

Climate Change Education in Curriculum Documents by The Norwegian Directorate for Education and Training: A Content Analysis

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Abstract

The education sector has increasingly been involved in informing learners about the issue of climate change (Reid, 2019), given that this issue represents an existential threat to young people and, generally, to the human race (Sears, 2020). The education sector has responded to the urgency of climate change by proposing the notion of “climate change education”. It can be defined as the process of learning in the face of climate change-related risks and uncertainty (Stevenson et al., 2017). Climate change education is argued to aim at raising primary and secondary school students’ awareness of climate change and its consequences (Tang, 2024). Climate change education is embraced by the education sector in a number of Nordic countries, in particular, Norway (Seikkula-Leino et al., 2021). In Norway, for instance, climate change education seems to fall within the scope of The Norwegian Directorate for Education and Training (henceforth – The Directorate), which is responsible for the governance of the education sector from kindergarten to secondary school (Kapranov, 2021). To-date, however, there is no published research on how climate change education is represented in The Directorate’s curriculum documents that pertain to pre-primary, primary, and secondary school curricula. Seeking to bridge the current research gap, the article presents a study that looks into this underresearched aspect by means of analysing a corpus of The Directorate’s curriculum documents available on its official homepage <https://www.udir.no/>. The corpus of The Directorate’s curriculum documents is investigated in the study by applying an approach to content analysis developed by Krippendorff (2004). The results of the content analysis indicate that climate change education appears to be represented in the corpus in a rather disproportionate manner. Specifically, climate change education is addressed, predominantly, in the curriculum documents in sciences in upper secondary school, whereas it is substantially underrepresented in curriculum documents on pre-primary and primary school levels. These and other findings are further discussed in the article. The

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article concludes with a range of practical suggestions that arise out of the present findings.

Keywords: *climate change education, content analysis, curriculum documents, primary and secondary education, The Norwegian Directorate for Education and Training*

1. Introduction

The issue of climate change is regarded as an existential threat to the human race (Sears, 2020) by a growing number of corporate and political actors (Kapranov, 2018a, 2018b), mass media (Schäfer & Painter, 2021), and the general public (Brosch, 2021; Kapranov, 2022a, 2023). Starting from the early 2010s, the perception of climate change as a threat to the mankind by a variety of actors has reached the education sector, which responded to it by putting forward the notion of “climate change education” (Busch et al., 2019; Reid, 2019; Stevenson et al., 2017; Tang, 2024). Climate change education can be narrowly defined as a focus on climate literacy and the environment in science classes at secondary school (Anderson, 2012, p. 193). The broad definition of climate change education is formulated as a comprehensive and multidisciplinary approach that involves “relevant content knowledge on climate change, environmental and social issues, disaster risk reduction and sustainable consumption and lifestyles” (Anderson, 2012, p. 194). That is, in general terms, climate change education is problematised as the process of learning in the face of climate change-related risks and uncertainty (Stevenson et al., 2017). Whilst the notion of climate change education is relatively novel, it is not entirely new to the education sector, given that it seems to be deeply interwoven with several cognate approaches, namely (i) environmental education (Jorgenson et al., 2019) and (ii) Education for Sustainable Development, or ESD (Kapranov, 2022b; Mochizuki & Bryan, 2015). According to Jorgenson, Stephens, and White (2019), climate change education is intrinsically connected with environmental education, given that its tenets fit into the current mould of problematising the issue of climate change in conjunction with the teaching and learning of science-related school subjects, for

instance, geography, physics, chemistry and the like. Another point of intersection is thought to be represented by the nexus between climate change education and ESD, which has been successfully incorporated into the education sector in the majority of highly developed countries as well as the developing parts of the world (Kapranov, 2021, 2022b). In this regard, it should be specified that ESD is seen as

an approach to teaching and learning based on the ideals and principles that underlie sustainability and applicable to all types, levels and settings of education. As such, ESD promotes multi-stakeholder social learning; emphasises the empowerment of communities and citizens; engages with key issues such as human rights, poverty reduction, sustainable livelihoods, environmental education and gender equality in an integral way; and encourages changes in behaviour that will create a more sustainable future. (Anderson, 2012, p. 193)

