Content Analysis of National Policies Towards Greening Education

Indicator summary	
Indicator name	Content Analysis of National Policies Towards Greening Education
Indicator type	Input
Indicator description	This indicator measures the extent to which national policy documents make explicit mention of greening education efforts and initiatives as well as the integration of relevant curricular content. It is based on an existing pool of policy documents, which would need to be updated over time, and which can be expanded to improve country coverage and possibly include other document types.

The proposed indicator focuses on two types of official documents as data: National Curriculum Frameworks (NCFs) and Technical and Vocational Education and Training (TVET) policies from countries around the world. These documents are analyzed for extent and type of content on environment, sustainability, and climate change, as an indication of countries' policy commitments to greening education. |
| **Indicator justification** | The inclusion of "green" keywords—terms related to environment, sustainability, and climate change—in NCFs & TVET policies indicates the extent to which a country is prioritizing the greening of education in their education policies. |
| **MECCE justification for prioritizing dataset and indicator** | Several recent studies have been conducted by UNESCO (UNESCO 2019, 2021, 2021b) which demonstrate the feasibility of this approach – namely, using keyword analysis of official education policies to determine countries' prioritization of environment, sustainability, and climate change in education policy. Starting from the archive of documents compiled for these earlier studies, additional NCF documents were added. In addition, a new set of national TVET policy documents were compiled, drawing on documents listed in TVET profiles developed by UNEVOC (UNESCO International Centre for Technical and Vocational Education and Training). The MECCE Project can commit to undertaking a bi-annual review and update of these documents until 2026, depending on interest and institutional support.

NCFs and TVET policy documents reflect education policy priorities and implementation strategies by national governments. If a national education system is committed to greening education, it is expected that this would be reflected in these documents. The extent and type of content related to greening education in policy helps advance and support this focus in schools and classrooms.

The MECCE Project uses various selection criteria to determine the suitability of a data source for use to support a global indicator (left column), with how this proposed indicator meets these criteria indicated (right column)[1]. Criteria are based on the MECCE Project indicator lifecycle approach. |

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[1] See Annex for definitions

Criteria	Assessment of Proposed Indicator
Geographical coverage/ representativeness	**Satisfactory.** Data source available for more than 130 countries (>80% of UNFCCC members).
Temporal scope	**Less than Satisfactory.** Depending on country context, NCFs & TVET policies are renewed every 5-12 years.
Disaggregation	**N/A**
Accessibility	**Satisfactory.** The data source is openly accessible.
Cost	**Satisfactory.** Costs associated with compiling documents and analyzing their content; no payments to vendors. Maintaining the dataset requires on-going investments.
Reliability	**Satisfactory.** Transparent methods, with some subjectivity in identifying relevant documents and content analysis. Data can be replicated by other persons/groups (intersubjectivity). The qualitative analysis used went through intercoder reliability tests. No conflicts of interest between data collectors and data sources.
Validity	**Satisfactory.** <u>Face Validity</u>: the dataset used in the study has been peer-reviewed in the past: UNESCO studies. <u>Content Validity</u>: The dataset covers the indicator area.
Impact of the dataset	**Satisfactory.** Indicator can be understood by policymakers and policy analysts, compared to other national contexts, and adjusted as new commitments to greening education are considered and implemented.

Dataset(s) description

Dataset(s)   <u>Brief description of specific dataset used to construct the indicator:</u>

Two initial datasets were constructed by the MECCE team of National Curriculum Frameworks (NCFs) and TVET policies. Based on previous studies conducted in collaboration with UNESCO, MECCE had access to NCFs for about 100 countries. The MECCE team then decided to collect TVET policy documents and collaborated with UNEVOC in identifying an initial set of TVET laws and policies. To enhance country coverage the team searched for additional NCFs and TVET policies in the websites of national Ministries of Education and in the following databases: IIEP Planipolis, Eurydice, OECD Policy Outlook, IIEP Siteal, Edumeres, SCRIBD and Course Hero; and studies: IIEP UNESCO, UNESCO ERCE. These searches yielded a significant increase in the number of relevant documents – more than 130 NCFs and more than 60 TVET policies. These are current as of 2022, and the Project can commit to conducting a bi-annual review and update of the dataset until 2026, depending on interest and institutional support.

