Sustainability Impact Assessment in Higher Education – A Review of Tools and Indicators

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Agenda

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1. Introduction

Sustainable Development in Higher Education institutions

- Increasing engagement of higher education institutions (HEIs) in contributing to sustainable development (SD) since the Stockholm Conference in 1972 (Amaral et al., 2015)

- SD in HEIs has been promoted by

  - declarations and charters (Lozano et al., 2013b)

  - the re-design of curricula (Qian, 2013)

  - regional and global partnerships (e.g., Kawabe et al., 2013)

  - sustainable campus initiatives (Vaughter et al., 2016)

- Parallel to sustainability declarations, sustainability assessment practices and tools in HEIs have gained increasing importance (Caeiro, Leal Filho, Jabbour & Azeiteiro, 2013)

Impacts and Higher Education Institutions

- Increasing relevance of HEIs' impacts on SD

  - "Impact" is a criterion for the allocation of research funds at the European level (European Commission, 2014)

  - Frameworks to assess the research impacts have been introduced in several countries (e.g. Research Excellence Framework in the UK)

  - Impact assessment is becoming part of accountability expectations from e.g. public and private funders, policy makers, accreditation agencies (Bonaccorsi et al., 2010)

  - Accreditation agencies offer systems for impact assessment and include "impact" in their accreditation evaluations (e.g. EQUIS accreditation)

Research aim

- Initial conceptual work on framing the multiple impacts of HEIs on SD has been proposed (Findler et al., forthcoming)

- Capability of Sustainability Assessment Tools (SATs) to provide systematic information on these impacts to is less explored

- Study aims to analyze the indicators of 19 SATs and elucidates to what extent these indicators measure SD performance (inside the organization) and impacts on SD (outside the organization)

- Update of previous reviews that focus on SATs' capability to measure SD performance (e.g. Shriberg [2002], Yarime & Tanaka [2012], Fischer et al. [2015], Bullock & Wilder [2016])

2. Literature Review

Sustainability Assessment in HEIs

- A variety of SATs have been developed to facilitate sustainability assessment and reporting in practice (Bullock & Wilder, 2016)

- Purpose of sustainability assessment and reporting (Lozano, 2013):

  - Assess the current state of HEIs progress towards SD

  - Communication to stakeholders

  - Benchmarking against other HEIs

  - Demonstrating how the HEIs influences, and is, influenced by expectations about SD

