



Understanding quality and sustainability in higher education institutions

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Purpose of the paper: This paper explores how quality and sustainability are understood, defined, and measured within higher education institutions. It seeks to uncover how universities conceptualize these ideas and how these understandings are reflected in their performance management and improvement practices.

Methodology: The study analyses the web pages of 14 universities for information of how quality and sustainability are defined and measured. The data are examined using an adapted version of the Sustainability Opportunity Study (SOS) framework, complemented by Garvin's quality dimensions and the Assessment Instrument for Sustainability in Higher Education (AISHE). These models have been modified into assessment models using Generative AI support.

Main Findings: The results show variation in the way universities interpret and measure quality and sustainability. This indicates that there is no common understanding of what quality and sustainability mean, signalling that these concepts are complex, requiring clearer definitions and better performance indicators to enable the setting of targets and correctly assessing current performance and existing improvement potential.

Practical implications: The study advances our understanding of how universities approach the intertwined challenges of quality and sustainability.

Originality/value:

The paper offers a conceptual approach for understanding quality and sustainability in higher education.

Type of paper: Research paper

Keywords: *University sustainability, University quality, Sustainability Opportunity Study, Generative AI, Chat GPT +, Garvin, AISHE.*

1. Introduction to quality and sustainability in higher education

Humanity needs sustainable countries and organisations with quality products. Contributing to fulfil these needs, universities play a critical role in fostering the required competence in quality and sustainability. One way of assessing university performance is to use ranking systems. Performance related to both quality and sustainability forms a part of general university rankings. The rankings focused on quality substantially overlap in terms of their coverage of teaching, research, and internationalization, though the specific indicators and weights assigned vary. The Times Higher Education (THE) World University Rankings assigns about one-third of its score to teaching related activities. The QS World University Rankings focuses on academic and employer reputation and faculty/student ratio. The Academic Ranking of World Universities (ARWU or Shanghai Ranking) is research focused and puts less emphasis on teaching quality. It is unclear how these rankings correlate with university quality.

None of the three mentioned ranking systems use Quality Management logic with a focus on customer needs. An extension of this logic is provided by Business Excellence Models (BEM), such as the European Foundation for Quality Management (EFQM) model, which uses RADAR (Results, Approach, Deployment, Assessment, and Refinement). BEMs are based on assessment of both results and resources. For Results the focus is on customers and other stakeholders. In the Approach, a core component is how quality is defined, the *what* of quality. An initial BEM and Quality Management inspired review of an organisation could consist of studying the espoused quality policy and then examining the enacted policy by reviewing the main results reported.

For assessing university sustainability there are several global ranking systems. These assess how well universities incorporate sustainability into operations, academics, research, governance, and outreach. Table 1 shows a summary of how university sustainability ranking is assessed. As with the quality-focused rankings, each has a different methodology and scope.

Table 1. Summary of the sustainability ranking systems.

Ranking System	Focus	Method Type	Rating/Ranking Output
STARS	Broad sustainability (all areas)	Self-assessment + documentation	Bronze, Silver, Gold, Platinum
UI GreenMetric	Campus sustainability & infrastructure	Self-reported survey	Global numerical rank
THE Impact	UN SDG contributions	Data + evidence + publication	Global SDG rankings
QS Sustainability	Environmental & social impact	Mixed data sources	Global sustainability rank

Source: ChatGPT

Like quality, there is varying understanding of sustainability in universities. This aligns with comments in Isaksson et al. (2023) noting that in various systems, such as construction, healthcare and education, there are difficulties in understanding, defining and measuring sustainability and sustainability performance. Quality and sustainability have similar problems, both being fuzzy concepts with varying definitions and lacking agreed performance indicators.

Isaksson et al. (2022) conducted a preliminary study on university sustainability using parts of the Assessment Instrument for Sustainability in Higher Education (AISHE) (Roorda and Son, 2016). The AISHE model is based on a BEM logic and on the core university missions of education, research, and societal contribution. This model suffers from similar problems as other BEMs, being too extensive and time consuming for attracting much attention. There are

no recent (search done June 2025) examples of where the AISHE model has been used. Isaksson et al. (2022) propose starting the assessment with focus on the identity module and the part relating to vision and policy, and on output assessment of the university missions. This could be seen as a short version of the approach of looking at main resources, identified as vision and policy, and at the main output results. An initial review could be based on assessing the espoused policies for quality and sustainability and then checking how these have been enacted by assessing the reported quality and sustainability output for university performance. The logic is that there should be a clear link with what has been written in the policy documents and what is being measured.

The Sustainability Opportunity Study (SOS) is used when there are no clear definitions or performance indicators for quality and sustainability (Isaksson et al. 2023), and for complex systems where there is lack of common understanding of *what* the system quality or sustainability are. This is checked by studying existing policies and key performance indicators. If no clear agreement is found there is probably little common understanding, and the system level of quality and sustainability cannot be assessed without first creating working definitions and performance indicators.

