Sustainable Academia

Translating the Vision of a Fully Sustainable University into a Measurable Reality

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Contents

Executive Summary

There is a growing public expectation that universities should start focusing on delivering sustainability. The topic of sustainability in higher education has gathered a significant amount of interest from students, academics, governments and international organizations.

With a plethora of declarations, initiatives, marketing and assessments, there is a need to assess what the stakeholders want in order to make decisions regarding an institutions sustainability. Ultimately, students are the ones using these sustainability marketing materials to assist in their decision at which institution they will pursue their studies. The sheer volume of interpretations of the word sustainability with regards to higher education institution leaves ample room for potentially misguided initiatives or marketing.

A universal system for assessing a higher educational institution's sustainability has not been translated into a measurable reality. It is proposed that a universal system would help create a common understanding of sustainability within higher education institutions and would help in stakeholder understanding, institutional accountability and impactful application of sustainable initiatives.

This research looked to answer if a holistic framework could be created that would aid stakeholders in reviewing a university's level of sustainability. And, if so, if this vision of a fully sustainable university could be translated into a measurable reality.

The research was approached in a structured way. Each chapter represents a published and peer-reviewed step towards addressing if a holistic framework could be created that would aid students in reviewing sustainability tools, assessments and marketing. The qualitative and quantitative conclusions from each chapter influenced the subsequent chapters, eventually leading to the creation and testing of two digital tools. The interpretations of these published chapters are found in the conclusion of this dissertation.

To assist the reader in effectively navigating this dissertation, an overview of the research questions, the methodology, and the summarized results are outlined below in Figure 0.1. A more detailed summary of each of the chapters follows.

Introduction (*Chapter 1*)

Paper 1 (*Chapter 2*)
What are the features, trends, and needs in relation to sustainability in higher education?

Research conducted using data from a survey of stakeholders.

Results:
A need for a uniform rating system of sustainability within institutions of higher education

Results:
The need for inclusion of economic factors (employability) as a measure of sustainability in higher education

Paper 2 (*Chapter 3*)
Does existing literature provided a basis for creating a framework to compare assessment systems in higher education?

Research conducted through literature review.

Results
Eleven point framework for assessing sustainability assessments

Paper 3 (*Chapter 4*)
Analyze STARS as a Sustainability Assessment System Universally Usable in Higher Education

Analysis conducted through application of survey results and eleven point framework.

Results:
The eleven point framework did not completely address economic parameters, indirectly identifying a gap in literature concerning economic parameters in sustainability assessments.

Paper 4 (*Chapter 5*)
Should employability be considered as a parameter of sustainability assessments within higher education?

Research conducted through literature review.

Results
Validated the need for economic metrics to be included in sustainability assessments.

Proposed using 3 metrics for sustainability assessments: starting salary, under-employment and over-education.

Paper 5 (*Chapter 6*)
What is the importance of starting salary, employment and over-education to higher education stakeholders?

Research conducted using data from a survey of stakeholders.

Results:
The results validated that full-time employment was the most important thing to stakeholders.

Results:
The results showed that there was a gap in stakeholders expectations versus realities with regards to the economic burden of education.

Creation of Universal Framework for comparing Sustainability Assessments in Higher Education

Creation of Economic Calculator

Paper 7 (*Chapter 8*)
Validate the if stakeholders want a universal sustainability assessment for higher education institutions..

Research conducted via testing and data collection.

Paper 6 (*Chapter 7*)
Validate the if economic metrics should be included in sustainability assessments of higher education institutions.

Research conducted via testing and data collection as well as survey feedback.

Conclusions (*Chapter 9*)

FIGURE 0.1 Research Overview

Paper 1 (Chapter 2)

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The first question was to **identify features, trends, and needs in relation to sustainability in higher education** so as to guide the research of this dissertation. A survey was created utilizing international experts and peer-reviewed literature. The survey collected empirical data that was analyzed to provide two predominate results; namely that there was a need for a universal system for sustainability assessment and that there was a gap in current assessments because they did not include post-graduate economic factors.

Higher education stakeholders, who for this paper were defined as being current or potential students, staff and management, were surveyed to identify features, trends, and needs of stakeholder in relation to the available tools and initiatives regarding sustainability assessments in higher education. This data provided a quantitative perspective to supplement the background qualitative information.

The paper showed that sustainability is a socially desirable trait but other factors, such as becoming more competitive in the job market, supersede it in importance to stakeholders. It also showed that there was a general need for a standardized method for assessing institutions, with Association for the Advancement of Sustainability in Higher Education's (AASHE) Sustainability Tracking and Assessment Rating System (STARS) system being the assessment of choice.

It was not expected that there was a gap in addressing economic factors as measures of sustainability. 92% of participants agreed that employability after graduation should be included in the measurement of an institutions sustainability. Even though the data was empirical, the strong support for the inclusion of economic metrics fundamentally changed this research. It provided a new direction that needed to be explored and considered for any potential holistic assessment framework.