ESD and climate change education have found their appropriate places in the education sector in the Nordic countries, particularly, Norway (Kapranov, 2021; Rundgren & Yamada, 2023). For instance, in Norway sustainable teaching and learning practices that focus on the problems of the environment and climate change have become entrenched into the fabrics of the Norwegian teacher identity (Kapranov, 2018c, 2020a, 2020b). The current level of involvement and interest in the environment- and climate change-related matters by Norwegian teachers and students is thought to be reflected in the acts and documents published by the Norwegian Ministry of Education and Research (Trædal et al., 2022). In particular, the Ministry's agency The Norwegian Directorate for Education and Training (henceforth – The Directorate) is known for its active engagement in the ESD- and climate change-related agenda (Seikkula-Leino et al., 2021). Currently, however, little is known about the place of climate change education in The Directorate's curriculum documents starting from kindergarten to Year 12 of upper secondary school (i.e., the so-called K-12). In light of the lack of current research on the matter, the article introduces a study whose purpose is to elucidate the representation of climate change education in a corpus of The Directorate's curriculum documents that are

available on The Department's official homepage
<https://www.udir.no/>.

Prior to continuing to the Research Question (RQ) of the study, it should be, perhaps, noted that The Directorate is an executive agency for the Ministry of Education and Research, which is responsible for (i) kindergartens, primary and secondary schooling, (ii) the governance of the education sector, (iii) the implementation of Acts of Parliament and regulations, and (iv) national statistics concerning kindergarten, primary and secondary education (The Norwegian Directorate for Education and Training, 2024a). Having specified The Directorate's scope of responsibility, let us proceed to the RQ, which is formulated as follows:

RQ: How is climate change education represented in the corpus of The Directorate's curriculum documents that are available on <https://www.udir.no/>?

Further, this article is structured in the following manner. First, a review of the literature is presented in section 2. The review consists of the prior studies on national policies and curriculum documents associated with climate change education. Thereafter, in section 3, the present study is introduced and discussed. Finally, in section 4 of the article, conclusions that arise from the study are presented.

2. The review of the specialised literature

Recently, there has been an increase in scholarly interest in climate change education, which is “attributable in part to [...] the addition of climate change to educational curriculum guidelines” (Monroe et al., 2017, p.1). These developments have resulted in a growing body of scientific publications that seek to establish how climate change education is represented in education policies and curriculum documents (Bieler et al., 2017; Chang & Pascua, 2017; Dunlop & Rushton, 2022; Greer et al., 2023; Han, 2015; Læssøe & Mochizuki, 2015; Mbah et al., 2022; Trædal et al., 2022). Let us review these publications in more detail.

A relatively recent study conducted by Læssøe and Mochizuki (2015) looks at climate change education in conjunction with ESD in

education policy documents in 17 different countries. The authors contend that climate change education represents a new phenomenon, which at the time of their study (i.e., in 2015) was relatively unexplored and poorly incorporated into education policy documents. Læssøe and Mochizuki (2015) argue that climate change in education policy documents should be treated in synergy with ESD. Moreover, they posit that climate change education should be taken more seriously by the national education agencies in the countries investigated.

Analogously to the study by Læssøe and Mochizuki (2015), which investigates climate change education in several countries, Mbah, Shingruf, and Molthan-Hill (2022) seek to shed light onto policies and practices of climate change education in a number of countries in South Asia, where climate change impacts negatively upon the whole region. Mbah, Shingruf, and Molthan-Hill (2022) assert that the inclusion of the issue of climate change into school curricula would be vital in mitigating and adapting to the challenges posed by the negative consequences of anthropogenic climate change in the region. Furthermore, Mbah, Shingruf, and Molthan-Hill (2022) show that there is a significant gap between climate change education-related national policies in South Asia and their effective implementation on the local level.