National Curriculum Frameworks (NCF) constitute a policy instrument that serves as a guideline for all actors in the education system. They specify the design, planning and sequencing of teaching and learning processes. NCFs typically include a statement of purpose, contents, activities and learning practices, as well as modalities for assessing student outcomes. They provide information on the implementation strategy, actions, and benchmarks for implementation, monitoring and evaluation strategies. NCFs generally present core values each

education system is meant to reflect, as well as the knowledge, skills, competencies, and other learning outcomes students are expected to achieve.

TVET policy documents are less standardized than NCFs, in large part due to the greater diversity of national approaches towards TVET programs, tracks, curricular content and learning outcomes. Drawing on the TVET profiles prepared by UNEVOC, the MECCE team collected clearly defined TVET policies (and laws). At a later point these documents will be reviewed whether they refer to ISCED levels 2, 3 or 4 or to tertiary systems (ISCED level 5 or higher). Documents (or sections of documents) only referring to tertiary education will be excluded from the analysis.

<u>Owner of the data if any, and name of data source or dataset, status of data source:</u>
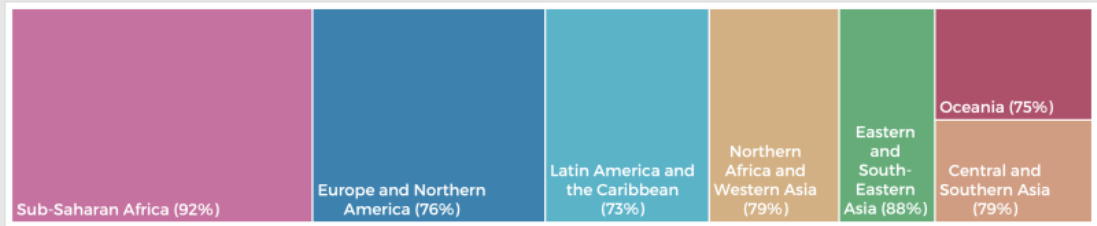Documents are public; the database was created by the MECCE Project.

<u>Language(s) the dataset is in:</u>
The current set of NCFs and TVET documents are in 25 different languages: Albanian, Arabic, Bulgarian, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Lithuanian, Macedonian, Malay, Mandarin, Norwegian, Portuguese, Romanian, Russian, Somali, Spanish, Swedish and Ukrainian. A large proportion of official documents are in English, Spanish, and French.
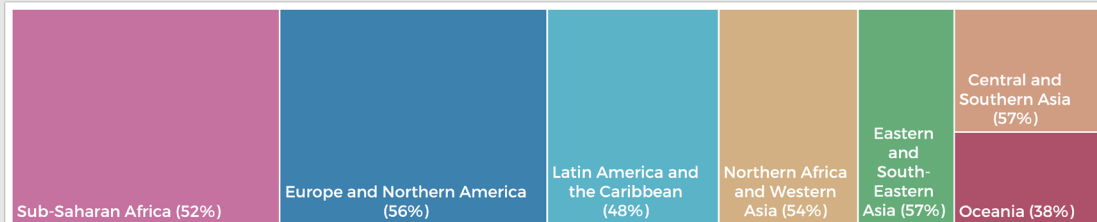
Data collection methods	<u>Procedures used for sampling and collecting data with details on their methods:</u> All countries with available relevant documents were included
Temporal scope	<u>Time period(s) collected data is available:</u> Many documents were initially collected from late 2018 to early 2020. A new search for NCFs and TVET policy documents took place during the first 9 months of 2022. Documents included in the database were published (released) between 2000 and 2022. <u>Frequency of data collection in the future:</u> MECCE will update the database bi-annually. <u>Analyzing change over time:</u> Not possible at this time.
Sample size, characteristics, and geographical coverage	<u>Current sample size and other relevant characteristics</u> **NCFs:** 133 countries, 25 languages **TVET Policies:** 62 countries, 6 languages <u>Selection criteria of sample of countries:</u> The MECCE team compiled NCFs and TVET policies from as many countries as possible. Although the search for documents was international, for more recent searching we prioritized SDG regions in which country coverage was more limited from prior data collection. Only documents released after 2000 were included. In some cases, it was not clear if a document was a TVET specific policy document, so we conducted a TVET content check. In such instances, if the document included fewer than 10 references to one of 15 pre-defined training keywords, it was excluded from the analysis. In cases where there was more than one document of a document type for a country, the standardized references for all such documents were averaged. <u>Country coverage (out of 197 UNFCCC parties) by SDG grouping:</u>