The purpose of this paper is to present the results of an exploratory study of how quality and sustainability are understood in universities, and to assess whether university quality and sustainability can be considered as complex concepts requiring an SOS.

The following Research Questions (RQs) have been formulated:

RQ 1: How are universities interpreting quality and sustainability?

RQ 2: What is the current level of espoused university quality and sustainability?

RQ 3: What is the current level of reported university quality and sustainability?

RQ 4: Are university ranking systems correlating with university espoused quality and sustainability, and reported quality and sustainability?

The rest of the work is organised as follows. In section 2 a theory background of the AISHE- and the SOS models are presented, together with quality and sustainability definitions inspired by Garvin (1984). Section 3 describes the methods used with details on university web analyses. In section 4 results from the study are presented and in 5 these are discussed. In section 6 conclusions are presented and future research proposed.

2. Theoretical background

This work originates in Quality Management principles and its core of customer focus. Here customer focus has been enlarged to include stakeholders. The *what* of quality is defined by customers and the *what* of sustainability by the system and its stakeholders' needs (Isaksson et al. 2024). The university is seen as a system. We work with the level of quality and sustainability as descriptions of the state of a system for vital impacts. The change processes of quality management and sustainable development are outside of the scope of this study.

2.1 System visualisation using the Sustainability Opportunity Study (SOS)

The first stage in the Sustainability Opportunity Study (SOS) is Diagnosing (Isaksson et al. 2023), which consists of Understanding, Defining and Measuring (Table 2). The SOS is applied when there are no agreed definitions and relevant indicators for system performance. When there are relevant performance indicators a simple Opportunity Study consisting of Diagnosing-Analysing-Solving can be carried out (Isaksson, 2015). Focus, in this study is on assessing if an SOS is needed by discussing the level of understanding of university quality and

sustainability. SOS-Diagnosing with Understanding-Diagnosing is marked in bold in Table 2. The work is limited to studying if university quality and sustainability are complex concepts requiring an SOS.

Table 2. Visualisation of a SOS for quality and sustainability in higher education with focus on Understanding, adapted from Isaksson et al. (2023) and Isaksson et al. (2024).

	Understanding	Defining	Measuring
Diagnosing	Value chain for Swedish University Education Which are the vital few Quality and Sustainability impacts? (current understanding)	Defining university Q and S (current state)	Measuring university Q and S? (current state?)
Analysing	Which are the vital few causes in the system?	Defining main causes	KPI for main causes?
Solving	Which are the vital few solutions?	Defining main solutions	KPI for proposed solutions and project?

Isaksson et al. (2022) propose a set of process models to describe university education. In the SOS, Understanding the value chain is part of Understanding of Diagnosing, where the system is described using the entire value chain.

Figure 1 describes a proposed value chain for providing education and knowledge from cradle to grave, starting with early learning needs and finalising with continued lifelong learning after university education. The sub-processes of Tertiary Undergraduate Education and Education at Master level, Research and Cooperation (Figure 1) set the scope for the study. Input are societal needs for education, research and cooperation needs between society and university, as well as student needs to be educated and to become employable. Employers are one important customer group requiring competence. Output from the tertiary education process is competence, research results and societal actions. In a value chain parties have a collective responsibility for the performance of the entire value chain.

A primary assessment can be done by studying the main resources and the main results. Core resources in this process are quality and sustainability policies and output measurement systems and records.

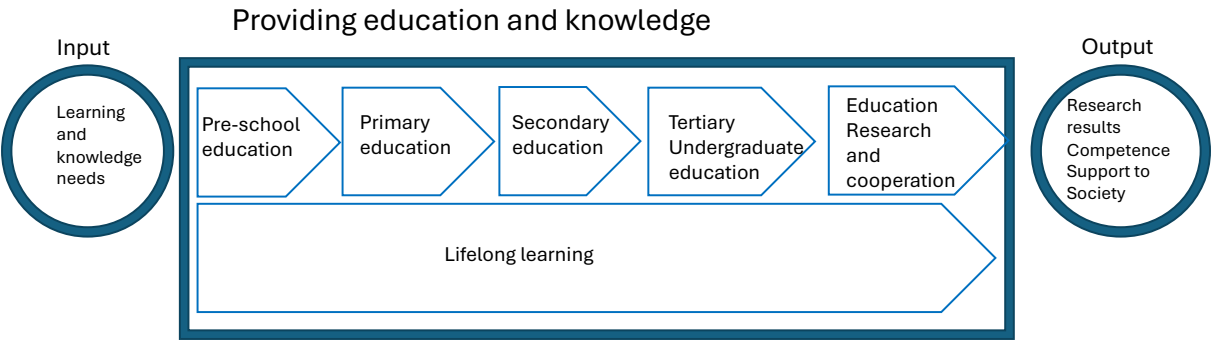


Figure 1. The value chain for lifelong learning. Source: Own elaboration based on Isaksson et al. (2022).