The survey also supported the general purpose of this research. 95% of respondents agreed that there was a need for a uniform rating system of sustainability within institutions of higher education. 54% of students used a combination of self-evaluation, assessment systems and university marketing to make a decision about a universities level of sustainability while a notable demographic, around 18%, elected to rely solely on their own evaluation of an intuitions sustainability. Amongst the various sustainability assessments provided to respondents, 88% were familiar with STARS while 60% claimed it was an ideal system for universal use.

Based on the empirical nature of this study, only absolute results were utilized in guiding the dissertation. Areas identified for further research were:

1   Identify stakeholders' needs to include economic metrics as a measure of an institution's sustainability; a gap in current assessment systems.
2   Validating the need for this research by creating a framework for reviewing STARS, the clear preference of the respondents.

Paper 2 (Chapter 3)

Seeing as the empirical evidence suggested that there was a need for a universal system, the next question was to **establish if a meaningful framework to compare assessment could be created via a literature review on assessments of sustainability system**. An eleven-point system was created using existing peer-reviewed literature on the subject and was used to perform a comparison of STARS and Campus Sustainability Assessment Framework (CSAF), two prominent sustainability assessment systems identified in the initial survey.

The researched focused on the creation of a framework based on specific literature that dealt exclusively with reviews of sustainability assessment in higher education. After creation of the framework, it applied it to the two most popular assessments identified in the first paper to see if it was useful in decision making.

The framework, when utilizing all the factors weighted on an equal basis, was capable of providing guidance and identified AASHE's STARS as a more complete assessment than CSAF. The results validated the initial data that STARS system was the most suitable system for universal use.

The most significant outcome was the first iteration of the framework, which is provided below in the Table 0.1:

Core issues of ecologically, socially and fiscally sustaining a society and campus by Orr (Penn State Green Destiny Council, 2000)
What quantity of material goods does the college/university consume on a per capita basis?
What are the university/college management policies for materials, waste, recycling, purchasing, landscaping, energy use and building?
Does the curriculum engender ecological literacy?
Do university/college finances help build sustainable regional economies?
What do graduates do in the world?
Ideal cross-institutional sustainability assessments (Shriberg, 2002)
Identify important issues
Are calculable and comparable
Move beyond eco-efficiency
Measure processes and motivations
Stress comprehensibility
Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches (Saadatian et al., 2011)
Popularity

TABLE 0.1 Framework for reviewing sustainability assessment systems

This framework proved effective in use for the purposes of research. Furthermore, it showed that it could also be flexible as an individual could place different weights or emphasis on areas they believed to be more important.

Using the framework also provided further evidence that AASHE's STARS could be a candidate for a universally useable assessment system, a need identified in the first paper. Although both STARS and CSAF are useful tools for assessment, STARS was a notably better system. Neither system was perfect and both were comparable, however STARS exceeds in fulfilling nine of eleven criteria proposed in the research, in comparison to CSAF's ability to fulfill five.

Paper 3 (Chapter 4)

STARS was identified as an ideal assessment for the basis of a universal system from the original survey as well as by utilizing the eleven-point framework. The research focused on **analyzing the lapses in STARS identified by both the eleven-point framework and the data collected from the initial survey**. The results showed that the framework provided a useful tool for identifying and assessing lapses in STARS, but it was not a complete tool as it did not include the economic parameters needed by stakeholders.

The framework demonstrated that there were some lapses within STARS that would need to be addressed in order fulfill all eleven criteria. The research also compared STARS to the stakeholder needs identified in the first paper. From the framework and stakeholder requirements, the conclusions provided three areas for improvement in the STARS assessment, namely:

1. The role of higher education institutions in building regional capacity to act in an increasingly competitive global economy,
2. Lack of post-graduate metrics, and
3. Lack of inclusion of employability after graduation.

The immediate value of these results provided insight for the non-profit organization that administers the AASHE STARS systems. However the intrinsic value for this dissertation was found in the realization that employability was not a metric currently discussed with regards to sustainability assessments; neither in STARS nor the framework (and the inferred peer-reviewed literature).

Paper 4 (Chapter 5)

Considering that economic parameters were needed by stakeholders but did not exist in sustainability assessment literature, a broad spanning literature review was conducted to **determine if employability should be considered a parameter of sustainability assessments within higher education**. The study highlighted the importance of understanding the economic returns of higher education within the framework of sustainability assessments. It proposed three metrics for assessing the economic returns of education, namely starting salary, employment and over-education. These metrics are well understood within the general context of higher education, but are novel with regards to sustainability assessments.

This was a qualitative review of the economic returns of degrees as a function of a sustainable institution. The paper reviewed a range of international research to summarize the economic drivers of higher education attainment.

It found that the cost inputs to higher education are fairly well understood by stakeholders but that the economic return of a degree was not. Students misperception of economic returns coupled with a dynamic definition of employability created the framework for unsustainable debt loads for graduates.

