	92.8
	Recycling and waste collection in the <local community>	13.8	86.2	31.0	69.0	37.0	63.0	14.2	85.8
Student level	*Students' responses to questions "Have you ever been involved in activities?" and "How important are actions for a good adult citizen?" (lowest 1 to highest 3 or 4)*	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	Have been involved in an environmental action group or organization (Q15)	1.1	0.4	1.1	0.3	1.1	0.4	1.1	0.4
	At school, participating in an activity to make the school more environmentally friendly (Q16)	1.5	0.7	1.4	0.6	1.6	0.7	1.5	0.7
	At school, have learned how to protect the environment (Q18)	2.8	0.9	3.2	0.7	2.9	0.9	3.3	0.8
	Important for a good adult citizen to take part in activities to protect the environment (Q23)	2.9	0.8	3.1	0.8	3.2	0.7	3.2	0.8
	Important for a good adult citizen of to make personal efforts to protect natural resources (Q23)	3.1	0.7	3.3	0.7	3.3	0.7	3.3	0.7
	In adulthood, will make personal efforts to help the environment (Q31)	3.0	0.8	3.0	0.8	2.9	0.9	3.0	0.9

Table 2 shows descriptive data for all the items at the student level that measure student environmental citizenship. The principal component analysis shows that these six items form two factors: the current participation in environmental actions at school or organizations outside school form one factor, while the other four items form another factor. However, the six items measuring different dimensions of student environmental citizenship form a scale with marginally acceptable reliability (Cronbach's alpha is lowest [0.59] for Norway and highest [0.63] for Finland, using student weight TOTWGTS). By computing means of the sum from these six items, we can create a new variable, namely, *the environmental citizenship of students*, which contains student perceived knowledge, values, attitudes, current participation, and intended future behavior.

Input Variables: Whole School Practices of Education for Environmental Citizenship

Table 2 provides descriptive data for the questions available in the ICCS 2016 study at the school level from principals' and teachers' reports of environmental citizenship educational activities at school. These questions will be used in our analyses as a proxy for environmental citizenship education implemented in Nordic schools. There are seven items from two questions asking principals the extent to which these environmental-citizenship-related activities have been carried out during the current school year. The response alternatives are 1=*none or not at all* to 4=*most or to a large extent*. Principals' responses to these seven items form a scale with marginally acceptable reliability (Cronbach's alpha is lowest [0.66] for Finland and highest [0.77] for Sweden, using school weight TOTWGTC). There are nine items from two *yes*/*no* questions asking teachers if their students have participated in environmental-citizenship-related activities during the current school year. Teachers' responses to these nine items form a scale with marginally acceptable reliability (Cronbach's alpha is lowest [0.63] for Norway and highest [0.67] for Denmark and Finland, using teacher weight TOTWGTT).

Analysis Plan

We first present the descriptive analyses of the composite scores (Nardo et al., 2005) on environmental citizenship education at the school level and student environmental citizenship at the individual level, respectively, by computing the means of the sums of all items presented in Table 2. Then, we apply a one-way ANOVA technique using post hoc testing to show the similarities and differences between the Nordic countries. As interlinking of different school levels is regarded an indicator of a whole-school approach (Gough, 2005; Scott, 2013; UNESCO, 2014), we create a score for school environmental citizenship education practices by summing up practices reported by principals and teachers. At this step, data of Danish schools suffer a huge loss of cases, as teachers from

many schools did not respond to the survey. However, after running some statistics tests (e.g. Chi-squared and T-test) on student-level variables (i.e. gender, parental education, immigrant background and a composite score of student environmental citizenship), we find none significant difference in those variables between students in schools of missing teacher responses and those in schools with complete data. As a third step, we test the association of school education with student environmental citizenship. As ICCS data are structured in two levels (Köhler et al., 2018; Schulz et al., 2017) in which students are nested in a sample of schools, independent variables are the composite scores of educational activities reported by principals and teachers at the school level, and student environmental citizenship is the outcome variable at the individual level. Using hierarchical linear modeling (HLM in SPSS) to check if the outcome variable *student environmental citizenship* varies at the school level, we found that the percentages of between-school variance of the composite score were rather limited, i.e., 8.6% in Denmark, 7.2% in Finland, 4.3% in Norway, and 7.8% in Sweden. However, these between-school variations warrant two-level mixed model regression analyses (Hayes, 2006; Heck, Thomas, & Tabata, 2014). Therefore, we test the association of school education (Level 2) with student environmental citizenship (Level 1) by applying two-level modeling (HLM in SPSS) in which student background characteristics such as student gender, parents' highest educational attainment, and student migration status are included as independent variables at Level 1. ICCS data contain sampling weights at both the school level and student level. As current HLM function at SPSS is not able to handle different weights in a two-level modelling, we decide to test our two-level modelling with unweighted estimates. Our choice is based on the fact that estimates can be slightly different between weighted and unweighted two-level modeling (Heck et al. 2014) but there is no specific pattern of the differences between weighted and unweighted estimates as some unweighted estimates would appear to be slightly larger than weighted estimates and another way around in some estimates in the same model.