Also set in Asian contexts, a study by Han (2015) reveals that climate change education in China appears to be incorporated into ESD. Han (2015) demonstrates that in the 2010s China developed and, presumably, implemented a number of policies and initiatives associated with ESD and climate change education. Han (2015) specifies that ESD as well as climate change education in China are perceived as promising approaches that are employed in order to provide a high standard of teaching and learning in primary and secondary school. Concurrently with a prestigious and desirable role played by ESD and climate change education in China, Han (2015) notes that there are multiple problems and challenges associated with their practical implementation.

Just like Han's (2015) study that covers climate change education in only one country, Bieler, Haluza-Delay, Dale, and McKenzie (2017) restrict their investigation on climate change education exclusively to one country, namely Canada. These authors

scrutinise climate change education policies in all 13 Canadian provinces and territories. Accordingly, Bieler, Haluza-Delay, Dale, and Mckenzie (2017) demonstrate that climate change education is rather shallowly represented on the national and regional levels in Canada. The authors (Bieler et al., 2017) assert that the major focus of climate change education in Canada consists in energy efficiency of school buildings, leaving out other important foci of climate change education.

Similarly to Bieler, Haluza-Delay, Dale, and Mckenzie (2017), Greer, King, and Glackin (2023), as well as Dunlop and Rushton (2022), pay attention to climate change education exclusively in one country, specifically, in England. Greer and her colleagues (2017) analyse the key events and shifts in climate change education in England starting from the early 2000s. Particularly, Greer, King, and Glackin (2023) argue that climate change education-related policies are presently lacking in England. Moreover, a systematic and effective response to the climate crisis is overlooked in policy documents on climate change education. Instead, climate change education-related policy documents in England seem to be dominated by economic considerations associated with the issue of climate change (Greer et al., 2023). The aforementioned findings are echoed by Dunlop and Rushton (2022), who show that climate change education-related documents in England appear to foreground economic concerns that are driven by the so-called net-zero policy agenda. Furthermore, Dunlop and Rushton (2022) suggest that there is a conspicuous absence of governmental responsibility and attention to climate change education.

Also focussing on policy documents on climate change education in one country only, specifically, in Singapore, Chang and Pascua (2017) show that the issue of climate change is included in school curricula there. However, Chang and Pascua (2017) have discovered that the inclusion of climate change in Singaporean school curricula appears to be disjointed, thus resulting in the absence of clearly formulated guidelines that can facilitate the teaching and learning of the issue of climate change within school subjects.

We have observed so far in the literature review that policy and curriculum documents on climate change education address, predominantly, macro-dimensions, such as education policy

frameworks (cf., Chang & Pascua, 2017; Dunlop & Rushton, 2022; Greer et al., 2023). In contrast, however, Trædal, Eidsvik, and Manik (2022) explore a micro-dimension of climate change education in curriculum documents. Specifically, the authors contrast the representations of climate change education in geography textbooks in South Africa and Norway, respectively. Trædal, Eidsvik, and Manik (2022) indicate that in South Africa, for instance, climate change education is represented within the framework of ecological modernisation, whereas the topics of civic environmentalism and global injustice associated with climate change appear to be marginal and decontextualised. In addition, the authors assume that South Africa and Norway show striking similarities between the respective portrayals of climate change in geography textbooks (Trædal et al., 2022). Furthermore, Trædal, Eidsvik, and Manik (2022) claim that the complexities of climate change education are discussed in an appropriate manner both in Norwegian and South African geography textbooks.

Summarising the literature review, it seems feasible to argue that whilst there are respective policy documents on climate change education in place in a variety of countries (for instance, China, England, Singapore, etc.), their practical implementation leaves much to be desired. In addition, the present literature could be summarised to involve a joint focus on ESD and climate change education in the respective national educational policies. With these research foci in mind, it seems that there are no current studies on The Directorate's curriculum documents that address or, at least, mention climate change education. The study, which is further presented in section 3 of the article, is sought to bridge this research gap.