2.2 Assessment Instrument for Sustainability in Higher Education (AISHE)

The AISHE model follows the logic of BEM in assessing both enablers and results (Roorda and Son, 2016). Enablers are in this paper, based on Isaksson (2019) called resources. The AISHE model has five modules: Identity, Operations, Education, Research and Society (Figure 2). Each of these modules consist of six criteria. Doing a self-assessment based on all criteria is an extensive task which might not be meaningful unless there is a strong commitment for improvement. A first assessment could be shortened. Out of the five modules in Figure 2, Isaksson et al. (2013) propose the use of Identity, Operations, Education and Society as a first assessment model. The logic is that the identity module forms a foundation for the other modules. Operations relate to how university premises are managed, which has an important symbolic, as well as substantive, value. The three modules of Education, Research and Co-operation with society are based on a typical view of university missions. In this paper we use the Identity module as a first indicative assessment of the level espoused quality and sustainability and of performance reporting. We choose the criteria Vision & Policy and overall quality and sustainability output as a version of what in Figure 2 is called Transparency & Accountability.

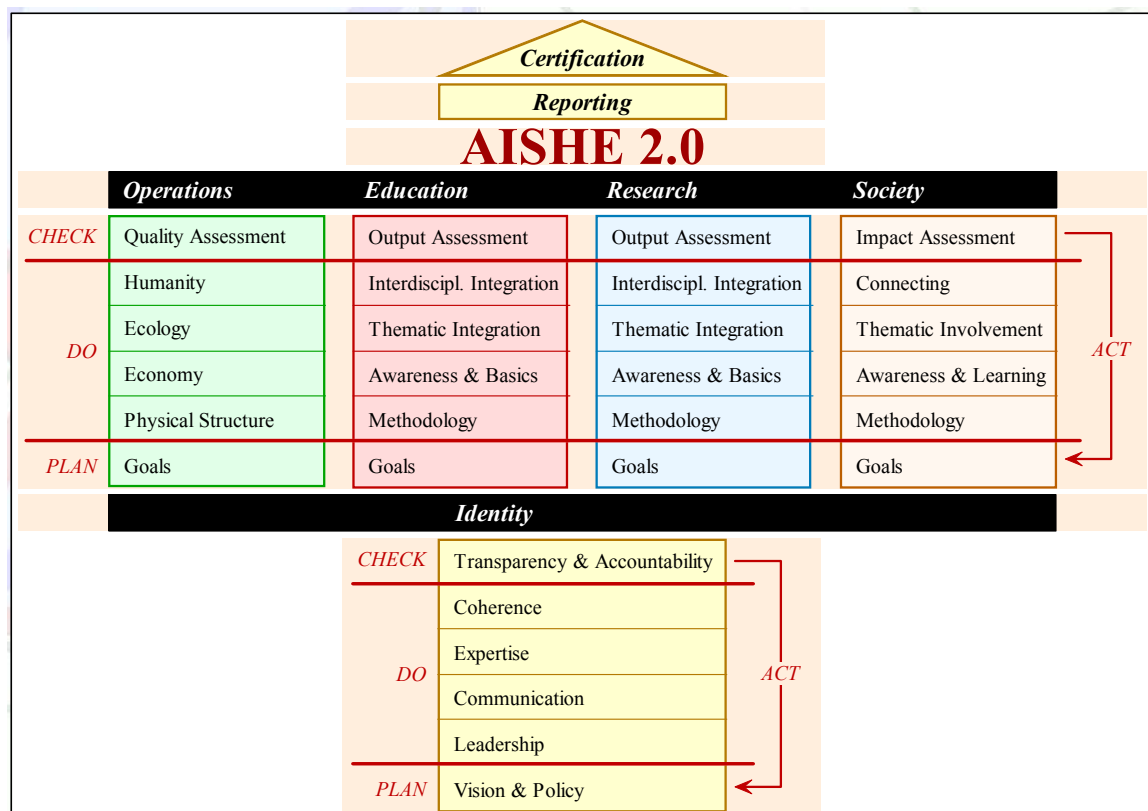


Figure 2. Criteria in the AISHE2 model. Source: (Roorda and Son, 2016).

Each criterion in the AISHE2 model is quantified by stages, from 0 to 5. The criteria are cumulative, and all previous ones must have been achieved to merit a higher rating. In Table 3 the AISHE2 stages are presented together with changes proposed in Isaksson et al. (2013) and a proposed change for Stage 0 from “Not interested” to “Not clearly committed”.