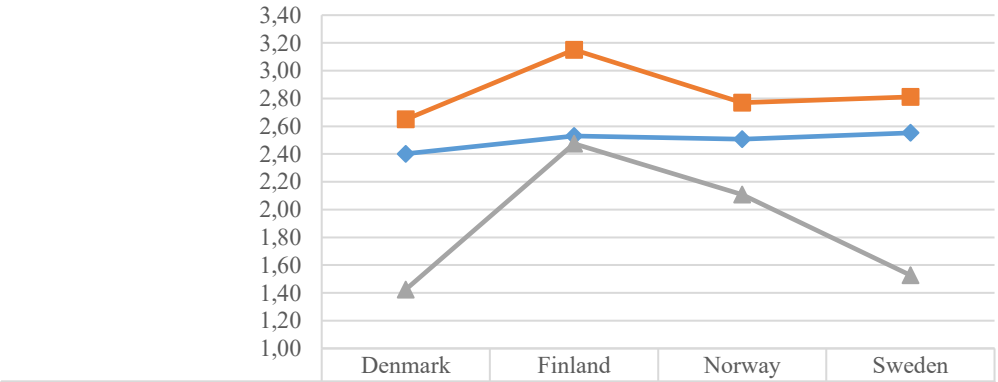
Results

Part 1: Composite Scores of School Practices and Student Environmental Citizenship in Nordic Schools

Figure 1 is a visual representation across the four countries of the averages of the composite scores of school practices for environmental citizenship education as reported by principals and teachers, respectively, together with the composite score of student environmental citizenship. In general, differences among the four countries are rather small: the country as a factor only explains 8% of the variance of school practices reported by principals and 6% of the variance of school practices reported by teachers. However, Finland has significantly higher scores than the other three countries for school practices reported by both principals and teachers, while Denmark has significantly lower scores

than the other three countries. Norway and Sweden are in the middle among Nordic countries, and they are the same for school practices as reported by principals. Although the differences are very small and statistically significant, only 2% of the variance of the composite score for student environmental citizenship is explained by country. This means that Nordic students are rather similar in environmental citizenship, regardless of their country of residence.

Figure 1. Composite scores of school practices of environmental citizenship education and student environmental citizenship in Nordic schools (means)



	Denmark	Finland	Norway	Sweden
Student environmental citizenship	2,40	2,53	2,51	2,55
School practice environmental citizenship education by principals	2,65	3,15	2,77	2,81
School practice environmental citizenship education by teachers	1,42	2,47	2,11	1,53

Note. One-way ANOVA using the following respective weights: for principals TOTWGTC, teachers TOTWGTT, and students TOTWGTS. The score of student environmental citizenship is significantly different among all four countries (2% variance explained by country). The score for school practice according to principals' reports is significantly different among all countries except for between Norway and Sweden (8% variance explained by country). The score for school practice according to teachers' reports is significantly different among all four countries (6% variance explained by country).

Part 2: The Effect of School Practices on Student Environmental Citizenship

Combining the composite scores for school practices reported by principals and by teachers, we create a score for whole school practices of environmental citizenship education. To obtain a preliminary view of the possible relationship between school education practices and student environmental citizenship, we develop a scatterplot of the relationship. Figure 2 is a graphic presentation of the distribution of all Nordic student cases between scores for student environmental citizenship and scores for school education practice at the individual level.

The majority of Nordic students with both high and low scores for environmental citizenship are in schools with environmental citizenship education practices around the mean, which are at the middle of the horizontal axis. When looking at the outliers at the

left side of the horizontal axis, i.e., school environmental education practices (scores of two standardized deviations lower, i.e., -2 from the mean of 0), we observe students from Sweden, Norway, and Finland with both low and high scores for environmental citizenship. When examining the outliers of school environmental citizenship education practice at the right side (scores of two standardized deviations higher; +2 above the mean of 0), we observe students from all four countries again have both low and high scores for environmental citizenship. However, there are few students with scores among the lowest for environmental citizenship among the outliers at the right side, i.e., the higher scores for school environmental citizenship education practices. The fitted line shows a positive but small relationship between the two factors in the Nordic context as a whole.