  - Support planning, decision-making, and strategy development

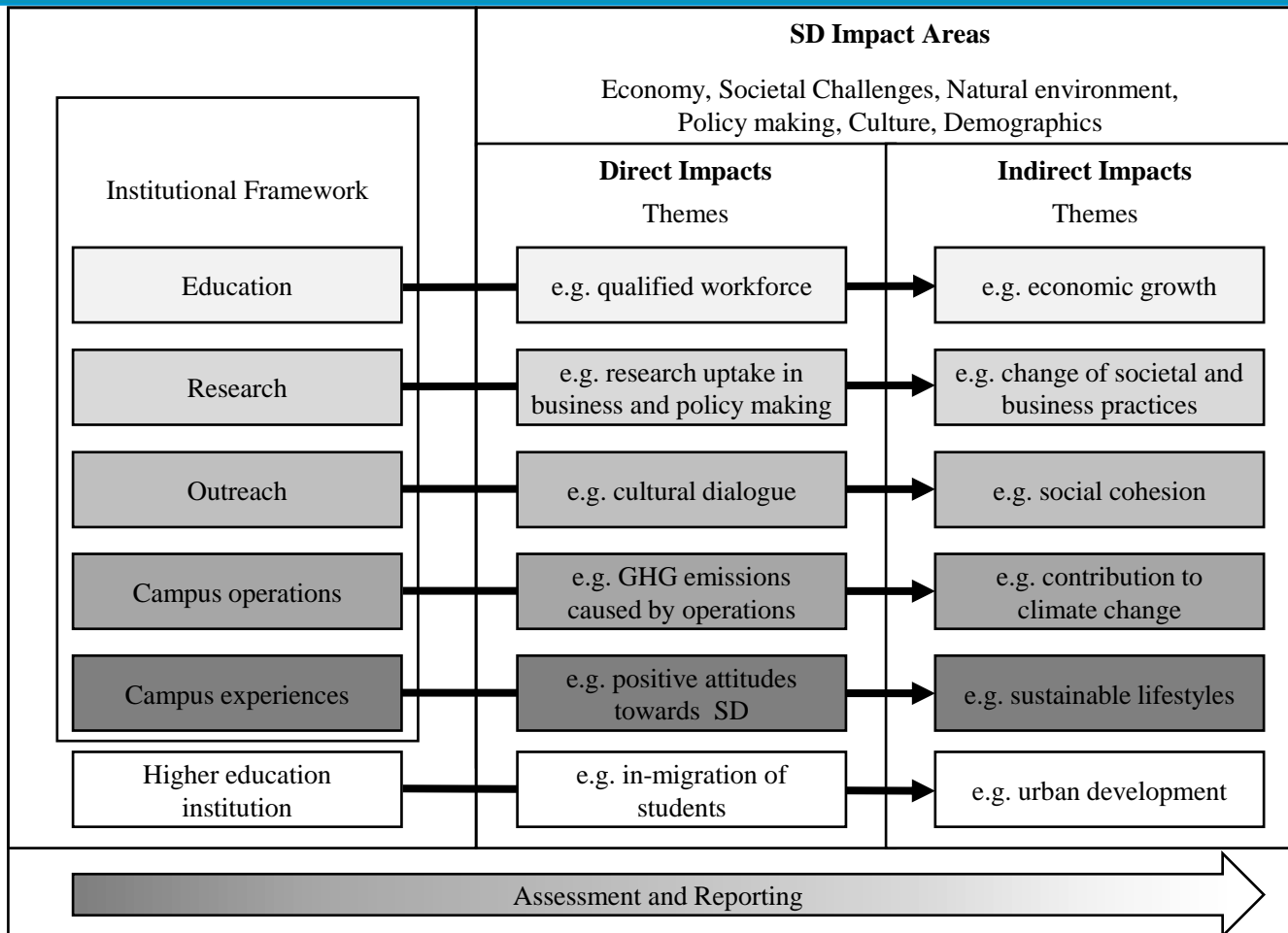# Sustainability Assessment in HEIs

- Three main approaches of sustainability assessment can be distinguished (Dalal-Clayton & Bass, 2002):

    - accounts assessment (raw data converted to a common unit)

    - narrative assessment (combine e.g. text, maps, and graphics)

    - indicator-based assessment (measurable and comparable)

- SATs mainly make use of indicator-based assessments (Ramos, 2009)

- Indicators measure a specific aspect of sustainability (e.g. student depression rate) and can be described as an attribute or characteristic of a system (e.g. student health) (Gallopín, 1997)

Impacts of HEIs on SD

- Understanding of "Impacts":

  - Impacts are the effects a HEI has outside of its organizational boundaries on stakeholders, the natural environment, the economy, and society

  - Impacts are caused by the HEI as an organization

- Impacts arise from the core elements of the HEI system (Gupta and Singhal, 2017):

    Education, research, campus operations, outreach, campus experiences, the institutional framework, and assessment and reporting (see Lozano, 2013b)

- Lack of clarity and divergent understandings of the concept (Gooch et al., 2017; Koehn and Uitto, 2014)

HEIs' impacts on Sustainable Development framework

Institutional Framework	SD Impact Areas	
	Economy, Societal Challenges, Natural environment, Policy making, Culture, Demographics	
	Direct Impacts Themes	**Indirect Impacts** Themes
Education	e.g. qualified workforce	e.g. economic growth
Research	e.g. research uptake in business and policy making	e.g. change of societal and business practices
Outreach	e.g. cultural dialogue	e.g. social cohesion
Campus operations	e.g. GHG emissions caused by operations	e.g. contribution to climate change
Campus experiences	e.g. positive attitudes towards SD	e.g. sustainable lifestyles
Higher education institution	e.g. in-migration of students	e.g. urban development
Assessment and Reporting		

Findler et al. (forthcoming)

3. Methods and Sample

Sampling strategy

- Selection aimed to generate a maximum variety of tools to foster a rich comparative assessment

- SATs were identified based on reviews of existing studies and online research

- Included SATs follow an indicator-based approach and are regularly applied in practice

- 1134 indicators were extracted from the SATs

- Analysis is based on a mixed-method approach based on quantitative and qualitative elements