This paper proposed three metrics that could be used to assess the economic sustainability of students graduating higher education in order to supplement the broader definition of sustainability within higher education.

These three metrics were derived from peer-reviewed literature and were as follows:

1   *What is the average yearly compensation of graduates with that specific degree within 12 months of graduation?*
    This question was extrapolated from the strong correlation that Rajecki & Borden (2011) identified between mid-career salaries and starting salaries. The findings showed that a higher starting salary supported a higher mid-career salary and that a low starting salary and hard work was often not enough to reach the same mid-career salary.

2   *What is the ratio of full-time / part-time employed graduates with that specific degree within 12 months of graduation?*
    Under-employment was defined as those working part-time due to lack of full-time jobs, or those working part-time who would like to work more hours (Bell & Blanchflower, 2011). Since underemployment has been a growing concern since the financial crisis of 2008 and remains persistent (Ashford et al., 2012) this question looked to provide students with a more meaningful number than just "employability".

3   *What percent of graduates with that specific degree are employed in a position whose level of education exceeds the requisite levels needed to perform their job?*
    The research by Carroll & Tani (2013) pointed to the growing concern surrounding over education and this question uses Linsley (2005) definition to capture the level of over education experienced by a graduate of a specific degree within the market place.

Paper 5 (Chapter 6)

In order to test the validated the three economic parameters from the literature review, a survey was conducted to **determine the importance of starting salary, under-employment and over-education to higher education stakeholders**. The results showed that employment was the most important of the three metrics to stakeholders. It also identified a gap between the perceptions of the economic burden of higher education and the realities.

Survey responses were received from a diverse group of international participants. The participants represented stakeholders from higher education institutions including executive leaders, managers, teachers, students and prospective students.

At an absolute level, the stakeholder's response showed a clear preference placed on employment. The data displayed that a majority of the stakeholder in higher education expect a graduate to secure full-time employment.

Even though the employment metrics was strongly supported, both starting salary and over-education were met with mixed opinion with respondents not showing an unequivocal preference. This relative uncertainty contradicts the strong expectations regarding both payback period and future allocation of funds regarding the debt incurred through higher education.

More than 90% supported that education should cost less than 15% of their future wages while 90% supported that they should be in debt for less than 10 years. This response, when compared specifically to the relative apathy towards starting salary, suggested a gap in stakeholder's expectations versus reality.

Paper 6 (Chapter 7)

A test was conducted to **validate why a student's post-graduation economic performance should be part of a higher education institutions metric for sustainability.** Two sets of data were collected:

1. Stakeholders were asked directly: "Should a student's economic well-being be a measure of a higher education institutions sustainability?"
2. Data was collected via a customized economic calculator that captured stakeholder economic realities for before, during and after higher education in order to identify any unsustainable trends.

The results showed a strong desire by stakeholders for the inclusion of economic metrics in sustainability assessments in higher education. The data collected showed that 89% of respondents agreed that a student's economic well-being is a measure of a higher education institution's sustainability.

It also highlighted that the economic burden of higher education would leave graduates in debt for decades to come. Using the benchmark maximum acceptable repayment of 8% (Baum & O'Malley, 2003; Gross et al., 2009), all stakeholder took more than 10 years to pay back their economic burden. Even more troubling, Europeans and North Americans remained in debt for decades. This payback period is definitely well beyond the expectations and perceptions of stakeholders. Furthermore, it essentially puts the 46% of respondents taking out loans in either an unsustainable situation where they will be repaying debt for the majority of their lives or a situation where they will have to default on their loans. The data supports claims by Noam Chomsky that high tuition acts as a debt trap that sharply restricts choices after graduation (Chomsky, 2013).

Paper 7 (Chapter 8)

A test was conducted to **validate that the theoretical framework met stakeholder's needs in comparing sustainability assessments in higher education institutions.** Stakeholders were given the ability to directly rate a variety of sustainability assessments using the modified framework from all the research conducted in Papers 1-5. The test, however, failed to deliver the expected results.

The test for the framework and the calculator were run simultaneously. The calculator page gathered 65% of the total views and received almost 4 visits for every 1 visit to the assessment page. This indicated that visitors were primarily interested in the calculator page and either went directly to it from links in the original solicitation or were forwarded the specific site from other visitors.

The data also showed that there was a significant difference in the response rate of the calculator versus the assessment page. The calculator collected responses for 95% of the visitors while the assessment page only collected responses from 4% of the page visitors.

The data collected did not provide definitive results regarding the usability of the framework or recommendations on a preferred assessment systems suitable for universal use. What it did provide, however, was some insight.

Some reasons identified for the low data collection included the complexity of the framework, the multitude of supporting literature that each individual assessment systems has and that the average user may not have time or interest to provide meaningful feedback.

It also may be explained by the psychological phenomena of behavioral discounting, where the ability to access a more immediate and personally salient reward, the economic calculator, may have created a situation in which the assessment of a sustainability framework, which would impact future generations, was "discounted".