Table 3. AISHE2 based on Isaksson et al. (2013).

Stage	AISHE2 name	Proposed name based on Isaksson et al. (2013)	Comment
0	Not started or not displayed	Not clearly committed (changed from Isaksson et al. 2013 who used “Not interested”)	Not demonstrating any detectable interest in sustainability
1	Activity oriented	Activity oriented	Activities are seen as parts of processes
2	Process oriented	Process oriented	Processes are seen as parts of the organisational system
3	System oriented	Organisation oriented	Organisations are seen as part of the supply networks
4	Chain oriented	Network oriented	Supply networks are seen as parts of society
5	Society oriented	Society oriented	This is the highest system level – a system approach can be applied at all levels starting from processes

2.3 Defining university quality and sustainability

Data collected based on the reduced list of AISHE2 criteria could be classified using Garvin’s five quality definitions renamed as: Image, Resource, Rules, User and Value per Harm Eberhardsson and Isaksson (2025), see Table 4. The first four are absolute definitions, and the last one is a relative one.

Table 4. Modified quality definition based on Garvin (1984), (Eberhardsson and Isaksson, 2025) and further modified with the help of Generative AI

Category	Content Definition
Image - brand, reputation, transcendence	Quality as perceived excellence—brand, global reputation, exceptionalism
Resource - mission, competence, pedagogy, infrastructure	Core capacity: mission clarity, faculty/research strength, facilities and governance
Rules - accreditation, audits, external review	Compliance-based quality via audit standards and written specifications
User - fit for student & employer needs	Quality defined by satisfaction and usability for students, employers, society
Value per Harm - benefit-to-cost ratio	Quality equated with value-for-money for stakeholders

The SOS Diagnosing as presented in Table 2 uses a roadmap for identifying if the studied educational system has relevant definitions and performance indicators or not (Isaksson et al. 2024). A question is if the educational process as presented in Figure 2 has agreed outputs for quality and sustainability and policy documents that define this? If there is no clear understanding, then the system probably is complex and requires some working definitions with proposed indicators to at least partly shift from a complex to a complicated system. The criterion used here is that there is no commonly agreed value for performance in a complex system. In a complicated system the performance, the y-value can be described but the x-es, the independent variables affecting it, might be unknown. Applying TQM based improvement should work in a

complicated system but would likely fail when there is no agreed *what* in the formed of agreed output y-values.

Like quality, sustainability can be classified based on Eberhardsson and Isaksson (2025), see Table 5.

Table 5. Modified sustainability definition based on Garvin (1984) and Eberhardsson and Isaksson (2025)

Definitions Category	Description
Image - brand, reputation	Sustainability is perceived excellence—branding, “green halo”, declared or externally recognized green identity.
Resource - footprint & expertise	Sustainability measured through objective inputs/outputs—CO ₂ , water, chemical use, social safety, materials. Reflects internal capacity and clean inputs. Competence and sustainability expertise.
Rules - compliance & standards	Sustainability is adherence to regulations, standards, audits—e.g., ESG rules, SDGs, reporting frameworks. Using recognized frameworks (GRI, EU Taxonomy or similar)
System - system & stakeholder need	Sustainability defined by meeting holistic socio-ecological needs within planetary limits. Stakeholder systems-centric perspective. Providing sustainability competence with research, education and societal cooperation.
Value/Harm - relative efficacy	Sustainability is a value/harm balance: stakeholder benefit vs ecological/social cost. Integrates cost, resource use, equity, and harm.

3. Methodology

The methods used for answering the research questions are briefly presented below.

RQ 1: “How are universities interpreting quality and sustainability?”, is addressed by collecting data from university webpages with the help of Generative AI, more specifically ChatGPT+. For RQ1 the data are analysed using Table 4 and 5. For this, available university web information was used. We chose 7 benchmark universities being those that were the most highly ranked based on Table 1 ranking systems (Table 6). The latest rankings from 2024 and 2025 were used. We have also chosen 7 random universities without any previously known qualifications as a comparison.

Table 6. Chosen universities for web-analysis.

Name	Qualification
Arizona State University	Platinum in STARS sustainability ranking
Wageningen University	Leader - UI GreenMetric World University Rankings
Harvard University	ARWU or Shanghai Ranking (First 2025)

Name	Qualification
MIT	THE leader (First 2025)
University of Toronto	THE Impact (First 2025)
Imperial College London	QS (Second 2025 with first being MIT)
Western Sydney University	QS sustainability (First 2024)
Uni 1-7	Random university

RQ 2: “What is the current level of espoused university quality and sustainability?” is answered by applying Table 7. This is a variant of Table 3, modified with the help of Generative AI. Table 3 was uploaded into ChatGPT+ and the program was asked to improve the scale as seen in Table 3. The results were manually checked by one of the authors and adjusted based on the author experience of maturity scales.