Sample

Tool No.	Abbreviation	Assessment Tool
1	AISHE	Auditing Instrument for Sustainability in Higher Education
2	AMAS	Adaptable Model for Assessing Sustainability in Higher Education
3	BSIS	Business School Impact System
4	CSA	CSA Assessment framework
5	CSAF	Campus Sustainability Assessment Framework
6	D-SiM	DPSEEA-Sustainability Index Model
7	DUK	German Commission for UNESCO (Deutsche UNESCO Kommission)
8	GASU	Graphical Assessment of Sustainability in Universities
9	GMID	Graz Model for Integrative Development
10	P&P	People & Planet University League
11	PENN	Penn State Indicators Report
12	SAQ	Sustainability Assessment Questionnaire
13	SCE	State of the Campus Environment
14	SPT	Sustainable Pathways Toolkit
15	STARS	Sustainability Tracking, Assessment and Rating System for Colleges and Universities
16	STAUNCH®	Sustainability Tool for Auditing for University Curricula in Higher Education
17	TUR	Three dimensional University Ranking
18	UIGM	UI GreenMetric World University Ranking
19	USAT	Unit-based Sustainability Assessment Tool

Coding

- Indicators were classified in order to link them to the categories that were derived from the SD impact framework of HEIs (quantitative)

    - Each indicator was exclusively attributed to one of core elements

    - Each indicator was exclusively categorized regarding its assessment target as performance, proxy, or impact indicator

    - Each proxy and impact indicator was classified into one SD impact area

    - Proxy and impact indicators were distinguished regarding the type of impacts they measure (direct and indirect)

- Indicators were also classified by type (quantitative, quasi-quantitative, qualitative) and level of analysis (individual, organizational)

- Themes were identified by a reviewing indicator descriptions (qualitative)

Analysis

- Descriptive statistic analyses were carried out with SPSS

- Relative frequencies of the indicator distribution among the category assessment target were calculated

- Proxy and impact indicators were further analyzed by cross tabulations regarding the categories core elements, SD impact areas, impact type, and indicator type

- The identification of themes of the inductive analysis was supported by the MAXQDA 12 qualitative analysis software

4. Findings

Findings I

Assessment target (in %)

Tool	Performance Indicator	Proxy Indicator	Impact Indicator	NA
AISHE	83.33	0.00	16.67	0.00
AMAS	84.00	16.00	0.00	0.00
BSIS	18.25	70.64	11.11	0.00
CSA	67.44	25.58	6.98	0.00
CSAF	81.66	16.57	1.18	0.59
D-SiM	28.56	17.86	14.29	39.29
DUK	100.00	0.00	0.00	0.00
GASU	59.77	19.54	4.02	16.67
GMID	100.00	0.00	0.00	0.00
P&P	82.35	17.65	0.00	0.00
PENN	39.39	51.52	9.09	0.00
SAQ	100.00	0.00	0.00	0.00
SCE	86.96	13.04	0.00	0.00
SPT	65.52	17.24	17.24	0.00
STARS	88.24	7.35	0.00	4.41
STAUNCH®	100.00	0.00	0.00	0.00
TUR	100.00	0.00	0.00	0.00
UIGM	72.47	17.39	0.00	10.14
USAT	100.00	0.00	0.00	0.00
Overall	**69.84**	**20.55**	**4.14**	**5.47**

Findings II

Total numbers of criteria on core elements

Core Elements	Proxy Indicator	Impact Indicator	Total
Campus Operations	121 (43.21%)	14 (5.00%)	135 (48.21%)
Higher Education Institution	33 (11.79%)	12 (4.29%)	45 (16.08%)
Outreach	22 (7.85%)	6 (2.15%)	28 (10.00%)
Research	22 (7.85%)	1 (0.36%)	23 (8.21%)
Education	10 (3.57%)	7 (2.50%)	17 (6.07%)
Institutional Framework	13 (4.65%)	2 (0.71%)	15 (5.36%)
Campus Experiences	4 (1.43%)	3 (1.07%)	7 (2.50%)
Assessment & Reporting	0 (0.00%)	0 (0.00%)	0 (0.00%)
NA	8 (2.86%)	2 (0.71%)	10 (3.57%)
Total	233 (83.21%)	47 (16.79%)	280 (100.00%)

