

QATAR UNIVERSITY

COLLEGE OF ENGINEERING

SUSTAINABILITY IN HIGHER EDUCATION: COMPREHENSIVE TOOL FOR
ASSESSING THE SUSTAINABILITY IN HIGHER EDUCATIONAL INSTITUTIONS

BY

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in Partial Fulfillment of the Requirements for the Degree of
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ABSTRACT

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Title: Sustainability in Higher Education: Comprehensive Tool for Assessing the Sustainability in Higher Educational Institutions

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Sustainability has received increasing attention in the Higher Education Institutions nowadays. Several sustainability assessment tools have been identified for higher education through previous research. However, there should be further research for sustainability aspects in higher education since there is still no standardized assessment that all institutions follow due to its broad categories involved.

This research work aims to develop a comprehensive tool for assessing sustainability in higher education. The tool is named later as “Sustainability Assessment of Higher Education” (SAHE). In order to realize the SAHE on a broad scale (locally and globally), the sustainability aspects considered in the SAHE were perfectly aligned to the “United Nations Sustainable Development Goals” (SDGs) and the “Times Higher Education” (THE). The SAHE tool provides higher education institutions with a database tool to assess their contribution to sustainable development.

More specifically, the SAHE constitutes of five main categories, namely, Academics; Operations & Environmental; Planning, Administration & Engagement; Economic; and Social. The SAHE proposes 108 qualitative and quantitative sustainability indicators to report the contribution of the educational institution under each of the main categories. The SAHE structure combines several subcategories – 21 layers. This unique structure, multiple-layer, provides the SAHE tool an advantage over

several of the existing tools or methods. The multiple-layer structure provides the sustainability practitioner with a narrow range of selections under each indicator.

This research work considers Qatar University as a case study to evaluate the applicability and operational performance of the SAHE tool. The case study started by composing a list of the potential administrative and academic sources of data. Once it is confirmed and approved, the communications with the data providers are initiated, and in return, the QU sustainability assessment database is created consisting of 85% of the information required. Finally, an assessment scoring and ranking approaches were proposed and implemented to the collected data.

DEDICATION

This research is dedicated to my parents, family, husband, and my little angel Ghazal.

Thank you for your endless support, patience, and encouragement through this academic journey. I also dedicate this research to the Almighty Allah, thank you that you are able to bring hope even through the toughest of times.

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Special thanks to Qatar University departments for their acknowledgment and experience, as well as providing me with the missing required data to complete my research case study. Most importantly, I would like to thank the “Facilities and General Services Department” and their manager, Eng. Mai Fetais, for their significant support and showing endless care towards my research.

Lastly, thank you, Allah, for blessing me with this high quality of education through studying at Qatar University.

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CHAPTER 1: INTRODUCTION

This chapter will introduce an overview of the sustainability in Higher Education (HE). It will start with defining the concept behind sustainability, and then it will touch on Sustainable Development Goals before stating how it is related to Education. Also, this chapter will shed lights on the sustainable development in education and the assessment tools used in measuring the sustainability in HE. Afterward, the aim and objective of this master thesis research will be mentioned, and then followed by the research scope. Finally, the thesis methodology will be stated.

1.1. Overview

Recently, universities face a persistent challenge to continue to meet the most updated demands of local and global development. This challenge can be attributed to the edge knowledge and technological advancement (Alsheeb et al., 2019-a; Al-sheeb et al., 2019-b). The notion of “Sustainability” has become the target aspiration of many universities around the world. Since the majority of the people around the world are starting to stress more about sustainability issues, people should understand the concept of sustainability (Sen et al., 2019). Sustainability is a balancing act and the ability to continue acting in a defined criterion over a period to ensure a more maintainable life and future (Onat et al., 2016; Onat et al., 2014). There are three essential pillars should be accomplished to achieve global sustainability. These pillars are 1) environmental; 2) economic; and 3) social sustainability. With the use and focus of these three pillars and powerful tools, a complete sustainability problem can be solved. However, for the global system as a whole to work and become sustainable, all three pillars must be

active (Onat et al., 2017). As shown below in Figure 1, a popular way can help to visualize the three essential pillars.

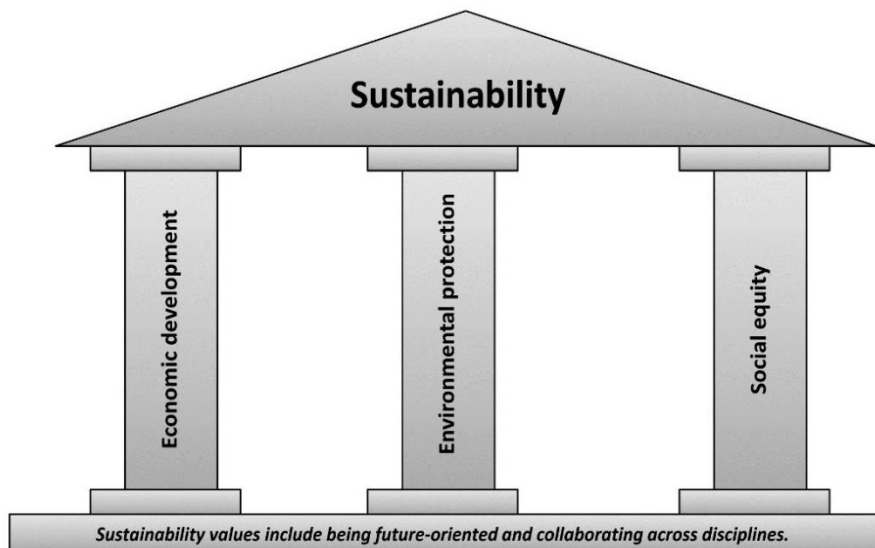


Figure 1: The three pillars of sustainability (Turner, 2014)

The concept of sustainability contemplates the idea that to achieve a responsible development; there should be aspects that are found within each of the three pillars (Egilmez et al., 2015). Nevertheless, having a balance between all three pillars is not as easy as it might seem since there are several different types of values that are found in a specific pillar but not in the other (Garrido, Lechón, De La Rúa, Rodríguez-Serrano, & Caldés, 2016; Mohamed Abdul Ghani, Egilmez, Kucukvar & S. Bhutta, 2017). In 2016 “The United Nations embraced the 2030 Agenda of Sustainable Development”,

which aims to end poverty as well as attaining sustainable development by the year 2030. (Bejakovic, 2018)

In September 2015, at the “United Nations Headquarters in New York,” the new global 2030 agenda for sustainable development that focuses on 17 sustainable development goals (SDG’s) shown in Figure 2 below was published, it comes to effect by January 1, 2016. The main goals found in the agenda focused on education as was mentioned by (Geryk, 2018) and (United Nations, 2015).



Figure 2: UN 17 SDG's (“#Envision2030: 17 goals to transform the world for persons with disabilities,” 2016)

Above all, according to the UN, all people around the world should be able to develop and build on the skills and knowledge they need to be able to strengthen the opportunity of having a sustainable future.

There have always been issues regarding universal primary education. However, since the year 2000 (United Nations Development Program), there has been a significant shift in progression in terms of achieving the target that is set for universal primary education. In developing countries, the overall enrollment rate reached 91% in 2015. Also, the number of children that are dropped out of school worldwide has been dropped by almost a half, which shows how education is becoming more important for everyone around the world. A literacy rate has increased dramatically, and this can be seen by several impressive successes such as the enormous number of girls that are enrolled in school nowadays, which is more than ever before. (United Nations Development Programme, n.d.)

Due to different factors such as poverty, armed conflicts, and other emergencies in some developing regions, progress related to education has been tough. It has been seen that children from the poorest households are around four times more likely to be out of school, whereas children from the richest households are not. Furthermore, there is still an ongoing major disparity between rural and urban areas regarding children being enrolled in schools.

People receiving a good quality of education proves the belief of education being one of the most potent ways for more sustainable development. One of the goals that were mentioned in the UN's global 2030 agenda for sustainable development is to "ensure that all girls and boys complete free primary and secondary schooling by 2030". Furthermore, one of the aims is to "provide equal access to affordable vocational training, to eliminate gender and wealth disparities, and achieve universal access to a quality higher education." (United Nations, 2015)

Nowadays, several higher educational institutions around the world have recently implemented a sustainability assessment. A great number of higher education institutions showed notable interest in maintaining the sustainability assessment as one of the core management activities towards the achievement of sustainable development. Referring to the Connelly diagram below in Figure 3, the diagram exhibits a mapping interpretation of the concept. At each point of the triangle, different viewpoints of economic growth, environmental protection, and social justice are shown.

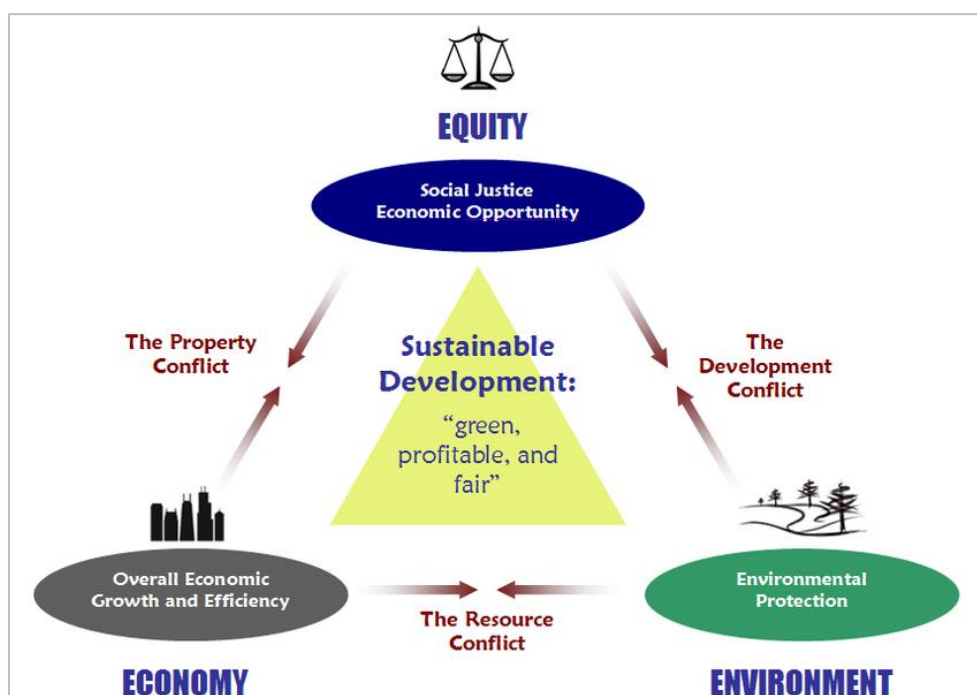


Figure 3: The sustainability triangle of the conflicting planning goals (Abukhater, 2009)

Trying to maintain sustainability in education might be extremely difficult due to the significant number of people that are involved. Every member of each institution should be aware of this process and its necessity. Although the term “sustainable development” is commonly used by most people, however, each person might have a different understanding of this term, hence why further research should start clarifying the term. Since a big number of universities well knows this concept, most of these universities are involved in activities and initiatives regarding sustainable development. However, for some of the universities that do participate in such activities and initiatives, this is just an ostensible action that is not followed by any action afterward. (Geryk, 2018)

Sustainability assessment tools are beneficial in universities that work toward sustainability. It helps in understanding and measuring the different sustainability aspects efficiently. Some of these tools were created specifically for universities while others were modified from other tools used in other sectors. There are three approaches used in sustainability assessment and reporting. These are:

1. Accounts
2. Narrative assessments
3. Indicator-based assessments

Universities tend to use the indicator-based assessments over the other approaches due to being more objective. This approach is extremely useful in terms of decision-making since it is known for its excellent transparency, consistency, and is easily implemented and measured by higher education institutions.

Furthermore, Lozano (2006) mentioned not a single tool is designed to assess the sustainability in terms of education and research including the main three pillars at

the same time. For example, ISO 14000 is a tool to assess sustainability; however, it does not focus on all three pillars of sustainability equally as well as not directly covering the education and research within the assessment. Moreover, through Shriberg's review summary of the cross-institutional sustainability assessment tools, it was clear that these tools focus on the environmental pillar more explicitly than the other two social and economic pillars (Lozano, 2006)

One of the highly preferred reporting tools that are commonly used by operations is the "Global Reporting Initiative (GRI) Guidelines" tool that covers all three main aspects of sustainability. Universities could use some of these performance indicator tools; however, not all of these indicators can be usefully used due to lack in some aspects as Education and Research.

Furthermore, other indicators are specified in some functions that are not helpful for universities and cannot be implemented. GRI is one of the tools that is frequently being used in sustainability measurements. Therefore, as mentioned previously regarding university's assessment tools for sustainability that are modified from other tools used in other sectors, GRI is a sustainability reporting tool that has been modified to "The Graphical Assessment of Sustainability in Universities (GASU)." GASU was initially created to be used in assessing sustainability in higher education institutions. This tool added three categories, which are under the educational dimensions and they are curriculum, research, and services.

1.2. Research Objectives

The thesis research study aims to involve HE institutions in the global sustainability by presenting the current status of the sustainability implementation in

HE, which were covered by the most recent international research articles, as well as exhibiting how institutions are assessing their sustainability.

The objective of this thesis is:

- 1- Tool development: to develop a comprehensive tool (index) for HE institutions that helps in measures and assess the sustainability while taking into consideration the three main pillars subcategories and indicators, hence, the educational indicators being part of it as well.
- 2- Tool implementation: to implement and apply the tool to Qatar University - Case Study.

1.3. Methodology

The research work will start with introducing the meaning behind sustainability to its readers; subsequently, it will cover the implementation processes of sustainability in higher education institutions based on the previous research articles. Afterward, the gap in the literature review regarding this topic is identified and presented. Then, a comprehensive assessment tool is developed, verified, and applied to Qatar University. The tool will be divided into three levels: Categories, subcategories, and indicators. An excel-database is created based on the collected data from QU. Then the tool is ready to be applied and linked globally such as linking it to other sustainability assessment tools or the institutions' strategic plan. Finally, yet importantly, scoring and ranking systems are proposed and implemented to QU data collected before summing up everything in conclusion. Many approaches could be used to implement scoring and assessment; such as 1) the tool's indicators weighting which done by expert judgments to put the proper weight to each indicator; 2) Normalization and Classification

approaches; 3) Benchmarking the results with other HE institutions. Then, ranking the institutions according to their results from the assessment. All the process above is given in Figure 4 below:

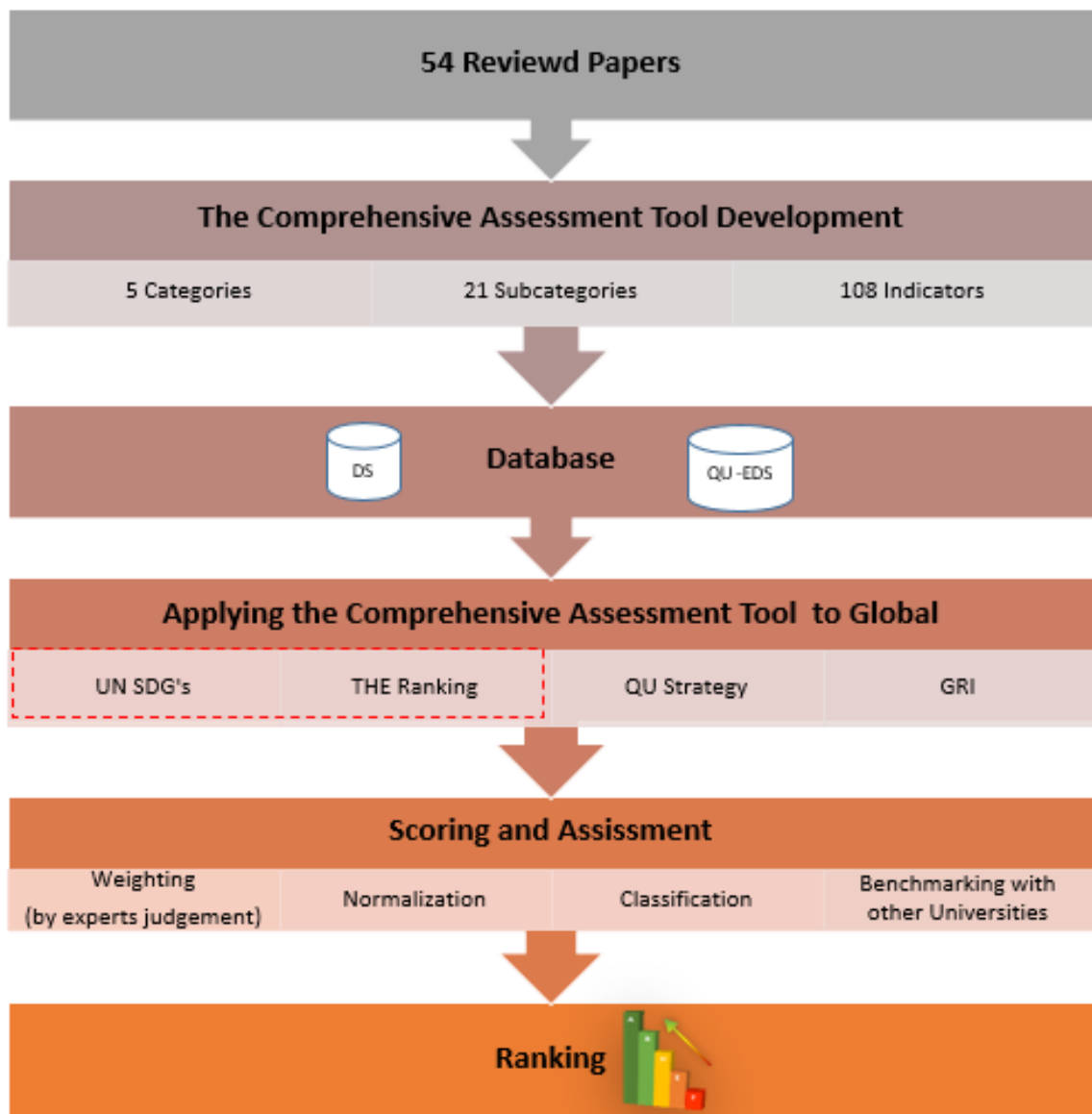


Figure 4: Tools methodology

CHAPTER 2: LITERATURE REVIEW

This chapter will cover a literature review that focuses on several recent studies (from 2005 up to 2018) that are published online regarding sustainability in HE. As for the review analysis, it will be a way to figure out the sustainability aspects that are mostly covered in previous researches regarding the educational sector, including their indicators to be considered in assessing the sustainability in HE institutions.