3. Research methodology

As shown above, in section 2, there is a substantial body of research on policy and curriculum documents associated with climate change education. Presently, however, there are no published studies that elucidate The Directorate's curriculum documents that pertain to climate change education. Taking into consideration the current lack of relevant research, this article involves a study whose purpose is to shed light onto climate change education in curriculum documents

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published by The Directorate on its official homepage <https://www.udir.no/>. To that end, the study seeks to provide answers to the RQ (see the introductory part of the article) as well as perform the following procedural steps: (i) to collect a relevant corpus and (ii) to analyse it by means of applying the methodological premises of content analysis developed by Krippendorff (2004).

In terms of the corpus, the following should be explained. The corpus is comprised of curriculum documents that are found on the official homepage of The Directorate available at <https://www.udir.no/>. The homepage was searched for curriculum documents that contained the following keywords: (i) *climate change education* and *climate change* on the English language version of the homepage and (ii) *klimaendringer* (i.e., climate change) and *utdanning om klima* (i.e., climate change education) on its Norwegian version. In addition to the aforementioned keywords, the corpus collection was based upon the inclusion criteria summarised in Table 1.

Table 1. The Corpus Inclusion Criteria

#	Criteria	Inclusion
1	All the curriculum documents are available at https://www.udir.no/	+
2	The language of the curriculum documents is English	+
3	The language of the curriculum documents is Norwegian (the <i>bokmål</i> variety)	+
4	The language of the curriculum documents is Norwegian (the <i>nynorsk</i> variety)	+
5	All the documents involve curriculum/curricula	+
6	The respective curriculum document is associated with kindergarten	+
7	The respective curriculum document is associated with primary school	+
8	The respective curriculum document is associated with lower secondary school	+
9	The respective curriculum document is associated	+

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	with upper secondary school	
10	The respective curriculum document is associated with adult education on the (lower and/or upper) secondary level	+

In line with the inclusion criteria, curriculum documents beyond upper secondary school (i.e., tertiary education) were excluded from the process of corpus collection. Also, it should be explained that the search for the English keyword *climate change* returned only two documents, which were associated neither with climate change education nor the issue of climate change per se. Accordingly, the aforementioned two documents were excluded from the corpus collection. Hence, all 20 curriculum documents in the corpus (see Table 2) represent the search for the Norwegian keywords conducted on the Norwegian version of The Directorate's homepage. The descriptive statistics of the corpus are summarised in Table 2 below.

Table 2. The Descriptive Statistics of the Corpus

#	Statistics	Value
1	The total number of documents	20
2	The total number of words	85 991
3	Mean words	4 299,6
4	Standard deviation words	2 911,3
5	Minimum words	1 384
6	Maximum words	8 774

As far as the present methodological foundations are concerned, it should be specified that the study uses the methodology of content analysis developed by Krippendorff (2004). In terms of the methodology, it should be borne in mind that whilst content analysis is amply employed in investigating climate change discourse (Basch et al., 2022; Dotson et al., 2012), this methodology appears to be used to a limited extent in analysing curriculum documents in relation to the issue of climate change.

Let us specify some of the principal postulates of Krippendorff's (2004) approach. According to Krippendorff (2004, p.18), content analysis is defined as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use". Furthermore, Krippendorff (2004) argues that texts (i) have no reader-independent qualities, i.e. "seeing something as a text entails an invitation, if not a commitment, to read it" (Krippendorff, 2004, p.22); (ii) do not have single meanings, but can be read from multiple perspectives (ibid.); (iii) inform their recipients, invoke feelings, and/or cause changes in people's behaviour (Krippendorff, 2004, p.23); (iv) "have meanings relative to particular contexts, discourses, or purposes" (Krippendorff, 2004, p.24); and (v) inform someone by allowing a reader to select among the alternatives (Krippendorff, 2004, p.25).