The results are a piece of anecdotal evidence that there may be no need for a universal system. The debate thus far on the controversies of creating a universal system has been based on literature, opinion and little testing. The research provided a data point, albeit empirical, that a universal framework was not utilized and thus may not be needed. While the reason for the lack of utilization is not clearly identifiable, the lack of responses does provide a small piece of data that questions the need for a universal system.

Dissertation Conclusions (Chapter 9)

Overall, this dissertation led to the creation of a conceptual framework for comparing assessments within higher education that highlighted the lack of economic metrics in current sustainability assessments in higher education.

The empirical evidence supports that stakeholders strongly desire the inclusion of economic metrics in sustainability assessments. 90% of the stakeholders supported in three different studies that they considered economic metrics part of a measure of an institution's sustainability. The data collected also showed that there was a gap between stakeholder perceptions of higher education debt repayment versus the realities, which may lead to an unsustainable debt load.

The initial testing of a universal framework for comparing sustainability assessments in higher education was inconclusive, but provided some evidence that there may not be a need for a universal system. Sustainability is a socially desirable trait which is

wanted by students, but not necessarily needed. Pressing factors to students, such as debt, are more salient due to the direct personal impact, therefore sustainability is discounted in the presence of debt. The framework is still useful in furthering the conversation regarding post-graduate economic factors not currently used in the field of sustainability assessments in higher education.

Overall, this dissertation found that sustainability assessments seem to be getting it (mostly) right. While the metrics and methodology vary, there is no question that these assessments are adding value to a universities sustainability efforts.

The next step for sustainability efforts in higher education institutions will be to focus on a student's lifecycle: what happens during and after the student's tenure. This is not a quantum leap for universities, but it is a significant change to the discussion surrounding sustainability in the university setting.

Specific to this dissertation, the economics surrounding education have been, and will continue to be, well studied so the application of economic metrics into sustainability assessments would be relatively simple. Universities are already tracking what graduates are doing after completion of their degrees. And if the universities themselves are not tracking, there are plenty of for/nonprofit organization dealing with this matter. This, by all accounts found within this thesis and the general global growth of student debt, is needed.

The real change will need to come from university leadership. These leaders will have to support and promote that a graduate's actions in the world is also a metric of the institutions sustainability. This is the feedback loop that will help improve institutions of higher education and their sustainability initiatives and continue to foster the improvement that is needed to empower the next generation of leaders.

Abbreviations

AASHE	The Association for the Advancement of Sustainability in Higher Education
ACPA	American College Personnel Association
ACUPCC	American College & University Presidents' Climate Commitment
CRE	Association of European Universities
CSAF	Campus Sustainability Assessment Framework
LPIID	Lester Pearson Institute for International Development,
OECD	Organization for Economic Co-operation and Development
STARS	Sustainability Tracking and Assessment Rating System
UNESCO	United Nations Educations, Scientific and Cultural Organization
WCED	World Commission on Environmental and Development

1 Introduction

§ 1.1 **Background**

Higher education is facing its greatest challenge ever in meeting its responsibility to provide the knowledge and educate citizenry that will lead to a thriving civil society... Higher education plays a unique and critical role, one often overlooked, in making a healthy, just and sustainable society and a stable climate a reality (ACUPCC, 2009).

Higher education is in a constantly shifting state as it seeks to meet the educational needs of an evolving society. Recently, changes are occurring in higher education because of five primary factors (Comm, 2003):

— Higher public expectations over what universities should be delivering,
— Increasing parental concern about the quality of education,
— Greater emphasis on college ratings,
— Demographic changes in student population, and
— Higher costs.
There is a growing public expectation that universities should start focusing on delivering sustainability. This expectation is highlighted by the demands of new students entering the university. Students not only placed high value on many aspects of sustainability, but also expressed that sustainability concerns are a significant factor in students' university choices (Bone & Agombar, 2011).

This expectation was first formally identified over two decades ago by university presidents in the Talloires Declaration (1990) and has subsequently gained momentum with the Halifax Declaration (LPIID & Dalhousie University, 1991), the Earth Summit Agreements (UN, 1992) the Swansea Declaration (Association of Commonwealth Universities, 1993), the Association of European Universities (CRE) –Copernicus Charter (Association of European Universities, 1994), and the Luneburg Declaration (University of Lüneburg, 2001)—each of which emphasizes the roles and responsibilities of universities to promote sustainable development (Steinemann, 2003). These declarations are milestones in addressing the public's expectations over what universities should be delivering, but do not address the basic problem of offering guidance in order to assess a universities level of sustainability.

The underlying issue with assessing sustainability seems to be found within the term itself. Sustainability is an ambiguous and often controversial term that lacks a universally accepted definition. Sustainable development is generally defined as, "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environmental Development, 1987). This vague definition and its various interpretations provide a barrier to directly applying sustainability assessment in universities. Indeed, universities, teachers, students and the general public have formed their own interpretation of the term and Velazquez et al. (2006) argue that, '...each university should define its own concept of a sustainable university.'