NCFs

| Sub-Saharan Africa (92%) | Europe and Northern America (76%) | Latin America and the Caribbean (73%) | Northern Africa and Western Asia (79%) | Eastern and South-Eastern Asia (88%) | Oceania (75%) / Central and Southern Asia (79%) |

TVET Policies

| Sub-Saharan Africa (52%) | Europe and Northern America (56%) | Latin America and the Caribbean (48%) | Northern Africa and Western Asia (54%) | Eastern and South-Eastern Asia (57%) | Central and Southern Asia (57%) / Oceania (38%) |

MECCE Project indicator analysis

Data preparation	The MECCE project extracted basic metadata from the collected documents -- including the document name, country, year of publication, level of education, and language. The majority of the documents were published in English, followed by Spanish and French. To analyze the content of non-English documents, all Climate Change and Training keywords were translated into 24 languages [2]. Our translation protocol follows: 1) Draw on existing official translations, either from previous studies or in official UN and EU documents[3]; 2) Conduct translations using DeepL. For those languages not covered by DeepL, use Google translate. 3) Contact native speakers working in the field of CCE to proofread all keywords. All languages were proofread except for Korean and Macedonian in analyses to date. Keyword queries were run using the NVivo software, which provided keyword counts in each document for the 29 "green" keywords across three areas (environment, sustainability, climate)[4]. These keywords were then classified into two broad areas: a) keywords related to Environment and Sustainability; and b) keywords specifically related to Climate Change. To compare the relative priority given to these "green" keyword areas, total keyword counts in each area were standardized by dividing them by the total words in the document multiplied by one million.

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[2] Albanian, Arabic, Bulgarian, Danish, Dutch, Finnish, French, German, Greek, Hungarian, Italian, Japanese, Lithuanian, Macedonian, Malay, Mandarin, Norwegian, Portuguese, Romanian, Russian, Somalian, Spanish, Swedish and Ukrainian.

[3] Databases used: IATE and UNTERM

[4] List of green keywords by **domain**: (**Environment**) environmental, ecosystem*, biodiversity, (**Sustainability**) education for sustainability, sustainable development, ESD, (**Climate**) climate change, global warming, climate crisis, climate action*, greenhouse gas*, GHG emission*, Carbon Dioxide emission*, CO_2 emission*, climate hazard*, climate impact*, climate vulnerab*, renewable energ*, climate resilienc*, carbon footprint*, low emission*, net-zero emission* OR net zero emission*, carbon neutral, just transition*, climate justice, adaptation, mitigation, climate change impact, Net-zero CO_2 emissions OR net zero CO_2 emissions. The term "climate" was also translated to verify if it appears within 15 words to "adaptation" and "mitigation".

If a country had more than one document of a given type, the standardized references were then averaged across all documents for each category. The final database for indicator calculation therefore utilized a standardized keyword count for Environmental/Sustainability and for Climate Change domains for each country.