Table 7. Improved university quality and sustainability maturity grid based on Table 3 developed using Generative AI.

Stage	Name	Description
0	Unaware	No formal interest or activity in quality management or sustainable development. Awareness of these areas is limited or absent.
1	Policy-Oriented	Initial activities are in place. The university has formal but fragmented policies for quality and sustainability. These may be symbolic or compliance-driven, not yet integrated into practice.
2	Process-Oriented	Policies begin reflecting stakeholder needs (including global SDGs). Structured processes are implemented with basic KPIs for quality and sustainability performance. Data is collected, but use may be inconsistent.
3	System-Oriented	Quality and sustainability are embedded institution-wide. Policies align with international standards. Data is used for systematic improvement. Stakeholder engagement is embedded, and responsibilities are assigned across departments.
4	Value Chain-Oriented	Quality and sustainability are addressed through collaboration with external partners across the educational and innovation value chain. Focus includes life-long learning, employability, societal transformation, and co-created impact.
5	Impact-Oriented	University defines success based on global stakeholder value creation and minimized harm. Decisions are driven by holistic life-cycle analysis of environmental, social, and economic impact. The university acts as a global leader and catalyst for sustainability and quality in education and research.

RQ 3: “What is the current level of reported university quality and sustainability?” is answered by applying Table 8. Table 3 has been converted to Table 8 with the help of ChatGPT+, using several iterations. The Key Enhancements are proposed from Generative AI on how to check the claims.

Table 8. Proposed quality and sustainability measurement maturity reporting grid developed using Generative AI.

Stage	Name	Refined Description (including Quality)	Key Metrics to Track
0	Non-reporting	No public reporting on quality (e.g., student outcomes, research impact) or sustainability (e.g., CO ₂ emissions).	N/A
1	Fragmented Reporting	Occasional sustainability data (emissions, water usage) and quality snapshots (e.g., graduation rate, Teaching Excellence Framework (TEF) bronze, appear in press or isolated web pages.	Single-year KPI values (e.g., TEF rating, CO ₂) with no trend context.
2	Process-Based Reporting	Regular publication of annual targets and reports: CO ₂ trends, TEF/ National Survey of Student Engagement (NSSE) scores, Research Excellence Framework (REF) outcomes, student engagement.	CO ₂ trends, student satisfaction (NSSE), TEF/REF scores, quality KPIs.
3	Integrated Reporting	Annual reports using GRI, AASHE STARS, ESG, higher-ed frameworks like REF, TEF, NSSE. Includes trendlines, targets, departmental breakdowns, third-party review.	STARS rating, GRI disclosures, benchmarked quality results (TEF gold/silver, REF GPA).
4	Collaborative Reporting	Reports include co-produced sustainability and quality outcomes: employability statistics, alumni-led sustainability projects, research partnerships.	Co-authored case studies, employability metrics, partnership KPIs, social-return narratives.
5	Impact-Driven Reporting	Publishes full lifecycle/environmental/social Profit and Loss, Scope 1–3 emissions, TCFD-aligned reports, global benchmarking (THE Impact, SDG Index), and quantifiable net-positive achievements.	Scope 1–3 emissions, lifecycle assessments, SDG Impact scores, longitudinal quality value assessments.

RQ4: “Are university ranking systems correlating with university espoused quality and sustainability and reported quality and sustainability?” is answered by summarising results from RQ1 to RQ3.

4. Results

This section presents the results of our web analysis of the 14 universities. These have been assessed based on publicly available information regarding their espoused quality and sustainability ambitions and their performance evidence.

4.1 University quality definitions

The categories of Table 4 have been used to analyse university quality definitions, see Table 9. The results indicate that all quality definitions are represented, with Image and Resource being present in all 14 universities. Rules and User are also well presented, albeit

User (customer) focus being at 79%. Value per harm is present in 21% of the universities. There is no apparent difference between the quality definition distribution between benchmark and reference universities.

Table 9. University quality definitions based on Table 4 and applied on 14 universities with the help of Generative AI and with a classification of 0-2 on each definitions category. Zero means no mention and 2 a full score for the definition.