Dalal-Clayton & Bass (2002) support Velazquez et al.'s view and, in fact, present three different approaches to assessing sustainability, which are generally based on either: accounts, narrative assessments or indicator-based assessment. These various approaches create suitability issues when trying to compare institutions level of sustainability. Different criteria for rating universities sustainability, different interpretation by universities as to what sustainability means and a self-reporting sustainability framework may lead to fluctuating and inconsistent ratings, which are important for future student's decision making. Regardless of these inconsistencies, ratings and rankings are increasingly becoming mainstream educational criteria for future students.

Analysis of universities in terms of sustainability is still in an evolutionary stage, yet educational resources providers are already creating a 'sustainability ranking' for universities (The Princeton Review, 2011). These rankings are important to students (Bone & Agombar, 2011) and will spur changes in higher education (Comm, 2003), regardless of if these rating systems are scientifically correct, generally accepted or even appropriate for application in a higher education setting.
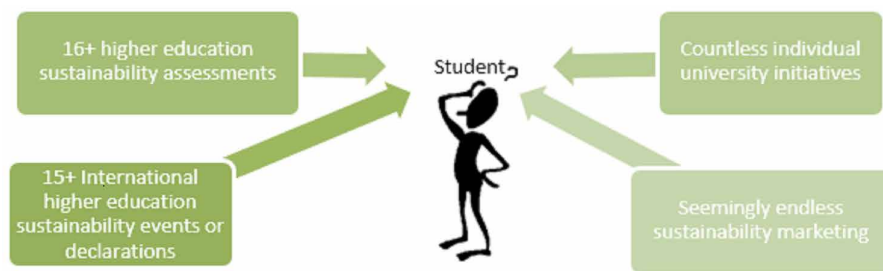
FIGURE 1.1 Higher education sustainability options to students

With a plethora of declarations, initiatives, marketing and assessments, there is a need to assess what the stakeholders want in order to make decisions regarding an institutions sustainability. Ultimately, students are the ones that are using the sustainability marketing materials to assist in their decision on which institution they will select to pursue their studies. The sheer volume of interpretations of the word sustainability with regards to higher education institution leaves ample room for potentially misguided initiatives or marketing.

Selby et. al. (2009) point out that there is already concerns/issues in higher education institutions sustainability marketing; including that it needs to be calibrated to actual sustainability performance while also embracing a sustainability vision. Without a common understanding of what sustainability is in a higher educational context, it will be hard for an institution and its stakeholders to have a common vision and understanding of sustainability, leading to inconsistent or inaccurate perceptions of marketing.

A universal system for assessing a higher educational institutions sustainability has not been translated into a measurable reality. A universal system would help create a common understanding of sustainability within higher education institutions and would help in stakeholder understanding, institutional accountability and impactful application of sustainable initiatives.

§ 1.2 **Research Framework**

§ 1.2.1 **Problem Statement**

Sustainability in higher education is a growing concern for students but is hard to assess as there is a continuously increasing amount of declaration, tools, assessments, studies and marketing available for students to review.

§ 1.2.2 Background Hypothesis

Summarizing the background information, it is assumed that a universal system is needed for assessing sustainability in higher education. By collecting what stakeholders need and utilizing the existing research, the following hypothesis can be identified:

— Students are fundamentally concerned with sustainability
— Current assessments are meeting stakeholder needs, but are not directly comparable
— Enough research exists so a framework can be created that allows stakeholders to compare different measurements of sustainability across multiple assessments

§ 1.2.3 Objective

The objective of this thesis is to provide a holistic framework to aid students in reviewing sustainability tools, assessments and marketing. The framework will not replace or compete with any of the existing tools but rather provide a simple, yet robust, starting-point that students can modify based on their own needs and perceptions. The framework will be derived from a qualitative assessment of current methods and then modified based on the quantitative analysis of various surveys.

§ 1.2.4 Boundary condition

The aim of this dissertation is to explore the value in creating a universal framework to aid students in reviewing sustainability tools and assessments. In order to accomplish this, one primary boundary conditions must be set to guide the research.

The boundary condition is understanding the limitations of the scope of each assessment. Each tool may vary in purpose, scope, function and state of development (Shriberg, 2002). They also vary in the weighing methods, flexibility and access to information (Gómez et al. 2015). Because of this, an assessment's scope will be considered sufficient for the assessments purpose. However, the breadth of the scope in relation to a holistic framework will be reviewed in order to aide stakeholders in understanding a more universal view.

Research Questions

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The main research question is:

Can a holistic framework be created that will aid stakeholders in reviewing a universities level of sustainability?