2.1. Literature Review Table

An exploratory (54) literature reviews of the implementation of sustainability in HE were studied in depth and summarized into a comprehensive table (Table 1 and Table 2) that includes the following categories;

1. Journal/Conference/Book name
2. Publishing year for the collected articles
3. Tools used in collecting the needed data for the assessment process
4. Methods used for assessment
5. Broadening Indicators availability

Table 1: Bibliometric Analysis of Research in Sustainability Assessment from 2005 to 2018

No	Author	Year	Publication Type	Data Source/Reporting/Assessment tool													
				Survey (Selected items)	Interview	Workshop	Literature Review/ Qualitative Research	University Documents	University Website/ Websites	STAUNCH	GRI	GASU	STARS	ACUPCC	Green Report Card	Green Metric	AISHE
1	(Büyükozkan & Karabulut, 2018)	2018	Journal of Environmental Management				√										
2	(Huber & Bassen, 2018) (Zainordin & Ismail, 2018)	2018	International Journal of Sustainability in Higher Education				√										
3	(Meiboudi, Lahijanian, Shobeiri, Jozi, & Azizinezhad, 2017)	2018	AIP Conference Proceedings 2016				√										
4	(Gamage & Sciulli, 2017)	2017	Journal of Environmental Management	√													
5	(Zahid, Ghazali, & Rahman, 2017)	2017	Australian Journal of Public Administration									√					
6	(Büyükozkan & Karabulut, 2018)	2017	Global Business and Management Research: An International Journal					√	√								

Table 1. Cont.

No	Author	Year	Publication Type	Data Source/Reporting/Assessment tool													
				Survey (Selected items)	Interview	Workshop	Literature Review/ Qualitative Research	University Documents	University Website/ Websites	STAUNCH	GRI	GASU	STARS	ACUPCC	Green Report Card	Green Metric	AISHE
7	(Kapitulčinová, AtKisson, Perdue, & Will, 2018)	2018	Journal of Cleaner Production				√										
8	(Berzosa, Bernaldo, & Fernández-Sanchez, 2017) (HOOEY, MASON, & TRIPLETT, 2017)	2017	Journal of Cleaner Production	√			√										
9	(Healy & Debski, 2017)	2017	The Midwest Quarterly LOCAL ENVIRONMENT														√
10	(Kapitulčinová, AtKisson, Perdue, & Will, 2018)	2017	The International Journal of Justice and Sustainability				√										
11	(Peterson & Wood, 2017)	2017	Academic Questions				√										

Table 1. Cont.

No	Author	Year	Publication Type	Data Source/Reporting/Assessment tool												
				Survey (Selected items)	Interview	Workshop	Literature Review/ Qualitative Research	University Documents	University Website/ Websites	STAUNCH	GRI	GASU	STARS	ACUPCC	Green Report Card	Green Metric
12	(Owens, 2017)	2017	European Journal of Education				√									
13	(Leal Filho et al., 2017)	2017	Journal of Integrative Environmental Sciences	√												
14	(Jang, 2017)	2017	The International Journal of Higher Education Research	√			√									
15	(Dalati, Raudeliūnienė, & Davidavičienė, 2017)	2017	Business, Management and Education	√												
16	(Berchin, Grando, Marcon, Corseuil, & Guerra, 2017)	2017	International Journal of Sustainability in Higher Education				√									
17	(Dumitru, 2017)	2017	International Journal of Sustainability in Higher Education				√									

Table 1. Cont.

No	Author	Year	Publication Type	Data Source/Reporting/Assessment tool													
				Survey (Selected items)	Interview	Workshop	Literature Review/ Qualitative Research	University Documents	University Website/ Websites	STAUNCH	GRI	GASU	STARS	ACUPCC	Green Report Card	Green Metric	AISHE
18	(Stough, Ceulemans, Lambrechts, & Cappuyns, 2018)	2018	Journal of Cleaner Production				√										
19	(Arjen E.J. Wals & Jickling, 2016)	2016	International Journal of Sustainability in Higher Education				√										
20	(Dagilienė & Mykolaitienė, 2016)	2016	Journal for Public & Nonprofit Services					√	√		√						
21	(Gunn, 2016)	2016	International Journal of Art & Design Education				√										
22	(Maragakis, Dobbelsteen, & Maragakis, 2016)	2016	International Journal of Higher Education							√							
23	(Caeiro et al., 2015)	2015	Elsevier: Journal of Cleaner Production				√										
24	(Fischer, Jenssen, & Tappeser, 2015)	2015	Assessment & Evaluation in Higher Education				√										
							(SAT & indicators/criteria's)										

Table 1. Cont.

No	Author	Year	Publication Type	Data Source/Reporting/Assessment tool													
				Survey (Selected items)	Interview	Workshop	Literature Review/ Qualitative Research	University Documents	University Website/ Websites	STAUNCH	GRI	GASU	STARS	ACUPCC	Green Report Card	Green Metric	AISHE
25	(Christie, Miller, Cooke, & White, 2015)	2015	Environmental Education Research	√													
26	(Cook & Khare, 2015)	2015	Transformative Approaches to Sustainable Development at Universities World Sustainability Series				√										
27	(Figueiró & Raufflet, 2015)	2015					√										
28	(Lauder, Sari, Suwartha, & Tjahjono, 2015)	2015	Elsevier: Journal of Cleaner Production										√			√	
29	(Ceulemans, Molderez, & Van Liedekerke, 2015)	2015					√										
							SRT										

Table 1. Cont.

No	Author	Year	Publication Type	Data Source/Reporting/Assessment tool													
				Survey (Selected items)	Interview	Workshop	Literature Review/ Qualitative Research	University Documents	University Website/ Websites	STAUNCH	GRI	GASU	STARS	ACUPCC	Green Report Card	Green Metric	AISHE
30	(Holm, Vuorisalo, & Sammalisto, 2015)	2015					√	√									
31	(Sammalisto, Sundström, & Holm, 2015)	2015	Elsevier: Journal of Cleaner Production	√			√										
32	(Alonso-Almeida, Marimon, Casani, & Rodriguez-Pomeda, 2015)	2015										√					
33	(Larrán Jorge, Herrera Madueño, Calzado Cejas, & Andrades Peña, 2015)	2015		√													
34	(Martin, McCoshan, & McEwen, 2014)	2014	World Sustainability Forum			√		√									
35	(Disterheft, Caeiro, Azeiteiro, & Filho, 2015)	2015	Elsevier: Journal of Cleaner Production		√												
36	(Lozano et al., 2015)	2015		√			√										

Table 1. Cont.

No	Author	Year	Publication Type	Data Source/Reporting/Assessment tool												
				Survey (Selected items)	Interview	Workshop	Literature Review/ Qualitative Research	University Documents	University Website/ Websites	STAUNCH	GRI	GASU	STARS	ACUPCC	Green Report Card	Green Metric
37	(Lukman, Lozano, Huisingh, Lozano, & Lambrechts, 2013)	2015	Elsevier: Journal of Cleaner Production				√									
38	(Koehn & Uitto, 2014)	2014	Higher Education				√									
39	(Jabbour, Sarkis, De Sousa Jabbour, & Govindan, 2013)	2013					√	√								
40	(Xiong et al., 2013)	2013	Elsevier: Journal of Cleaner Production				√	√								
41	(Shi & Lai, 2013)	2013											√	√	√	
42	(Lozano & Young, 2013)	2013								√						
43	(Lozano, 2011)	2011	International Journal of Sustainability in Higher Education								√	√				
44	(Klein-Banai & Theis, 2013)	2013	Elsevier: Journal of Cleaner Production										√			
45	(Boman & Andersson, 2013)	2013						√								
46	(Nomura & Abe, 2010)	2010	International Journal of Sustainability in Higher Education				√									

Table 1. Cont.

No	Author	Year	Publication Type	Data Source/Reporting/Assessment tool												
				Survey (Selected items)	Interview	Workshop	Literature Review/ Qualitative Research	University Documents University Website/ Websites	STAUNCH	GRI	GASU	STARS	ACUPCC	Green Report Card	Green Metric	AISHE
47	(Wigmore & Ruiz, 2010)	2010	Ramon Llull Journal of Applied Ethics										√			√
48	(Bell & Morse, 2010)	2010	International Sustainable Development Research Conference			√	√									
49	(Desha & Hargroves, 2010)	2010	Elsevier: Journal of Cleaner Production	√												
50	(Ramos, 2009)	2009	Journal of Education for Sustainable Development	√												
51	(Harpe & Thomas, 2009)	2009	Elsevier: Journal of Cleaner Production													
52	(Alshuwaikhat & Abubakar, 2008)	2008	International Journal of Sustainability in Higher Education				√									
53	(Lozano, 2006)	2006	International Journal of Sustainability in Higher Education				√			√	√					
54	(Velazquez, Munguia, & Sanchez, 2005)	2005	International Journal of Sustainability in Higher Education				√									

Table 2: Method Used for Rating and Broadening Indicators Availability

Paper Title	Author	Published Year	Method Used for Rating										Broadening Indicators availability				
			DM*	CA*	LCR*	FA*	CC*	FS*	Hypothesis	NSA*	DA*	MCDM*	Economic	Environmen tal	Social	Educational	
[1]	(Büyükożkan & Karabulut, 2018)	2018															
[2]	(Huber & Bassen, 2018)	2018											√	√	√	√	√ (Teaching, research, operation)
[3]	(Zainordin & Ismail, 2018)	2018															
[4]	(Meiboudi, Lahijanian, Shobeiri, Jozi, & Azizinezhad, 2017)	2017				√	√	√						√			
[5]	(Gamage & Sciulli, 2017)	2017								√						√	
[6]	(Zahid, Ghazali, & Rahman, 2017)	2017		√													
[7]	(Kapitulčinová, AtKisson, Perdue, & Will, 2018)	2018															√
[8]	(Berzosa, Bernaldo, & Fernández-Sanchez, 2017)	2017											√	√	√	√	√ (Curricular)
[9]	(HOOEY, MASON, & TRIPLETT, 2017)	2017															

Table 2. Cont.

Paper Title	Author	Published Year	Method Used for Rating										Broadening Indicators availability							
			DM*	CA*	LCR*	FA*	CC*	FS*	Hypothesis	NSA*	DA*	MCDM*	Economic	Environmen- tal	Social	Educational				
[10]	(Healy & Debski, 2017)	2017																		√
[11]	(Peterson & Wood, 2017)	2017																		
[12]	(Owens, 2017)	2017																		
[13]	(Leal Filho et al., 2017)	2017																		
[14]	(Jang, 2017)	2017																		
[15]	(Dalati, Raudeliūnienė, & Davidavičienė, 2017)	2017					√													√ (Administrative Staff)
[16]	(Berchin, Grando, Marcon, Corseuil, & Guerra, 2017)	2017																		√
[17]	(Dumitru, 2017)	2017																		√ (Curricular)
[18]	(Stough, Ceulemans, Lambrechts, & Cappuyns, 2018)	2018																		√ (Curricular/courses)

Table 2. Cont.

Paper Title	Author	Published Year	Method Used for Rating									Broadening Indicators availability						
			DM*	CA*	LCR*	FA*	CC*	FS*	Hypothesis	NSA*	DA*	MCDM*	Economic	Environmen tal	Social	Educational		
[19]	(Arjen E.J. Wals & Jickling, 2016)	2016																
[20]	(Dagilienė & Mykolaitienė, 2016)	2016										√		√	√		√	
[21]	(Gunn, 2016)	2016																
[22]	(Maragakis, Dobbelsteen, & Maragakis, 2016)	2016																
[23]	(Caeiro et al., 2015)	2015																
[24]	(Fischer, Jenssen, & Tappeser, 2015)	2015										√						√
[25]	(Christie, Miller, Cooke, & White, 2015)	2015										√	√					(Curriculum for 13 discipline)
[26]	(Cook & Khare, 2015)	2015											√					
[27]	(Figueiró & Raufflet, 2015)	2015											√					√ (Curricular)
[28]	(Lauder, Sari, Suwartha, & Tjahjono, 2015)	2015										√			√			√

Table 2. Cont.

Paper Title	Author	Published Year	Method Used for Rating							Broadening Indicators availability						
			DM*	CA*	LCR*	FA*	CC*	FS*	Hypothesis	NSA*	DA*	MCDM*	Economic	Environmen tal	Social	Educational
[29]	(Ceulemans, Molderez, & Van Liedekerke, 2015)	2015								√						√
[30]	(Holm, Vuorisalo, & Sammalisto, 2015)	2015								√						
[31]	(Sammalisto, Sundström, & Holm, 2015)	2015								√						
[32]	(Alonso-Almeida, Marimon, Casani, & Rodriguez-Pomeda, 2015)	2015							√							
[33]	(Larrán Jorge, Herrera Madueño, Calzado Cejas, & Andrades Peña, 2015)	2015							√				√	√		√
[34]	(Martin, McCoshan, & McEwen, 2014)	2014								√						√
[35]	(Disterheft, Caeiro, Azeiteiro, & Filho, 2015)	2015														√
																(CSF for participatory processes in sustainability initiatives in HEI)

Table 2. Cont.

Paper Title	Author	Published Year	Method Used for Rating									Broadening Indicators availability						
			DM*	CA*	LCR*	FA*	CC*	FS*	Hypothesis	NSA*	DA*	MCDM*	Economic	Environmental	Social	Educational		
[36]	(Lozano et al., 2015)	2015									√	√					√	
[37]	(Lukman, Lozano, Huisingh, Lozano, & Lambrechts, 2013)	2013									√							√
[38]	(Koehn & Uitto, 2014)	2014										√						
[39]	(Jabbour, Sarkis, De Sousa Jabbour, & Govindan, 2013)	2013										√						
[40]	(Xiong et al., 2013)	2013									√	√						√ (Curricular)
[41]	(Shi & Lai, 2013)	2013									√							√
[42]	(Lozano & Young, 2013)	2013							√	√			√	√	√			
[43]	(Lozano, 2011)	2011									√		√	√	√			√

Table 2. Cont.

Paper Title	Author	Published Year	Method Used for Rating											Broadening Indicators availability										
			DM*	CA*	LCR*	FA*	CC*	FS*	Hypothesis	NSA*	DA*	MCD	Econo	Environment	1	Social	Educational							
[44]	(Klein-Banai & Theis, 2013)	2013				√						√				√								
																(Emissions)								
[45]	(Boman & Andersson, 2013)	2013											√											
[46]	(Nomura & Abe, 2010)	2010											√											
[47]	(Wigmore & Ruiz, 2010)	2010													√		√		√				√	
																								(STARS Credit)
[48]	(Bell & Morse, 2010)	2010																						
[49]	(Desha & Hargroves, 2010)	2010											√											
[50]	(Ramos, 2009)	2009											√		√		√		√				√	
[51]	(Harpe & Thomas, 2009)	2009											√										√	
[52]	(Alshuwaikhat & Abubakar, 2008)	2008											√				√		√				√	
[53]	(Lozano, 2006)	2006											√		√		√		√				√	
[54]	(Velazquez, Munguia, & Sanchez, 2005)	2005											√											

DM*: Delphi Method, **CA*:** Content Analysis, **LCR*:** Logistic Curve Regression, **FA*:** Factor Analysis, **CC*:** Coefficients for Criteria's, **FS*:** Factorial Simplicity, **NSA*:** Numerical Scoring Approach / inferential statistics, **DA*:** Descriptive Analysis, **MCDM*:** Multi-Criteria Decision Making

2.2. Review Analysis

The 54 published literature review papers covered in this review were collected from different journals, conferences and, books. There are twenty-one international journals, two conferences and, one book. In terms of the sustainability in HE, Journal of Cleaner Production has the most published papers regarding this topic. Followed by the International Journal of Sustainability in Higher education with seven literature review papers. Adding to that, Journal of Environmental Management has two papers covered in this review. Nevertheless, the rest of the papers were published in the journals, conferences, and the book mentioned below in Figure 5 and Figure 6.

