Comparative Analysis of Sustainability Curricula Implementation Processes in Higher Education Institutions: A Variable-based Analytical Scheme

Marie Weiss, Matthias Barth

Working Papers in Higher Education for Sustainable Development Series

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Editorial

Working Papers in Higher Education for Sustainable Development is a series dedicated to publishing recent insights and discussions from *ongoing* research projects in the field of Higher Education for Sustainable Development. One major goal is to make detailed case descriptions, notes on methods, research designs, and related information available in a transparent fashion which usually exceeds the scope of journal articles. Fellow researchers, scholars and practitioners are invited to comment, discuss and contribute their thoughts and experiences. This working papers series is published by the joint "Center for Global Sustainability and Cultural Transformation" (CGSC), a transatlantic academic collaboration between Leuphana University of Lüneburg and Arizona State University.

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Abstract

English

Sustainable development depends on the broad implementation of sustainability curricula across higher education institutions. While this belief is widely shared, little empirical evidence and generalizable results have been generated of such implementation processes and specific driving and hindering factors. This paper provides a scheme for analyzing these processes. The scheme can be used to analyze a single case or a few case studies, but its primary appeal lies in enabling comparisons and meta-analyses of a large number of case studies. Its application will deepen the understanding of sustainability curricula implementation processes in higher education institutions.

Key words: higher education, university, education for sustainable development, sustainability, curricula, implementation process, drivers, barriers, meta-analyses, case survey method

Deutsch

Die nachhaltige Entwicklung unserer Gesellschaft hängt wesentlich davon ab inwiefern Nachhaltigkeitsthemen Einzug in die Programme, Kurse und Curricula der Bildungseinrichtungen, v.a. der Hochschulen finden. Während diese Ansicht etabliert ist und geteilt wird, finden sich kaum empirische Arbeiten mit hohen Fallzahlen zu den eigentlichen Implementierungsprozessen und den entscheidenden Barrieren und Treibern. Erkenntnisse zu Implementierungsprozessen liegen bisher nur in einzelnen Fallstudien oder Vergleichen mit geringen Fallzahlen vor.

Das vorliegende analytische Gerüst ermöglicht einen Vergleich von einer hohen Anzahl von Fallstudien, die über Implementierungsprozesse von Nachhaltigkeitscurricula an Hochschulen berichten. Damit wird ermöglicht auch eine sehr große Anzahl von Fallstudien in einer Meta-Analyse zu vergleichen, um generalisierbare Erkenntnisse zu erhalten.

Key words: Hochschulbildung, Universität, Bildung für nachhaltige Entwicklung, Nachhaltigkeit, Implementierung, Meta-Analyse, case survey Methode

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Part I

Introduction

1.1 The Educating Future Change Agents Project

The *Educating Future Change Agents* (EFCA) project produced empirical insights on how higher education can support students' development of key competencies in sustainability. The project was conducted 2016-2020 as a joint research project between Leuphana University of Lüneburg, Germany and Arizona State University, Tempe, Arizona, USA. The project was structured into five studies, which conducted in-depth case studies and comparative studies on the course, curriculum, and institutional level. The specific cases were selected so as to have a high degree of both similarities and variances within and across cases and to represent the widely recognized fields of sustainability education, namely, education of sustainability professionals, teachers, and entrepreneurs.

All studies were grounded in a shared analytical framework that informed both data collection and analysis. Based on this framework, each study adopted its own suite of research methods appropriate for the respective research questions, while still coordinating and sharing insights on methods among the studies. Each study produced a set of results specific to the specific case(s) and contexts. In the final phase of the project, results from the individual studies were synthesized to offer general insights for researchers, educators, and administrators in the field of sustainability education.

Results of the EFCA project have been published and can be found on ResearchGate: https://www.researchgate.net/project/Educating-Future-Change-Agents. This working paper series provides previously unpublished background material and additional information to facilitate deeper understanding of the research carried out. The working papers offer thorough case documentation and in-depth information on instruments and analytical steps.

1.2 Research on drivers of and barriers to sustainability curricula implementation

One study of the EFCA project focuses on the implementation processes of sustainability curricula in higher education institutions. The core of the analysis relies on identifying specific driving and hindering factors and distinct patterns of implementation. A heterogeneity of single-case or small N comparative case studies have been published on sustainability curricula implementation processes. However, a comparison of all of the published case studies so far, and an analysis that derives generalizable results based on the single-case and small N studies, were both missing. This study helps to close this gap. In a first step, we searched widely for case studies on sustainability curricula implementation in peer-reviewed journal articles and specific edited volumes. Details on the comprehensive search strategy and further analysis of the research landscape can be found in Weiss & Barth (2019). In a second step, we built an extensive variable-based analytical scheme to compare the various case studies. To make our coding process not only understandable and transparent but also replicable, we provide the EFCA analytical scheme in this working paper.

1.3 Why an analytical scheme?

By now there is a growing but scattered body of *single-case studies* describing and/or analyzing specific sustainability curricula implementation processes in higher education institutions around the globe (Cebrián, 2017; Ferrer-Balas et al., 2008; Segovia & Galang, 2002; Trechsel et al., 2018; Velazquez, Munguia, & Sanchez, 2005; Verhulst & Lambrechts, 2015). Yet, consolidated knowledge on the role of various drivers and barriers in determining the level of sustainability curriculum implementation achieved (especially across different contexts) has been missing. As each case study is written from a different perspective (university leadership, lecturer, sustainability champion, student (occasionally), or external researcher), focuses on different variables in the description or analysis, and uses different methods to gather data, comparison is highly difficult. So how can we make use of these insights to derive evidence-based conclusions?

Barth and Thomas (2012) explain varying approaches to synthesizing case study research. In general, inter-case research aggregates data from single case studies and works toward more robust data by analyzing trends and patterns that are shared and that emerge in different contexts. These *multiple case studies and cross-comparison case studies* try to draw conclusions about the commonalities and differences among a small number of cases by using the same focus and methodology (Ferrer-Balas et al., 2008; Sterling & Scott, 2008; Junyent & Geli de Ciurana, Anna M., 2008). However, this kind of analysis can only be done for a small number of case studies.

As a single researcher isn't able to monitor and/or compare all existing case studies and research on sustainability curricula implementation processes, there is a need for an overview of existing research, one that systematically retrieves and organizes the data lying in every qualitative case study (Barth & Thomas, 2012; Fien, 2002). A more integrative interpretation of findings, i.e., one that goes beyond the findings of the single-case studies, is offered by a *meta-analytical approach*.

This research provides a unique contribution to closing this research gap by analyzing 133 case studies on sustainability curricula implementation processes around the globe by means of *the case survey method*.

The *case survey method* (Lucas, 1974; Newig & Fritsch, 2009; Yin & Heald, 1975) is a meta-analytical technique that enables researchers to "to systematically and rigorously synthesize previous case-based research by drawing on the richness of the case material, on different researchers and research designs, and at the same time allowing for a much wider generalization than from single cases" (Newig & Fritsch, 2009). To embed the case survey method in the methodological theory, Newig and Fritsch describe differences between a traditional review, a meta-synthesis, a systematic review, a meta-analysis based on qualitative (case) material—this is the case survey method—and a meta-analysis based on quantitative data. The methods differ according to the type of data input (quantitative or qualitative) and the method of integration. The categorization of the various methods in this matrix is

shown in Figure 1. The advantages of meta-analytical approaches include (first) the opportunity to analyze patterns in a large set of case studies and (second) the ability to generalize to larger populations. The number of available case studies and the restriction of information available can be seen as limitations (Barth & Thomas, 2012).

<table>
<tr><td>Source of data
Method of integration</td><td>Qualitative case studies
(unit = case)</td><td>Quantitative studies
(unit = article)</td></tr>
<tr><td>Narrative / ad hoc</td><td colspan="2">Traditional review</td></tr>
<tr><td>Qualitative, interpretive</td><td>Meta-synthesis</td><td>---</td></tr>
<tr><td>Systematic, but not quantitative</td><td colspan="2">Systematic review</td></tr>
<tr><td rowspan="2">Quantitative or otherwise highly structured (statistical or QCA)</td><td colspan="2">Meta-analysis (in a broader sense)</td></tr>
<tr><td>Case survey
(case meta-analysis)</td><td>Meta-analysis
(in the narrowest sense)</td></tr>
</table>

Figure 1: Typology of research synthesis approaches according to the used source of data and the method of integration (Newig & Fritsch, 2009)

In employing the case survey method we were guided by the steps recommended by Newig and Fritsch (2009). Figure 2 shows our procedure with its individual steps.

Case survey method:

1. Develop research questions
2. Decide on the methodology
3. Define case selection criteria
4. Collect case sample universe
5. Design initial coding scheme
6. Pretest and create iterative revision of coding scheme
7. Create final coding of cases through multiple raters
8. Measure interrater reliability
9. Resolve important -but not all- coding discrepancies
10. Analyze created case data set (statistical or other)
11. Report the study

Figure 2: Case survey method steps (adapted from Newig & Fritsch, 2009)

To compare data from different case studies, the existence of a coherent and empirically operable analytical scheme (which allows for transforming the qualitative data from the case studies into quantitative data) is crucial. Regarding both the analytical scheme and the case-study reports, the analysis can be replicated by other researchers (Lucas, 1974).

In this paper, we introduce and outline an analytical scheme that was in development for over three years and was then tested in an analysis of 133 case studies from around the globe.

1.4 Applicability, scope, and development of the EFCA analytical scheme

The following analytical scheme is a first attempt at creating a rigorous procedure for comparing a large number of sustainability curricula implementation processes in higher education. This scheme was tested with 133 case studies around the globe and is meant to be applicable to all higher education institutions regardless of socio-cultural context. It allows for the analysis of sustainability curricula implementation, including the underlying mechanisms and the output of the process (i.e., the level of the sustainability curricula implementation).

The comprehensive analytical scheme is based on existing research on drivers and barriers, complemented with insights from the case studies. As a starting point, we used the logic model of drivers and barriers (Figure 3), which was compiled and structured by Barth (2015).