The sub-research questions are:

— What are the features, trends, and needs in relation to sustainability in higher education?
— Is there a comprehensive framework to compare assessments? If not, could one be created through existing peer-reviewed literature?
— Do existing assessments cover the features, trends and needs of stakeholders in relation to sustainability in higher education?
— Should employability be considered a parameter of sustainability assessments within higher education?
— What is the importance of starting salary, under employment and over-education to higher education stakeholders?
— Can a test be conducted to validate why a student's post-graduation economic performance should be part of a higher education institutions metric for sustainability?
— Can a test be conducted to validate that stakeholders want a universal sustainability assessment for higher education institutions?
To answer these questions, each chapter was broken down into research sub-questions, with the results driving the subsequent chapter's research questions. This methodological approach is outlined and summarized below:

Introduction (*Chapter 1*)

Paper 1 (*Chapter 2*)
What are the features, trends, and needs in relation to sustainability in higher education?

Research conducted using data from a survey of stakeholders.

Results:
A need for a uniform rating system of sustainability within institutions of higher education

Results:
The need for inclusion of economic factors (employability) as a measure of sustainability in higher education

Paper 2 (*Chapter 3*)
Does existing literature provided a basis for creating a framework to compare assessment systems in higher education?

Research conducted through literature review.

Paper 3 (*Chapter 4*)
Analyze STARS as a Sustainability Assessment System Universally Usable in Higher Education

Analysis conducted through application of survey results and eleven point framework.

Paper 4 (*Chapter 5*)
Should employability be considered as a parameter of sustainability assessments within higher education?

Research conducted through literature review.

Results
Eleven point framework for assessing sustainability assessments

Results
Validated the need for economic metrics to be included in sustainability assessments.

Proposed using 3 metrics for sustainability assessments: starting salary, under-employment and over-education.

Results:
The eleven point framework did not completely address economic parameters, indirectly identifying a gap in literature concerning economic parameters in sustainability assessments.

Paper 5 (*Chapter 6*)
What is the importance of starting salary, employment and over-education to higher education stakeholders?

Research conducted using data from a survey of stakeholders.

Results:
The results validated that full-time employment was the most important thing to stakeholders.

Results:
The results showed that there was a gap in stakeholders expectations versus realities with regards to the economic burden of education.

Creation of Universal Framework for comparing Sustainability Assessments in Higher Education

Creation of Economic Calculator

Paper 7 (*Chapter 8*)
Validate the if stakeholders want a universal sustainability assessment for higher education institutions..

Research conducted via testing and data collection.

Paper 6 (*Chapter 7*)
Validate the if economic metrics should be included in sustainability assessments of higher education institutions.

Research conducted via testing and data collection as well as survey feedback.

Conclusions (*Chapter 9*)

FIGURE 1.2 Research Overview

1   **Paper 1 (Chapter 2)**
The first question was to **identify features, trends, and needs in relation to sustainability in higher education** so as to guide the research of this dissertation. A survey was created utilizing international experts and literature and the empirical data was collected and analyzed to provide two meaningful results; namely that there was a need for a universal system and that there is a gap in current systems by not including the economic well-being of graduates.

2   **Paper 2 (Chapter 3)**
Seeing as the empirical evidence suggested that there was a need for a universal system, the next question was to **establish if a meaningful framework to compare assessment could be created via a literature review on assessments of sustainability system**.

An eleven-point system was created using existing peer reviewed literature on the subject and was used to perform a comparison of STARS and CSAF, two prominent sustainability assessment systems identified in the initial survey.

3 **Paper 3 (Chapter 4)**
The research focused on **analyzing the lapses of the STARS system identified by both the eleven-point framework and the data collected from the initial survey.** The results showed that the framework provided a useful tool for identifying and assessing lapses in STARS, but it was not a complete tool as it did not include the economic parameters needed by stakeholders.

4 **Paper 4 (Chapter 5)**
Considering that economic parameters were needed by stakeholders but did not exist in sustainability assessment literature, a broad spanning literature review was conducted to **determine if employability should be considered a parameter of sustainability assessments within higher education**. The review highlighted the importance of understanding the economic returns of higher education within the framework of sustainability assessment. It proposed three metrics for assessing the economic returns of education, namely starting salary, employment and over-education. These metrics are well understood within the general context of higher education, but are novel with regards to sustainability assessment.

5 **Paper 5 (Chapter 6)**
In order to test the conclusions of the literature review, a survey was conducted to **determine the importance of starting salary, under-employment and over-education to higher education stakeholders.** The results should that under-employment was the most important of the three metrics to stakeholders. It also identified a gap based on the perceptions of the economic burden of higher education and the post-graduate reality.

6 **Paper 6 (Chapter 7)**
A test was conducted to validate why a student's post-graduation economic performance should be part of a higher education institutions metric for sustainability. Two sets of data were collected:

   a   Stakeholders were asked directly: "Should a student's economic well-being be a measure of a higher education institutions sustainability?"
   b   Data was collected via a customized economic calculator that captured stakeholder economic realities for before, during and after higher education in order to identify any unsustainable trends.