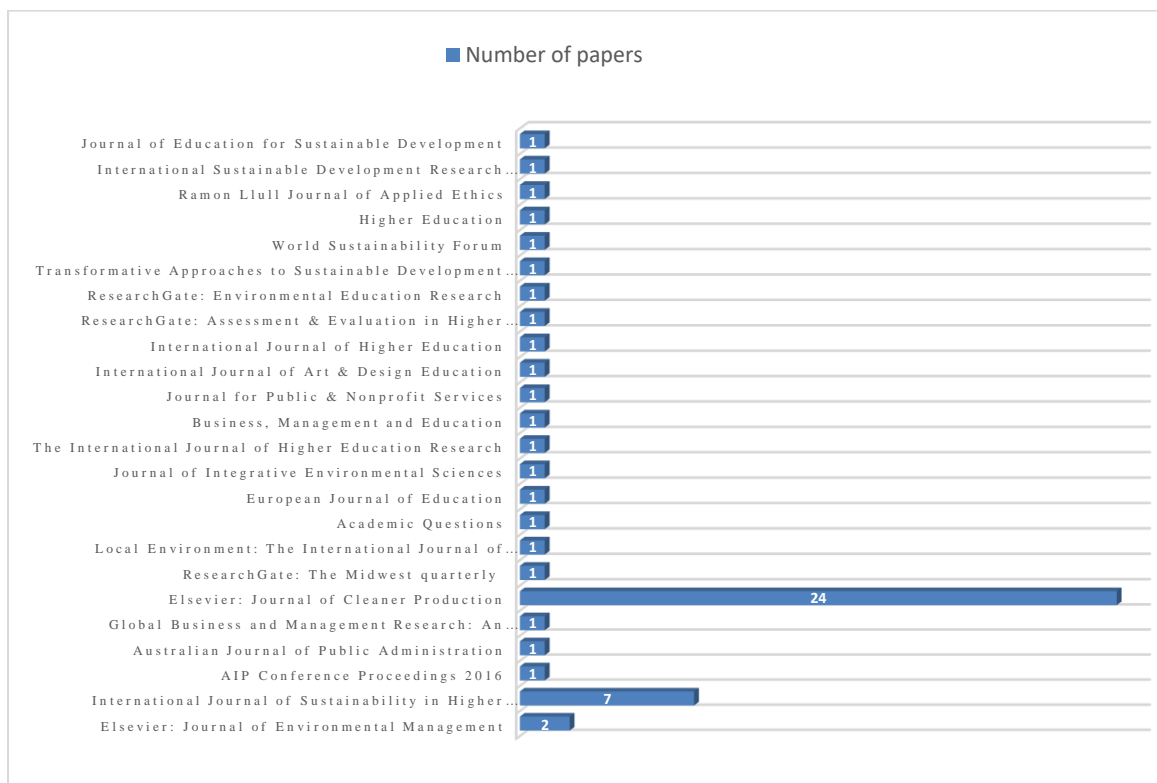


Figure 5: Journal/Conference/Book name for the covered literature reviews

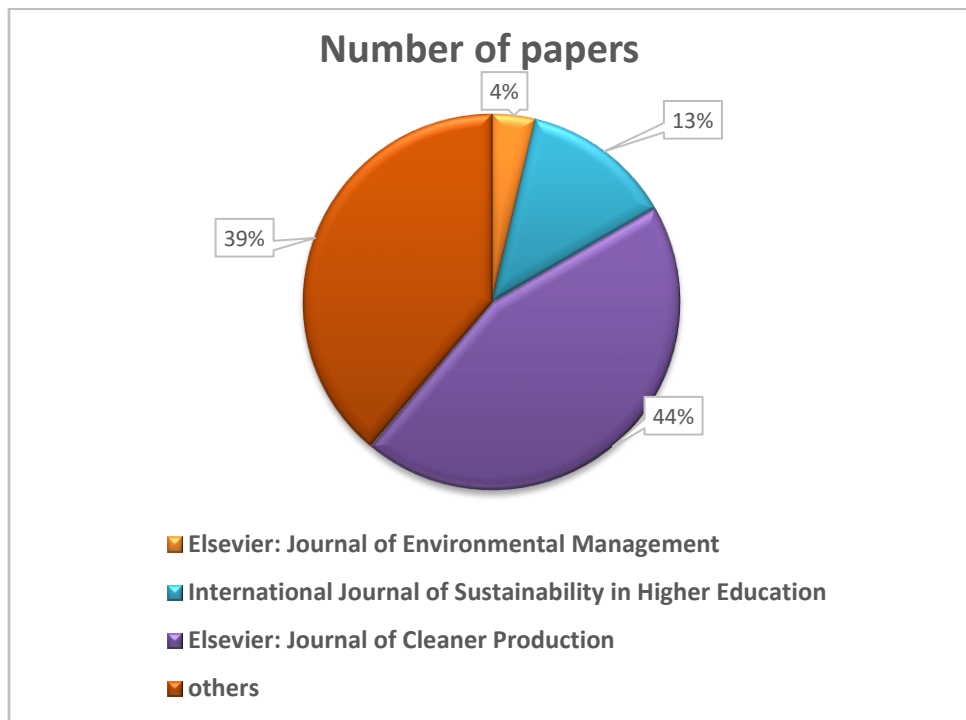


Figure 6: Journal/Conference/Book summary for the covered literature reviews

Figure 7 presents the results of the comparative analysis of numbers of papers published based on the year from 2005-2018. After analyzing the figure below, it was seen that in the past five years there had been an increase in the number of papers published regarding sustainability in HE. This observation gives an indicator that educational institutions started to become more aware of sustainability in education. Furthermore, 28% of the papers covered in this review were published in 2017. Moreover, since this research paper started since spring 2018, the collected published literature reviews were limited in the year 2018.

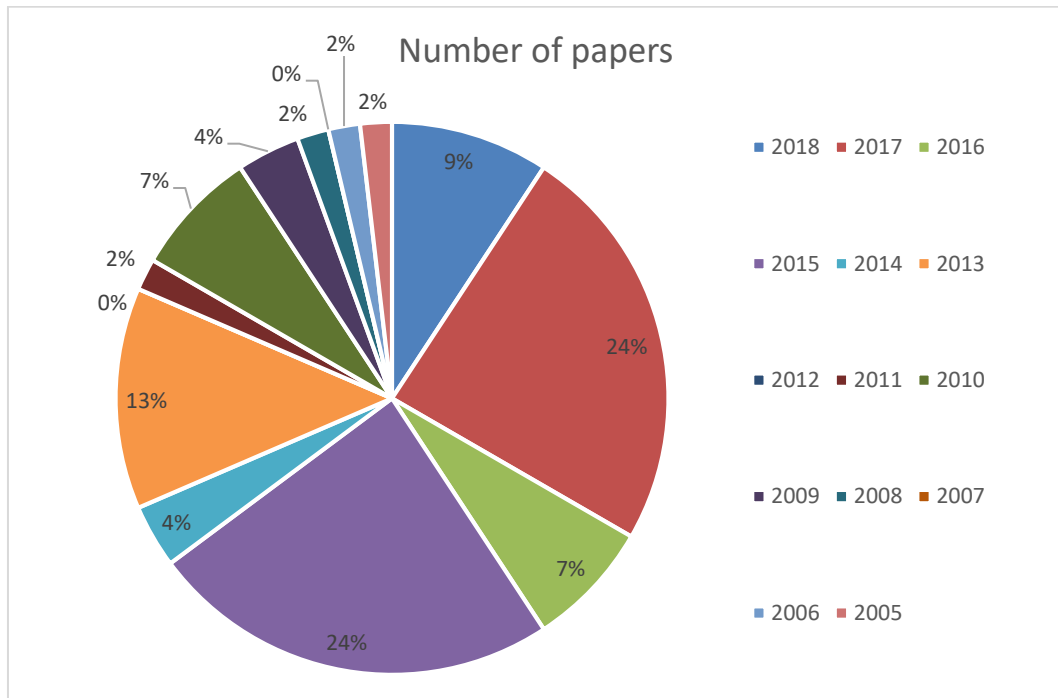


Figure 7: Published year for the covered literature reviews

The columns chart in Figure 8 below shows the Data Source, Reporting, and Assessment Tools that were mentioned in the 54 literature reviews. While analyzing the literature reviews, it was seen that the most type of data collection was based on Literature Review or Qualitative Research; hence, 32 literature reviews used this type to assess the sustainability in HE. Moving on next, the second data collection tool that was mostly mentioned in literature reviews was the Survey. Literature reviews prefer to use surveys since it is an easy implementation method, it is not a limited tool like others, and as well, the numerical scoring results are easily analyzed through graphs, charts, and percentages. Moreover, the results show that the assessment tools that are used in measuring and assessing sustainability in higher education such as; STAUNCH,

GRI, GASU, STARS, ACUPCC, Green Report Card, GreenMetric, AISHE, and USAT (See Appendix A of the shortcuts table), are mentioned in 17 literature review papers, however, none of them is widely focused on in literature reviews.

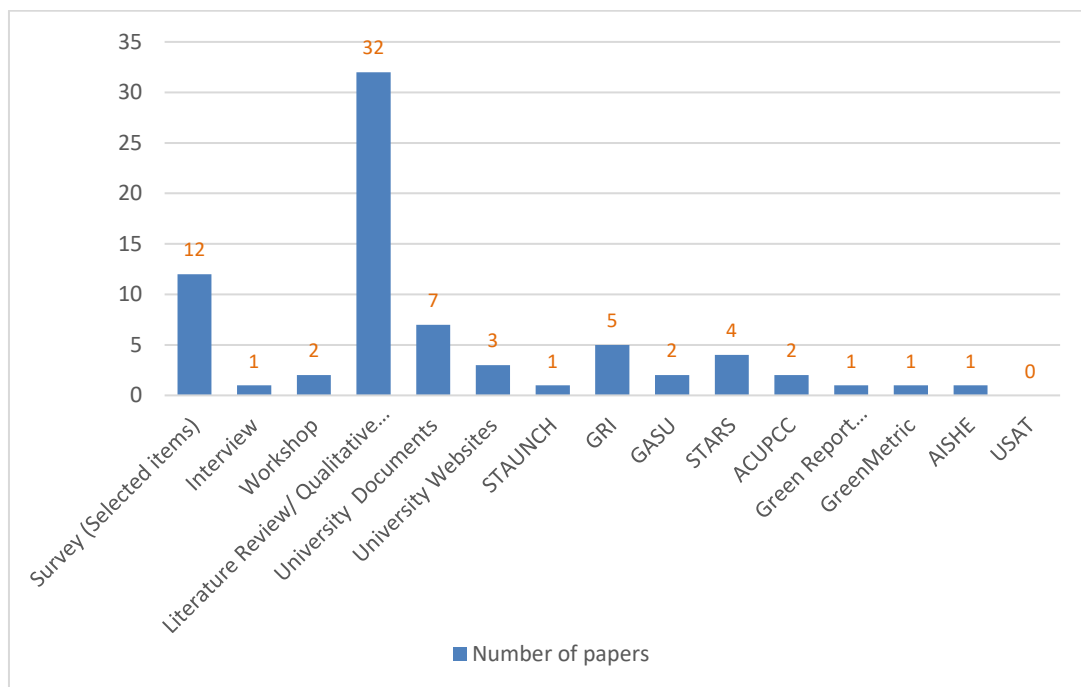


Figure 8: Data Source, Reporting, and Assessment Tool used in literature reviews

As mention previously, Literature Review/Qualitative Research and Survey are the most ways used for Data Source, Reporting, and Assessment Tool, which were mentioned in the literature reviews and covered in this paper. The analysis in Figure 9 supports the fact stated before by seeing that the descriptive analysis method is the most used method, which has been mentioned in 22 literature review papers out of 54. Then, the Numerical Scoring Approach method, which was used by the Survey tool, was

mentioned in 19 literature review papers. Other methods were used in literature according to the tool used for measuring the sustainability in higher education such as the factor analysis method, which was mentioned in the review papers [4], [15], and [44] and used by the Survey and ACUPCC tool. Methods like Content Analysis, Coefficients for Criteria's, Factorial Simplicity and Hypothesis were also appeared in the literature reviews for assessing the sustainability in HE.

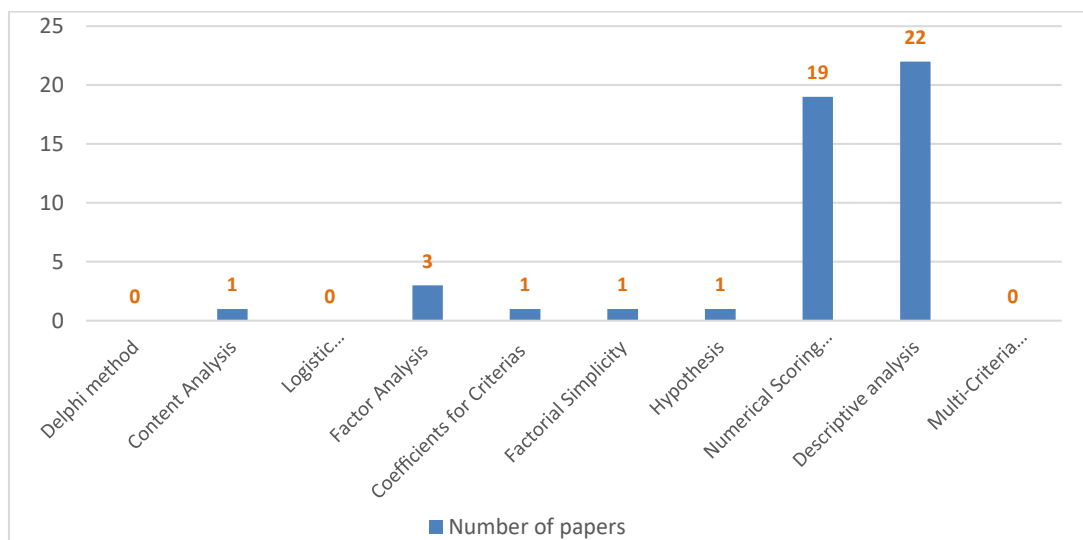


Figure 9: Methods used for rating and covered in literature reviews

Figure 10 presents the number of papers that have indicators in the main categories (pillar of sustainability) used in higher education, which are Economic, Environmental, Social and Education. It has clearly shown that 24 literature review papers out of the 54 papers covered in this study did not mention any of the main categories or the broadening indicators used for assessing the sustainability in HE.

However, 15 literature review papers were focusing mainly on the Education broadening indicators. On the other hand, six review papers were found that they mentioned the four main categories used in measuring and assessing the sustainability in higher education which are [2], [8], [43], [47], [50], and [53]. None of the 54 reviewed papers was covering the Economic pillar alone when measuring the sustainability in HE. However, papers [4] and [44] were focusing on the Environmental pillar in their literature review, and paper [5] recognized the Social pillar. Paper [16] focused on Educational and Economics pillar; while, paper [28] looked at the Educational category and indicators related to Environment. The review papers [20] and [42] study the sustainability assessment indicators that are related to Economic, Environmental and Social categories at the same time, while papers [33] and [52] mentioned indicators related to Environmental, Social and Educational together.