Figure 2. Student level graphing of the relationship between school environmental citizenship education practices and student environmental citizenship

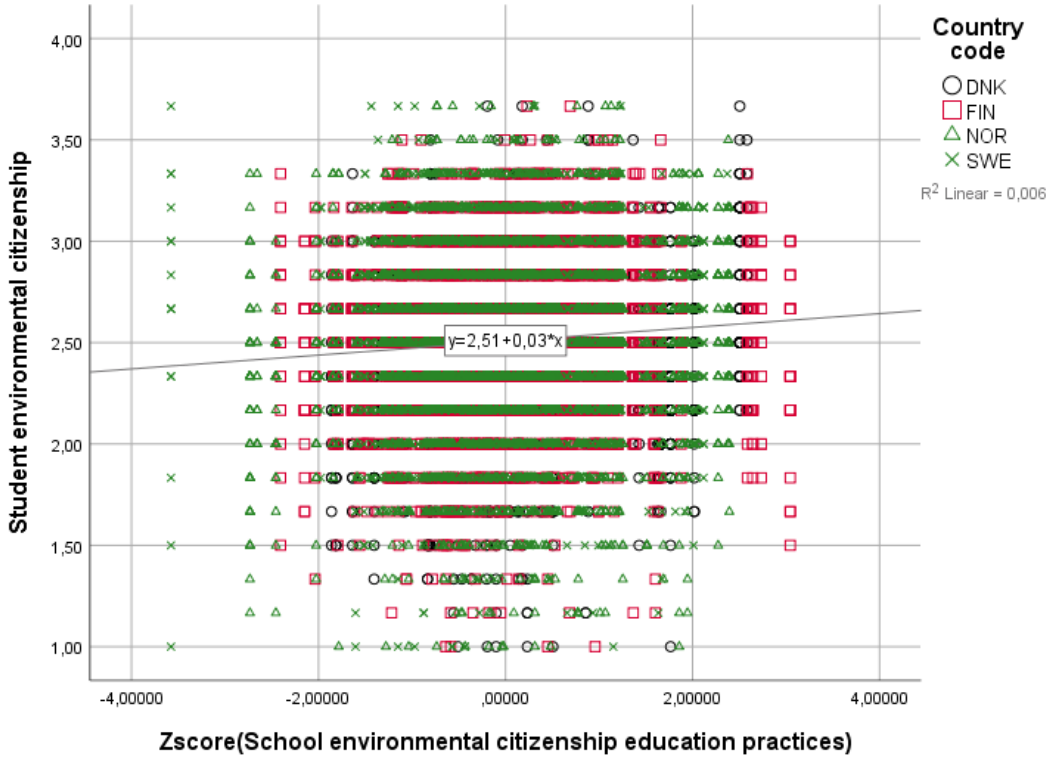


Table 3 presents the results of two models estimating variables of two levels associated with student environmental citizenship. Model 1 includes only background variables at level 1 while Model 2 includes variables at both Level 1 and Level 2. The results of Model 1 shows that gender and parental education are positively and significantly associated with student environmental citizenship. Most background estimates at Level 1 have not changed in Model 2 when we include the variable of school environmental citizenship education practices at Level 2, student immigrant background has changed from non-significant in Model 1 to a significant estimate in Model 2 only in Denmark. We suspect a 'school-effect' of students with immigrant background in Denmark due to its

immigration policy in the recent decades which segregate immigrant neighborhoods from the native population, thus results as segregated schools (Rangvid, 2007; Jørgensen, 2017).

Model 2 shows the two-level modeling results of the regression coefficients of school educational practices (Level 2) on student environmental citizenship (Level 1), together with independent variables such as gender, parents' highest educational attainment, and student migration status, at the individual level (Level 1). The variable *school environmental citizenship education practices* are the standardized z-score of the sum of the composite score reported by school principals and that by teachers. First, the results show that school education does have a positive and statistically significant association with student environmental citizenship in Denmark, Finland and Norway but not in Sweden. More specifically, each unit increase from the mean score of school environmental citizenship education practices would increase the student environmental citizenship composite score by 0.06 points in Denmark, 0.03 points in Finland and Norway. Second, background variables are associated with student environmental citizenship to some extent where gender and parental education are significant in all four countries while the immigrant background is only significant in Denmark and Norway.