The results showed a strong desire by stakeholders for the inclusion of economic metrics in sustainability assessments in higher education. It also highlighted that the economic burden of higher education is unsustainable and would leave graduates in debt for decades to come.

7 **Paper 7 (Chapter 8)**

A test was conducted to **validate that stakeholders want a universal sustainability assessment for higher education institutions.** Stakeholders were given the ability to directly rate a variety of sustainability assessments using a modified framework from all the research conducted to date. The test, however, failed to deliver the expected results. The low amount of data collected only allowed for interpretations for the usefulness of the framework. Ultimately, it provides some anecdotal evidence as to why there may be no need for a universal sustainability assessment in higher education.

The dissertation follows this outline, with papers 1-7 presented in numerical order in chapters 2-8 with chapter 9 covering the conclusions and discussion.

2 Higher Education: Features, Trends and Needs in Sustainability

Higher Education: Features, Trends and Needs in Relation to Sustainability

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Abstract

The progress of sustainability within higher education has steadily increased in focus over the last decade and has increasingly become a topic of academic research. With various scholars, journals and conferences exclusively dealing with the subject, a wealth of literature has been produced on best practices, suggestions, and assessments pertaining to sustainability within the higher education field.

Higher education stakeholders, who for this paper are defined as being the potential/current students, staff and management, continue to become more conscious of the principles of sustainability. This higher level of understanding promotes the needs to assess existing literature in relation to the actual needs of the stakeholders in order to identify existing features, trends and needs so that there is continual improvement in the field.

This paper shows that sustainability is currently a socially desirable trait but other factors, such as becoming more competitive in the job market, supersede it in importance to stakeholders. It also shows that there is a general need for a standardized method for assessing institutions, with AASHE's STARS system being the most used system.

Introduction

Globally, societies are subject to an intertwined future that immerses people into the realities of climate change, social inequalities and fragile economic systems. There is a growing need for sustainable development, which is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN, 1987).

Since the 2002 Johannesburg Summit, the special role of our education systems in facilitating, envisioning, and leading change towards sustainability has been the focus of renewed attention (Ryan et. al., 2010). International leaders have declared education as a motor for change, with the United Nations General Assembly implementing the Decade of Education for Sustainable Development from 2005-2014 (UNESCO 2011).

There is also a growing public expectation that universities should start focusing on delivering sustainability. Students in particular are starting to place an emphasis on sustainability. This emphasis is highlighted by the demands of new students entering the university. Students not only placed high value on many aspects of sustainability, but also expressed that sustainability concerns are a significant factor in students' university choices (Bone and Agombar 2011).

Indeed this view directly corresponds with industries uptake of the notion of sustainability in higher education. An overview of the top 100 Universities as listed on the Times Higher Education World University Rankings (TSL Education Ltd., 2012) reveals that 100% of the universities have marketed some sort of sustainability initiative. These included, but were not limited to, fully functional research centers, sustainability programs, research initiatives, student involvement or campus wide plans. This comprehensive uptake demonstrates the significance of sustainability and suggests continued interest in the future.

Sustainability in higher education often varies in scope and magnitude and covers a wide gamma of initiatives. Initiatives range from something as simple as offering an elective course to deep social integration between the community and the student population. Various assessment methods assess the level of sustainability differently; however there is some consensus among assessment methodologies that measure sustainability. A review of the GreenerU (2010) shows that most methodologies have some shared characteristics, such as focusing on academics (education and research), real estate (buildings and amenities), control of essential flows (e.g. energy, water, food, materials and their wastes), management and operation, and transportation.

Institutions are starting to incorporate these sustainability initiatives in their values, principles and marketing. There are even efforts to standardize the measurement of sustainability within institutions. An example of this 'sustainability ranking' for universities is the "Princeton's Guide to 311 Green Colleges" (The Princeton Review 2011). Organizations such as The Association for the Advancement of Sustainability in Higher Education (AASHE) have skyrocketed in acceptance (GreenerU, 2010 and Dole et. al., 2011), providing the Sustainability Tracking and Assessment Rating System (STARS) assessment tool for sustainability within higher education. The self-reporting assessment method, similar to other methods available, offers a great tool for institutions to develop sustainable practices but falls short of providing a concrete system for comparing institutions.

While this brief introduction does not aim to cover the entire gamma of research in the field, it does seek to create a strong argument that sustainable practices are becoming part of the standard requirements of higher education institutions. The acceptance of institutions to initiate sustainability-related activities as well as the desire of both the public and policy makers to actively promote sustainability predicts that there will be continued interest in this field going forward.

What this also supports is that there is need for a more uniformed approach to dealing with sustainability within the education industry. A lot of efforts seem to be reproduced which may inhibit research development and allows for a disconnect from the realities of the field. For example, there are a variety of assessment methods currently available to measure institutions sustainability. All of these systems ultimately serve the same goals, but they do not necessarily serve the goals of an interested student that is looking to compare two institutions. Furthermore, these assessment methods generally do not place any emphasis on key economic factors that are the primary motivation for students.