Anchored in Krippendorff's (2004) methodology, the study uses the computer program AntConc (Anthony, 2022) in order to ensure an objective and replicable analysis of the corpus. AntConc (Anthony, 2022) allows to compute word frequencies and N-grams (in other words, clusters) in a given text. In this regard, it should be noted that all the documents in the corpus are treated as one single file, i.e., all 20 files with the respective 20 curriculum documents in the corpus are merged into one Word file. This is done in order to compute the frequency and N-grams in AntConc. In addition, the content analysis in the study involves the structural unit component, which is used in order to situate each given curriculum document within the structural realm that involves references to the study level (for instance, kindergarten, primary school, lower secondary school, and upper secondary school) and the respective school subject (Kapranov, 2013).

Having outlined the corpus of the study and explained the methodology of the content analysis, let us proceed to the results and their discussion in subsection 3.1 of the article.

3.1. Analysis and interpretation of the research data

The content analysis has yielded the results that are further presented in Tables 3 – 4 and Figures 1 – 2. In particular, Table 3 summarises the collocations of keyword *klimaendringer* [climate change], inclusive of its rank (R), frequency (F), and likelihood (L). It

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should be observed that the collocations are given in the Norwegian language in the way they appear in the curriculum documents, whereas their respective glosses in English are given in square brackets.

Table 3. The Collocations of the Keyword *Climate Change* in the Corpus

#	Collocations	R	F	L
1	Evolusjon [evolution, change]	1	20	160,5
2	Naturfarer [nature hazards]	2	16	109,8
3	Utbredelse [the spread]	3	10	80,1
4	Arter [species]	4	10	69,1
5	Påvirker [to influence]	5	14	63,8
6	Kan [can]	6	22	49,6
7	Gjøre [to do]	7	21	48,5
8	Forårsake [to cause]	8	6	44,4
9	Globale [global]	9	7	38,1
10	Faktorer [factors]	10	6	33,9
11	Energibevaring [energy conservation]	11	5	32,8
12	Leve [to live]	12	4	31,9
13	Ressursforvaltning [resource management]	12	4	31,9
14	Framtidens [future]	12	4	31,9
15	Geologisk [geological]	12	4	31,9
16	Beskytte [to protect]	18	4	30,1
17	Hvordan [how]	20	19	27,9
18	Rede [to bring, to clear]	19	15	28,8
19	Anleggsbransjen [the construction industry]	22	4	26,2
20	Enkeltmennesker [ordinary people]	22	4	26,2
21	Nåtid [the present]	22	4	26,2
22	Økosystem [ecosystem]	25	4	25,3
23	Framtid [the future]	25	4	25,3
24	Konsekvenser [consequences]	28	6	24,9
25	Føre [to lead to]	29	4	24,5
26	Redusere [to reduce]	30	4	23,7
27	Forebygge [to prevent]	30	4	22,3
28	Forskning [research]	32	4	21,2

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29	Samfunn [society]	38	4	15,6
30	Miljø [the environment]	39	5	14,4

The results of the content analysis that involve N-grams (i.e., the N number of the set occurrences of the keyword *klimaendringer* [climate change] in the corpus) are given in Table 4. Identically to Table 3 above, in Table 4 R stands for the rank of the respective collocation, whereas F represents its frequency of the occurrence (in absolute values) in the corpus.

Table 4. N-Grams with the Keyword Climate Change in the Corpus

#	N-Gram Type	R	F
1	Klimaendringer påvirker evolusjon utbredelse [Climate change affects evolutionare spread]	1	10
2	Klimaendringer gjøre rede for [Climate change account for]	2	5
3	Klimaendringer for enkeltmennesker, samfunn [Climate change for individuals, society]	3	4
4	Klimaendringer i nåtid og [Climate change in the present and]	3	4
5	Klimaendringer kan påvirke disse [Climate change can affect these]	3	4
7	Klimaendringer og aktuelle naturfarer [Climate change and current natural hazards]	3	4
8	Klimaendringer og naturfarer gjennom [Climate change and natural hazards throughout]	3	4
9	Klimaendringer og naturfarer og [Climate change and natural hazards and]	3	4
10	Klimaendringer påvirker bygg og [Climate change affects buildings and]	3	4
11	Klimaendringer har for landbruket [Climate change has for agriculture]	11	2
11	Klimaendringer anvende bevaringslover til [Climate change applies conservation laws to]	12	1
12	Klimaendringer bruke atommodeller og [Climate change use atomic models and]	12	1