Indicator calculation possibilities

Once values for each country were calculated (e.g., the number of climate related keywords per one million words), the MECCE project clustered the values of this CCE indicator into five levels with one being the lowest and five the highest. The following algorithm (or set of rules) was used to determine the level to which each country belonged:

1. No keywords were found
2. Any Environmental/Sustainability domain keywords found
3. Fewer than 100 Climate keywords OR a more than 1,000 Environmental/Sustainability keywords (High)
4. Between 100 and 1,000 Climate keywords (Moderate)
5. More than 1,000 Climate keywords (High)

Note: All numbers above refer to standardized keywords—in other words, the number of keywords per one million words
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For the proposed *Content Analysis of National Policies Towards Greening Education* Indicator, the indicator calculation would utilize a different algorithm which weighted the three areas (environment, sustainability, climate) more evenly. One illustrative example:

1. No keywords found
2. Any keywords found
3. More than 100 keywords (moderate) found of one area of keywords OR more than 10 keywords (low) of two or more areas
4. More than 1,000 keywords found OR more than 100 keywords of two or more areas
5. More than 100 keywords found in 2 areas AND more than 1,000 keywords in at least 1 area

Alternatively, the indicator could be calculated using a scale from 1 to 100, or just reporting the exact keyword counts. Below are some summary statistics for the standardized keyword counts for each domain and document type.

National Curricular Frameworks:
133 countries
# of countries with 0 keywords: 16
# of countries with 0 keywords in each area: **Environment**=21, **Sustainability**=43, **Climate**=71
Having removed the zeros, the summary statistics (mean; median; max) for each domain are, respectively:
Environment: 515; 348; 2,709
Sustainability: 491; 339; 2,635
Climate: 512; 350; 2,635

Technical Vocational Education and Training Policies:
62 countries
# of countries with 0 keywords: 15
# of countries with 0 keywords in each area: **Environment**=30, **Sustainability**=28, **Climate**=42

Having removed the zeros, the summary statistics (mean; median; max) for each domain are:
Environment: 213; 91; 1,012
Sustainability: 308; 148; 2,083
Climate: 180; 128; 499

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The MECCE project is currently considering an analytical approach that would utilize Natural Language Processing to provide a more detailed and nuanced depiction of greening education efforts. The team will have an assessment of the feasibility of utilizing NLP methods by mid-2023.

Limitations	Potential sources of error:
	Translation: working with keywords in 25 different languages is a complex endeavor. Nine of the 25 languages have noun declensions, and we were able to obtain declinations for all keywords in 4 of the languages (German, Romanian, Russian and Ukrainian). For The remaining 5 languages (Finnish, Greek, Hungarian, Lithuanian, and Somali), we selected one or two keywords per term.
	Possible human error in processing the documents, extracting metadata, etc., which we believe was kept to a minimum.
	NVivo does not work efficiently in all languages. We ran a preliminary analysis of keywords both manually and using NVivo and found in some cases considerable differences. This we decided to *manually* code documents in the following languages: Arabic, Dutch, Japanese, Russian, Ukrainian and Korean. In addition, not all documents appeared to be equally machine-readable even after running OCR (optical character recognition) on all of them.
	Methodological and conceptual weaknesses:
	From a conceptual standpoint, National Curriculum Frameworks have different aims and audiences, which influences document content, and creates country variation. In some cases, NCFs include detailed information on subject syllabi, timetables, course contents, etc., whereas in others the NCF represents more of a set of guidelines upon which grade specific curricula are drafted.
	Keyword counts provide only a rough measure of the integration of something such as climate change education into any document.
	Validity concerns:
	The basic structures of primary and secondary education vary by country as does the official intended curriculum. NCFs provide a valid but imperfect window into the curricular content prioritize in each country. That said, they tell us very little upon what precisely is implemented in local schools and classrooms, even in relatively centralized education systems.