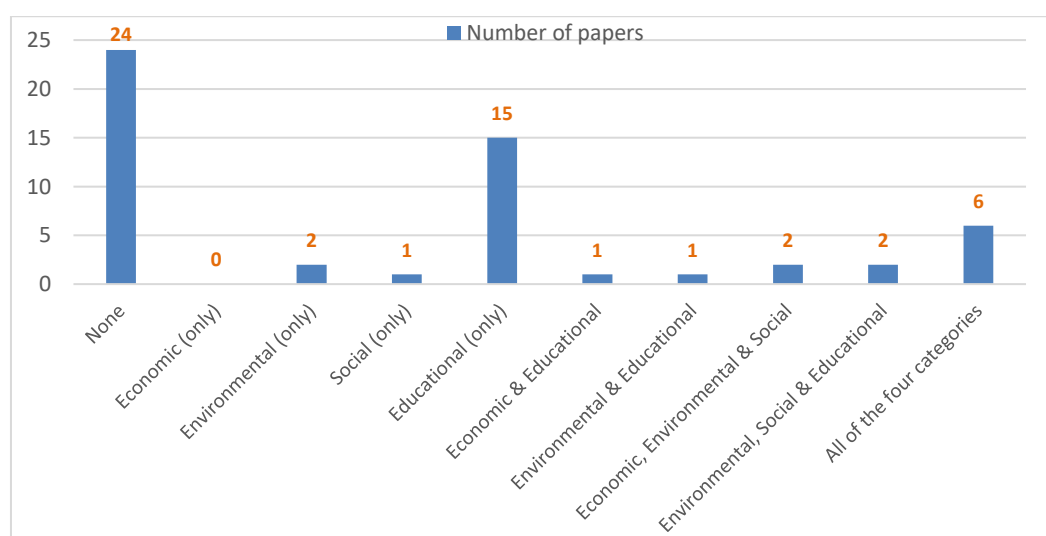


Figure 10: Broadening indicators covered in literature reviews

Table 3 overall shows the number of published papers that have indicators in each category of the main categories that may found while assessing sustainability in HE. Out of the 54 literature papers reviewed in this paper, 25 papers focused on the Educational category indicators in their research; while 13 papers looked at the Environmental category indicators; 11 papers looked at the Social category, whereas nine papers considered the Economic category in their literature review.

Table 3: Number of Papers That Has Indicators in Each Category

Broadening Indicators	Number of papers
Economic	9
Environmental	13
Social	11
Educational	25

Nowadays, it has been seen that education has higher attention in terms of sustainability. Higher educational institutions are recently including into their actions and processes a focus on education regarding sustainable development. These actions include a wide range of teaching curriculums, researches, and campus operations.

Furthermore, higher education institutions are being required intensively to attempt to follow the trend of the UNEP Agenda through their actions. Such declarations set for the universities regarding their actions play a role in making sure that there is a high commitment to including sustainability in their educational processes and actions. (Geryk, 2018)

2.3. Discussion

Different sustainability assessment tools have been identified for higher education through previous reviews regarding global sustainability assessment researches. However, literature research studies remain to have a gap due to issues arising from measuring and assessing sustainability. (Stough et al., 2018) The literature review in this paper sheds light on the sustainability aspects that had covered in the international literature regarding sustainability in HE. Solutions could be anticipated for the gap found in the literature review.

Mostly aspects used in HE institutions are the academic, social and environmental aspects. They are used to ensure institutional excellence and to examine their influence on student satisfaction and experiences. (Al-Sheeb, Hamouda, & Abdella, 2018) As shown previously, literature reviews generally focused on teaching and curriculum processes. It puts little attention to environmental aspect and very less to social and economic.

Although GASU (see Appendix A of the shortcuts table) is a good tool that is used for assessing sustainability in higher education institutions, however, since this tool relies on the GRI reporting tool, it is difficult to use it at all times since GRI is initially created for corporations and not universities in specific. Hence, not all universities around the world have reported in the GRI reporting tool. According to (Findler, Schönherr, Lozano, & Stacherl, 2018), AISHE and GASU, designed to focus mainly on campus operations and governance concerns. Nevertheless, they did not address well the education, research, and outreach category. Besides, some SAT suitable mostly for companies such as GRI and GSAS where some of its indicators difficult to be applied on universities for example “child labor, forced and compulsory

labor, customer health and safety, and products and services.” STARS is an excellent tool for measuring sustainability performance in universities. On the other hand, some of its operational indicators do not appear suitable for the HE institutions in the developing countries where it is a daunting challenge for the universities participation. UI GreenMetric WUR does not have management, administration, finance indicators. GSAS was designed to create a sustainable built environment, which focuses mostly on the environmental category and to reduce the ecological impact. (Alhorr & Alkuwari, 2018)

By the end of this intensive literature review, it was concluded that there is significant attention coming from the HE institutions regarding sustainability aspects and its assessment tools. However, it remains to be seen that there are no standardized assessment tools that are widely used amongst all HE institutions. Since there are numerous assessment tools out there that lack in some aspects, the motivation beyond the research work started from that point. There is a vital need towards having a comprehensive global tool that can be used by any HE institution.

Lastly, regarding the tools scoring and ranking systems that are used while assessing the sustainability in HE, and according to (Zainordin & Ismail, 2018) review study on several sustainability assessment tools used for HE, the ranking method is not explained among all the tools. Some tools such as AISHE has no weighting for its indicators; others may have partially explained method like STARS or thoroughly explained like GASU. Usually, there are challenges in comparing the responses of the qualitative data with the quantitative data. However, transformation into numbers of “0”, “1” and “2” could be applied. (Lozano et al., 2015)

There are many different weighting and aggregation methods applied to the sustainability indicators through the literature review. Some of the indicators weighting methods that could be used are “Equal weighting”, “Principal components analysis or factor analysis”, “Benefit of the doubt approach”, “Regression analysis”, “Unobserved component models”, “Budget allocation”, “Public opinion”, “Analytic hierarchy process” and “Conjoint analysis” method. Others indicators aggregation methods such as “Additive aggregation,” “Geometric aggregation” and Non-compensatory aggregation methods. Nonetheless, for the best selection from these methods, it is important to know the required conditions for the application of the methods. (Gana et al., 2017)

CHAPTER 3: A COMPREHENSIVE ASSESSMENT TOOL FOR SUSTAINABILITY IN HIGHER EDUCATION

This chapter will shed lights on the comprehensive assessment tool that was created for sustainability in HE. It will mention the methodology stage that focuses on three main phases to establish SAHE tool. Within each phase, different processes will be presented to complete the phase and move on to the following one.

3.1. Tool's Methodology:

Higher Education gives major importance to sustainability. Therefore, this research will help motivate and lead the institutions to follow this path. Accordingly, a comprehensive tool (Index) that helps in measuring and assessing the sustainability in HE while covering the main three aspects of sustainability (social, environmental, and economic) was developed. The development of the tool was done through the following three phases given in Figure 11:

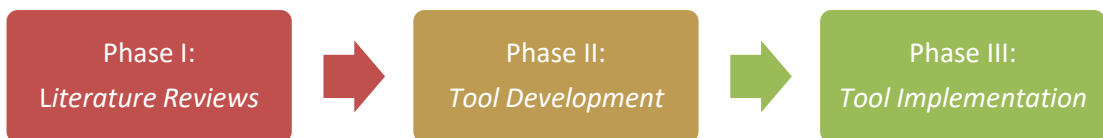


Figure 11: Phases of the comprehensive assessment tool

Phase I: Literature Reviews

Various sustainability assessment tools have been recognized in the previous

literature research studies for HE. However, there is still no standardized measurements and assessments for the sustainability in HE. Therefore, reviewing numerous research studies for the most recently published papers (2005 - 2018) regarding sustainability in HE was made. The study identified tools that were used for collecting their data, the methods used, as well as considering the broadening indicator aspects. This study was completed in the literature review chapter that is covered earlier in this research study. (Refer back to Table 1 and Table 2)

Phase II: Tool Development

A comprehensive tool development that was created through several steps is shown below in Figure 12.

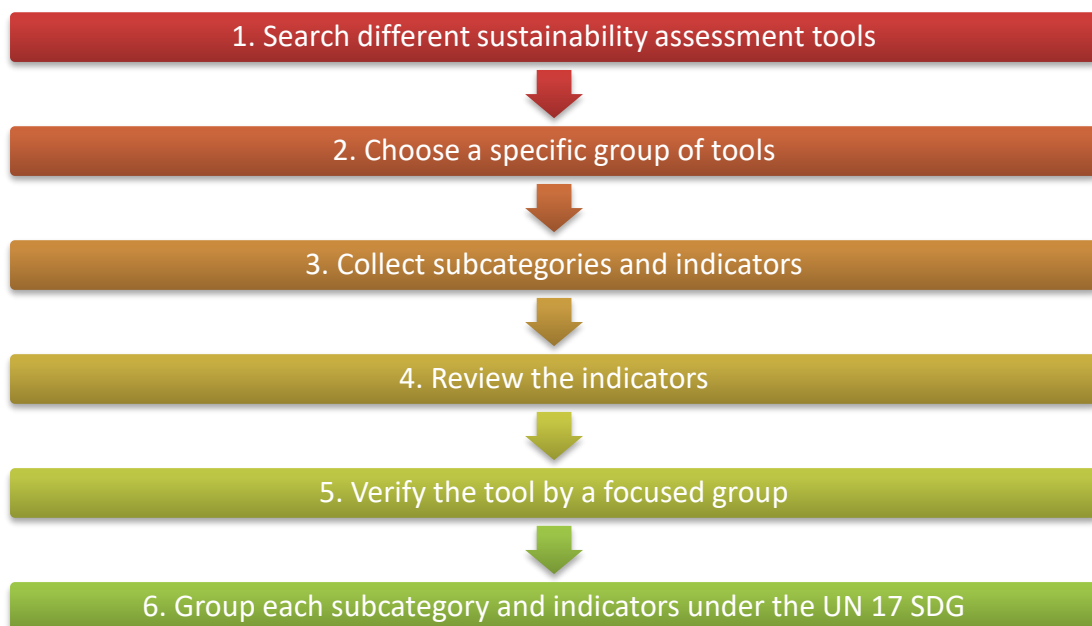


Figure 12: Phase II steps

A new global assessment tool was created by searching for different sustainability assessment tools that could be applied to HE institutions. Several global and regional existing tools were studied to identify the different categories and indicators that must be considered before collecting a specific group of tools to be used in the development and modification of the tool. The collected globally recognized group of tools are GASU, GSAS, SCI, STARS, and UI GreenMetric WUR, which are a great way in order to have an overall comprehensive indicators list, refer to Appendix C. The comprehensive sustainability assessment tool that was created was named “Sustainability Assessment in Higher Education” (SAHE). The comprehensive tool (SAHE) is divided into five main categories covering 21 subcategories and 108 indicators used for sustainability in HE (Appendix B). The list of main and subcategories as below:

- | | |
|--|---|
| <p>1. Academic</p> <ul style="list-style-type: none"> 1.1. Student Supporting Programs 1.2. Curriculum 1.3. Research 1.4. Service | <p>2. Operations & Environmental</p> <ul style="list-style-type: none"> 2.1. Air & Climate 2.2. Setting and Infrastructure 2.3. Buildings 2.4. Energy 2.5. Materials 2.6. Transportation 2.7. Waste & Effluents 2.8. Water 2.9. Food & Dining Services 2.10. Grounds 2.11. Purchasing |
| <p>3. Planning, Administration & Engagement</p> <ul style="list-style-type: none"> 3.1. Engagement 3.2. Management, Coordination & Planning 3.3. Investment & Finance Wellbeing & Work (Human Resources) | |
| <p>4. Economic</p> <ul style="list-style-type: none"> 4.1. Economic Impacts | <p>5. Social</p> <ul style="list-style-type: none"> 5.1. Society |

The number of subcategories and indicators were established after multiple reviews. At the initial stage of the group collection, there was 30 subcategories and 187 indicators.

Moreover, a focusing group was implemented to confirm the subcategories and indicators that will be applied later on as a sustainability assessment tool for HE. According to (Latif & Dilshad, 2013) “many authors suggest that the size of the focus group should range from six to twelve participants.” This group of six consultant people in sustainability in HE was selected based on their qualification and experience. Due to the lack of time and communications, the minimum number of consultants were chosen. With more time, it would have been possible to increase the number of qualified consultant people in the sustainability topics in order to have a more desirable confirmation step. The six consultants were from various departments at Qatar University, which are:

1. Department of Mechanical and Industrial Engineering
2. Department of Chemical Engineering
3. Management and Marketing Department
4. Academic Planning and Quality Assurance Office

See Appendix B for the verified assessment tool (SAHE) and the list of data required for assessing each indicator under the main five categories is shown in Appendix G.

After the list is confirmed, finalized and the tool named with SAHE; a comparison between the four collected tools and the newly created tool was established in terms of their subcategories. (Appendix D) The chart below exhibits that GASU¹ and

¹ GASU: Graphical Assessment of Sustainability in Universities,

SCI (STARS)² matches with the SAHE tool by around 70%. However, GSAS³ and GreenMetric⁴ match around 40% and 50% respectively to the SAHE tool. (Figure 13)

Nevertheless, the 21 subcategories under the five categories were used to compare the four globally recognized tools with SAHE tool that was created. The colored columns show the different five categories, whereas the number above each column demonstrates the number of subcategories that are matched in each specific category (See Figure 14). Moreover, Figure 15 shows the comparison in terms of subcategories in the SAHE tool.

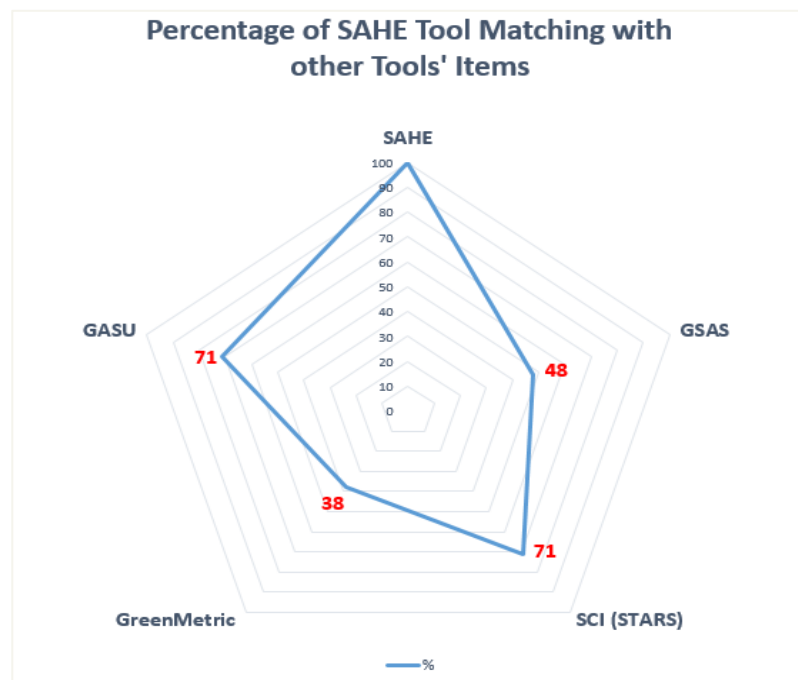


Figure 13: The percentage of SAHE matching with other tools' subcategories

² SCI: Sustainable Campus Index, STARS: Sustainability Tracking, Assessment & Rating System,

³ GSAS: Global Sustainability Assessment System,

⁴ GreenMetric: UI GreenMetric World University Ranking

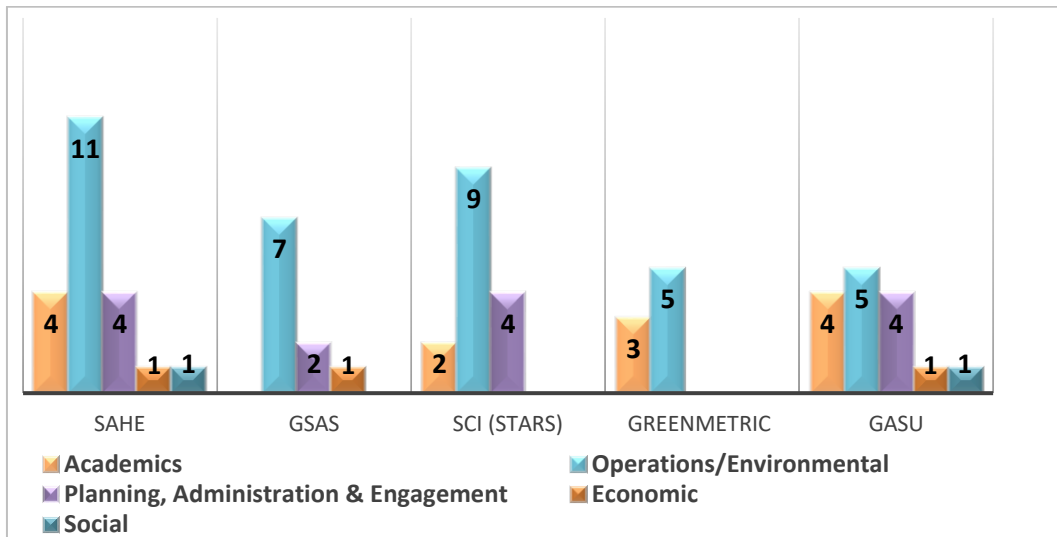


Figure 14: A comparison between SAHE and other tools in terms of categories

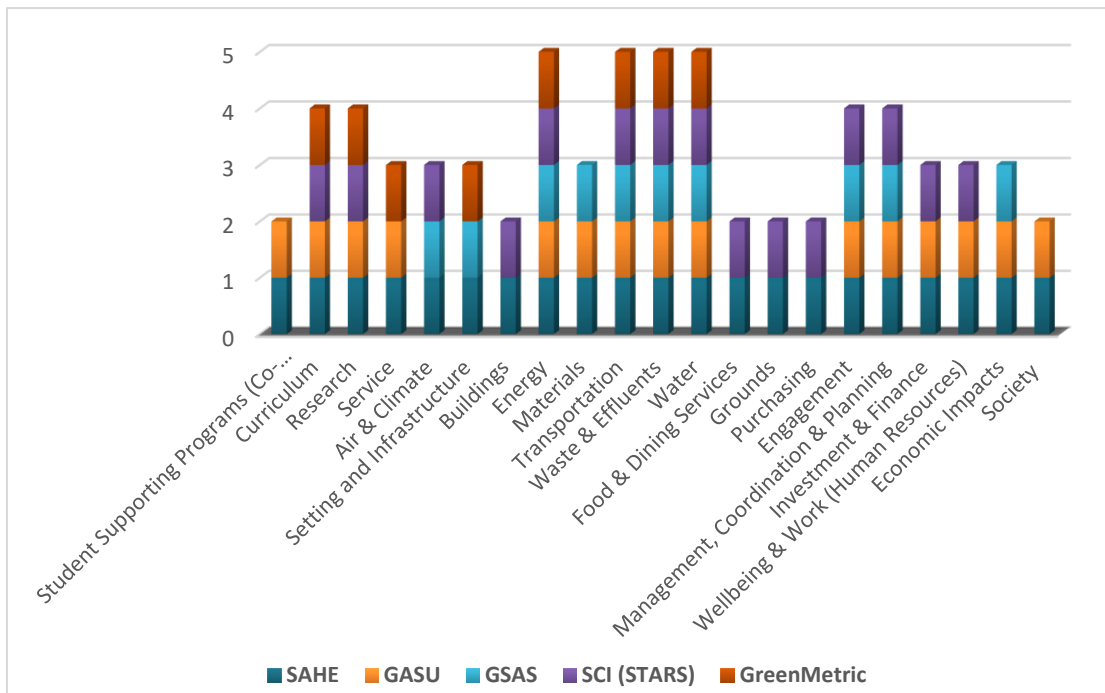


Figure 15: A comparison between SAHE and other tools in terms of subcategories

All the tools have similar appearances in terms of a group of categories and indicators. The environmental category has a great sharing among the tools as was shown in Figure 14.