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13	Klimaendringer og fordeling og [Climate change and distribution and]	12	1
14	Klimaendringer og migrasjon utdanning [Climate change and migration education]	12	1
15	Klimaendringer og ta vare [Climate change and take care]	12	1
16	Klimaendringer og vannskader faget [Climate change and water damage]	12	1
17	Klimaendringer vann og matsikkerhet [Climate change water and food security]	12	1

The findings pertaining to the level of study, for instance, (i) kindergarten, (ii) primary school, (iii) lower secondary school, (iv) upper secondary school, and (v) preparatory education for adults are represented by Figure 1 below.

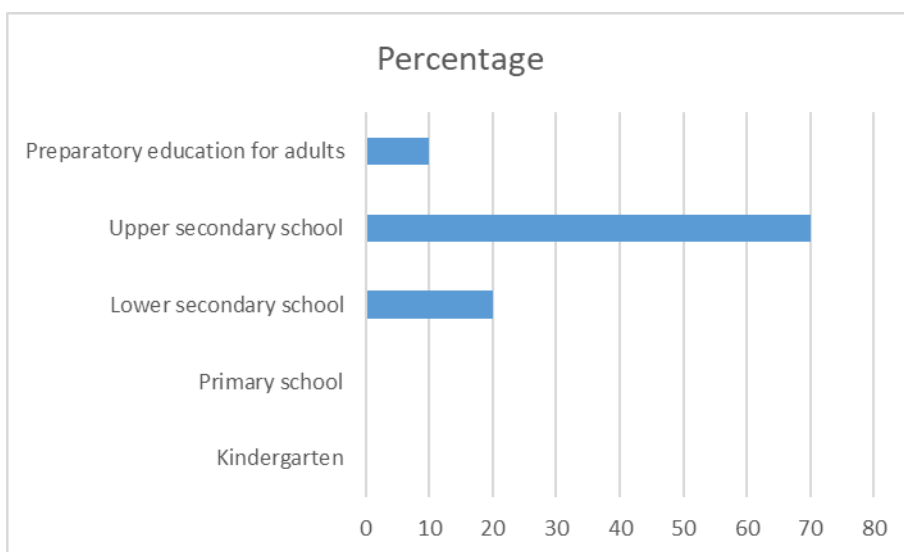


Figure 1. The Representation of Climate Change in The Directorate's Curriculum Documents According to the Educational Level

In addition to the findings that concern the level of education, the content analysis has revealed the range of school subjects, in which the keyword *klimaendringer* [climate change] is mentioned.

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These findings are summarised in Figure 2, which illustrates the subjects irrespective of the study levels they are associated with.