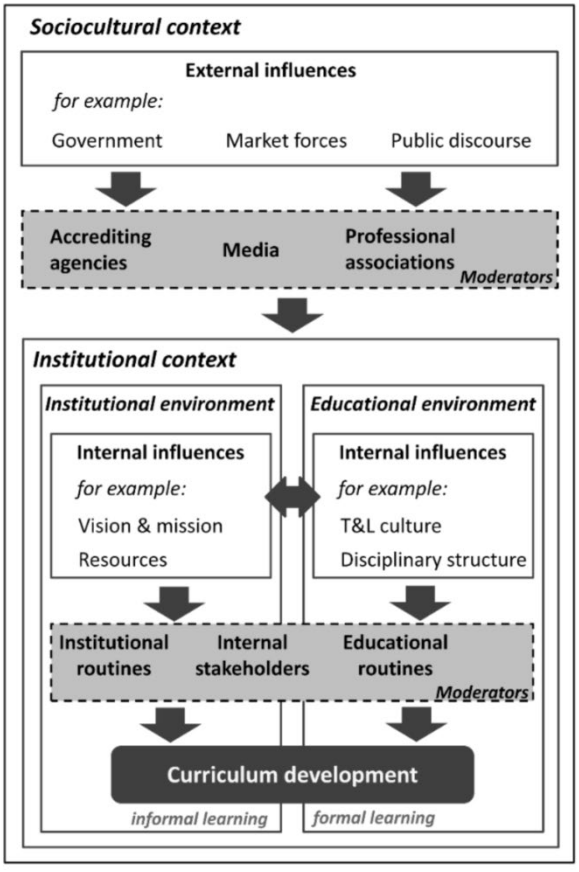

Figure 3: Layers and moderators of curriculum development (Barth, 2015)

In a second step, we supplemented the model with additional variables from the literature (Barth, 2013; Ferrer-Balas et al., 2008; Kitamura & Hoshii, 2010; Hurney et al., 2016; Thomas & Nicita, 2002; Banga Chhokar, 2010; Junyent & Geli de Ciurana, Anna M. ,2008; Velazquez, Munguia, & Sanchez, 2005; Lidgren, Rodhe, & Huisingh, 2006; Muhar, Visser, & van Breda, 2013). Finally, we tested our analytical scheme with the case study material and adapted the analytical scheme with insights drawn from this material.

To describe and analyze a sustainability curricula implementation process in a higher education institution, various drivers and barriers can be identified and described in varying degrees of detail. The overarching influence is the *sociocultural context*. Within this context are *external influences*: governmental restrictions (including relevant laws and the variability of public funding) affect the extent to which curriculum (re)development can take place, market forces apply pressure on employability of students and partially dictating the appeal of different courses of study, accrediting agencies are decisive in establishing new subjects in higher education, and public discourse impacts awareness of societal responsibility for improving the sustainability of key systems. Internally, the *institutional environment*—the institution's vision and mission (i.e., its strategic planning) as well as the resources available—is vital. For implementing innovative sustainability curricula, the *educational environment*, which includes the teaching and learning culture and the disciplinary structure (i.e., the extent of interdisciplinarity), plays a crucial role. Moreover, curriculum change is strongly connected to changes in the institution's organizational structure and the university culture: changes, that is, to institutional routines such as leadership, collaboration, and communication (Barth, 2015). An additional integral component is the support of internal stakeholders, especially academic staff and their willingness to change their teaching, university leadership offering support, and students' interest in sustainability.

In the proposed analytical scheme, we try to capture the available information at a deep and detailed level. During the coding process the following categories were used to organize the individual variables:

1. Basic data case
2. Basic data HEI (higher education institution)
3. Educational environment
4. Implementation process
5. Leadership
6. Support during the sustainability curricula implementation process
7. Internal stakeholders
8. Sociocultural context
9. Level of sustainability curricula implementation

How we situated our variables in Barth's analytical scheme is depicted in Figure 4.

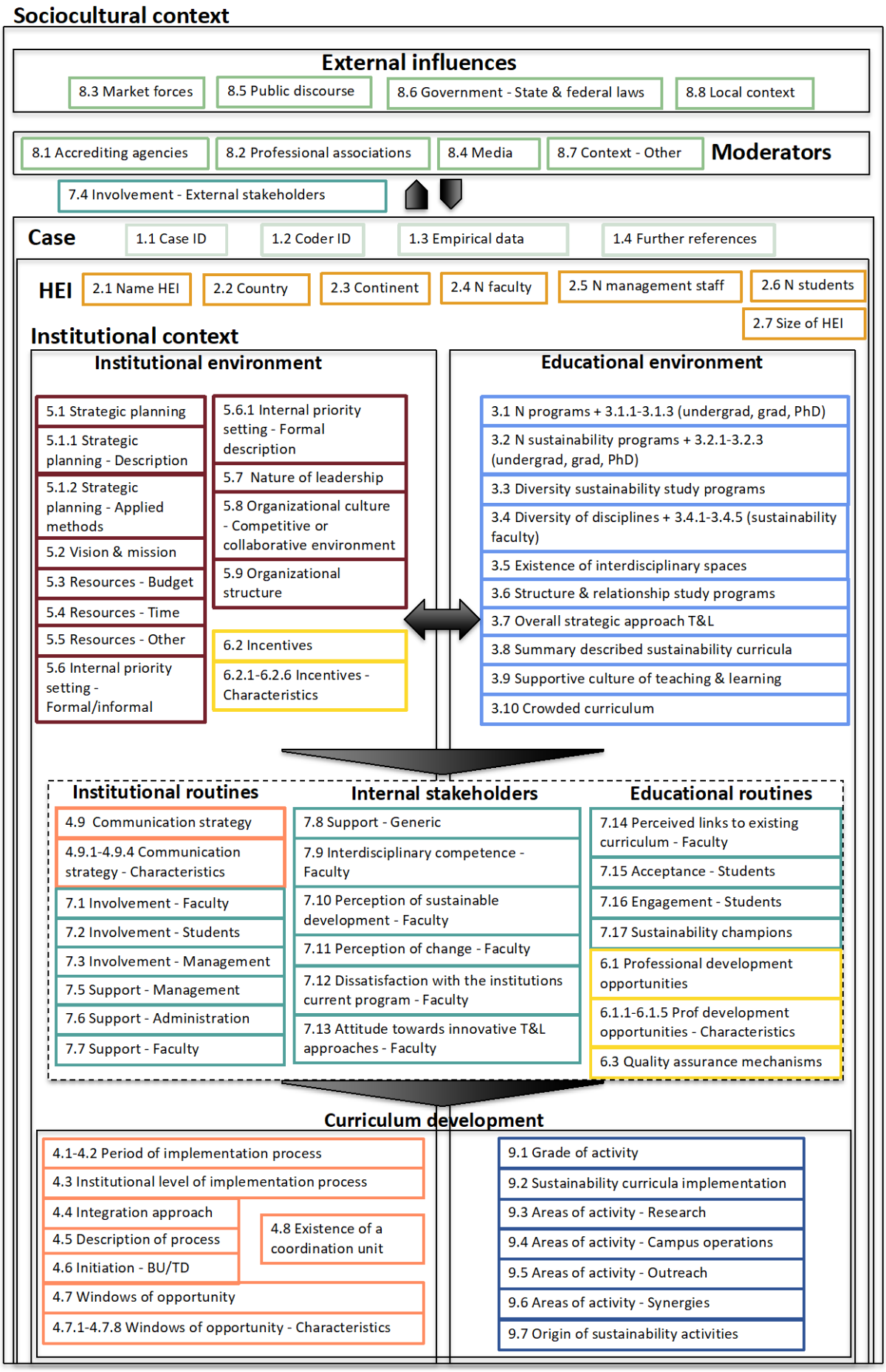

Figure 4: EFCA analytical scheme variables situated in the drivers and barriers logic model developed by Barth (2015)

1.5 Case sample description

Our unit of analysis is the higher education institution and our universe of cases consists of 133 sustainability curricula implementation processes in higher education institutions around the globe. Sources for the systematic document analysis were published peer-reviewed journal articles, chapters in specific edited volumes and additional online material from the websites of the higher education institutions. In a recently published paper (Weiss & Barth, 2019) we described our structured data collection process in detail. Overall, we found 230 case studies, which provided varying levels of information. We then analyzed the case studies using the following category structure. First, we distinguished the case studies based on their general level of information. This distinction is made by applying the *Relevance 1* and *Relevance 2* categories.

- *Relevance 1:* Case studies with at least one publication focusing on the sustainability curricula implementation process. These can be single or comparative case studies.
- *Relevance 2:* Case studies that only marginally describe the sustainability curricula implementation process. These can be single or comparative case studies.

Furthermore, we distinguished the *Relevance 1* cases based on the type of publication, as we assumed that single peer-reviewed case studies offer the most comprehensive analytical data. Therefore, we created the following categories:

- *Long:* Case studies described in depth in at least one peer-reviewed journal article and further additional publications, which could include book chapters, comparative case studies, and *Relevance 2* publications.
- *Short:* Case studies described in depth in one peer-reviewed journal article (single case study) (and no further publication.
- *Book chapter:* Case studies described in depth in a book chapter. Additional publications could include *Relevance 2* peer-reviewed articles.
- *Comparative:* Case studies included in at least one comparative study. Additional publications could include *Relevance 2* publications.

An overview of the various categories and their frequency is shown in Figure 5. Of the 230 case studies, we excluded 10 because the topic of interest wasn't captured in the published text, or because the relevant higher education institution no longer existed in the same form (e.g., it was merged with another HEI). The comprehensive database, including all collected 220 case studies structured by their relevance, publication type, name of the HEI, country, continent, and publications can be found in an open access Excel file on ResearchGate (Weiss & Barth, 2020). A shortlist with the relevance, name of the HEI, country, and continent of the case studies can be found in Appendix 1.

The proposed analytical scheme was applied to all *Relevance 1* case studies (N=133).

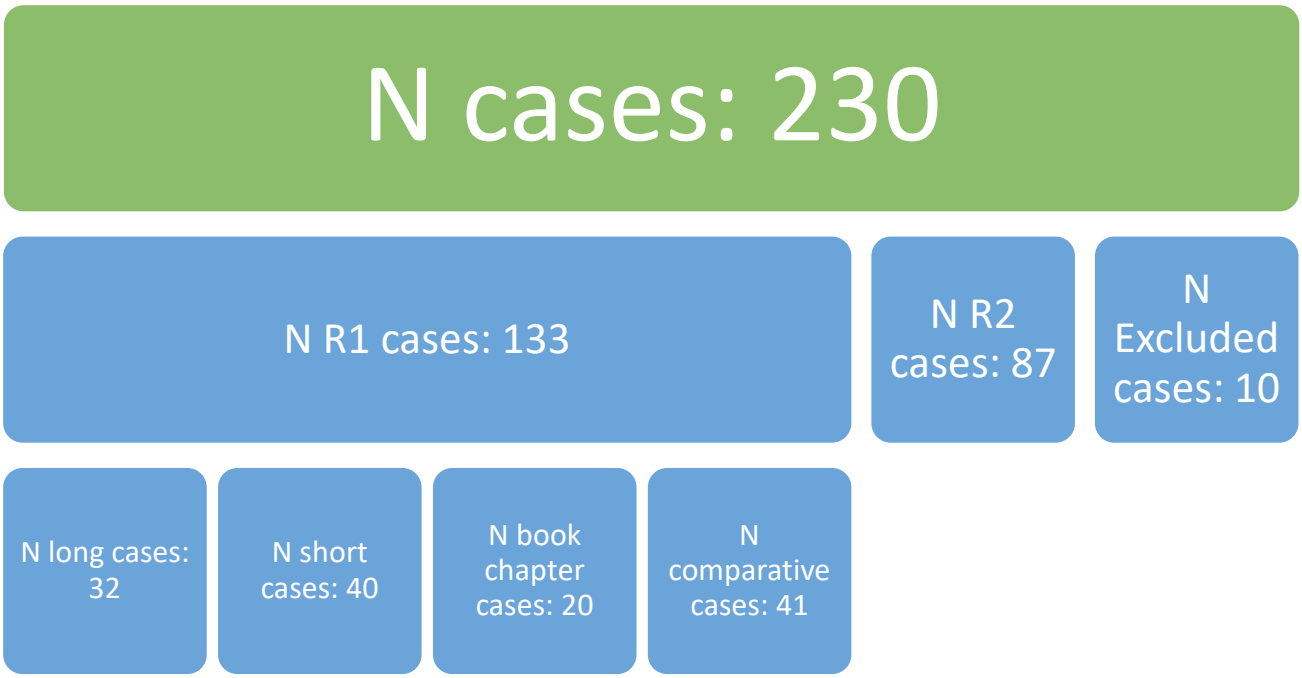

Figure 5: Frequency and structure of case studies

1.6 Acknowledgement

We thank our colleagues Jana Timm and Stephanie Jahn as well as our student and research assistants Anna Falkenstein, Franziska Steinbrügge, Johanna Kruse, Lisa Eberhardt, Lisa Eicke and Anke Klaever for helpful comments on this analytical scheme during various phases of its development and/or the collection of the case studies, which informed the development of the analytical scheme. Furthermore, we acknowledge support from the entire EFCA research team, especially from Jodie Birdman, Aaron Redman, and Arnim Wiek, who helped to clarify terms.