Moreover, SAHE tool was compared to the 17 Sustainable Development Goals (SDG's) to examine whether SAHE lies under all goals. The comparison was deeply studied in terms of both the subcategories and indicators to get a clear overall image of the SAHE tool (See Figure 16 and Appendix E & F).

Category	Subcategory	UN 17 SDG's																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17					
AC.	AC1. Student Supporting Programs (Co-curricular)				√						√						√						
	AC2. Curriculum				√					√													
	AC3. Research																						
	AC4. Service																						
OE.	OE1. Air & Climate	AC.	AC1.	AC1.1				√								√		√					
	AC1.2																		√				
	AC1.3																						
	AC2.1			AC2.	AC2.1				√														
	AC2.2							√															
	AC2.3							√															
	AC2.4							√															
	AC2.5							√															
	AC2.6							√															
	AC2.7							√															
	AC2.8							√															
	AC3.1				AC3.	AC3.1																	
	AC3.2																						
	AC3.3																						
	AC3.4																						
	AC3.5																						
	AC3.6																						
	AC4.1					AC4.	AC4.1																
	AC4.2																						
	AC4.3																						
AC4.4																							
AC4.5																							

Figure 16: SAHE compared to SDG's in terms of subcategories and indicators

Figure 17 below shows the link between SAHE categories and subcategories to the UN SDG's. Each color demonstrates a specific category, while each number within the column shows how many subcategories could be considered under each category. The chart proves that the SAHE tool lies under all 17 SDG of the UN.

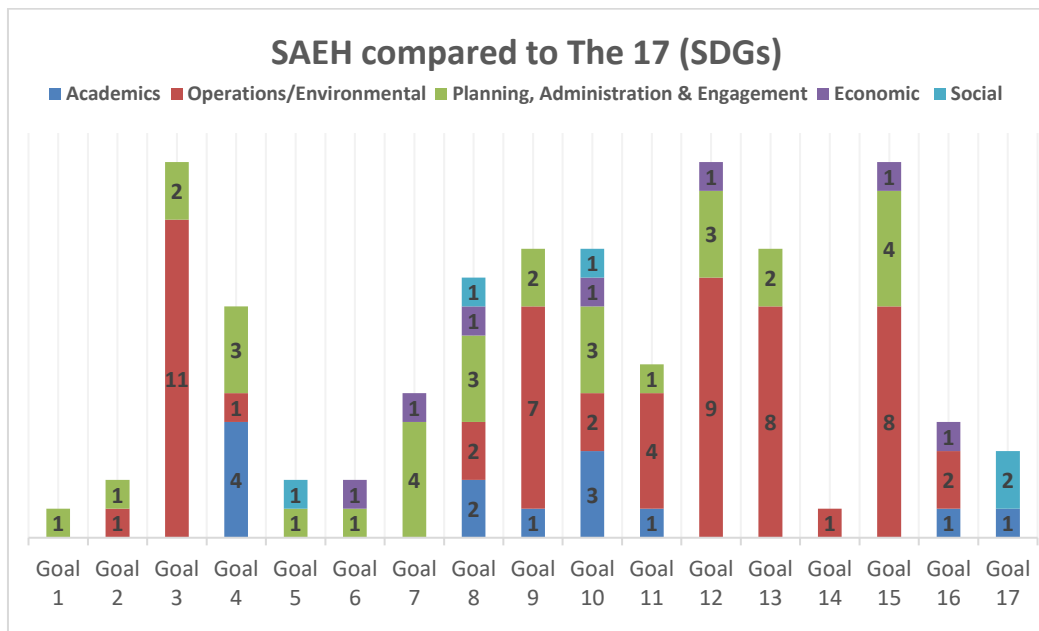


Figure 17: SAHE tool comparison against the 17 Sustainable Development Goals

The Times Higher Education University (THE) ranking tool is developing a new global university ranking that focuses on measuring institutions' success in achieving the UN 17 SDG's. The figure below illustrate THE logo.



Figure 18: THE ranking (Ross & Fedorciow, 2018)

THE ranking tool will be reviewed since it covers most of the 17 SDG of the UN. It will be compared with the new tool SAHE to check the tool’s subcategories and show the differences between SAHE and THE ranking tool. After examining and comparing THE ranking tool to the SAHE tool, it was seen that THE ranking tool focuses on 11 of the SDG only. The six excluded goals are; “GOAL 1: No Poverty, GOAL 2: Zero Hunger, GOAL 6: Clean Water and Sanitation, GOAL 7: Affordable and Clean Energy, GOAL 14: Life below Water, and GOAL 15: Life on Land” (Ross & Fedorciow, 2018). From THE’s perspective and through its studies and survey’s, THE stated that these six goals are not mostly relevant to universities. (Figure 19)



Figure 19: THE 11 relevant goals (Ross & Fedorciow, 2018)

Since the SAHE tool covers all 17 SDG of the UN, this means that it can be considered as more comprehensive than THE ranking tool (Ross & Fedorciow, 2018). Referring back to Figure 17; it can be seen that goals 1, 2, 5, 6, 14, 16, and 17 are not extremely relevant to universities such as the other ten goals; however, they still play a role within the sustainability in universities. After examining the graph in Figure 17, it was concluded that goal 15 is one of the most important goals regarding universities.

Nevertheless, in terms of THE perspective and studies, goal 15 was excluded since it was not relevant towards universities.

Phase III: Tool Implementation

Lastly, applying SAHE tool at Qatar University (QU) and collecting the results to test and assess its sustainability. The chart below demonstrates the steps targeted to show the applicability of the SAHE tool and how QU could use it in order to be aligned with the global sustainable development in HE. (Figure 20)

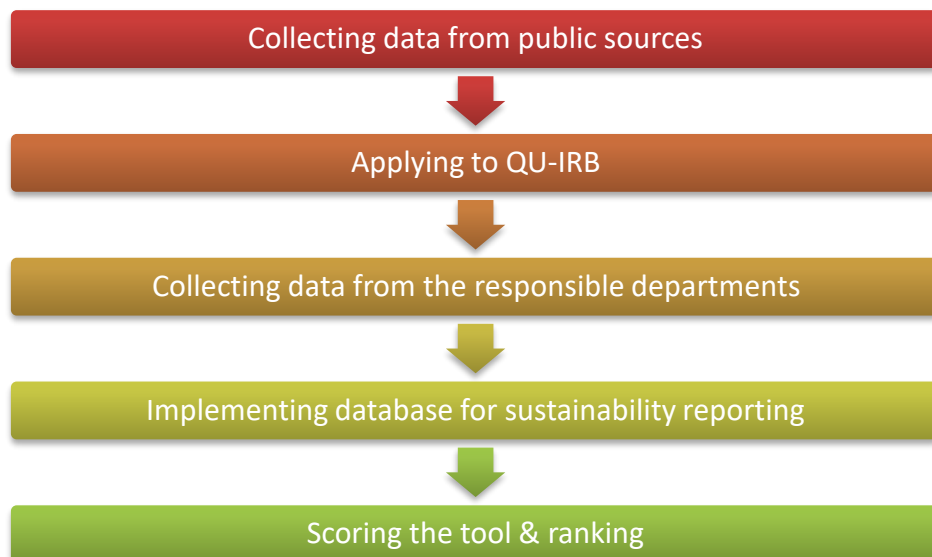


Figure 20: Phase III steps

Different data collection is needed since it provides us with an overview of each indicator. The more in-depth data that is collected for each indicator, a broader

overview of the indicator will be seen which will help us understand if the indicator is achieved or not. The first step in the implementation phase was to collect data from public sources, which are collected from QU website, as well as QU publications such as QU Fact Book, Semester Analysis Report, Students-Undergraduate, and Graduate Catalog, Banner, Cognos Reports and others. Public sources are easy to be collected, and it has limited restrictions when being used. The missing information was collected from responsible departments. However, in order to collect the information from these departments, Qatar University – Institutional Review Board (QU-IRB) application was required to be filled out and approved before getting any information. The Research Ethics approval number is QU-IRB 1063-E/19. Moving on next; communication and data collection were applied in order to collect the highest number of information as possible. The data collected were from different departments at QU, which are:

1. Associate Vice President for Academic Planning and Quality Assurance Office
2. Institutional Data Analytic
3. Center of volunteerism
4. Facilities and General Services Department (FGSD)
5. Graduate and Research office
6. Leadership and Civic Engagement Department
7. Strategy and Development Office

Faculties and staffs at QU only who have background information about the three main pillars of sustainability at QU or other information related to the subject are eligible to answer the questions. Participants are not required to answer all questions; they could answer the questions where they have background information and evidence

only, to ensure the collected data is accurate.

The outcome of the SAHE is expected to support QU, which is the case study of the research, in assessing its sustainability development under the HE context. The higher number of data that is collected from QU, the higher rate and better judgment on the institution sustainability will be.

Since more than 85% of the data required was collected, a QU sustainability assessment excel-database (EDS) was generated (see *Table 4*). The collected data results, shown in the appendices (Appendix G), were analyzed to show the number of data collected with accurate answers related to the question, as well as the data that lacked specific answers to it such as missing or not applicable answers.

Table 4: Database of the Data Source for Each Subcategory

Category	Subcategory	Department
AC. Academics	AC1. Student Supporting Programs (Co-curricular)	Student Learning Support Center, Student Activities Department, Enrollment Outreach and Engagement, Leadership and Civic Engagement
	AC2. Curriculum	Cognos Reports, Banner, Institutional Data Analytic
	AC3. Research	Office of the Associate Dean for Research & Graduate Studies Leadership and Civic Engagement
	AC4. Service	Department, Student Affairs Department, Student Activities Department, Enrollment Outreach and Engagement

Table 4. Cont.

Category	Subcategory	Department
OE. Operations & Environmental	OE1. Air & Climate	Facilities and General Services Department
	OE2. Setting and Infrastructure	Capital project
	OE3. Buildings	
	OE4. Energy	
	OE5. Materials	
	OE6. Transportation	
	OE7. Waste & Effluents	Facilities and General Services Department
	OE8. Water	Department
	OE9. Food & Dining Services	
	OE10. Grounds	
	OE11. Purchasing	
PE. Planning, Administration & Engagement	PE1. Engagement	Enrollment Outreach and Engagement Transportation Services Policies, QU Facility Risk Register Report, Institutional Effectiveness Annual Report, Strategy and Development Office, Administration and Financial Affairs Office
	PE2. Management, Coordination & Planning	Human Resources Department, Strategy and Development Office, Social and Economic Survey Research Institute
	PE3. Investment & Finance	Strategy and Development Office, Social and Economic Survey Research Institute
	PE4. Wellbeing & Work (Human Resources)	Strategy and Development Office, Social and Economic Survey Research Institute
EC. Economic	EC1. Economic Impacts	Strategy and Development Office, Social and Economic Survey Research Institute
SO. Social	SO1. Society	Social and Economic Survey Research Institute

Table 5 exhibits the percentage of the collected answers in two categories, which are answers and missing answers. In terms of questions with answers, they are Yes/No answers, numbers or NA. As for the missing answers, they consist of either no response received yet, requires more time to be collected, or confidential answers that cannot be shared. In general, the responses are qualitative and quantitative data.

Table 5: The Percentage of the Collected Answers to the Required Questions

Category	Item	Answers	%
Answers	Yes	89	32.48
	No	33	12.04
	Number	97	35.40
	NA	27	9.85
Missing Answers	Response not received or needs more time	21	7.66
	Confidential answers	7	2.55
Total		274	100

The last step of the SAHE tool implementation is scoring and ranking. In this step, an assessment scoring and ranking approaches for the tool's indicators are proposed as following:

- **Benchmarking:** This approach mainly depends on the application of the SAHE to several HE institutions. Then, the ranking system could be implemented by ranking the institutions according to their SAHE outcome to investigate how excellent they are in terms of sustainability.

- **Weighting-Score SAHE.** This approach based mainly on estimating weighting values for the SAHE tool indicators. It is done by having specific experts for assigning the proper weight to each indicator, as well as, the entire required data. The weights would not be appropriate if it assigned equally to all indicators, because each indicator has a different value of impact. It must be according to the amount of the indicators' impact on global sustainability.

Data analysis was applied to the collected data from QU. Additionally, a transformation in the responses of the qualitative and quantitative data was implemented according to (Lozano et al., 2015). The responses according to Table 5 were transformed as follows:

- a) Numbers are considered as a yes and agree entirely with the question. Therefore, clear answers with “Yes” and Numbers data was transformed into “2”.
- b) “Response needs more time” was considered as “Yes, implicitly” and was transformed to “1”.
- c) “No,” “NA” and “Response not received” was transformed to “0”.

The total score of 100% for all SAHE data needed for each indicator and concerning the full answers as “Yes” and Numbers will become:

$$274 \times 2 = 548$$

The overall scoring for SAHE is calculated as follows:

$$\text{SAHEScore} = \sum \text{Scores}, \quad \text{Equation 1: SAHE total score}$$

Table 6 shows the weighting-scores SAHE percentage according to the full data collected from QU. According to that, the results of SAHE implementation on QU indicates that QU contribution towards the sustainability in HE by 70.80% putting into consideration all the five categories. This result gives a sign that QU performance is towards global sustainability. See Appendix H for the detailed calculations.

Table 6: QU Data Scoring

Category	Item	Value	Number of Answers	Score	%
Answers	Yes	2	89	178	32.48
	No	0	33	0	0
	Number	2	97	194	35.40
	NA	0	27	0	0
Missing Answers	Response not received	0	19	0	0
	Response needs more time	1	2	2	0.36
	Confidential answers	2	7	14	2.55
Total			274	388	70.80

By applying the SAHE weighting-score on each category separately, it is clear from Figure 21 that the highest percentage was 83% for the Planning, Administration & Engagement category. It means that QU is doing well in its engagement planning, coordination, management, investments, wellbeing, and human resources in terms of

sustainability. Secondly, the Academic category is taking place with around 80%. Consequently, if QU did the sustainability assessment considering the academic category only, QU will be doing well in term of sustainability in education.