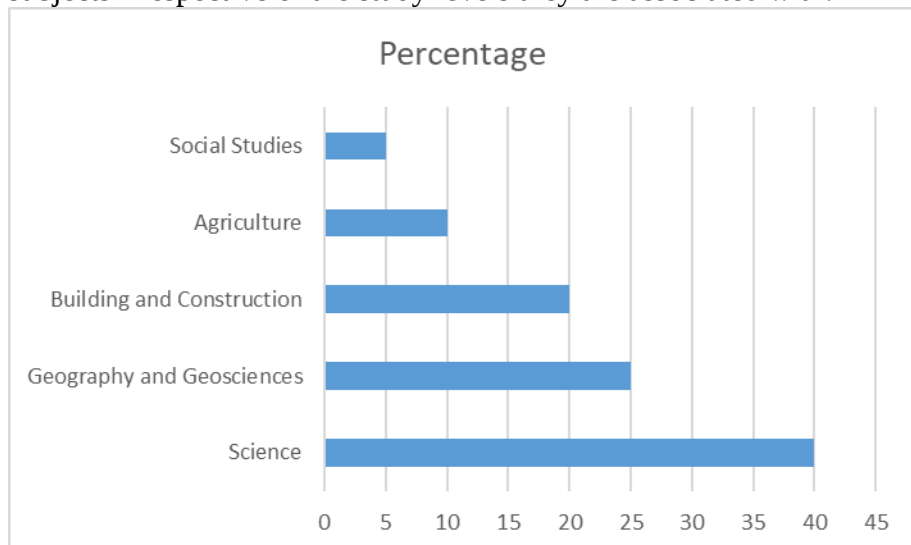


Figure 2. The Representation of Climate Change in The Directorate's Curriculum Documents According to the School Subject

First, let us discuss the findings starting with Figures 1 and 2 and, thereafter, proceed to the discussion of Tables 3 and 4. It is evident from Figure 1 that the major bulk of curriculum documents associated with climate change education pertains to upper secondary school and, to a lesser degree, to lower secondary school. As Figure 1 demonstrates, there are no curriculum documents on the kindergarten and primary school levels that mention climate change education. Judging from these findings, we contend that the representation of climate change education in the K – 12 curriculum documents is not equally distributed. Furthermore, we may argue that climate change education is mentioned in the curriculum documents, predominantly, on the upper secondary level. These findings provide direct support to the literature (Bieler et al., 2017; Chang & Pascua, 2017; Dunlop & Rushton, 2022; Greer et al., 2023; Han, 2015; Læssøe & Mochizuki, 2015; Mbah et al., 2022), which shows that climate change education in its current state is not equally represented in curriculum documents in terms of the study levels. Indeed, we observe The Directorate's

almost exclusive focus on the secondary school segment as far as climate change education is concerned. Seemingly, this comes at the expense of kindergarten and primary school levels. These findings resonate with the prior studies (Bieler et al., 2017; Dunlop & Rushton, 2022; Greer et al., 2023), which argue that climate change education seems to be critically overlooked and unsystematic, especially on the pre-primary and primary school levels. Identically, the findings in this study, so far, provide a clear indication that The Directorate's curriculum documents do not appear to mention climate change education in kindergarten as well as primary school.

As far as the representation of climate change education in respective school subjects is concerned, it is evident from Figure 2 that climate change education in the corpus pertains to science-related school subjects. This finding echoes the study conducted by Anderson (2012), who asserts that climate change education tends to be invariably associated with a science class at secondary school. In addition to science classes, however, climate change education is represented in The Directorate's curriculum documents that are associated with such school subjects as geography and geosciences. This finding provides direct support to the prior investigation by Trædal, Eidsvik, and Manik (2022), who note that climate change education is quite adequately represented in the school subject of geography on the secondary school level.

Another school subject, in which climate change education is represented or, at least, mentioned, is building and construction, which is taught on the upper secondary school level. This finding, however, does not seem to be reported in the prior studies. Hence, we may contend that the representation of climate change education in curriculum documents in the school subject of building and construction is an aspect that is, perhaps, specific to the Norwegian educational landscape.

In addition to discussing the findings that situate climate change education in the school subjects and the level of education, let us pay attention to how climate change education is represented linguistically in The Directorate's curriculum documents. Judging from the findings summarised in Table 3, the linguistic representations of climate change education avail themselves of quite an extensive use of nouns, for instance, *evolusjon* [evolution, change], *naturfarer*