Institution	Category	Image	Resource	Rules	User	Value/Harm	Total
Arizona State University	Benchm.	2	2	2	2	2	10
Wageningen University	Benchm.	2	2	1	2	1	8
Harvard University	Benchm.	2	2	1	2	0	7
MIT	Benchm.	2	2	2	1	0	7
University of Toronto	Benchm.	2	2	2	1	0	7
Imperial College London	Benchm.	2	2	2	2	0	8
Western Sydney University	Benchm.	2	2	2	2	2	10
Ref 1	Reference	2	2	2	2	1	9
Ref 2	Reference	2	2	2	1	0	7
Ref 3	Reference	2	2	2	1	0	7
Ref 4	Reference	2	2	2	1	0	7
Ref 5	Reference	2	2	2	2	0	8
Ref 6	Reference	2	2	2	2	0	8
Ref 7	Reference	2	2	2	1	0	7
	Total	28	28	26	22	6	110
		100%	100%	93%	79%	21%	39%

4.2 University sustainability definitions

Sustainability definitions have been categorised using the definitions in Table 5 and results are presented in Table 10. The resource-based definition is the most common with all but one university corresponding to it. Image, rules and system definitions are also frequent.

The relative value per harm is identified in 36% of the universities which is more than for quality. Western Sydney University has a full score covering all definitions for both quality and sustainability. The benchmark universities cover all definitions to about 90% whereas the reference universities average 60%. This indicates that benchmark universities post more of relevant texts within sustainability than reference universities.

Table 10. University sustainability definitions based on Table 5 and applied on 14 universities with the help of Generative AI. Score from 0 to 2 with 2 being a full score.

Category	University	Image	Resource	Rules	System	Value/ Harm	Total (max 10)
Benchm.	ASU	2	2	2	2	1	9
Benchm.	Wageningen Univ.	2	2	2	2	1	9
Benchm.	Harvard Univ.	2	2	2	1	1	8
Benchm.	MIT	2	2	2	2	1	9
Benchm.	Univ. of Toronto	2	2	2	1	1	8
Benchm.	Imperial College London	2	2	2	2	1	9
Benchm.	Western Sydney Univ.	2	2	2	2	2	10
Reference	Ref 1	2	2	2	2	1	9
Reference	Ref 2	2	2	2	1	1	8
Reference	Ref 3	1	2	1	1	0	5
Reference	Ref 4	1	2	1	1	0	5
Reference	Ref 5	1	1	1	1	0	4
Reference	Ref 6	1	2	1	1	0	5
Reference	Ref 7	1	2	1	1	0	5
	Total	23	27	23	20	10	103
		82%	96%	82%	71%	36%	37%

4.3 University quality and sustainability maturity

The AISHE inspired maturity grid for university quality and sustainability presented in Table 7 has been used to assess the 14 case universities. The resulting ratings with justifications provided by Generative AI are presented in Table 11.

There is a significant variation in the performance based on the used scale with stages 1-5 being present. None of the 14 universities gets a 0, Unaware rating. WSU is the only one with a 5 and the reference universities 6 and 7 get a 1. The benchmark universities as a group perform considerably better.

Table 11. University quality and sustainability based on espoused mission, policy and activities using Table 7 and applied on 14 universities with the help of Generative AI.

University	Stage	Rationale
Western Sydney University	5 – Impact-Oriented	Demonstrates global leadership with SDG-alignment, living labs, community benefit, Core curriculum, and holistic lifecycle thinking through THE impact rankings.

University	Stage	Rationale
Arizona State University (ASU)	4 – Value Chain-Oriented	Embedded sustainability in education (all students), operations, and extensive partnerships across sectors.
Harvard University	4 – Value Chain-Oriented	Harvard's Sustainability Action Plan explicitly addresses fossil fuel neutrality, equity, climate, water, scope 3 (value chain), and global impact through research and endowment strategy.
Wageningen University	3 – System-Oriented	Mission-centred systems, stakeholder focus, and integrated research and education; lacks explicit global impact framing.
Imperial College London	3 – System-Oriented	Strong institutional integration, SDG goals, and holistic sustainability planning.
Ref 1	3 – System-Oriented	Institution-wide sustainability governance and stakeholder outreach.
MIT	3 – System-Oriented	Comprehensive sustainability framework with academic integration and lead partnerships (e.g., with Harvard).
Ref 2	2 – Process-Oriented	Complies with ESG frameworks, has basic sustainability policy, but limited integration across system.
University of Toronto	2 – Process-Oriented	Sustainability-focused processes and some academic programming; lacks institution-wide systems or deep external integration.
Ref 3	2 – Process-Oriented	Sustainability is embedded in mission and some operations, but lacks systemic stakeholder integration.
Ref 4	2 – Process-Oriented	Regional sustainability engagement with policies, though incomplete systems integration.
Ref 5	2 – Process-Oriented	Emerging sustainability policies and some curriculum efforts.
Ref 6	1 – Policy-Oriented	Has environmental statements and some initiatives; still fragmented.
Ref 7	1 – Policy-Oriented	Green references in mission and rankings; lacks inclusive strategy and governance.

4.4 University quality and sustainability measurement maturity

The AISHE inspired maturity grid for university quality and sustainability measurement presented in Table 8 has been used to assess the 14 case universities. The resulting ratings with justifications provided by Generative AI are presented in Table 12.