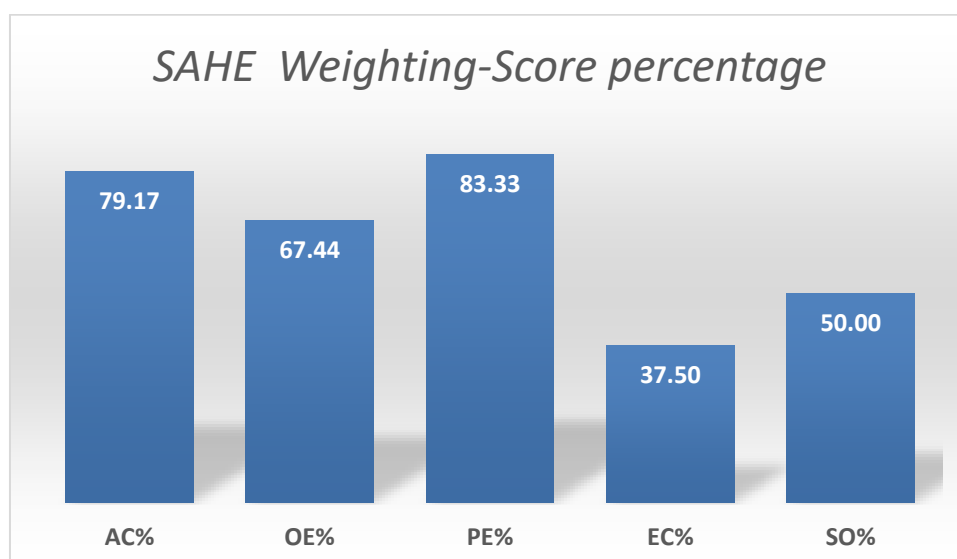


Figure 21: SAHE Weighting-Score percentage for each category

As an overview, the results show that QU is moving toward global sustainability in most of the categories. However, still, QU can enhance more its operations and efforts. Since these results are based on the collected data, it could be increased by having the missing answers or not applied to QU such as (No, NA, or not received) answers which are around 79 answers.

Finally, the ranking approach could be implemented where it will help in improving the HE institutions progress and assessing their efforts and practices towards

sustainability. After the assessment scoring was applied, a ranking system could be implemented according to the gained results.

3.2. Discussion

According to SAHE implementation on QU, several points were deduced when applying the tool to any institution:

- 1- Commitment from the higher management level is required
- 2- Some information and data might be confidential, which would cause difficulties in collecting and sharing it.
- 3- Some results could be collected from different sources where the information are not up to date. Hence, an investigation should be applied to make sure if the information is valid.
- 4- Time is required during data collection process due to the number of requests and communications that are needed to go through.

For the best practicing, the commitment from the higher management level and other employees at the assessing institution must be available while preparing the sustainability assessment report to ensure the completeness, accuracy, up-to-date information, as well as full documentation availability.

Nonetheless, using the created database sources may help in reducing the time required during the communication process. Collecting as much data required as possible would lead to an accurate judgment regarding the indicators.

Other issues that might be faced while collecting the data is the fact that there is a big range of different data types and measurement units. As a result, some data needs to be converted to a specific unit, or be gathered as a specific group or calculation.

CHAPTER 4: CONCLUSIONS AND PERSPECTIVE

The SAHE tool for assessing the sustainability in HE was developed and applied on QU as a case study for this research. This tool followed three main phases, which are Literature Review, Tool Development, as well as Tool Implementation. Within each phase, several steps were followed to complete the phase. The SAHE tool is divided into five categories covering 21 subcategories, and 108 qualitative and quantitative sustainability indicators that are used for sustainability in HE. The tool aimed to assess the sustainability in HE institutions to be aware of the level of sustainability. It will help the institutions to have a more comprehensive overview of what can be done and enhanced in order to achieve global sustainability requirements. SAHE was weighted upon to the 17 SDG's to examine whether the tool lies under all goals. After the comparison, it was seen that the tool lies under all goals. Adding to that; THE ranking tool was compared with SAHE tool, and since it follows only 11 of the 17 SDG's whereas SAHE tool follows all 17 goals, this shows that THE lies under SAHE tool as well. SAHE was applied to QU as a case study to evaluate the tool's operational performance and applicability. The last step of implementing the tool, which is scoring and ranking step was proposed. This step could be implemented by several approaches in order to compare the Institution's Excellency in terms of sustainability. It was concluded based on the collected results that:

- 1- The power of the SAHE tool and its effectiveness in terms of reporting the contribution of any education institution towards sustainability.
- 2- The SAHE can be an advantage to any educational institution since it creates a database that could be used later on for other sustainability ranking tools.
- 3- SAHE can create a benchmarking assessment between two institutions or

more to assess their contribution towards global sustainability.

- 4- It is recommended to adapt SAHE to new HE institution strategy plans.
- 5- It helps in reducing duplication of effort within the institutions' departments.
- 6- It helps in improving the institutions' recognition between the local and regional HE institutions.

4.1. Research Limitations/Implications

Many papers that have been written in 2018-2019 were unpublished yet or published after the review was finished. This information could have been beneficial in the initial stages of the research. Also, due to time limitation, the implementation and application of the tool to other Universities in Qatar did not start; therefore, it was applied to QU only. As a result, it was not easy to compare QU with other universities as well as completing the last step of the SAHE tool's implementation.

Collecting data about QU that is accurate and up to date from the responsible departments needs approvals from the management level to allow sharing any information related to the institution, which required lots of time and communications. Hence, most of the questions were answered according to the published data at QU website and publications. Other answered questions that were collected by the different departments were mostly a direct answered question without providing the research author references due to the time limitations, approval steps, and revising from each level. In terms of the missing answers, either it took an extremely long time to receive a response, or it was confidential information that could not be shared, such as budgets and costs.

Finally, the verification and validation for the SAHE tool scoring results were

not done according to the existing works; however, its applicability was tested by implementing it to QU as a case study in this research.

4.2. Future Work

The new comprehensive tool (SAHE) can also be used to assess the contribution level of the educational institutions regarding the UN Sustainability Development Goals. The SAHE tool could be applied and linked to QU strategic plan or other sustainability assessment tools such as GRI where it can be suitable to be implemented to any HE institutions. Adding to that, this will ensure the linkage of the institution sustainability regarding the UN 17 SDG's.

The sustainability assessment EDS that was created for QU could be improved by feeding, saving and updating the information needed from QU responsible departments. This could be done through having a centralized database and all responsible departments required in the SAHE tool must be involved in the process. Last but not least, monitoring and commitment must be considered and conducted from the higher management level while applying the SAHE tool.

The tools' indicators weighting method proposed could be enhanced more by applying a scoring approach for each indicator separately according to its value of impact on the global sustainability where experts must do this task. As well, weighting and aggregation methods could be applied for the SAHE indicators as mentioned by (Gana et al., 2017).

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APPENDICES

Appendix A: Shortcut table

Shortcut	Full name
HE	Higher Education
SAHE	Sustainability Assessment for Higher Education tool
GRI	Global Reporting Initiative Reporting
GASU	Graphical Assessment of Sustainability in Universities (Lozano, 2006)
GSAS	Global Sustainability Assessment System (Alhorr & Alkuwari, 2018)
SCI	Sustainable Campus Index (AASHE, 2018)
STARS	Sustainability Tracking, Assessment & Rating System (Wigmore & Ruiz, 2010)
UI GreenMetric WUR	“UI GreenMetric World University Ranking” (Lauder et al., 2015)
AISHE	“Assessment Instrument for Sustainability in Higher Education” (Wigmore & Ruiz, 2010)
STAUNCH	“Sustainability Tool for Assessing Universities Curricula Holistically” (Lozano & Young, 2013)
ACUPCC	“American College & University Presidents' Climate Commitment” (Shi & Lai, 2013)
AASHE	The Association for the Advancement of Sustainability in Higher Education (AASHE, 2018)
USAT	“Unit-Based Sustainability Assessment Tool” (Berzosa, Bernaldo, & Fernández-Sanchez, 2017)
THE	“Times Higher Education University ranking” (Ross & Fedorciow, 2018)
QU	Qatar University
SAT	Sustainability Assessment Tools
SRT	Sustainability Reporting Tools

Appendix B: SAHE tool

Category	Subcategory	Indicator
AC. Academics	AC1. Supporting Programs (Co-curricular)	Student AC1.1 Students Engagement as Sustainability Educators
		AC1.2 Student Involvement in Outreach Campaign Related to Sustainability
		AC1.3 Sustainability in New Student Orientation
	AC2. Curriculum	AC2.1 Sustainability in general courses
		AC2.2 Students enrolled in sustainability-related courses
		AC2.3 Sustainability Courses by Departments
		AC2.4 Sustainability Learning Outcomes
		AC2.5 Undergraduate Program in Sustainability
		AC2.6 Graduate Program in Sustainability
		AC2.7 Sustainability Assessment Methods and Initiatives
		AC2.8 Developing Sustainability Courses
	AC3. Research	AC3.1 Sustainability Research Funding
		AC3.2 Products design for sustainability
		AC3.3 Published research in sustainability
		AC3.4 Centers provide sustainability-related research
		AC3.5 Faculty involved in sustainability-related research
		AC3.6 Departments involved in sustainability-related research
	AC4. Service	AC4.1 Student contributions to community development and service
		AC4.2 Faculty contributions to community development and service
		AC4.3 Partnerships companies for sustainability
		AC4.4 Stakeholders involved in sustainable development programs
		AC4.5 Sustainability events

Appendix B: Cont.

Category		Subcategory		Indicator	
OE.	Operations & Environmental	OE1.	Air & Climate	OE1.1	Natural Ventilation
				OE1.2	Indoor/outdoor Air Quality
				OE1.3	Climate change adaptation and mitigation
				OE2.1	Open space area towards the total area
				OE2.2	Open space area towards the total campus population
				OE2.3	Forested vegetation area
		OE2.	Setting and Infrastructure	OE2.4	Planted vegetation area
				OE2.5	Non-retentive surfaces towards the total area
				OE2.6	Sustainability budget towards the total university budget
				OE3.1	Building operations & maintenance
				OE3.2	Building design & construction
				OE3.3	Green building
		OE3.	Buildings	OE3.4	Greenhouse gas emissions inventory
				OE3.5	Greenhouse gas emission reduction
				OE3.6	Greenhouse gas emission reductions policy
				OE3.7	Noise Pollution
				OE3.8	Light Pollution
				OE4.1	On-Campus Primary Energy Sources
		OE4.	Energy	OE4.2	On-Campus CO2 Emissions & Offset
				OE4.3	NOx, SOx, & Particulate Matter
				OE4.4	Renewable energy usage
				OE4.5	Energy efficient appliances usage
				OE4.6	Energy conservation program
				OE4.7	Electricity usage
		OE5.	Materials	OE5.1	Recycled Materials
				OE5.2	Materials Reuse
				OE5.3	Toxic & Hazardous Substances

Appendix B: Cont.

Category		Subcategory	Indicator	
OE.	Operations & Environmental	OE5. Materials	OE5.4 Low-Emitting Materials	
			OE5.5 Indoor Chemical & Pollutant Source Control	
			OE6.1 Cars entering	
			OE6.2 Bicycles in the campus's fleet	
			OE6.3 Campus buses in the campus's fleet	
		OE6.4 Students use primary sustainable commuting options for transportation		
		OE6.5 Employee use primary sustainable commuting options for transportation		
		OE6. Transportation	OE6.6 Transportation policy on limiting vehicles on campus	
			OE6.7 Transportation policy on limiting parking space	
			OE6.8 Bicycle and pedestrian policy	
			OE6.9 Green Transportation	
			OE6.10 Load on Local Traffic Conditions	
			OE6.11 Accessibility	
			OE7. Waste & Effluents	OE7.1 Waste Reduction
				OE7.2 Toxic waste recycling
				OE7.3 Organic waste treatment
				OE7.4 Inorganic waste treatment
				OE7.5 Recycling program for university waste
		OE7.6 Diversion of Construction & Demolition Waste		
		OE7.7 Program of electronic waste recycling		
		OE7.8 Hazardous Waste Management		
		OE7.9 Sewage disposal		
		OE7.10 Paper and plastic usage		
OE8. Water	OE8.1 Water Efficiency			
	OE8.2 Water Consumption & Reuse			

Appendix B: Cont.

Category		Subcategory		Indicator			
OE.	Operations & Environmental	OE9.	Food & Dining Services	OE9.1	Food Purchasing		
		OE10.	Grounds	OE10.1	Integrated Pest Management		
		OE11.	Purchasing	OE11.1	Computer Purchasing		
				OE11.2	Cleaning Product Purchasing		
		OE11.3	Office Paper Purchasing				
PE.	Planning, Administration & Engagement	PE1.	Engagement	PE1.1	Campus and Public Engagement		
				PE2.1	Construction Management Plan		
				PE2.2	Wastewater Management Plan		
				PE2.3	Energy Systems Management Plan		
				PE2.4	Intelligent Transport systems Plan		
				PE2.5	Information Systems Management Plan		
				PE2.	Management, Coordination & Planning	PE2.6	Infrastructure Maintenance Plan
						PE2.7	Community & Road Safety Plans
						PE2.8	Facility Management
						PE2.9	Sustainability Coordination and Planning
		PE2.10	Diversity and Affordability				
		PE3.	Investment & Finance	PE3.1	Committee Socially Responsible Investment		
				PE3.2	Stockholder Corroboration		
				PE3.3	Positive Sustainability Investments		
				PE4.1	Sustainable Compensation		
PE4.2	Employee Satisfaction Evaluation						
PE4.	Wellbeing & Work (Human Resources)	PE4.3	Employee Professional Development in Sustainability				
		PE4.4	Sustainability topics in the new employee orientation				
		PE4.5	sustainability educators programs for employee				

Appendix B: Cont.

Category		Subcategory		Indicator	
EC.	Economic	EC1.	Economic Impacts	EC1.1	Customers
				EC1.2	Suppliers
				EC1.3	Employees
				EC1.4	Providers of capital
				EC1.5	Public sector
				EC1.6	Support of National Economy
SO.	Social	SO1.	Society	SO1.1	Bribery and corruption
				SO1.2	Political contributions
				SO1.3	Competition and pricing

Appendix C: Indicators source

Category	Subcategory	Indicator	Source	Category	Subcategory	Indicator	Source	
AC.	AC1.	AC1.1	STARS 1.0	OE.	OE2.	OE2.1	GreenMetric	
		AC1.2	STARS 1.0			OE2.2	GreenMetric	
		AC1.3	STARS 1.0			OE2.3	GreenMetric	
	AC2.	AC2.1	GASU			OE2.4	GreenMetric	
		AC2.2	GASU			OE2.5	GreenMetric	
	AC2.	AC2.3	STARS 1.0			OE2.6	GreenMetric	
		AC2.4	STARS 1.0		OE3.1	STARS 1.0		
		AC2.5	STARS 1.0		OE3.2	STARS 1.0		
		AC2.	AC2.6		STARS 1.0	OE3.3	GreenMetric	
			AC2.7		STARS 1.0	OE3.4	STARS 1.0	
	AC3.	AC2.8	STARS 1.0		OE3.5	STARS 1.0		
		AC3.1	GreenMetric		OE3.6	GreenMetric		
		AC3.2	GASU		OE3.7	GSAS		
		AC3.	AC3.3		GASU	OE3.8	GSAS	
			AC3.4		GASU	OE4.1	GSAS	
		AC3.5	STARS 1.0		OE4.2	GSAS		
		AC3.6	STARS 1.0		OE4.3	GSAS		
		AC4.	AC4.1		GASU	OE4.4	GreenMetric/STARS 1.0	
			AC4.2		GASU	OE4.5	GreenMetric	
		AC4.	AC4.3		GASU	OE4.6	GreenMetric	
	AC4.4		GASU		OE4.7	GreenMetric/STARS 1.0		
	AC4.5		GreenMetric		OE5.1	GSAS		
	OE.	OE1.	OE1.1		GSAS	OE5.	OE5.2	GSAS
			OE1.2		SCI/STARS		OE5.3	GSAS
					1.0/GSAS		OE5.4	GSAS
			OE1.3		SCI/GreenMetric			

Appendix C: Cont.

Category	Subcategory	Indicator	Source	Category	Subcategory	Indicator	Source	
OE.	OE5.	OE5.5	GSAS	OE.	OE10.	OE10.1	STARS 1.0	
		OE6.1	GreenMetric				OE11.1	STARS 1.0
		OE6.2	GreenMetric			OE11.	OE11.2	STARS 1.0
		OE6.3	GreenMetric/STARS 1.0				OE11.3	STARS 1.0
		OE6.4	STARS 1.0			PE1.	PE1.1	SCI
		OE6.5	STARS 1.0				PE2.1	GSAS
	OE6.	OE6.6	GreenMetric				PE2.2	GSAS
		OE6.7	GreenMetric				PE2.3	GSAS
		OE6.8	GreenMetric				PE2.4	GSAS
		OE6.9	GSAS				PE2.5	GSAS
		OE6.10	GSAS		PE2.	PE2.6	GSAS	
		OE6.11	GSAS			PE2.7	GSAS	
		OE7.1	STARS 1.0		PE.	PE2.8	GSAS	
		OE7.2	GreenMetric				PE2.9	STARS 1.0
		OE7.3	GreenMetric				PE2.10	STARS 1.0
		OE7.4	GreenMetric				PE2.11	STARS 1.0
		OE7.5	GreenMetric				PE3.1	STARS 1.0
	OE7.	OE7.6	STARS 1.0			PE3.	PE3.2	STARS 1.0
		OE7.7	STARS 1.0				PE3.3	STARS 1.0
		OE7.8	STARS 1.0				PE4.1	STARS 1.0
		OE7.9	GreenMetric				PE4.2	STARS 1.0
		OE7.10	GreenMetric			PE4.	PE4.3	STARS 1.0
		OE8.1	GSAS			PE4.4	STARS 1.0	
	OE8.	OE8.2	STARS 1.0/GSAS			PE4.5	STARS 1.0	
	OE9.	OE9.1	STARS 1.0		EC.	EC1.	EC1.1	GASU

Appendix C: Cont.