[nature hazards], utbredelse [the spread], arter [species], and faktorer [factors]. They are followed by the frequently occurring verbs that collocate with climate change, such as påvirker [to influence], kan [can], gjøre [to do], and forårsake [to cause]. Their high frequency of the occurrence is, arguably, not at all surprising given that the aforementioned frequently occurring lexis are mainly used in the context of such school subjects as science, geoscience, and geography, cf. klimaendringer påvirker evolusjon utbredelse [climate change affects evolutionare spread], klimaendringer gjøre rede for [climate change account for], klimaendringer kan påvirke disse [climate change can affect these], and klimaendringer og aktuelle naturfarer [climate change and current natural hazards]. Judging from these findings, The Directorate's representation of climate change education can be characterised by a distinct science-related dimension. In contrast, however, a humanitarian dimension of climate change education appears to be less frequently represented in The Directorate's curriculum documents. This contention is supported by the findings summarised in Table 4. Specifically, the findings illustrate that science-related N-grams seem to be rather frequent, whereas there appears only one frequent N-gram, namely klimaendringer for enkeltmennesker, samfunn [climate change for individuals, society], which is associated with the societal and humanitarian dimension.

Additionally, it is relevant to mention that it has been established in the course of the corpus analysis that climate change education seems to be mentioned in the curriculum documents under the rubrics of “sustainable development” and/or “sustainability”. This finding is further illustrated by excerpt (1) that is taken from a curriculum document in geosciences for upper secondary school:

- (1) Bærekraftig utvikling. I geofag handler det tverrfaglige temaet bærekraftig utvikling om å forstå at jordsystemene er grunnlaget for naturressursene som menneskene er helt avhengige av. Det handler også om hvordan menneskeskapte og naturlige endringer i jordsystemene kan føre til klimaendringer, naturfarer og endringer i geologisk mangfold, og hvordan samfunnet kan forebygge og tilpasse seg disse. Videre handler det om å finne

løsninger for en mer bærekraftig ressursutnyttelse nå og i framtiden. [Sustainable Development. In geosciences, the interdisciplinary topic of sustainable development is about understanding that Earth systems are the foundation for the natural resources on which humans are completely dependent. It is also about how human-made and natural changes in Earth systems can lead to climate change, natural hazards and changes in geological diversity, and how society can prevent and adapt to these. It is also about finding solutions for more sustainable resource utilization now and in the future.] (The Norwegian Directorate for Education and Training, 2024b)

This finding is in line with the research results that are reported by Anderson (2012), Kapranov (2021, 2022b), Han (2015), Jorgenson, Stephens, and White (2019), Mochizuki and Bryan (2015), Seikkula-Leino, Jónsdóttir, Håkansson-Lindqvist, Westerberg, and Eriksson-Bergström (2021), as well as Trædal, Eidsvik, and Manik (2022), who have unveiled that climate change education is routinely regarded within the parameters of ESD.

4. Conclusions

The article presented and discussed a study that sought to establish how climate change education was represented in the curriculum documents by The Directorate, i.e. The Norwegian Directorate for Education and Training. The content analysis of the corpus of The Directorate's curriculum documents revealed that The Directorate subsumed climate change education under the rubric of ESD. Furthermore, it was found that climate change education was mentioned exclusively in the secondary school and preparatory adult education contexts, thus leaving out the teaching and learning contexts associated with young learners, i.e. K – Year 7 of primary school. Moreover, climate change education was found to be embedded into the curriculum documents associated with the school subjects of science, geography, geoscience, and building and construction. The aforementioned findings revealed that the humanitarian as well as

societal aspects of climate change education were underrepresented in The Directorate's curriculum documents.

Based upon the present findings, it could be feasible to conclude that the notion of climate change education in general was not treated as a separate didactic and/or pedagogical approach in The Directorate's curriculum documents. Instead, it was found to be embedded into the notion of ESD, in which it was discovered to be associated with secondary education. Additionally, the analysis of the corpus revealed that whilst climate change education was confined to such secondary school subjects as science, geography, geosciences, and building and construction, it was underrepresented across other subject curricula.

In light of the findings, it was possible to formulate the following didactic suggestions: (i) The Directorate should specify its position on climate change education by situating it in a broader spectrum of school subjects; (ii) The Directorate should pay attention to climate change education on the pre-primary and primary school level; and (iii) The Directorate should specify its position on climate change in curricula documents on arts, humanities, and social sciences. Hopefully, the suggestions could be of practical use in primary and secondary educational contexts in Norway and other European countries.

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