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Part II

The analytical scheme (Code book)

2.1 General coding guidelines

The analytical scheme consists of 111 variables and uses qualitative, categorical scaled and numeric data. To apply the analytical scheme, we recommend building a database (e.g., using an Excel spreadsheet) for all non-qualitative data. For the qualitative data, we recommend using a factsheet for each case to capture the qualitative material in greater detail. We also highly recommend using a coding protocol to capture coding decisions. This can also be recorded in the factsheets. We provide an example of a factsheet in Appendix 2.

Ideally, all variables are coded by at least two coders. In reality, there are often not enough resources to have the entirety of the case universe and all variables coded by multiple coders. In our study, two trained coders separately coded 10% of the cases; we tested the results for inter-rater agreement.

Coding should be based on evidence from the case material. In unclear cases, coders can make substantiated judgments if the variable cannot be coded otherwise. If this is the case, it is useful to make a comment in the coding protocol.

Coding should follow the coders' assessment based on the descriptions of the variables in the coding protocol and should not include any idiosyncratic interpretations or terminology introduced by the coder.

In some cases, it could be difficult to code or assess variables since the consideration of varying publications for one case, which could focus on different time spans, can result in conflicting information. Difficulties can be recorded in the coding protocol. Furthermore, some variables offer the value label "differing" to code conflicting information in the case material (i.e., different actors or publications describe the same variable either as a driver or as a barrier). Another possibility is that it is described that the variable had "some influence" and was neither a clear driver nor a barrier – in these cases the value label "medium" offers an option in-between. Both "differing" and "medium" describe the variable as an influencing factor without a clear driving or hindering impact. Which value label is used depends on the variable and our experiences in applying these to the case material.

Some variables offer an open "other" value label to make it possible to capture any information that is not captured in the named value labels. If an "other" value label is coded, a comment should be recorded in the coding protocol explaining what information is behind the "other" label.

If there is no information on the specific variable, it should be kept in mind to distinguish between the following value labels:

- **Binary variables:**
  0 = no
  1 = yes
- **Nominal variables:**
  0 = a lack of the variable is described (worked as a barrier)
  1 = the variable is described as a driver
  -77 = no information on the variable
  -99 = logically not possible due to missing information in other variable(s).

2.2 Guidelines and information for specific groups of variables

Some variables require general information, which may be looked up in other resources. The most recent data from a trustworthy resource should be used (e.g., an HEI website or annual report). These variables are marked with a **(+)** before the variable description.

- Variables 2.4 - 2.6: Number of faculty, management, students
- Variables 3.1 - 3.2.3: Number of (sustainability) programs
- Variables 3.4.1 - 3.4.5: Disciplines of the specific HEI
  - To determine whether a specific discipline is taught, inclusive and institution-wide information from the HEI's website should be included. Sources could include the pages of schools, departments, institutes, and chair levels, for example. To decide what topic belongs to which discipline it should be referred to the DFG Classification of Scientific Disciplines, Research Areas, Review Boards and Subject Areas (2016-2019).

Some variables are filter variables with related variables that give more information on the filter variable. If a filter variable is coded with -77 (no information), every related variable on a lower level should be coded with a -99 (logically not possible).

- Variable 4.7: Window of opportunity (with related characteristics: variables 4.7.1 - 4.7.8)
- Variable 4.9: Communication (with related characteristics: variables 4.9.1 - 4.9.4)
- Variable 6.1: Professional development opportunities (with related characteristics: variables 6.1.1 - 6.1.5)
- Variable 6.2: Incentives (with related characteristics: variables 6.2.1 - 6.2.6)

Some variables offer an open "other" variable to make it possible to capture any information that is not prescribed in the theoretical schemes. To indicate what information is behind the "other" label a comment in the coding protocol should be made.

- Variable 4.7.8: Window of opportunity - Characteristics: Other
- Variable 4.9.4: Communication strategy - Characteristics: Other
- Variable 5.5: Resources - Other
- Variable 6.1.5: Professional development opportunities - Characteristics: Other
- Variable 6.2.6: Incentives - Characteristics: Other

2.3 Glossary of key terms

Table 1: Glossary of key terms

Term (abbreviation)	Definition/Description
Faculty	Includes professors and all types of researchers, lecturers, and teaching assistants
Case material (CM)	Publications that report on the sustainability curricula implementation process
ESD	Education for sustainable development
HEI	Higher education institution
Management staff	Includes all non-academic staff (e.g., administrative leaders and staff)
Students	Includes all enrolled students (part-time, full-time, online)
Study programs	Includes all study programs including professional training/accompanying studies
Sustainability (-related) programs	Programs that point to sustainability based on the title/name or description of the program: at least one form of the word *sustainab** must be mentioned at some point. Exclude single courses, certificates, and minors. Exclude programs that are described solely as environmental
T&L	Teaching and learning
Top management staff	Includes HEI president (institution level), deans and associates (division level), program leaders

2.4 Key abbreviations and symbols

Table 2: Key abbreviation and symbols

(+)	Besides the case material, other external sources like the website or annual report of the HEI may be consulted
-77	No information
-99	Logically not possible
bin.	Binary scale
met.	Metric scale
nom.	Nominal scale
ord.	Ordinal scale
qual.	Qualitative scale

2.5 List of scales used

Table 3: List of scales used

Scale	Coding possibilities	Missing information
[0/1]	0,1	-77/-99
[0..2]	0,1,2	-77/-99
[0..3]	0,1,2,3	-77/-99
[0..4]	0,1,2,3,4	-77/-99
[1..3]	1,2,3	-77
[1..4]	1,2,3,4	-77/-99
[1..5]	1,2,3,4,5	-77
[1..7]	1,2,3,4,5,6,7	-77
Number	Enter numbers	-77/-99
Text	Enter text	-77/-99
Date	Enter date YYYY	-77

Note: the choice to include multiple scales with the same number of assignable values (e.g. 0..2 and 1..3 each have three possible value designations) is deliberate. Due to our logic model, which we chose because it enables us to describe barriers and drivers, a value of 0 is assigned if anything is described as a barrier/weak/lack of (etc.). Categories that do not admit of a barrier/driver assessment are scaled beginning with 1. If you are not working within a barrier/driver model, you may be tempted to simplify the coding scheme and start every scale with 0. We would gently encourage you not to do this, as it could be barrier to later comparative or collaborative research on studies coded by different teams.

2.6 How to read the tables

The Codebook consists of 5 columns:

1. Numeration of each category or variable.
2. Name and abbreviation of the variable.
3. Data type: We use the following data types: qualitative (text), binary (no/yes), metric (number), ordinal (categories in a specific order), nominal (categories without a specific order), and date.
4. Value label: Description of the kind of data that can be coded. "Text" indicates that you can insert text-based data. If the data type is binary, ordinal, or nominal the range of possible value labels is given. For instance, [1..6] means that you can code a 1, 2, 3, 4, 5, or 6. Moreover, guidance is provided on how to code missing data. A -77 indicates that the data is not available, and a -99 indicates that the coding is not logically possible due to a filter variable.
5. Description of the variable. If applicable, the value labels are described. Moreover, further notes to specify inclusion or exclusion criteria, or coding rules are explained to eliminate conflicts during coding.

Table 4: Explanation of table structure for the code book

X.	**Name of the Category**			
X.1	Variable name (Abbreviation)	Data type	Value label	Description of the variable. Description of value labels (if applicable). *Further notes on exclusion/inclusion criteria or coding rules (if applicable)*
Example 1				
1.1	Case identification (CASE ID)	qual.	Text	Continuous numeration (three-digit) of selected case studies from the population (e.g., C001).
Example 2				
2.7	Size HEI (SIZE HEI)	ord.	[1..4]	Current size of institution. 1 ≥ 30,000 students 2 ≥ 12,000 students 3 ≥ 5,000 students 4 < 5,000 students *Note: The number of students from variable 2.6 N students should be used to code this variable.*

2.7 Variables Category 1: Basic Data Case

1.	BASIC DATA CASE			
1.1	**Case identification** **(CASE ID)**	qual.	Text	Continuous numeration (three-digit) of selected case studies from the population (e.g., C001).
1.2	**Coder ID** **(CODER ID)**	qual.	Text	Initials of coder.
1.3	**Empirical data** **(EMP DATA)**	bin.	[0/1]	Statement of whether empirical evidence is used in at least one publication. 0 = no 1 = yes
1.4	**Further references** **(REF)**	bin.	[0/1]	Statement of whether further references are mentioned in the case material that offer more information on the implementation process of sustainability curricula at the specific HEI. 0 = no 1 = yes *Note: The explicit qualitative text string is marked in MAXQDA for possible further analysis.*

2.8 Variables Category 2: Basic Data HEI

2.	BASIC DATA HEI			
2.1	**Name HEI** **(NAME HEI)**	qual.	Text	Full name of the higher education institution (HEI) in English. If there is no English name, the common name used in the country in which the HEI is located should be used. The abbreviation should be placed in parentheses.
2.2	**Country** **(COUNTRY)**	qual.	Text	Name of the country in which the HEI is located.
2.3	**Continent** **(CONTINENT)**	nom.	[1..6]	Name of the continent in which the HEI is located. 1=Africa 2=Asia 3=Europe 4=Latin America and the Caribbean 5=North America 6=Oceania and Australia *Note: The detailed number of cases per country and the affiliated region based on the UN geographical regions (United Nations (UN), 2018).*
2.4	**Number of faculty** **(N FACULTY)**	met.	Number -77	**(+)** Current number of faculty. *Note: If the numbers of faculty and administrative or management staff cannot be disentangled, the overall staff number should be coded under N faculty, and a note should be made in the coding protocol.*
2.5	**Number of management staff** **(N MGMT)**	met.	Number -77	**(+)** Current number of management staff. *Note: This figure should be excluded if the numbers of academic and administrative or management staff cannot be separated. The overall staff number should be coded under variable 2.4 N Faculty, and a note should be made in the coding protocol.*