Category	Subcategory	Indicator	Source	Category	Subcategory	Indicator	Source
EC.	EC1.	EC1.2	GASU	EC.	EC1.	EC1.6	GASU
		EC1.3	GASU			SO1.1	GASU
		EC1.4	GASU	SO.	SO1.	SO1.2	GASU
		EC1.5	GASU			SO1.3	GASU

Appendix D: Matching SAHE with other tools

Category	Subcategory	GASU	GSAS	SCI (STARS)	GreenMetric	SAHE
AC. Academics	AC1. Student Supporting Programs (Co-curricular)	√				√
	AC2. Curriculum	√		√	√	√
	AC3. Research	√		√	√	√
	AC4. Service	√			√	√
OE. Operations & Environmental	OE1. Air & Climate		√	√		√
	OE2. Setting and Infrastructure		√		√	√
	OE1. Buildings			√		√
	OE1. Energy	√	√	√	√	√
	OE1. Materials	√	√			√
	OE1. Transportation	√	√	√	√	√
	OE1. Waste & Effluents	√	√	√	√	√
	OE1. Water	√	√	√	√	√
	OE1. Food & Dining Services			√		√
	OE1. Grounds			√		√
OE1. Purchasing			√		√	
PE. Planning, Administration & Engagement	PE1. Engagement	√	√	√		√
	PE2. Management, Coordination & Planning	√	√	√		√
	PE3. Investment & Finance	√		√		√
	PE4. Wellbeing & Work (Human Resources)	√		√		√
EC. Economic	EC1. Economic Impacts	√	√			√
SO. Social	SO1. Society	√				√

Appendix E: SAHE matching with UN SDG's in terms of subcategories

Category	Subcategory	UN 17 SDG's																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
AC.	AC1. Student Supporting Programs (Co-curricular)				√						√							√	
	AC2. Curriculum				√						√								
	AC3. Research				√				√	√	√								
	AC4. Service				√				√			√						√	
	OE1. Air & Climate			√							√			√			√		
OE.	OE2. Setting and Infrastructure			√					√	√		√	√	√			√		
	OE1. Buildings			√				√	√		√	√	√			√	√		
	OE1. Energy			√				√	√			√	√			√			
	OE1. Materials			√								√	√			√			
	OE1. Transportation			√					√	√	√	√	√			√	√		
	OE1. Waste & Effluents			√				√	√			√	√	√		√			
	OE1. Water			√			√					√							
	OE1. Food & Dining Services	√	√										√						
	OE1. Grounds			√						√		√							
	OE1. Purchasing			√	√			√	√		√		√	√			√		
	PE.	PE1. Engagement				√					√	√			√		√		√
		PE2. Management, Coordination & Planning	√	√	√	√		√	√	√	√	√	√	√			√		
		PE3. Investment & Finance								√				√			√		√
PE4. Wellbeing & Work (Human Resources)				√	√	√			√		√		√			√			
EC.	EC1. Economic Impacts								√	√		√				√			
SO.	SO1. Society					√		√	√									√	

Appendix F: SAHE matching with UN SDG's in terms of indicators

Category	Subcategory	Indicator	UN 17 SDG's																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
AC.	AC1.	AC1.1			√						√							√	
		AC1.2																√	
		AC1.3									√								
	AC2.	AC2.1			√														
		AC2.2			√						√								
		AC2.3			√														
		AC2.4			√														
		AC2.5			√														
		AC2.6			√														
		AC2.7			√						√								
		AC2.8			√														
	AC3.	AC3.1			√				√										
		AC3.2			√					√									
		AC3.3			√														
		AC3.4			√					√									
		AC3.5			√					√	√								
		AC3.6			√						√								
	AC4.	AC4.1			√							√							
		AC4.2			√							√							
		AC4.3			√				√										√
AC4.4				√				√										√	
AC4.5				√															
OE.	OE1.	OE1.1		√									√			√			
		OE1.2		√									√			√			
		OE1.3								√			√			√			
	OE2.	OE2.1								√	√								
		OE2.2		√						√	√								
		OE2.3											√			√			
		OE2.4											√			√			
		OE2.5										√	√						

Appendix F: Cont.

Category	Subcategory	Indicator	UN 17 SDG's																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
OE.	OE2.	OE2.6							√										
		OE3.1						√		√			√						
		OE3.2						√		√		√	√						
		OE3.3			√			√		√			√				√		
		OE3.4			√			√					√	√			√		
	OE3.	OE3.5			√			√					√	√			√		
		OE3.6			√			√					√	√			√	√	
		OE3.7			√								√						
		OE3.8			√			√					√						
		OE4.1						√					√						
		OE4.2			√								√	√			√		
		OE4.3			√								√	√			√		
		OE4.4						√		√			√	√			√		
	OE4.	OE4.5						√		√			√	√			√		
		OE4.6						√					√	√			√		
		OE4.7						√					√	√			√		
		OE5.1											√				√		
		OE5.2											√				√		
	OE5.	OE5.3			√								√	√			√		
		OE5.4			√								√	√			√		
		OE5.5			√								√	√					
		OE6.1			√						√		√	√			√		
		OE6.2			√						√		√	√			√		
		OE6.3			√						√		√	√			√		
		OE6.4			√						√	√	√	√			√		
		OE6.5			√						√	√	√	√			√		
	OE6.	OE6.6			√						√	√	√	√			√	√	
		OE6.7			√						√		√	√			√	√	
	OE6.8			√						√		√	√			√			
	OE6.9			√						√		√	√			√			

Appendix F: Cont.

Category	Subcategory	Indicator	UN 17 SDG's																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
OE.	OE6.	OE6.10			√								√	√	√			√		
		OE6.11			√						√		√						√	
	OE7.	OE7.1													√	√	√	√		
		OE7.2			√										√	√	√	√		
		OE7.3			√										√	√	√	√		
		OE7.4			√										√	√	√	√		
		OE7.5			√						√				√	√	√	√		
		OE7.6			√										√	√	√	√		
		OE7.7			√					√					√				√	
		OE7.8			√										√	√			√	
		OE7.9			√										√	√	√	√		
		OE7.10			√										√	√	√	√		
	OE8.	OE8.1			√			√												
		OE8.2			√			√							√					
	OE9.	OE9.1	√	√											√					
	OE10.	OE10.1		√							√		√						√	
	OE11.	OE11.1			√			√	√		√									
		OE11.2		√					√											
		OE11.3			√				√					√	√				√	
	PE.	PE1.	PE1.1			√					√	√			√		√		√	√
PE2.1				√					√	√		√	√					√		
PE2.		PE2.2		√			√		√	√			√	√				√		
		PE2.3						√	√	√			√	√				√		
		PE2.4		√					√	√		√	√					√		
		PE2.5			√				√											
		PE2.6		√					√	√		√	√					√		
		PE2.7		√					√	√		√	√					√		
		PE2.8		√	√				√	√		√						√		
		PE2.9			√	√			√	√		√		√				√		
PE2.10	√	√		√			√		√											

Appendix F: Cont.

Category	Subcategory	Indicator	UN 17 SDG's																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PE.	PE2.	PE2.11								√	√	√	√						
		PE3.1								√								√	
	PE3.	PE3.2								√			√			√		√	
		PE3.3								√									
		PE4.1					√			√		√							
		PE4.2			√		√			√		√							
	PE4.	PE4.3			√		√			√		√							
		PE4.4								√		√		√			√		
		PE4.5				√	√			√		√							
EC.	EC1.	EC1.1								√		√		√			√	√	
		EC1.2								√		√		√			√	√	
		EC1.3								√		√		√			√		
		EC1.4								√		√		√			√	√	
		EC1.5								√		√		√			√	√	
		EC1.6								√									√
SO.	SO1.	SO1.1								√		√		√			√	√	
		SO1.2								√		√		√			√		
		SO1.3								√		√		√			√	√	

Appendix G: QU data collection on the list of data required for each indicator

AC. Academics Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
AC1.	AC1.1	- Does the institution has programs/initiatives that actively involve students to assist as educators/instructors in one to one sustainability outreach and education program (ex: Eco-Reps Program).	Yes	
		- Number of students involved by/enrolled in the program	-	Students
		- Number of students enrolled who is a degree-seeking at the institution (Continuing education and/or not enrolled students are excluded)	-	Students
		- Is the program offers any official training to the educators for conducting outreach?	Yes	
		- Is there staff and financial support to the program?	Yes	
	AC1.2	- Are the students have involvement in Outreach Campaign related to Sustainability	Yes	
AC1.3	- Is there an opportunity for the students to participate in orientation activities and programs that highly include sustainability?	Yes		
AC2.	AC2.1	- Number of sustainability or related undergraduate courses within the colleges/Core Curriculum	19	courses
		- Number of sustainability or related graduate courses within the colleges/Core Curriculum	11	courses
		- Ratio of sustainability undergraduate courses /total undergraduate courses	2.48	%
		- Ratio of sustainability graduate courses /total graduate courses	4.49	%
		- Frequency of sustainability or related courses/year	30	Courses
		- Does the students have the knowledge of sustainability from these courses	Yes	
		- Number of students in undergraduate courses related to Sustainability	1393	Students
		- Number of students in graduate courses related to Sustainability	100	Students

Appendix G: Cont.

Cont. AC. Academics Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
AC2.	AC2.2	- Total number of students enrolled in sustainability or related courses	1493	Students
	AC2.3	- Total number of Sustainability Courses by Departments	4	Courses
	AC2.4	- Is sustainability one of the courses Learning outcomes	Yes	
		- All courses or not,	No	
		- Is sustainability one of the programs learning outcomes	Yes	
		- Is there assessment for the student learning outcome in this regard	Yes	
	AC2.5	- Number of Undergraduate Programs in Sustainability or related	6	Programs
	AC2.6	- Number of Graduate Programs in Sustainability	1	Program
AC2.7	- Is there Sustainability Assessment Methods and initiatives	Yes		
AC2.8	- Is there any incentives for developing these Courses	No		
	- Does the institution have a program/s that offer motivations for its faculty in different disciplines or departments to provide new sustainability courses and/or include sustainability subject into the existing courses?	No		
AC3.	AC3.1	- Total sustainability research funding	-	QR
		- Total research funding	-	QR
		- Total sustainability research funding/Total research funding	-	%
	AC3.2	- Total revenues from grants and contracts specifying sustainability or related research	-	QR
		- Number of products design used for sustainability	-	products
	AC3.3	- Number of published academic publications/research with a focus on sustainability or related issues	-	Academic Publications
		- Number of published sustainability report/year	-	Report/year

Appendix G: Cont.

Cont. AC. Academics Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
AC3.	AC3.4	- Number of student organizations/clubs related to sustainability and related issue	-	Organization
		- Number and function of centers on campus providing sustainability or related research / services	5	Centers
		- Is there an website for sustainability that the university is running	Yes	
	AC3.5	- Number of the faculty and/or staff in the institution who are involved in sustainability researches	50	Faculty
		- Total number of the faculty and/or staff in the institution who are involved in the campus researches	1503	Faculty
		- Ratio of number of the faculty and/or staff in the institution who are involved in sustainability researches compared to the total number of the faculty and/or staff in the institution who are involved in the campus researches	3.33	%
		- Number of academic departments in the institution that include one or more faculty and/or staff that conducts sustainability researches	25	Departments
	AC3.6	- Total number of academic departments in the institution that implement researches	35	Departments
	AC4.	AC4.1	- Number of student contributions to community development and service	5000
AC4.2		- Number of faculty contributions to community development and service	60	Faculty
AC4.3		- Number of partnerships companies for sustainability with educational, business, and government entities at the local level	2	Partnerships
AC4.4		- Number of stakeholders involved in sustainability development programs	4	Stakeholders
AC4.5		- Number of events related to sustainability or linked issue	3	Events
		- Number of the events attendees	1493	People
		- Number of the events volunteers or members	100	Volunteers

Appendix G: Cont.

Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE1.	OE1.1	- Is the Natural Ventilation available in the campus buildings?	Yes	
	OE1.2	- Does the institution have a management plan, policy or operational practices for the Indoor Air Quality where it ensures regular auditing and monitoring, as well as, a way for registering the occupants' complaints?	Yes	
		- Does the institution operate and maintain its processes according to sustainable O&M guidelines and policies that protect the indoor environmental quality?	No	
	OE1.3	- Does the institution have programs or plans for climate change adaptation and mitigation?	No	
- Does the institution have a plan or policy for its greenhouse gas emissions mitigation that takes into consideration a measurable goal/s and its conforming achievement date		Yes		
OE2.	OE2.1	- Area of the open space	5,050,000	m2
		- Total area of the institution	5,500,000	m2
		- Ratio of open space area/total area	91.818182	%
	OE2.2	- Area of the open space	5,050,000	m2
		- Total number of people in the institution (Faculty and students)	25000	people
		- Ratio of open space area/total campus population	20200	%
	OE2.3	- Area on campus covered in forested vegetation	11165	m2
	OE2.4	- Area on campus covered in planted vegetation	390000	m2
	OE2.5	- Area of non-retentive surfaces	4,648,835	m2
		- Area on campus for water absorbance	0	m2
		- Total area of the institution	5,500,000	m2
		- Ratio of non-retentive surfaces/total area	84.524273	%
OE2.6	- Total sustainability budget (sustainable effort)	5700000	QR	

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE2.	OE2.6	- Total university budget	-	QR
		- Ratio of sustainability budget/total university budget	0.38	%
OE3.	OE3.1	- Does the institution have any qualified building area operations and maintenance (O&M)	Yes	
		- Does the institution certified from any O&M Green Building Rating System; such as "GSAS" or "LEED for Existing Buildings"	No	
		- Does the institution operate and maintain in accordance with sustainable O&M rules, plans and principles that consider the effect on the surrounding locations, usage of friendly materials to the environment	No	
		- Area of the certified building design and construction	111912	m2
		- Total area of eligible building design and construction	450,000	m2
	OE3.2	- Does the institution have any qualified building area Design and Construction	Yes	
		- Does the institution certified from any O&M Green Building Rating System; such as "GSAS" or "LEED for New Construction and Major Renovations, LEED for Commercial Interiors, or LEED for Core and Shell Green Building Rating Systems"	Yes	
		- Does the institution design and build in accordance with sustainable green building rules, plans and principles that consider the effect on the surrounding locations, usage of friendly materials to the environment	Yes	
		- Area of certified building space	111912	m2
		- Total area of eligible building space	111,912	m2
	OE3.3	- Number of elements of green building implementation as considered in all construction and renovation policy	-	elements

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE3.	OE3.4	- Is the institution has inventory for its greenhouse gas emissions?	Yes	
		- Does the institution is conducting a greenhouse gas (GHG) emissions inventory, where it is an engaged process support the institution in figuring out the emissions sources and make prioritization to the emissions reduction plans and strategies?	Yes	
		- What is included in the inventory: Scope 1, 2 or 3 emissions?	Scope 1 & 2	
	OE3.5	- Does the institution is reducing its net Scope 1 & 2 of the GHG emissions in accordance with the campus user?	No	
		- Does the institution catalyzed carbon offsets "local offsets"?	No	
		- Does the institution purchase carbon offsets that already verified by a third party?	No	
		- Net GHG emissions	63732.98	tCO2e
		- Total carbon footprint	63732.98	tCO2e
		- Weighted campus users (Campus population)	25000	people
		- Performance of net GHG emissions to the weighted campus users	3.33	tCO2e/occupant
	OE3.6	- Does the institution have greenhouse gas emission reductions policy	No	
		- Does the institution have greenhouse gas emission reductions program	No	
	OE3.7	- Percentage of noise pollution on campus	NA	%
	OE3.8	- Percentage of light pollution on campus	NA	%
		- Total amount of shading area	230139.84	m2
- Total campus area		5,500,000	m2	
- Total amount of shading area/total campus area		4.2	%	