Table 12. University quality and sustainability measurement maturity based on Table 8 and applied on 14 universities with the help of Generative AI

University	Stage	Rationale
Western Sydney University	4- Collaborative Reporting	Publishes annual sustainability reports aligned with ESG/SDG, includes partner-level data (e.g., employability, curriculum co-creation). Ranked #1 in THE Impact four years running, indicating value-chain engagement.

University	Stage	Rationale
Arizona State University	3 → 4	AASHE STARS Platinum reports (self-reported, transparent), SDG Impact ranking (#1 US), Campus Metabolism dashboard. To reach Stage 4, needs more partner co-authored reporting.
Harvard University	3 → 4	Detailed Sustainability Action Plan with Scope-3 commitments and investment impact; next step: co-reports with partners.
Wageningen University	3- Integrated Reporting	Integrated sustainability reporting aligned with SDGs; lacks visible value-chain partnership data.
Imperial College London	3- Integrated Reporting	Formal sustainability report, SDG-aligned, with KPIs, though partner metrics aren't explicit.
Ref 1	3- Integrated Reporting	Publishes comprehensive sustainability/quality reports aligned to frameworks; stakeholder data included but partner reporting limited.
MIT	3- Integrated Reporting	Structured reporting with dashboard features; some co-reporting via partnerships.
University of Toronto	2-Process-Based Reporting	Process-based reporting with sustainability KPIs; needs further integration and strategic narrative.
Ref 2	2-Process-Based Reporting	Annual sustainability plans and KPI publication; lacks clear system alignment to partners and frameworks.
Ref 3	2-Process-Based Reporting	Publishes baseline sustainability and quality indicators; lacking comprehensive integration.
Ref 4	2-Process-Based Reporting	Regional KPI reporting present but not fully contextualized or partner-inclusive.
Ref 5	2-Process-Based Reporting	Emerging KPIs and alignment with SDGs; still developing strategic context and stakeholder insight.
Ref 6	1-Fragmented Reporting	Fragmented sustainability statements; no integrated reporting found.
Ref 7	1-Fragmented Reporting	Occasional sustainability mentions (rankings etc.), no structured reporting mechanism detected.

The results in Table 12 vary from 1 to 4 on the scale going from 0-5. The average performance for measurement maturity is lower than for the policy maturity. This indicates that espoused policies might not have been fully translated into measurable performance.

5. Discussion

This exploratory paper covers several areas on a superficial level and uses modified methods, partly developed using Generative AI. Results are therefore indicative and should be treated with caution. Using Generative AI makes data collection easy but comes with a problem of questionable validity. The model changes made with the help of Generative AI, need to be discussed.

The rating of quality and sustainability performance originating from the AISHE Identity module is only based on the espoused policy. This might be improved by using the more detailed instructions provided in the Identity module and by only focusing on official policy documents. This was tested, but our tools had problems in accessing pdf-documents which were not always in English. The rating might be improved by choosing and extracting only formally approved documents and then limit the AI analysis to this repository. When going through

policy documents manually the impression is that Resource and Rule are the main ways of defining, especially quality. The focus on User seems more limited. Understanding employer and societal competence needs seems to be limited.

Measurement is costly and doing a full review based on Business Excellence Models such as the AISHE requires a lot of resources. Logically a first assessment could be more superficial looking at the espoused policies and the reported results. This is an ultimate simplification of a full assessment of Resources and Results to focus on Policy and main results. The focus on the results was complicated. The measurement system is a resource. If this has not been correctly set up to assess quality and sustainability impacts, there will be limited output measurements. Table 8 tries to make a combination of the reporting system maturity and the results maturity. This will require further research. In the original AISHE model in Figure 2 the Society Check is an impact assessment. In process terms we can talk about process output and then the outcome this has on customers and other stakeholders. Outcome can be seen as the level of stakeholder satisfaction (Isaksson, 2019). Possibly we should limit the university missions to education and research, both of which should have a societal focus. This means that focus would be on educational and research output and the outcome would then be studied with the stakeholders with society being one of them.

The maturity levels based on the provided university information are medium with some high performers. This could have an upwards bias since most of the information is based on what the universities want to display. For a proper maturity assessment there should be more focus on outcomes from education and research. This could be information which is not readily available.

The detailed background logic for the rankings has not been studied. The AISHE system is for sustainability in higher education, but based on a QM logic integrating user and system-based quality, which could be seen to combine quality and sustainability.

6. Conclusions and future work

The purpose of this paper is to present the results of a first exploratory study of how quality and sustainability are understood in universities. Website information has been analysed to determine whether we can consider university quality and university sustainability as complex concepts. The indicative answer is that there is no clear common understanding neither of quality nor of sustainability, indicating that the systems are complex. This means that we should proceed with the SOS model to propose working definitions and performance indicators for university quality and sustainability. Below are our proposed answers for the four research questions.