2.	**BASIC DATA HEI *(continued)***			
2.6	**Number of students** **(N STUDENTS)**	met.	Number -77	**(+)** Current number of students.
2.7	**Size HEI** **(SIZE HEI)**	ord.	[1..4]	Current size of institution. 1 ≥ 30,000 students 2 ≥ 12,000 students 3 ≥ 5,000 students 4 < 5,000 students *Note: The number of students from variable 2.6 N students should be used to code this variable.*

2.9 Variables Category 3: Educational Environment

3.	EDUCATIONAL ENVIRONMENT			
3.1	**Number of all programs** **(N PROGRAMS ALL)**	met.	Number -77 -99	**(+)** Number of all study programs. *Note: Exclude single courses, minors, certificates. Code based on the variables 3.1.1, 3.1.2, 3.1.3 and add up the numbers. If one of these numbers is missing, code it with -99.*
3.1.1	**Number of undergrad programs** **(N PROGRAMS UNDERGRAD)**	met.	Number -77	**(+)** The current number of all bachelor's degree programs. *Note: Exclude single courses, minors, certificates.*
3.1.2	**Number of grad programs** **(N PROGRAMS GRAD)**	met.	Number -77	**(+)** The current number of all master's degree programs. *Note: Exclude single courses, minors, certificates.*
3.1.3	**Number of doctoral programs** **(N PROGRAMS DR)**	met.	Number -77	**(+)** The current number of all PhD programs. *Note: Exclude single courses, minors, certificates.*
3.2.	**Number of all sustainability programs** **(N SUS PROGRAMS ALL)**	met.	Number -77 -99	**(+)** Number of all sustainability-related study programs. *Note: Exclude single courses, certificates, minors. Code based on the variables 3.2.1, 3.2.2, 3.2.3 and add up the numbers. If one of these numbers is missing, code it with -99.*
3.2.1	**Number of undergrad sustainability programs** **(N SUS PROGRAMS UNDERGRAD)**	met.	Number -77	**(+)** The current number of all sustainability-related bachelor's degree programs. *Note: Exclude single courses, certificates, minors.*

3.	EDUCATIONAL ENVIRONMENT *(continued)*			
3.2.2	**Number of grad sustainability programs** **(N SUS PROGRAMS GRAD)**	met.	Number -77	**(+)** The current number of all sustainability-related master's degree programs. *Note: Exclude single courses, certificates, minors.*
3.2.3	**Number of doctoral sustainability programs** **(N SUS PROGRAMS DR)**	met.	Number -77	**(+)** The current number of all sustainability-related PhD programs. *Note: Exclude single courses, certificates, minors.*
3.3	**Diversity sustainability study programs** **(DIV SUS PROGRAMS)**	ord.	[0..2] -77 -99	Description of the diversity of sustainability study programs in terms of the degree(s) offered (undergrad, Master's, PhD). 0 = weak diversity (one type of degree [undergrad, grad, or PhD] is offered) 1 = medium diversity (two types of degree are offered) 2 = high diversity (all three types of degree are offered) *Note: Include the codings of the variables 3.2.1-3.2.3 as a data source.*
3.4	**Diversity of disciplines** **(DIV DISC)**	ord.	[0..2] -77 -99	Description of the diversity of disciplines taught. 0 = weak diversity (1-2 disciplines are taught) 1 = medium diversity (3 are taught) 2 = high diversity (4 are taught) *Note: Include the codings of the variables 3.4.1-3.4.4 as a data source. Exclude Variable 3.4.5. Diversity of disciplines: Sustainability.*

3.	EDUCATIONAL ENVIRONMENT *(continued)*			
3.4.1	**Diversity of disciplines - Humanities & social sciences** **(DISC HUM SOC)**	bin.	[0/1] -77	**(+)** Statement of whether humanities or social sciences are part of the taught disciplines. 0 = no 1 = yes
3.4.2	**Diversity of disciplines - Natural sciences** **(DISC NAT)**	bin.	[0/1] -77	**(+)** Statement of whether natural sciences are part of the taught disciplines. 0 = no 1 = yes
3.4.3	**Diversity of disciplines - Life sciences** **(DISC LIFE SC)**	bin.	[0/1] -77	**(+)** Statement of whether life sciences are part of the taught disciplines. 0 = no 1 = yes
3.4.4	**Diversity of disciplines - Engineering** **(DISC ENG)**	bin.	[0/1] -77	**(+)** Statement of whether engineering is part of the taught disciplines. 0 = no 1 = yes
3.4.5	**Diversity of disciplines - Sustainability sciences** **(DISC SUS)**	bin.	[0/1] -77	**(+)** Statement of whether sustainability science is part of the taught disciplines. 0 = no 1 = yes *Note: include if the discipline is taught at the HEI and criteria for identifying disciplines are inclusive and institution-wide. These could be based, for example, on faculties, schools, departments, institutes, chair levels. Include if "sustainab*" is mentioned in the name of the faculty, institute, chair, center etc.*

3.	EDUCATIONAL ENVIRONMENT *(continued)*			
3.5	**Existence of interdisciplinary spaces** **(INTERDISC SPACE)**	nom.	[0..3] -77	Description of whether interdisciplinary collaborations, meetings, workshops, or other forms of disciplinary cooperation exist as a constant part of teaching and learning practices. 0 = lack of, described as a barrier 1 = differing 2 = yes, described as a driver 3 = other *Note: include constant (regular and institutionalized, not just occasional) interdisciplinary collaborations and spaces, for example, interdisciplinary centers that teach. Sustainability collaborations (if constant and part of teaching and learning practice) are also classified as interdisciplinary spaces. Exclude one-time workshops (for instance, a few interdisciplinary workshops during a research project or a few interdisciplinary meetings).*
3.6	**Structure & relationship of study programs** **(STRCTR STUDY P)**	nom.	[0..2] -77	Description of whether courses/programs/modules exist in which students from different disciplines can enroll. 0 = lack of 1 = yes 2 = other

3.	**EDUCATIONAL ENVIRONMENT *(continued)***			
3.7	**Overall strategic approach to teaching & learning** **(TLA OVERALL)**	qual.	Text -77	**(+)** Description of the *generic* teaching & learning approach of the HEI. The teaching and learning approach means information on general principles and pedagogy used for instruction. In general, it could be student-centered, or teacher-centered. Examples of approaches are discursive learning, solution-oriented learning, consultative learning, experiential learning, problem-based learning, project-based learning. Some examples of format: teacher as a facilitator, group-works, collaboration, innovative methods, project-based learning, reflection, lecture, videos, online learning, stakeholder engagement. *Note: include information that is extracted from the vision or mission of the HEI's website and the case material (CM). Exclude individual (just for one course or by one teacher) teaching and learning approaches.*
3.8	**Summary described sustainability curricula** **(SUM DESCRBD CURRI)**	qual.	Text -77	Brief description of the sustainability curriculum mentioned in the case material. This includes a) the offering type (one course, program, curricula, training); b) the target audience (students, faculty, stakeholders, other); c) the degree granted by the sustainability curriculum (BA, MA, PhD, faculty training, certificate, other); d) the name(s) of the described sustainability curricula; e) the applied teaching and learning approach; f) the learning objectives (e.g., sustainability competencies); g) the program structure.

3.	EDUCATIONAL ENVIRONMENT *(continued)*			
3.9	**Supportive culture of teaching and learning** **(SUPP CLT TL)**	nom.	[0..3] -77	Assumption of the existence of a supportive culture of teaching and learning (T&L) within the higher education institution. This includes openness to innovation, supportive structures to encourage innovation, participatory approaches to decision-making. The culture of T&L may be described in terms of the institutional, academic, or professional culture. 0 = weak (lack of supportive culture is explicitly mentioned as a barrier in the text—for instance, missing incentives for innovation, no academic freedom, no participation) 1 = medium/differing (supportive culture is not explicitly stressed in the text, but the text hints at incentives for one or some but not all elements—for instance, innovative T&L or participatory decision-making) 2 = high (supportive culture is mentioned as an important driver and explicitly stressed in the text—for instance, support for innovative T&L methods are mentioned, participatory decision-making is in place) 3 = other (supportive culture is mentioned as an important driver and explicitly stressed in the text, but it is stated generically and it remains unclear what the institution really does to create a supportive culture of T&L)
3.10	**Crowded curriculum** **(CROW CURR)**	nom.	[0..3] -77	Description of whether a dense curriculum, already full of other topics, is described as an influence affecting sustainability curricula implementation. 0 = yes, described as a barrier 1 = differing 2 = no crowded curriculum, described as driver 3 = other

2.10 Variables Category 4: Implementation Process

4.	IMPLEMENTATION PROCESS			
4.1	**Period of sustainability curricula implementation process - Start** **(PERIOD SCIP START)**	date	Date -77	Description of the start date of the sustainability curricula implementation process. Format: YYYY *Note: if different periods are mentioned make a note in the coding protocol and use the earliest date.*
4.2	**Period of sustainability curricula implementation process - End** **(PERIOD SCIP END)**	date	Date -77	Description of the end date of the sustainability curricula implementation process. Format: YYYY *Note: if different periods are mentioned make a note in the coding protocol and use the latest date.*
4.3	**Institutional level of the sustainability curricula implementation process** **(INSTITUTIONAL LEVEL SCIP)**	nom.	[1..5] -77	Description of the institutional level (whole HEI, division (e.g., faculty, school, center), program, course) of the sustainability curricula implementation process that is described. 1 = institution 2 = division (e.g., faculty/school/center level) 3 = program 4 = course 5 = other *Note: code the highest mentioned level of the described process. For instance, if the institutional level is the focus of the study, but a single course is described too, code it as 1. Special case: one compulsory undergrad ESD course for all disciplines counts as institution-wide.*

4.	IMPLEMENTATION PROCESS *(continued)*			
4.4	**Integration approach of the sustainability curricula implementation process** **(INTEGRATION APRCH SCIP)**	nom.	[1..7] -77	Description of the approach to implementing sustainability curricula in the HEI. 1 = integration of sustainability as a minor subject in existing course(s) 2 = integration of sustainability as a minor subject in existing program(s) 3 = integration of sustainability in a minor 4 = new (re)design of program(s) (offering a major) focused on sustainability 5 = general studies approach—integration of sustainability as a subject in different parts in university curricula 6 = creation of new sustainability department (chairs, institutes etc. are included) 7 = other
4.5	**Description of the sustainability curricula implementation process** **(DESCRIP SCIP)**	qual.	Text	Brief description of the sustainability curricula implementation process. The focus is on the nature of the process, activities that foster sustainability curricula implementation, temporal occurrence of the variables (drivers and barriers), and synergies. Capture a) all phases with time periods (include notes about the initial situation), b) all highlighted variables (drivers and barriers) and in which phase they were important, c) the grade of activity per phase and whether these were successful; d) the internal priority-setting and whether it changed during the process (capture time period); e) planned improvements.