Table 3 Student-Level and School-Level Regression Coefficients for Student Environmental Citizenship (Standard Error)

	Model 1: only with Level 1 variables				**Model 2**: with Level 1 and Level 2 variables			
	DNK	**FIN**	**NOR**	**SWE**	**DNK**	**FIN**	**NOR**	**SWE**
Intercept	2.32 (0.01)	2.37 (0.01)	2.39 (0.01)	2.44 (0.02)	2.31 (0.02)	2.37 (0.01)	2.40 (0.01)	2.43 (0.02)
Level 1: Student gender (boy=0, girl=1)	**0.12*** (0.01)	**0.27*** (0.01)	**0.15*** (0.01)	**0.16*** (0.02)	**0.14*** (0.02)	**0.27*** (0.01)	**0.15*** (0.01)	**0.16*** (0.02)
Level 1: Parents' highest educational attainment (lower than university education=0, university and higher education=1)	**0.08*** (0.01)	**0.06*** (0.01)	**0.06*** (0.01)	**0.06*** (0.01)	**0.09*** (0.02)	**0.04*** (0.01)	**0.05*** (0.01)	**0.06*** (0.02)
Level 1: Student migration status (native=0, 1=2nd generation or 1st generation)	0.00 (0.02)	0.02 (0.04)	**0.06 (0.02)**	0.02 (0.02)	**0.08*** (0.04)	0.01 (0.04)	**0.06*** (0.02)	0.03 (0.02)
Level 2: School environmental citizenship education practices (standardized z-score)					**0.06*** (0.02)	**0.03*** (0.01)	**0.03*** (0.01)	0.02 (0.01)
Between school variance explained %	5.7	10.0	7.7	18.5	27.2	17.1	22.0	10.2
Within group variance explained %	3.7	12.7	4.7	5.4	3.2	11.8	4.5	4.2

Note. Numbers in bold and with * denote coefficients significant at the 0.05 level. Weights off. Not shown in the Table are the estimates of a model test with only the variable at Level 2 as they are identical with the ones in Model 2.

Being a girl with parents who have higher education and immigrant background would yield a score for environmental citizenship that is higher than a boy with parents without higher education or immigrant background. A boy whose parents do not have a higher-

education or immigrant background would typically have an environmental citizenship composite score of 2.31 in Denmark, 2.38 in Finland, 2.4 in Norway, and 2.43 in Sweden (see the values for Intercept in Table 3). A girl whose parents have a higher education and immigrant background will have an environmental citizenship score higher than that of a boy at 2.62=2.31 + 0.31 (0.14 + 0.09 + 0.08) in Denmark and 2.66=2.40 + 0.26 (0.15 + 0.05 + 0.06) in Norway. Ultimately, the two-level model has explained 27.2% of the school level variance of student environmental citizenship in Denmark, 17.1% of that in Finland, 22% of that in Norway, and 10.2% of that in Sweden.

Discussion and Conclusion

By considering various philosophical ideas and educational models to generate a pedagogical framework capable of characterizing environmental citizenship education in the studied Nordic countries, we identified a whole-school approach to educational practices and school conditions that are conducive to fostering students' environmental citizenship. Our first key finding is an overview of environmental citizenship education in Nordic schools (Figure 1). Overall, Finnish schools score the highest in environmental citizenship education practices, while Danish schools score the lowest. This reflects well the fact that Finnish teachers and principals are higher than their Nordic peers in considering "promoting respect for the safeguarding of the environment," one of the most important aims of civic and citizenship education, while Danish teachers and principals score lower than their Nordic peers in this consideration (Schulz et al., 2017).

Our second key finding is from our two-level regression analyses (Table 4), where we find that the composite score for school environmental citizenship education practices has a significant positive association with student environmental citizenship in all four countries. This demonstrates that school leaders', teachers', and students' attitudes and behaviors toward environmental actions coincide with one another and that a heightened significance or value placed on environmental actions in civic life and within school communities coincides with heightened attitudes and magnified behaviors toward environmental actions now and in the future. Another key finding of this study is that background variables play a significant role in student environmental citizenship such that being a girl and having parents with higher-education attainment is positively associated with higher scores for environmental citizenship. Interestingly, an immigrant background is a positive factor for student environmental citizenship in Denmark, Norway, and Sweden but not in Finland, which may be because there are very few students with an immigrant background in Finland (only 3.5%, as shown in Table 1).

However, it is important to note the fact that school education plays a significant role even though the factors included in this study explain only a limited amount of the variance of student environmental citizenship in Nordic schools. The fact that we detect a little between-school variation of student environmental citizenship among the Nordic countries means that students are rather similar to each other in different schools concerning their environmental citizenship. Future research may consider other factors

and educational practices beyond the schoolyard, such as the impact of interests, discussions, and practices at home, local communities, and the internet on environmental issues. Both the EPI and SDG reports emphasize that positive and negative environmental spill-over should be considered by citizens and societies in their actions and policies aimed at environmental sustainability. Moreover, overall school community practices (e.g., energy saving, waste reduction, recycling, campaign actions) may be influenced by current government policies, energy sources, and technologies as well as different socio-economic incentives. Nevertheless, due to data limitations, our study covers only the temporal dimension (i.e., present and future environmental actions); the importance of the spatial dimension in environmental citizenship.

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