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit	
OE4.	OE4.1	- Number of primary energy sources on-campus	1		
	OE4.2	- Net CO2 emissions & offset on-campus	0		
	OE4.3	- Net of NOx, SOx, & Particulate Matter in campus	NA		
	OE4.4	- Does the institution operate and maintain in accordance with sustainable O&M guidelines and policies covering energy consumption	No		
		- Number of renewable energy sources in campus	1		
		- Does the institution use energy from clean and renewable energy	No		
		- Total of renewable energy produced	0		
		- Total of energy usage/Consumption	13202005	kWh/month	
		- Ratio of renewable energy produced/energy usage	0	%	
	OE4.5	- Does the institution have Smart Building implementation	Yes		
		- Does the energy efficient appliances usage in the institution are replacing conventional appliances	Yes		
		- Total Building Energy consumption/total building space	29.337789	kWh/m2	
	OE4.6	- Is the institution has program/policy for energy conservation	Yes		
	OE4.7	- Percentage of Electricity usage from the total energy usage per year	100	%	
		- Total electricity usage	13202005	kWh/month	
- Total campus population		25000	people		
	- Total electricity usage/total campus population	528.0802	kWh/person		
OE5.	OE5.1	- Increasing in the percentage of recycled materials	5	%	
		- Total amount of recycled materials	50765	tons	
		- Total amount of the institution waste	NA		

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE5.	OE5.1	- Total amount of recycled materials/Total amount of the institution waste	NA	
	OE5.2	- Increasing in the percentage of reused materials	NA	
		- Total amount of reused materials	NA	
	OE5.3	- Does the institution have policy for the safety use of toxic & hazardous substances	Yes	
		- Does the institution have policy for the safety disposal of toxic & hazardous materials	Yes	
	OE5.4	- Does the institution have policy for the safety use of toxic & hazardous substances	Yes	
OE5.5	- Is the institution has indoor chemical & pollutant source control	Yes		
OE6.	OE6.1	- Total cars entering the institution	20000	car/day
		- Total number of people in the institution (population)	25000	people
		- Ration of the total cars entering the institution/total number of people in the institution	80	%
	OE6.2	- Total number of bicycles in the institution	NA	
		- Total number of people in the institution (population)	25000	people
		- Ration of the total bicycles entering the institution/total number of people in the institution	NA	%
	OE6.3	- Total number of Campus buses in the campus's fleet	64	bus/day
		- Total number of vehicles in the campus's fleet	20064	
		- Ration of the total campus buses/total number of people in the institution	0.256	%
		- Ration of the total campus buses/total number of vehicles	0.3189793	%
		- Does the institution have shuttle service	Yes	

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE6.	OE6.4	- Do the institution's students go to and from campus by another way than a single-occupancy vehicle for most of their daily commute driving?	Yes	
		- Total number of students that use more sustainable commuting options as their primary way of transportation; such as: live inside the campus or nearby, walking, using bicycles, van or carpooling, taking public transportation such as buses or trains, or using a campus shuttle	400	student
		- Total number of students	20,880	student
	OE6.5	- Do the institution's employee go to and from campus by another way than a single-occupancy vehicle for most of their daily commute driving?	Yes	
		- Total number of employee that use more sustainable commuting options as their primary way of transportation such as: walking, using bicycles, van or carpooling, taking public transportation such as buses or trains, or using a campus shuttle	100	
		- Total number of employee	2867	employee
		- Does the institution give to its daily commuters to cash out instead of the car parking; for example, the institution is paying for its employees who do not drive	No	
		- Does the institution have rewarding or programs to motivate its employees to live near the campus?	No	
	OE6.6	- Does the institution have a policy for transportation to limiting vehicles on campus?	Yes	
	OE6.7	- Does the institution have a transportation program designed to limit or decrease the parking area on campus?	No	
		- Total area of the campus parking	250,152	m2

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit	
OE6.	OE6.7	- Total campus area	5,500,000	m2	
		- Ratio of parking area to total campus area	4.5	%	
		- Total amount of parking footprint	250,152	m2	
	OE6.8	- Does the institution have a policy for bicycle on campus	No		
		- Does the institution have pedestrian path policy	No		
		- Does the institution have safe indoor bike storage, closed facilities or lockers for bicycle?	No		
	OE6.9	- Does the institution support and encourage other alternatives for fuel and power technology and using it in its vehicles for transporting its people or goods?	Yes		
		- Does the institution have Zero Emission Vehicles policy?	No		
		- Total number of Zero Emission Vehicles	NA		
		- Total number of people in the institution (population)	25000	people	
		- Ratio of Zero Emission Vehicles/total campus population	NA	%	
- Number of transportation initiatives to decrease private vehicles on campus		1	initiative		
OE6.10	- Does the institution have conditions and policy for loading on local traffic?	Yes			
OE6.11	- Is there a policy for pedestrian path on campus	Yes			
	- Is there alternative pathways on campus	Yes			
	- Total number of pathways on campus/total campus area	-			
OE7.	OE7.1	- Percentage of waste reduction	5	%	
		- Does the institution have programs and waste treatments	NA		
		- Does the institution implement source reduction strategies in order to reduce the total amount of the generated waste?	Yes		

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE7.	OE7.1	- The total amount of the waste generation per tons such as trash, recycled materials, composted soil, disposed of as trash (except building constructions and demolitions), electronic, dangerous, common and non-controlled chemical waste	51433.825	tons
		- The total weighted campus user (population)	25000	people
		- The total waste generation/weighted campus user	NA	%
	OE7.2	- Does the institution have recycling programs the campus toxic waste	No	
		- Percentage of recycled toxic waste	NA	
	OE7.3	- Does the institution have programs or organic waste treatments	No	
		- Percentage of treated organic waste	NA	
	OE7.4	- Does the institution have programs or inorganic waste treatments	No	
		- Percentage of treated inorganic waste	NA	
	OE7.5	- Does the institution have recycling programs the campus waste	Yes	
		- The total amount of recycled waste from campus (tons)	50765	tons
		- The total amount of disposed materials from campus (tons)	NA	
		- The total amount of waste generated per ton where it was generated from recycling and disposal	50765	tons
		- The total amount of recycled waste from campus/Total amount of waste generated	NA	
	OE7.6	- Does the institution divert and reuse the non-hazardous construction and demolition waste instead of disposing of them in the landfill or incinerator	Yes	
- The total amount of construction and demolition materials waste per tons		NA		

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE7.	OE7.6	- The total volume of construction & demolition waste recycled or donated	87828	tons
		- The total volume of waste generated (Recycled & Disposed)	89387	tons
	OE7.7	- Does the institution have recycling or reuse programs for electronic waste generated by students?	No	
		- Does the institution have recycling or reuse programs for electronic waste produced by the institution?	No	
		- The total amount of recycled electronic waste from campus	NA	
	OE7.8	- Does the institution safely dispose of all dangerous, common and non-controlled chemical waste?	Yes	
		- Does the institution have programs or procedures seeking for minimizing these dangerous materials on campus	No	
		- Percent of reduction of dangerous, common and non-controlled chemical waste on campus/year	NA	
	OE7.9	- Does the institution using Treated Sewage Effluent (TSE) water for irrigation	Yes	
		- Efficiency of sewage disposal	NA	
OE7.10	- Does the institution have policy/program to reduce the use of paper and plastic in campus	Yes		
	- Percentage of paper and plastic usage/year	NA		
OE8.	OE8.1	- Percentage of campus water efficiency	NA	
		- Does the institution use efficient appliances for water (for example water tap, toilet flush, etc.)	Yes	
	OE8.2	- Does the institution operate and maintain its processes according to sustainable O&M guidelines and policies that is related to the campus water consumption	NA	
- Does the institution implement water conservation program/policy		Yes		

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE8.	OE8.2	- Does the institution implement water recycling program	Yes	
		- Does the institution have storm water management (rules, procedures and programs) to minimize the storm-water run path and the consequent water pollution	No	
		- The total water consumed	319920488	m3/year
		- The total treated water consumed	304354	m3/year
		- The total weighted campus user (population)	25000	people
		- The total water consumption/weighted campus user per year	12796.82	m3/occupant
OE9.	OE9.1	- The total sustainable food expenditures	NA	
		- The total Food Purchasing cost	NA	
		- Does the institution purchases food have the following principles/standards: food that took and processed in less than 250 miles from the institution, Third-party is qualified; food is grown on a farm that performed as a cooperative and has a profit-sharing plans and strategy?	No	
		- Is the food purchases for dining halls, serving and catering services was run by the institution or the institution's main contractor for food services?	No	
OE10.	OE10.1	- The total size of the campus grounds	5,500,000	m2
		- Does the institution have Integrated Pest Management (IPM)	Yes	
		- Does the institution's grounds (sustainability of campus grounds) are developed and maintained through integrated pest management plan (IPM)	Yes	
		- Does the institution have Integrated Pest Management (IPM) that put and define action obstacles, monitor and record pests, and make preventive and control plans?	Yes	

Appendix G: Cont.

Cont. Operations & Environmental Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
OE10.	OE10.1	- The size of campus grounds that are maintained according to IPM plan	450,000	m2
		- Does the institution use a native plant species in landscaping?	Yes	
		- Does the institution have programs to keep safe or build a wildlife habitat within the institution lands?	Yes	
		- Does the institution compost or mulch waste from grounds-keeping and trimming grass?	Yes	
OE11.	OE11.1	- The total number of Purchased Computers	-	Computers
		- The total Computer Purchasing cost	-	QR
	OE11.2	- The total number of Purchased Cleaning Product	3225	Product
		- The total Cleaning Product Purchasing cost	75155	QR
	OE11.3	- The total number of Purchased Office Paper	9.5	tons
		- The total Office Paper Purchasing cost	-	QR

PE. Planning, Administration & Engagement Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
PE1.	PE1.1	- Student Life: Does the institution have one or more active student groups focused on sustainability?	-	
		- Does the institution have an outreach Materials and Publications	Yes	
		- Does the institution assessing the Sustainability Culture	Yes	
		- Does the institution have developed and established campus community corporations/partnership to support sustainability where it works together with different school, government agencies, non-profit companies, businesses or external units?	Yes	
		- Does the institution cooperate with other colleges or universities to help and support in building a sustainable campus widely?	Yes	

Appendix G: Cont.

Cont. PE. Planning, Administration & Engagement Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
PE1.	PE1.1	- Does the institution have created an inventory for its courses that mainly nominated as a sustainability course and offered in the standard students' course catalog?	Yes	
		- Average hours that the institution engage students in community service per student per year.	-	hours
		- Number of student who participate in community service.	-	student
		- Does the institution support the public policies that help in reaching the campus sustainability or that otherwise supported the sustainability?	Yes	
PE2.	PE2.1	- Does the institution have Construction Management Plan	Yes	
		- Does the institution have a physical campus plan	Yes	
	PE2.2	- Does the institution have Wastewater Management Plan	Yes	
	PE2.3	- Does the institution have Energy Systems Management Plan	Yes	
	PE2.4	- Does the institution have Intelligent Transport systems Plan	Yes	
	PE2.5	- Does the institution have Information Systems Management Plan	Yes	
	PE2.6	- Does the institution have Infrastructure Maintenance Plan	Yes	
	PE2.7	- Does the institution have Community & Road Safety Plans	Yes	
	PE2.8	- Does the institution have Facility Management	Yes	
	PE2.9	- Does the institution have a committee, department, or coordinating office for sustainability which was appointed by the higher administration or the institutions' board of trustees where its main task is to give advises on and applied policies, procedures, and programs that consider the campus sustainability and related issues?	Yes	
- Does the institution concentrate on sustainability widely & climate change and consider the whole institution?		Yes		
- Does the institution develop a sustainability plan and procedure with the coordination of the institution employees and students and take into consideration their inputs in assigning measurable goals that align with the institution strategies and timelines to achieve these goals?		Yes		

Appendix G: Cont.

Cont. PE. Planning, Administration & Engagement Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
PE2.	PE2.10	- Does the institution have a committee, department, or coordinating office, which was appointed by the higher administration or the institutions' board of trustees where its main task is to applied policies, procedures, and programs that consider diversity and equity on campus to create a sustainable society?	Yes	
		- Does the institution evaluate attitudes regarding diversity and equity on campus and use these results in conducting policy, procedures, programs, and initiatives?	Yes	
		- Are there programs offered and supported by the institution that work on supervising, mentoring, counseling the academic support programs or other programs in order to help and assist its students and employee?	Yes	
		- Does the institution manage or engage in programs that aim to have a diverse faculty all through higher education? These programs such as mentoring, financial, or other support programs to create and motivate students to follow more of education and careers opportunities like faculty members or support programs for graduate students.	Yes	
		- Does the institution have procedures, policies, and programs in order to be accessible and affordable to students with low incomes; such as offering scholarships for these students, admissions procedures facilitation and policies for the financial aids?	Yes	
		- Does the institution have training opportunities and activities for cultural competence offered for all its students and employee?	Yes	
	PE2.11	- Does the institution have Strategic Plan?	Yes	
		- Does the institution have made an official, substantial commitment to sustainability by involving it in their institutional strategic plan?	Yes	
		- Is the institution include the main three dimensions of sustainability in their strategic plan?	Yes	
	PE3.	PE3.1	- Does the institution have an active official committee that was initiated for investor responsibility (CIR) is responsible for putting recommendations to support the decision makers responsible for social and environmental investment opportunities through whole asset classes?	No

Appendix G: Cont.

Cont. PE. Planning, Administration & Engagement Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
PE3.	PE3.2	- Does the institution use its investment power and capability to encourage corporate sustainability?	-	
		- Does the institution recognized or applied at least one of stakeholder resolutions that consider sustainability or submitted at least one letters to an investment company regarding social or environmental responsibility?	-	
	PE3.3	- Does the institution wish to pursue (positive sustainability investment)	Yes	
PE4.	PE4.1	- Does the institution assesses, develops and updates its wages and benefits procedures and policies for the campus workers to make sure that the total compensation of wages with benefits for all its workers that is satisfying to allow these workers to meet their main needs, as defined by the institution?	Yes	
		- Does the institution have a childcare facility on campus, or offer allowances or financial-support to satisfy the childcare needs and requirements of its students and employees (faculty and staff)?	Yes	
	PE4.2	- Does the institution implement a survey or other assessment approach that allows anonymous responses to measure the satisfaction of its employees?	Yes	
	PE4.3	- Does the institution have training opportunities and activities for cultural competence available for its entire employee?	Yes	
		- Does institution have training opportunities or professional development options in sustainability offered to all of its employees, at least once a year?	Yes	
	PE4.4	- Does the institution involve sustainability or related topics in new employee orientation or provides guidance materials provided to its new employee.	Yes	
	PE4.5	- Does the institution have or participates in programs/initiatives that help making a varied employee through higher education.	No	
		- Does the institution have employee one-to-one sustainability outreach & education program where employee receive official training or participate in the university orientation for its sponsors.	Yes	

Appendix G: Cont.

EC. Economic Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
EC1.	EC1.1	- What is the impact of customers on the economy, the environment, and society dimensions of sustainability (Economic Performance)	-	QR
	EC1.2	- What is the impact of suppliers on the economy, the environment, and society dimensions of sustainability	-	QR
	EC1.3	- What is the impact of employees on the economy, the environment, and society dimensions of sustainability	-	QR
		- Qualified employee impact on the institutional profitable growth	-	QR
	EC1.4	- What is the impact of providers of capital on the economy, the environment, and society dimensions of sustainability	-	QR
	EC1.5	- What is the impact of public sector on the economy, the environment, and society dimensions of sustainability	-	QR
	EC1.6	- Does the economic value have support of national economy	Yes	
- Is the institution have Profitable Growth		Yes		

SO. Social Category Data from QU

Subcategory	Indicator	Needed Data	QU Data	Unit
SO1.	SO1.1	- Does the institution have policy for bribery and corruption (anti-corruption)	Yes	
	SO1.2	- Does the institution have policy for the political contributions	No	
		- Does the institution have Public Policy	-	
	SO1.3	- Does the institution have policy for competition and pricing (Anti-competitive Behavior)	Yes	

Appendix H: Applying Weighting-Score SAHE on QU data

Category	Item	Value	Number of Answers					
			All	AC	OE	PE	EC	SO
Answers	Yes	2	89	11	39	35	2	2
	No	0	33	3	27	2		1
	Number	2	97	24	73			
	NA	0	27	0	27			
Missing Answers	Response not received	0	19	7	1	5	5	1
	Response needs more time	1	2	0	2			
	Confidential answers	2	7	3	3		1	
Total			274	48	172	42	8	4



Category	Item	Value	Total %	% from the total				
				AC	OE	PE	EC	SO
Answers	Yes	2	32.48	4.01	14.23	12.77	0.73	0.73
	No	0	0	0	0	0	0	0
	Number	2	35.40	8.76	26.64	0	0	0
	NA	0	0	0	0	0	0	0
Missing Answers	Response not received	0	0	0	0	0	0	0
	Response needs more time	1	0.36	0	0.36	0	0	0
	Confidential answers	2	2.55	1.09	1.09	0	0.36	0
Total			70.80	13.87	42.34	12.77	1.09	0.73