4.	IMPLEMENTATION PROCESS *(continued)*			
4.6	**Initiation - Bottom-up/top-down** **(INI BU/TD)**	nom.	[1..3] -77	Description of whether the sustainability curricula implementation process started at the "bottom" (students, academic staff) or the "top" (top management). 1 = bottom-up 2 = top-down 3 = other *Note: "top-down" is excluded if the management executes the implementation but the process was initiated at the level of students or academic staff (the bottom).*
4.7	**Window of opportunity** **(WOO)**	nom.	[0..3] -77	Description of whether a favorable opportunity or momentum fostered the sustainability curricula implementation process. 0 = lack of, described as a barrier 1 = differing 2 = yes, described as a driver 3 = other
4.7.1	**Window of opportunity - Characteristics: Forthcoming accreditation processes** **(WOO ACCRED)**	bin.	[0/1] -77 -99	Statement of whether a forthcoming accreditation fostered the sustainability curricula implementation process. 0 = lack of, described as missing 1 = yes
4.7.2	**Window of opportunity - Characteristics: Change of faculty (WOO CHG FACULTY)**	bin.	[0/1] -77 -99	Statement of whether a change of staff fostered the sustainability curricula implementation process. 0 = lack of, described as missing 1 = yes

4.	IMPLEMENTATION PROCESS *(continued)*			
4.7.3	**Window of opportunity - Characteristics: Change of top-management** **(WOO CHG TM)**	bin.	[0/1] -77 -99	Statement of whether a change of top management fostered the sustainability curricula implementation process. 0 = lack of, described as missing 1 = yes
4.7.4	**Window of opportunity - Characteristics: State support** **(WOO STATE SPT)**	bin.	[0/1] -77 -99	Statement of whether an external political guideline or a support program promoted the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes
4.7.5	**Window of opportunity - Characteristics: Requirement to restructure HEI (extern)** **(WOO RESTRUCTURE)**	bin.	[0/1] -77 -99	Statement of whether there was an external requirement to restructure the HEI (regardless of whether the requirement was sustainability-focused) that fostered the sustainability curricula implementation process. For instance, restructuring of the HEI because it was financially precarious. 0 = lack of, described as missing 1 = yes
4.7.6	**Window of opportunity - Characteristics: Evaluation/reform of programs (intern)** **(WOO EVAL)**	bin.	[0/1] -77 -99	Statement of whether any kind of internal evaluation or reform fostered the sustainability curricula implementation process. 0 = lack of, described as missing 1 = yes
4.7.7	**Window of opportunity - Characteristics: Political reforms** **(WOO POL REFORM)**	bin.	[0/1] -77 -99	Statement of whether an external political reform fostered the sustainability curricula implementation process. For instance, Bologna reform in HEIs located in Europe. 0 = lack of, described as missing 1 = yes

4.	**IMPLEMENTATION PROCESS *(continued)***			
4.7.8	**Window of opportunity - Characteristics: Other** **(WOO O)**	bin.	[0/1] -77 -99	Statement of whether any other kind of favorable opportunity fostered the sustainability curricula implementation process. For instance, special (limited) funding, a research project, changes in local context (e.g., restructuring). 0 = lack of, described as missing 1 = yes
4.8	**Existence of a coordination unit** **(COORDINATION)**	nom.	[0..3] -77	Description of whether some type of a coordination unit is formed at the HEI to organize the activities required to implement sustainability curricula. The coordination unit can be individual persons, a steering committee or digital platforms responsible for organizing the activities, or simply a platform for keeping track of the activities with no assigned responsibility. 0 = lack of, described as a barrier 1 = medium/differing 2 = yes, described as a driver 3 = other *Note re. an atypical example: a specific coordination unit isn't created, but coordination is stressed in another context, e.g., a strategic plan is implemented, which contains explicit provision for the implementation of sustainability curricula.*

4.	**IMPLEMENTATION PROCESS *(continued)***			
4.9	**Communication strategy** **(COMM)**	nom.	[0..3] -77	Description of whether some type of an internal verbal or visual communication strategy (exchange of information between a sender and a receiver) is executed to spread information about the implementation of sustainability curricula to trigger a process of learning that happens within the institution. For instance, mailing lists, internal information campaigns, points of contact, specific books or materials about how to implement sustainability education. Digital types are included. 0 = lack of, described as a barrier 1 = differing/in place but unclear impact 2 = yes, described as a driver 3 = other *Note re. an atypical example: a participation process during the action research method, but also used intentionally to spread the vision; a collaborative approach to develop sustainability curricula (stakeholder involvement); methods for outreach e.g., a collaborative scheme.*
4.9.1	**Communication strategy - Characteristics: Information campaign** **(COMM CAMPAIGN)**	bin.	[0/1] -77 -99	Statement of whether an information campaign (effort to educate a large number of individuals and boost public awareness over a specific time) was used as a communication strategy to foster the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes
4.9.2	**Communication strategy - Characteristics: Involvement of diff. stakeholders** **(COMM INVOLV STAKEH)**	bin.	[0/1] -77 -99	Statement of whether the communication strategy of the HEI was targeted to different stakeholder groups (internal/external) to foster the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes

4.	IMPLEMENTATION PROCESS *(continued)*			
4.9.3	**Communication strategy - Characteristics: Point of contact** **(COMM CONTACT POINT)**	bin.	[0/1] -77 -99	Statement of whether a specific point of contact (e.g., specific contact persons, a center for ESD, a coordination unit) was used as a communication strategy to foster the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes
4.9.4	**Communication strategy - Characteristics: Other** **(COMM O)**	bin.	[0/1] -77 -99	Statement of whether any other kind of communication strategy (internal and external) was used to foster the implementation of sustainability curricula, e.g., a website (or, less typically, lobbying). 0 = lack of, described as missing 1 = yes

2.11 Variable Category 5: Leadership

5.	LEADERSHIP			
5.1	**Strategic planning (STRAT PLAN)**	nom.	[0..3] -77	Description of whether a systematic process (strategic planning) with objectives and steps for achieving some level of sustainability curricula implementation is in place. 0 = lack of, described as a barrier 1 = medium/differing 2 = yes, described as a driver 3 = other
5.1.1	**Strategic planning - Description** **(STRAT PLAN DESCRIP)**	qual.	Text -77 -99	Description of the specific systematic process (strategic planning) with the objectives and steps intended to achieve (any level of) sustainability curricula implementation. Take notes a) on the implementation strategies mentioned; b) on methods that were used; c) on special variables that are highlighted, e.g., motivation or engagement strategies.
5.1.2	**Strategic planning - Applied methods for implementing change process** **(STRAT PLAN METHOD)**	qual.	Text -77 -99	Description of the methods that were used during the sustainability curricula implementation process, e.g., evaluation tools, assessment, etc.

5.	LEADERSHIP *(continued)*			
5.2	**Vision & mission** **(VISION)**	nom.	[0..3] -77	**(+)** Description of whether sustainability education or sustainability is represented in the HEI's vision, mission, charter, or a comparable source. 0 = not mentioned in vision 1 = mentioned in vision, which is available online 2 = mentioned in vision, which is available online and described as a driver in case material (CM) 3 = other (e.g., mentioned in case material, but not available online) *Note: include information from the case material and the HEI's website or annual report.*
5.3	**Resources - Budget** **(RES BUDGET)**	nom.	[0..3] -77	Description of whether money and budgeting influences sustainability curricula implementation. 0 = lack of budget, described as a barrier 1 = differing 2 = enough budget, described as a driver 3 = other
5.4	**Resources - Time** **(RES TIME)**	nom.	[0..3] -77	Description of whether time influences sustainability curricula implementation. For example, it is described that time affected formal planning, evaluation, reporting processes, and adding sustainability issues to curriculum. 0 = lack of time, described as a barrier 1 = differing 2 = extra time, described as a driver 3 = other

5.	**LEADERSHIP *(continued)***			
5.5	**Resources - Other** **(RES O)**	nom.	[0..3] -77	Description of whether resources other than money or time (e.g., human resources or other resources) influence sustainability curricula implementation. Include if human or generic resources are described without details relating to what kind of resources affected formal planning, evaluation, reporting processes, and adding sustainability issues to curriculum. 0 = lack of resources 1 = differing 2 = enough resources 3 = other *Note re. an atypical example: academic workload (as it not solely refers to time, but also to mental resources)*

5.	LEADERSHIP *(continued)*			
5.6	**Internal priority setting - Formal/informal** **(INT PRIORITY FRML/INFRML)**	nom.	[0..3] -77	Description of the strategic planning and prioritization of sustainability curricula; i.e., whether ESD is operationalized in some official manifestation within the HEI, as well as how the strategic planning and prioritization of sustainability curricula is executed within the HEI. Official manifestations include, e.g., mission statements, official policies, declarations, sustainability or environmental plans, guidelines, learning outcome guidelines for a whole institution or division, etc. (can be on university or unit level). 0 = lack of formalization 1 = differing (formalization, but weak informal priority setting) 2 = yes, formalization 3 = other (could be, for example, no information about formal, but weak or strong informal support) *Note: exclude individual course or program-level learning outcomes (PLOs) that focus on ESD; these are coded under variable 3.8 Summary described sustainability curricula.*
5.6.1	**Internal priority setting - Formal description** **(INT PRIORITY FRML DESCRIP)**	qual.	Text -77 -99	Description of what official manifestations exist that express the strategic planning and prioritization of sustainability curricula within the HEI. For instance, mission statements, official policies, declarations, sustainability or environmental plans, guidelines, learning outcome guidelines for the whole institution or division etc. (can be on university or unit level). *Note: exclude individual course and program-level learning outcomes (PLOs) that focus on ESD; these are coded under variable 3.8 Summary described sustainability curricula.*

5.	LEADERSHIP *(continued)*			
5.7	**Nature of leadership** **(LEADERSHIP)**	nom.	[0..3] -77	Description of the nature of leadership (top management) in terms of supporting the implementation of sustainability curricula. Leadership involves the establishment of a clear vision, communication strategies to share the vision and provide information, methods to realize the vision, and coordination to execute the implementation of sustainability curricula. 0 = weak leadership (no support, no interest, no awareness) 1 = inconsistent leadership (changes in the top management, different phases, changing priorities, vision but no strategy) 2 = strong leadership (strong support, e.g., vision, strategic planning, incentives) 3 = other
5.8	**Organizational culture - Competitive or collaborative environment** **(COLL ENVRNMT)**	nom.	[0..3] -77	Description of the organizational culture (expectations, experiences, philosophy, values that hold the organization together: in other words, shared attitudes) of the HEI in terms of a competitive or a collaborative atmosphere. 0 = barrier (the competitive environment of the organization is described as a barrier or the collaboration needs to be strengthened) 1 = medium/differing (some or differing efforts to work collaboratively, but not described as a barrier) 2 = driver (the collaborative environment of the organization is described as a driver) 3 = other

5.	LEADERSHIP *(continued)*			
5.9	**Organizational structure** **(ORG STRCT)**	nom.	[0..3] -77	Description of the generic organizational structure and its influence affecting the sustainability curricula implementation process. For instance, descriptions of "silos" or "ivory towers" or academic traditions as barriers. 0 = lack of structure, described as a barrier 1 = differing 2 = sufficient (changed) structure, described as a driver 3 = other