Total numbers of criteria on SD impact areas

Core Elements	Proxy Indicator	Impact Indicator	Total
Natural Environment	123 (43.94%)	15 (5.36%)	138 (49.30%)
Economy	53 (18.93%)	13(4.64%)	66 (23.57%)
Societal Challanges	24 (8.57%)	13 (4.64%)	37 (13.21%)
Culture	2 (0.71%)	2 (0.71%)	4 (1.42%)
Policy	2 (0.71%)	1 (0.36%)	3 (1.07%)
Demographics	2 (0.71%)	0 (0.00%)	2 (0.71%)
NA	27 (9.64%)	3 (1.08%)	30 (10.72%)
Total	233 (83.21%)	47 (16.79%)	280 (100.00%)

Findings IV

Total numbers of impact type, indicator type and level of analysis

	Core Elements	Proxy Indicator	Impact Indicator	Total
Impact type	**Direct**	232 (82.85%)	40 (14.29%)	272 (97.14%)
	Indirect	1 (0.36%)	7 (2.50%)	8 (2.86%)
	Total	233 (83.21%)	47 (16.79%)	280 (100.00%)
Indicator type	**Quantitative**	162 (57.86%)	13 (4.64%)	175 (62.50%)
	Quasi-Quantitative	39 (13.93%)	15 (5.36%)	54 (19.29%)
	Qualitative	32 (11.42%)	19 (6.79%)	51 (18.21%)
	Total	233 (83.21%)	47 (16.79%)	280 (100.00%)
Level of analysis	**Individual**	211 (75.36%)	32 (11.43%)	243 (86.79%)
	Organizational	22 (7.85%)	15 (5.36%)	37 (13.21%)
	Total	233 (83.21%)	47 (16.79%)	280 (100.00%)

Findings V

Major Themes

Core Elements	Proxy Indicator	Impact Indicator
Natural Environment	• Consumption of energy, water and materials • Emission of GHGs Generation of waste	• Effects on conditions (e.g. biodiversity, ground water) • Generation of waste
Economy	• Local expenditures • Research on Economics • Local job creation	• Alumni in the job market • Start-ups in the region
Societal Challenges	• Stakeholder engagement & Community development • Health & safety issues	• Stakeholder engagement & Community development • Health & safety issues
Policy	• Contribution to Public Policy Development	• Contribution to Public Policy Development
Culture	• International student exchange	-
Demographics	• In-migration of students	-

5. Discussion

Discussion

- Majority of the examined SATs have a strong focus on measuring SD performance in the core element campus operations

  - Assessment of SD impacts involves a high level of complexity and data requirements

  - SATs that require additional efforts in data collection (e.g. via alumni surveys) may pose considerable difficulties for their adoption

- Main focus is on the SD impact areas Natural Environment, Economy, and Societal Challenges, while Policy, Culture, and Demographics are rarely considered

  - Environmental impacts tend to lend themselves to measurement because causal links, e.g. from GHG emissions to climate change, are easier to assess than many social issues (e.g. impacts of a HEI on local culture)

Discussion

- SD impact areas addressed by SATs do not necessarily cover the most important impacts of any given HEI (rather, they focus on indicators that can be measured based on internally available data)

  - Only one of the SATs in the sample, namely GASU, requires a materiality assessment or prioritization of SD impact areas

  - Makes it difficult for HEIs to focus their assessment efforts in those SD impact areas where they can make the most substantive contributions to SD.

- Some tools acknowledge that impacts may vary between different types of HEIs, e.g. the BSIS tool with its explicit focus on business schools as distinct from universities

Discussion

- Strong focus on quantitative indicators indicates that impacts (especially indirect ones) are neglected because quantitative measurement is frequently not feasibly along complex and poorly understood impact pathways

- Qualitative assessments could be fruitful in this regard and may support future sustainability assessment in SD impact areas of increasing importance to HEIs

6. Conclusion

Conclusion

- SATs are largely designed to assess specific activities inside the HEI's core elements, and provide stakeholders only information about the internal engagement with SD

- Update of existing indicator-based SATs and the development of new approaches of impact measurement can support HEIs to fully realize their potential to contribute to SD

- Narrative assessments may provide fruitful avenues of future research

  - Due to their flexibility, they could be helpful in the area of research impacts, where counting citations and bibliometric analysis do not provide an accurate picture of research impacts on SD

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THANK YOU.

Questions?