6.1 How are universities interpreting quality and sustainability?

Results presented in Table 9 indicate that universities follow most of the proposed quality definition categories Image, Resource, Rule and User, but that the relative definition of Value per Harm is only mentioned by 21% of the universities. Garvin (1984) notes that several quality definitions should be used simultaneously. However, addressing all might be a case of trying to please all readers. Seen from a QM perspective there could be more focus on the User and then on User value per harm such as employability per invested time and money. The benchmark universities average score is similar to the reference universities with benchmark universities having a combined total of 57 and reference universities having a combined total of 53 out of 70 as maximum score. The benchmark universities Arizona State University and Western Sydney University score a full 10.

Results in Table 10 indicate university focus on Resources followed by Image, Rules and User. The benchmark universities tick 90% of the definitions and reference universities 60%. Only Western Sydney University scores a full 10. The Value per Harm definition for sustainability is ticked by 36% which is higher than the corresponding for quality.

The results do not indicate any clear definitions for quality and sustainability. User focus appears in 79% of the university quality descriptions and system focus in 71% of the sustainability descriptions. Results are only indicative but indicating a variable understanding of university quality and sustainability.

6.2 What is the current level of espoused university quality and sustainability?

Results in Table 11 place the espoused quality and sustainability in the middle of the scale. The scale in Table 7 has the stages: Unaware (0), Policy-oriented (1), Process-oriented (2), System-oriented (3), Value chain-oriented (4) and Impact oriented (5). The average value for the 14 universities is 2.6. The Western University of Sydney is the only one rated as 5 – Impact-oriented. The conclusion is that the level of quality and sustainability in universities is at an average level with high variability.

6.3 What is the current level of reported university quality and sustainability?

Results in Table 12 place the reported university quality and sustainability in the middle of the scale. The average value is 2.5. The scale in Table 8 has the stages: Non reporting (0), Fragmented Reporting (1), Process Based Reporting (2), Integrated Reporting (3), Collaborative Reporting (4) and Impact Driven Reporting (5). No university scores 5. The Western University of Sydney is the only one rated as 4 – Collaborative Reporting.

6.4 Are university ranking systems correlating with university espoused quality and sustainability and reported quality and sustainability?

The benchmark universities have higher scores in how espoused quality and sustainability are presented (Table 11) and in how quality and sustainability results are presented (Table 12), indicating that the maturity assessment originating from AISHE and presented in Tables 7 and 8 correlates with the mixed ranking systems.

6.5 Summary conclusions and future work

This study indicates that university quality and sustainability definitions need to be clarified. For better university quality, definitions for customers and customer needs should be determined in what is called as the User based quality definition which in Table 4 is expressed as: “Quality defined by satisfaction & usability for students, employers, society”. Future research is needed to discuss and study who the customers for university education and research are. Primary focus is proposed to be on the educational process and student employability, which also reflects the employer quality. Student preferences should be clarified, as these can extend beyond employability. By clarifying quality definitions such as employability, it becomes possible to measure the performance and then the related outcome, being the customer satisfaction. Similarly, sustainability needs should be discussed. It could be that employers are not asking for these due to lack of knowledge, despite there being sustainability issues. Future research needs to study if we can join Quality and Sustainability in Quality for Sustainability (Q4S) as a joint approach.

Performance indicators are needed both in absolute and relative terms. Learning for employability comes with harm in the form of time and money spent. With lifelong learning and the need of new learning and relearning focus on Value per Harm becomes more important.

Much better university sustainability definitions are needed. The definition from Table 5 for System based sustainability is still vague: “Sustainability defined by meeting holistic socio-ecological needs within planetary limits. Stakeholder systems-centric perspective. Providing sustainability competence with research, education and societal cooperation.” A good definition is one that can be converted into relevant performance indicators. It should focus on the vital few sustainability impacts from the university mission. How should educational and research sustainability be defined and measured?

The highest level of impact-based university reporting in Table 8 states: “Publishes full lifecycle/environmental/social Profit and Loss, Scope 1–3 emissions, TCFD-aligned reports, global benchmarking (THE Impact, SDG Index), and quantifiable net-positive achievements”. This is still a list of things, without a clear focus on system value and harm.

Generative AI can help when the solutions are found on the internet, but if these are not available it cannot solve the problem. Since Generative AI could not come up with any clear definitions and performance indicators for neither quality nor sustainability the indication is that these need to be defined in further research.

Further work could start with the educational process by following the SOS logic of proposing quality and sustainability definitions and performance indicators. Performance indicators should measure both output and outcome. With proposed performance indicators it will be possible to quantify the level of performance and to set targets. Only at this stage will it be possible to quantify the improvement potential – SOS-Diagnosing.

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