2.12 Variable Category 6: Support mechanisms

6.	SUPPORT MECHANISMS			
6.1	**Professional development opportunities** **(PROF DEVELOP)**	nom.	[0..3] -77	Description of whether mechanisms to assist or encourage sustainability curricula implementation are in place, providing and/or distributing high-level knowledge (provided by HEI). 0 = lack of, described as a barrier 1 = medium/differing 2 = yes, described as a driver 3 = other (e.g., if professional development opportunities are used in the research method of the paper)
6.1.1	**Professional development opportunities - Characteristics: Faculty training** **(PROF DEVELOP FCLTY TRNG)**	bin.	[0/1] -77 -99	Description of whether faculty training (provided by the HEI) was used as one method to support staff in carrying out the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes
6.1.2	**Professional development opportunities - Characteristics: Individual coaching** **(PROF DEVELOP INDVL COACH)**	bin.	[0/1] -77 -99	Description of whether individual coaching was used as one method to support staff in carrying out the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes
6.1.3	**Professional development opportunities - Characteristics: Spaces for exchange of expertise (group, network)** **(PROF DEVELOP SPACE)**	bin.	[0/1] -77 -99	Description of whether specific physical spaces for exchange of expertise exist as one method to support staff in carrying out the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes

6.	SUPPORT MECHANISMS *(continued)*			
6.1.4	**Professional development opportunities - Characteristics: Good teaching practices** **(PROF DEVELOP GTP)**	nom.	[0..2] -77 -99	Description of whether examples of good teaching practices (materials, not persons) exist as one method to support staff in carrying out the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes
6.1.5	**Professional development opportunities - Characteristics: Othe** **(PROF DEVELOP O)**	nom.	[0..2] -77 -99	Description of whether any kind of method other than those mentioned above exist to support staff in carrying out the implementation of sustainability curricula. 0 = lack of, described as missing 1 = yes
6.2	**Incentives** **(INCTIV)**	nom.	[0..3] -77	Description of whether any kind of incentive is created to motivate and encourage people (academics, faculty, students, and external stakeholders) to engage in the sustainability curricula implementation process. 0 = lack of, described as a barrier 1 = medium/differing 2 = yes, described as a driver 3 = other
6.2.1	**Incentives - Characteristics: Awards (intern)** **(INCTIV INT AWRD)**	bin.	[0/1] -77 -99	Statement of whether internal awards are created as incentives to motivate and encourage people to engage in the sustainability curricula implementation process. For instance, awards for innovative teaching and learning approaches. 0 = lack of, described as missing 1 = yes

6.	SUPPORT MECHANISMS *(continued)*			
6.2.2	**Incentives - Characteristics: Awards (extern)** **(INCTIV EXT AWRD)**	bin.	[0/1] -77 -99	Statement of whether external awards (governmental, local companies etc.) exists or are created as incentives to motivate and encourage people to engage in the sustainability curricula implementation process. 0 = lack of, described as missing 1 = yes
6.2.3	**Incentives - Characteristics: Financial** **(INCTIV FINANCE)**	bin.	[0/1] -77 -99	Statement of whether financial incentives (e.g., raises or bonuses) are offered to motivate and encourage people to engage in the sustainability curricula implementation process. 0 = lack of, described as missing 1 = yes
6.2.4	**Incentives - Characteristics: Time** **(INCTIV TIME)**	bin.	[0/1] -77 -99	Statement of whether time advantages are offered as incentives to motivate people to engage in the sustainability curricula implementation process. For instance, a reduction of regular working hours to have more time for working on implementing sustainability curricula. 0 = lack of, described as missing 1 = yes
6.2.5	**Incentives - Characteristics: Promotion** **(INCTIV PROMO)**	bin.	[0/1] -77 -99	Statement of whether a promotion (e.g., granting tenure) is offered as an incentive to encourage people to engage in the sustainability curricula implementation process. 0 = lack of, described as missing 1 = yes
6.2.6	**Incentives - Characteristics: Other** **(INCTIV O)**	bin.	[0/1] -77 -99	Statement of whether any other kind of incentive besides those mentioned above is offered to motivate and encourage people to engage in the sustainability curricula implementation process. 0 = lack of, described as missing 1 = yes

6.	SUPPORT MECHANISMS (*continued)*			
6.3	**Quality assurance mechanisms** **(QAM)**	nom.	[0..4] -77	Description of whether any kind of mechanisms or systems are in place to check the quality of sustainability education. Include evaluations, e.g., checking the content of courses/programs/curricula with the aim of ensuring or improving consistency with ESD. 0 = lack of (no quality assurance mechanisms are established) 1 = occasional/differing (some sort of quality assurance mechanisms are occasionally applied, but not on a regular basis) 2 = established (quality assurance mechanisms are constant and established, meaning they are institutionalized and have allocated resources) 3 = research method (quality assurance mechanisms are used as a research method in the case studies, but it is unclear if they are institutionalized) 4 = other

2.13 Variable Category 7: Internal Stakeholders

7.	INTERNAL STAKEHOLDERS			
7.1	**Involvement - Faculty** **(INVOLV FACULTY)**	nom.	[0..3] -77	Description of how faculty take part in the sustainability curricula implementation process in terms of expressing and registering their opinions, participation in decision-making, initiation or support of the sustainability curricula implementation process. 0 = lack of 1 = formal (participation led by the university) 2 = informal (personal initiative) 3 = other (e.g., involvement through research method) *Note: exclude initiatives of single persons.*
7.2	**Involvement - Students** **(INVOLV STUDENTS)**	nom.	[0..3] -77	Description of how students take part in the sustainability curricula implementation process in terms of expressing and registering their opinions, participation in decision making, initiation or support of the sustainability curricula implementation process. 0 = lack of 1 = formal (participation led by the university) 2 = informal (personal initiative) 3 = other *Note: exclude initiatives of single persons and student involvement in research projects or campus sustainability initiatives.*

7.	INTERNAL STAKEHOLDERS *(continued)*			
7.3	**Involvement - Management** **(INVOLV MGMT)**	nom.	[0..3] -77	Description of how management staff take part in the sustainability curricula implementation process in terms of expressing and registering their opinions, participation in decision-making, initiation or support of the sustainability curricula implementation process. 0 = lack of 1 = formal (participation led by the university) 2 = informal (personal initiative) 3 = other *Note: exclude initiatives of single persons.*
7.4	**Involvement - External stakeholders** **(INVOLV EXT STAKEH)**	nom.	[0..3] -77	Description of how individuals or organizations not part of the HEI take part in the sustainability curricula implementation process in terms of expressing and registering their opinions, participation in decision-making, initiation or support of the sustainability curricula implementation process. 0 = lack of 1 = formal (participation led by the university) 2 = informal (personal initiative) 3 = other *Note: exclude initiatives of single persons.*
7.5	**Support - Management** **(SUPP MGMT)**	nom.	[0..3] -77	Description of the commitment, willingness, and motivation of top management staff to steer and promote sustainability curricula implementation. 0 = no support, described as a barrier 1 = medium/differing support 2 = high support, described as a driver 3 = other

7.	INTERNAL STAKEHOLDERS *(continued)*			
7.6	**Support - Administration** **(SUPP ADMIN)**	nom.	[0..3] -77	Description of the commitment, willingness and motivation of administration to steer and promote sustainability curricula implementation. 0 = no support, described as a barrier 1 = medium/differing support (e.g., if support from administration is described, but bureaucracy is also mentioned as a challenge) 2 = high support, described as a driver 3 = other (e.g., if bureaucracy is described as a challenge)
7.7	**Support - Faculty** **(SUPP FACULTY)**	nom.	[0..3] -77	Description of the commitment, willingness and motivation of faculty to steer and promote sustainability curricula implementation. 0 = no support, described as a barrier 1 = medium/differing support 2 = high support, described as a driver 3 = other
7.8	**Support - Generic** **(SUPP GNRC)**	nom.	[0..3] -77	Description of the commitment, willingness, and motivation of nonspecific stakeholders to steer and promote sustainability curricula implementation. For instance, if it is described that the sustainability curricula implementation was widely accepted. 0 = no support (explicitly mentioned) 1 = differing support (positive and negative support explicitly mentioned) 2 = high support (explicitly mentioned) 3 = other

7.	INTERNAL STAKEHOLDERS *(continued)*			
7.9	**Interdisciplinary competence - Faculty** **(INTERDIS COMP FACULTY)**	nom.	[0..3] -77	Description of faculty's understanding of sustainability-related topics and ability to teach these topics. 0 = lack of competence, described as a barrier 1 = medium/differing competence 2 = high competence, described as a driver 3 = other *Note re. an atypical example: A lack of shared understandings or shared language to discuss sustainability topics.*
7.10	**Perception of sustainable development - Faculty** **(PERC SD FACULTY)**	nom.	[0..3] -77	Description faculty's beliefs and opinions regarding sustainable development generally and the implementation of sustainability curricula specifically. 0 = negative perception, barrier 1 = medium/differing perception 2 = positive perception, driver 3 = other (e.g., if there are differing perceptions regarding the different dimensions) *Note re. an atypical example: differing attitudes regarding differing sustainability dimensions (e.g., positive perception of ecological sustainability, but negative perception of social sustainability).*
7.11	**Perception of change - Faculty (PERC CHNG FACULTY)**	nom.	[0..3] -77	Description of faculty's general opinion on and willingness to accept change. 0 = negative perception, barrier 1 = differing perception 2 = positive perception, driver 3 = other

7.	INTERNAL STAKEHOLDERS *(continued)*			
7.12	**Dissatisfaction with the institutions current program - Faculty** **(DISSAT FACULTY)**	nom.	[0..3] -77	Description of faculty's dissatisfaction with the institution's current program. 0 = no dissatisfaction, described as a barrier 1 = differing, not described as a driver 2 = high dissatisfaction, described as a driver 3 = other
7.13	**Attitude towards innovative T&L approaches - Faculty** **(ATT ITL FACULTY)**	nom.	[0..3] -77	Description of the attitude toward innovative teaching and learning (T&L) approaches of faculty. 0 = negative attitude, barrier 1 = medium/differing attitude 2 = positive attitude, driver 3 = other *Note: include not just the overall culture, but also individual cases. If it is only mentioned on an individual level, place a comment in the coding protocol.*
7.14	**Perceived links to existing curriculum - Faculty** **(PERC CURR LINKS FACULTY)**	nom.	[0..3] -77	Description of perceived links between sustainability as a topic (or different sustainability dimensions) to the existing curriculum as an influence on the implementation of sustainability curricula by faculty. 0 = negative perception, described as a barrier 1 = medium/differing perception 2 = positive perception, described as a driver 3 = other *Note: include not just an overall culture, but also individual cases.*

7.	INTERNAL STAKEHOLDERS *(continued)*			
7.15	**Acceptance - Students** **(ACC STUDENTS)**	nom.	[0..3] -77	Description of student awareness and acceptance of sustainability programs in terms of requesting and supporting such an implementation and/or by enrolling in such curricula. 0 = no acceptance, described as a barrier 1 = medium/differing acceptance 2 = high acceptance, described as driver 3 = other
7.16	**Engagement - Students** **(ENGAGE STUDENTS)**	nom.	[0..3] -77	Description of the students' engagement regarding sustainability curriculum change. 0 = lack of 1 = yes, leads to curriculum change 2 = yes, but ineffective (does not lead to curriculum change) 3 = other (e.g., engagement in campus sustainability initiatives)
7.17	**Sustainability champions** **(SUS CHAMP)**	nom.	[0..3] -77	Description of whether sustainability champions (individuals that really shape sustainable development, transformative leaders) actively steer sustainability curricula change. This could be single persons, small groups, or evolving groups (could be students, faculty, or other stakeholders). 0 = lack of, described as a barrier 1 = medium 2 = yes, described as a driver 3 = other

2.14 Variable Category 8: Sociocultural Context

8.	SOCIOCULTURAL CONTEXT			
8.1	**Accrediting agencies** **(ACCRED A)**	nom.	[0..3] -77	Description of the influence of accrediting agencies on sustainability curricula implementation. Accrediting agencies include all external organizations responsible for accrediting studies or quality assessment (these could be, e.g., governmental or industry-based). 0 = none, described as a barrier 1 = medium 2 = yes, described as a driver 3 = other (e.g., if some influence/involvement is planned)
8.2	**Professional associations** **(PROF ASSOC)**	nom.	[0..3] -77	Description of the influence of external organizations that articulate the voices of employers and alumni (professional associations) on sustainability curricula implementation. 0 = none, described as a barrier 1 = medium 2 = yes, described as a driver 3 = other (e.g., if some influence/involvement is planned)
8.3	**Market forces** **(MARKET F)**	nom.	[0..3] -77	Description of the influence of market forces on sustainability curricula implementation. Market forces include, for example, calls from industries and employers regarding output-orientation, competence development, and employability. 0 = none, described as a barrier 1 = medium 2 = yes, described as a driver 3 = other (e.g., if some influence/involvement is planned)

8.	SOCIOCULTURAL CONTEXT *(continued)*			
8.4	**Media** **(MEDIA)**	nom.	[0..3] -77	Description of the influence of any kind of media on sustainability curricula implementation. 0 = none, described as a barrier 1 = medium 2 = yes, described as a driver 3 = other (e.g., if some influence/involvement is planned)
8.5	**Public discourse** **(PUB DISC)**	nom.	[0..3] -77	Description of the influence of public discourse (discussion of sustainability issues within the society) on sustainability curricula implementation. For instance, sustainability problem awareness within society. 0 = none, described as a barrier 1 = medium 2 = yes, described as a driver 3 = other (e.g., if some influence/involvement is planned)
8.6	**Government - State & federal laws** **(GOVERNM)**	nom.	[0..3] -77	Description of the influence of the government on sustainability curricula implementation. For instance, specific laws or boundaries, in which development may or may not take place (e.g., ESD is mandated for all Engineering undergrad degrees), or the influence of local municipalities or ministries, are mentioned. 0 = none, described as a barrier 1 = medium 2 = yes, described as a driver 3 = other

8.	**SOCIOCULTURAL CONTEXT *(continued)***			
8.7	**Context - Other** **(CONTEXT O)**	qual.	Text	Description of the influence of other external factors or stakeholders (other than accrediting agencies, professional associations, media, market forces, government, public discourse) on sustainability curricula implementation. For instance, NGOS, networks, partnerships, peer institutions or top-tier universities may serve as examples to promote sustainability curricula implementation. *Note re. an atypical example: documents (including governmental guidelines etc.) are used to inspire the HEI's own ESD strategy. If some influence/involvement is planned, make a note in the coding protocol.*
8.8	**Local context** **(LOCAL CTXT)**	qual.	Text	Brief description of factors in the local/regional context (geography, societal/ecological problems, history, surrounding city/town) that influence the sustainability curricula implementation process. For instance, water issues, cultural traditions, globalization, climate destabilization, newness of higher education, autonomy of institutions, development of an institution in a specific local context.

2.15 Variable Category 9: Level of Sustainability Curricula Implementation

9.	LEVEL OF SUSTAINABILITY CURRICULA IMPLEMENTATION			
9.1	**Grade of activity (GOA)**	ord.	[1..3] -77	Description of the level of activity in terms of time relating to sustainability curricula implementation efforts. 1 = recently started activities, meaning for <5y 2 = established activities, meaning for 5-10y 3 = long tradition of activities, meaning >10y *Note: in most cases the timespan of the available publications refers to a specific earlier stage of the implementation process. We assume that the process is still ongoing (often depictable through the HEI's current annual reports or websites). To compare all cases, we decided to use the year in which we started the coding as an anchor point to estimate the time span. Example: If variable 4.1 Period of sustainability curricula implementation process -Start is coded as 2008, and we started our coding process in 2018, then we look back at ten years of implementation (=established activities).*

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9.	LEVEL OF SUSTAINABILITY CURRICULA IMPLEMENTATION *(continued)*			
9.2	**Sustainability curricula implementation (RATING SUS IMPLEMENTATION)**	nom.	[0..3]	Rating of the sustainability curricula development within the HEI in terms of the approach of Sterling and Thomas (2006), which holds that sustainability curricula development can happen on a spectrum of different levels and depths. Sterling and Thomas differentiate between denial (no change), bolt-on (education about sustainability), build-in (education for sustainability), and curriculum redesign (sustainability education) (Sterling & Thomas, 2006). 0 = no change 1 = bolt-on (Sustainability issues inform disciplinary topics with the integration of sustainability into existing courses or program(s).) 2 = build-in (Sustainability is tackled via interdisciplinary collaboration with the creation of a new discipline or cross-disciplinary sustainability courses or programs. Or, ESD is at least in HEI's current vision (HEI's annual report or website) plus in ESD courses/programs.) 3 = redesign (Sustainability issues are integrated into common core requirements and/or the vision—case material (earlier stage – depends on publication date) and online (current state)—of the HEI. In addition, there has to be medium or strong leadership support.)

9.	LEVEL OF SUSTAINABILITY CURRICULUM DEVELOPMENT *(continued)*			
9.3	**Areas of activity - Research** **(GOA RESEARCH)**	ord.	[0..3] -77	Description of the level of activity and effort (not success) in terms of commitment to the area of sustainability research. 0 = no specific activities 1 = active (the area is mentioned, but is not the focus of the HEI) 2 = significant (the commitment becomes visible in projects, initiatives etc.) 3 = core focus (the commitment becomes visible in projects, initiatives etc., and the commitment is determined in strategic papers, vision etc.)
9.4	**Areas of activity - Campus operations** **(GOA CAMPUS)**	ord.	[0..3] -77	Description of the level of activity and effort (not success) in terms of commitment to campus sustainability. For instance, information on energy, waste, and sustainability management systems. 0 = no specific activities 1 = active (the area is mentioned, but is not the focus of the HEI) 2 = significant (the commitment becomes visible in projects, initiatives etc.) 3 = core focus (the commitment becomes visible in projects, initiatives etc., and the commitment is determined in strategic papers, vision etc.)

9.	LEVEL OF SUSTAINABILITY CURRICULA IMPLEMENTATION *(continued)*			
9.5	**Areas of activity - Outreach** **(GOA OUTREACH)**	ord.	[0..3] -77	Description of the level of activity in terms of sustainability outreach. Include activities that connect research and other activities of the HEI to society and specific communities, e.g., partnerships with local communities to support sustainable development. 0 = no specific activities 1 = active (the area is mentioned, but is not the focus of the HEI) 2 = significant (the commitment becomes visible in projects, initiatives etc.) 3 = core focus (the commitment becomes visible in projects, initiatives, etc., and the commitment is determined in strategic papers, vision etc.)
9.6	**Areas of activity - Synergies** **(GOA SYN)**	ord.	[0..2] -77	Description of the level of activity and effort (not success) in terms of fostering ESD through building interactions or cooperation between teaching and learning (T&L), research, campus operations, and outreach, which produces a combined effect greater than the sum of their separate effects. 0 = no specific synergies 1 = some synergies are described 2 = synergies are pushed
9.7	**Origin of sustainability activities** **(GOA ORIGIN)**	nom.	[1..5] -77	Description of the activity that started other sustainability activities. 1 = research 2 = teaching & learning 3 = campus operations 4 = outreach 5 = other

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Appendix

No. 1 Case study lists structured by their relevance

Relevance 1 case studies (N=133)

Table 5: Relevance 1 case studies

Continent	Country	Name of the Higher Education Institution
Africa	Botswana	University of Botswana (UB)
Africa	South Africa	Rhodes University
Africa	Tanzania	University of Dar es Salaam
Asia	China	Beijing Normal University (BNU)
Asia	China	Tsinghua University
Asia	India	Anna University
Asia	India	Indira Gandhi Open National University (IGOU)
Asia	India	Jadavpur University
Asia	India	Jammu University
Asia	India	Symbiosis International University
Asia	India	TERI University
Asia	India	University of Hyderabad
Asia	India	University of Madras
Asia	India	University of Pune
Asia	Indonesia	Universitas Gadjah Mada (UGM)
Asia	Iran	Amirkabir University of Technology (AUT)
Asia	Japan	Hokkaido University
Asia	Japan	Ibaraki University
Asia	Japan	Kobe University
Asia	Japan	Kyoto University
Asia	Japan	Osaka University
Asia	Japan	Shinshu University (SU)
Asia	Japan	University of Tokyo
Asia	Malaysia	National University of Malaysia
Asia	Malaysia	University Sains Malaysia (USM)
Asia	Oman	Sultan Qaboos University
Asia	Philippines	Miriam College
Asia	South-Korea	Yonsei University (YU)
Asia	Thailand	Asian Institute of Technology (AIT)
Asia	Vietnam	Hanoi National University of Education (HNUE)
Asia	Vietnam	Ho Chi Minh University of Pedagogy (HCMUP)
Asia	Vietnam	Hue University of Education (HUEd)
Asia	Vietnam	Quang Nam University (QNU)
Asia	Vietnam	University of Da Nang, Danang University of Education (DUEd)

Continent	**Country**	**Name of the Higher Education Institution** *(continued)*
Europe	Bulgaria	University of Architecture, Civil Engineering and Geodesy (UACEG)
Europe	Denmark	Aalborg University
Europe	Germany	Leuphana University
Europe	Germany	University of Tübingen
Europe	Greece	University of Aegean
Europe	Greece	University of Thessaloniki
Europe	Latvia	Daugavpils University
Europe	Latvia	Liepaja University (LiepU)
Europe	Latvia	Rezekne Higher Education Establishment (RHEE)
Europe	Latvia	University of Latvia
Europe	Netherlands	Delft University of Technology (DUT)
Europe	Netherlands	Eindhoven University
Europe	Netherlands	Erasmus University of Rotterdam
Europe	Netherlands	Van Hall Larenstein University of Applied Science
Europe	Spain	Technical University of Catalonia (UPC)
Europe	Spain	Technical University of Valencia (TUV)
Europe	Spain	University of Zaragoza
Europe	Sweden	Chalmers University of Technology
Europe	Sweden	KTH Royal Institute of Technology
Europe	Sweden	Linköping University
Europe	Sweden	Lund University
Europe	Switzerland	ETH Zurich
Europe	Switzerland	Zurich University of Applied Sciences
Europe	UK	Anglia Ruskin University
Europe	UK	Bournemouth University
Europe	UK	Cambridge University
Europe	UK	De Montfort University
Europe	UK	Newcastle University
Europe	UK	University of Bristol
Europe	UK	University of Gloucestershire
Europe	UK	University of Huddersfield
Europe	UK	University of Leeds
Europe	UK	University of Plymouth
Europe	UK	University of Southampton
Europe	UK	University of Strathclyde
Europe	UK	University of the West of England
Europe	UK	University of Wales Trinity Saint David
Latin America and the Caribbean	Brazil	Methodist University of São Paulo (Universidade Metodista de São Paulo (UMESP))
Latin America and the Caribbean	Ecuador	Universidad Técnica del Norte
Latin America and the Caribbean	Jamaica	University of the West Indies
Latin America and the Caribbean	Mexico	Metropolitan Autonomous University

Continent	Country	Name of the Higher Education Institution *(continued)*
Latin America and the Caribbean	Mexico	Monterrey Institute of Technology and Higher Education
Latin America and the Caribbean	Mexico	National Autonomous University of Mexico
Latin America and the Caribbean	Mexico	Universidad Veracruzana
Latin America and the Caribbean	Mexico	University of Sonora
North America	Canada	Bishop's University
North America	Canada	British Columbia Institute of Technology
North America	Canada	Dalhousie University
North America	Canada	Université de Sherbrooke
North America	Canada	University of Alberta
North America	Canada	University of British Columbia (UBC)
North America	Canada	University of Guelph
North America	Canada	York University
North America	USA	Arizona State University (ASU)
North America	USA	Berea College
North America	USA	California State University, Northridge (CSUN)
North America	USA	Carnegie Mellon University
North America	USA	Emory University
North America	USA	Ferrum College
North America	USA	Florida Gulf Coast University
North America	USA	George Washington University
North America	USA	Indiana University Bloomington
North America	USA	Ithaca College
North America	USA	James Madison University (JMU)
North America	USA	Johns Hopkins
North America	USA	Middlebury College
North America	USA	Northern Arizona University
North America	USA	Ohio State University (OSU)
North America	USA	Philadelphia University
North America	USA	Princeton
North America	USA	San José State University
North America	USA	Tulane University
North America	USA	Unity College
North America	USA	University of California, Santa Cruz (UCSC)
North America	USA	University of Colorado Boulder
North America	USA	University of Hawaii
North America	USA	University of Minnesota
North America	USA	University of New Hampshire
North America	USA	University of New Haven
North America	USA	University of Northern Iowa
North America	USA	University of Pennsylvania (Penn)
North America	USA	University of South Carolina
North America	USA	University of Utah

Continent	Country	Name of the Higher Education Institution *(continued)*
North America	USA	University of Vermont (UVM)
North America	USA	Yale
Oceania and Australia	12 Islands Nation	University of the South Pacific
Oceania and Australia	Australia	Deakin University
Oceania and Australia	Australia	Edith Cowan University
Oceania and Australia	Australia	James Cook University (JCU)
Oceania and Australia	Australia	La Trobe University
Oceania and Australia	Australia	Monash University
Oceania and Australia	Australia	Murdoch University
Oceania and Australia	Australia	Oceania and Australian Catholic University
Oceania and Australia	Australia	Oceania and Australian National University (ANU)
Oceania and Australia	Australia	Royal Melbourne Institute of Technology (RMIT) University
Oceania and Australia	Australia	University of New South Wales
Oceania and Australia	Australia	University of South Oceania and Australia
Oceania and Australia	Australia	University of Tasmania
Oceania and Australia	Australia	University of Technology (UTS)
Oceania and Australia	Australia	University of Wollongong

Relevance 2 case studies (N=87)

Table 6: Relevance 2 case studies

Continent	Country	Name of Higher Education Institution
Africa	South Africa	Stellenbosch University
Africa	South Africa	University of South Africa (UNISA)
Asia	China	Tongji University
Asia	India	Apeejay School of Management
Asia	Israel	Green Valley College
Asia	Jordan	Amman University
Asia	Jordan	Hashemite University
Asia	Lebanon	Notre Dame University
Asia	Malaysia	University Malaysia Sarawak
Asia	Thailand	Maejo Universities
Asia	Turkey	Bilkent University
Europe	Austria	BOKU University
Europe	Austria	University of Graz
Europe	Czech Republic	Technical University of Ostrava
Europe	Denmark	Roskilde University
Europe	Denmark	Royal Veterinary and Agricultural University
Europe	Denmark	University of Copenhagen
Europe	Germany	University of Applied Sciences Zittau/Goerlitz
Europe	Germany	University of Paderborn
Europe	Greece	University of Thessaly

Continent	Country	Name of the Higher Education Institution *(continued)*
Europe	Ireland	St Angela's College
Europe	Ireland	University of Limerick
Europe	Italy	Polytechnic University of Milan
Europe	Italy	University of Milano-Bicocca
Europe	Lithuania	Kaunas University of Technology
Europe	Netherlands	University of Amsterdam
Europe	Netherlands	Vrije Universiteit Amsterdam (VU)
Europe	Netherlands	Zeeland University of Applied Sciences (ZU)
Europe	Russia	St Petersburg State University
Europe	Sweden	Blekinge Institute of Technology (BTH)
Europe	Turkey	Bogazici University
Europe	UK	Canterbury Christ Church University
Europe	UK	Keele University
Europe	UK	Manchester Metropolitan University (MMU)
Europe	UK	Middlesex University
Europe	UK	The University of Nottingham
Europe	UK	University of Bradford
Europe	UK	University of Chester
Europe	UK	University of Leicester
Europe	UK	University of Manchester
Europe	UK	University of Surrey
Europe	UK	University of Worcester
Europe	UK	University of X
Latin America and the Caribbean	Brazil	Paulista University
Latin America and the Caribbean	Jamaica	Bethlehem Moravian College
Latin America and the Caribbean	Jamaica	Edna Manley College of the Visual and Performing Arts
Latin America and the Caribbean	Jamaica	Moneague College
Latin America and the Caribbean	Jamaica	St. Joseph's Teachers' College (SJTC)
North America	Canada	Brock University
North America	Canada	Laval University
North America	Canada	Olds College
North America	Canada	Ryerson University
North America	Canada	Simon Fraser University (SFU)
North America	Canada	University of Prince Edward Island
North America	Canada	University of Toronto
North America	Canada	University of Victoria
North America	USA	Appalachian State University
North America	USA	City College of New York
North America	USA	Clemson University
North America	USA	Colorado State University
North America	USA	Cornell University

Continent	**Country**	**Name of the Higher Education Institution** *(continued)*
North America	USA	Georgia Institute of Technology
North America	USA	Green Mountain College
North America	USA	Hobart & William Smith Colleges (HWS)
North America	USA	Kettering University
North America	USA	Michigan State University
North America	USA	Northland College
North America	USA	Oklahoma State University
North America	USA	Pennsylvania State University
North America	USA	Portland State University
North America	USA	Salisbury University
North America	USA	San Diego State University
North America	USA	Tufts University
North America	USA	University of Alaska Fairbanks
North America	USA	University of Arizona
North America	USA	University of Delaware
North America	USA	University of Guam
North America	USA	University of Michigan
North America	USA	University of Oklahoma
North America	USA	University of Texas-Pan American (UTPA)
Oceania and Australia	Australia	Charles Sturt University
Oceania and Australia	Australia	Curtin University
Oceania and Australia	Australia	Griffith University
Oceania and Australia	Australia	Queensland University of Technology (QUT)
Oceania and Australia	Australia	Southern Cross University
Oceania and Australia	Australia	University of Sydney
Oceania and Australia	New Zealand	Victoria University of Wellington

No. 2 Factsheet – Example

FACT SHEET

Case ID:

HEI name:

Coder ID:

Date(s) of Coding*:

Note: please include all dates separated by commas

VARIABLE	NOTES
1.4 Further references **(REF)**	
3.8 Summary described sustainability curricula **(SUM DESCRBD CURRI)** ***Take notes on the information described below***. *You don't have to describe it in this order, just be sure to capture information on all the factors described below. If something. seems very important or if it helps to structure the information, please underline the selected text or format the text in* ***bold***. - ***Described level*** *(one course, program, curricula, training)* - ***Target audience*** *(students, faculty, stakeholders, other)* - ***Degree(s)*** *of the mentioned sustainability curricula (BA, MA, PhD, faculty training, certificate, other)* - ***Name(s) of the described sustainability curricula*** - ***Applied teaching and learning approach and methods*** *(see also Codebook 3.8)* - ***Learning objectives*** *(e.g. sustainability competencies* - ***Program structure***	

4.5 Description of the sustainability curricula implementation process **(DESCRIP SCIP)** *Brief description of the implementation process for the sustainability curricula.* ***Take notes on ALL information about the implementation process, e.g. the information described in the bullet points**. You don't have to describe it in this order, just be sure to capture all information about the factors described below **with enough context information!** Don't summarize too much; you can copy/paste passages from the case study. If something seems very important or if it helps to structure the information, please underline the selected text or format the text in **bold**.* *- **All phases with time scales** (include notes about the **initial situation**)* *- **All emphasized variables** (drivers and barriers) and in which phase they were important* *- **Grade of activity** (active, significant, core focus) per phase and whether these were successful* *- **Internal priority setting** and whether it changed during the process (capture timescale/phase)* *- **Planned improvements*** *- **Figures** if provided by the case study (include figures at the end of the table with a reference in this cell)*	
5.1.1 Strategic planning - Description **(STRAT PLAN DESCRIP)**	

Description of the specific systematic process (strategic planning) ***intended to achieve any level (even small-scale improvements) of sustainability curricula implementation, with all objectives and steps described.*** ***Take notes on all information regarding strategy aimed at fostering ESD, e.g., information on the bullet points described below****. You don't have to describe it in this order, just be sure to capture all information regarding the factors described below. If something seems very important or if it helps to structure the information, please underline the selected text or format the text in* ***bold****.* *-* ***Implementation strategies*** *mentioned, e.g., a sustainability plan with different steps* *-* ***Special variables*** *that were emphasized, e.g., motivation or engagement strategies.* *-* ***Figures*** *if provided by the case study (include figures at the end of the table with a reference in this cell)*	
5.1.2 Strategic planning - Applied methods for implementing change process **(STRAT PLAN METHOD)** *Description of the methods that were used during the* ***sustainability curricula implementation process*** *(e.g., evaluation tools, assessment, action-research etc.)*	
8.8 Local context **(LOCAL CTXT)**	

Brief description of factors in the local/regional context (geography, societal/ecological problems, history, surrounding city/town/geopolitical context/traditions etc.) that influence the sustainability curricula implementation process.	
ADDITIONAL NOTES	
Other important notes about the case **- Your impression of the case study.** What would you tell me in one sentence about it, if I haven't read it and want to know specifics about the implementation strategy and its drivers/barriers. **-Everything that seems important to you but isn't captured in the variables.**	
Coding protocol **Please make notes on your coding decisions for EVERY variable.** You can copy/paste text passages on which you base your decisions to make your point clear. If unsure how to code an item, please state the problem and discuss it with the other coders.	

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Back cover

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