By conducting a survey, this paper looks to identify these features, trends, and needs so as to start a more meaningful discussion towards convergence of research initiatives in order to make more specific contributions towards this growing field. This overarching survey looks to identify key features through the analysis of empirical data that will help shape future research and progress in the field.

§ 2.2　Methodology

§ 2.2.1　Survey Outline

A survey was created to determine the validity of the existing common practices in higher education in relation to sustainability and identify existing lapses and future trends. The survey was created with the input from various international experts in sustainability.

This survey also was created for a defined demographic within the higher education industry. The survey was created for direct stakeholders in higher education, which for this paper is defined as potential or current students, staff and management.

It is important to note that this survey looks to approach educators in a more holistic view. Often within higher education, learning can happen through other avenues than just faculty. Thusly, educators are included as educational staff and not limited to just faculty.

This paper is limited to specific areas of interest. These areas were limited to: Student Needs, Staff and Management Needs, Assessment Methods, and Economic Factors. These areas of interest, as a whole, look to identify the importance of sustainability to stakeholders, determine if it is conceptually and practically applicable, and see what stakeholders feel is the future of the field. These are individually overviewed as follows:

§ 2.2.1.1　Students Needs

The survey aims to validate Bone and Agombar's (2011) results and expand on the needs of students. It attempts to quantify the perception of sustainability within the student demographic by exploring students understanding of the term sustainability.

It also attempts to understand how students make decisions with specific emphasis on motivating factors and methods used to research sustainability.

Finally, it looks to make a distinction between the conceptual and practical importance of sustainability.

§ 2.2.1.2   **Staff and Management Needs**
. . . .

The survey directly addresses the employee demographic that is repeatedly identified as a driving force that is needed in order to promote and support sustainability within an institution. As with the students' needs, it attempts to quantify the perception of sustainability while also attempting to understand the distinction between the conceptual and practical importance of sustainability.

This survey focuses on the composition of the staff beyond just faculty. It addresses educational staff (which includes faculty), general staff and staff that are sustainability focused.

§ 2.2.1.3   **Assessment Methods**
. . . .

There is a variety of assessment and rating systems that are available to assess sustainability. The survey aims to identify which one is most used and which one the stakeholders believe is best suited for assessing sustainability.

§ 2.2.1.4   **Economic Factors**
. . . .

Although economics is one of the main categories of the triple bottom line, it is hardly used in context to the stakeholders, and specifically with regards to students. The survey looks to understand if there is economic motivation for students to undertake their degrees and if they consider post-graduation metrics of economics to be part of an institutions measure of sustainability.

§ 2.2.2   **Survey Questions and Data Collection**
. . . .

The actual survey format and questions are found within the appendix. The process of creating the survey was based on various key elements identified within higher education institutions assessment of sustainability. It was created to collect data on stakeholder perception and looks to provide empirical evidence for future studies. The survey was overarching and experimental and looked to serve the purpose of this paper and future papers. It could be broken into three parts: assessment methods and performance, economic factors, STARS performance and general stakeholder preferences.

The survey was created using Google forms and was promoted utilizing various channels of communication. It was heavily promoted at the AASHE 2012 conference and internationally through key contacts within universities in North America, Europe, Asia, Africa and Australia. Social media tools as Facebook, Google and similar sites were also used to gather information.

Due to this methodology, there is the potential for promoting bias in the results. The two primary sources of bias stem from the promotion of the survey at the AASHE conference and promotion of the survey through digital media that trend towards sustainability efforts in higher education institutions. Although some of this bias cannot be measured, some steps were taken to isolate potential bias.

Seeing as this survey was heavily promoted at the AASHE conference, it can be inferred that this would be a major source of bias as participants may be more aware of sustainability in higher education. To isolate this bias, two identical surveys were created in Google forms and AASHE conference participant were given a unique hyperlink to one of the surveys. There were a total of 56 responses that were registered from October 14-31 of 2012. These results are presented in the discussion when applicable to highlight any divergence from the overall results.

A major emailing campaign also was conducted by searching for "university sustainability" in Google and emailing the relevant parties which also allows for biased responses. Although various emailing campaigns were also general in nature to universities throughout the world, there is no way to pinpoint responses due to the anonymous online format of the survey. Other steps, namely the creation of a unique survey for each emailing campaign, are recommended for future research.

§ 2.3 Survey Results

To facilitate the effectiveness of this paper, the results of the survey have been broken down by the aforementioned specific areas. Some general highlights of the survey are as follow:

COUNTRY	High School Students	Under Graduate Students	Graduate Students	Post Graduate Students	Other Staff	Sustain-ability Oriented Staff	Education-al Staff	Executive Manage-ment
Australia		1					1	
Belgium		1	1					
Brazil		3	1					
Canada		5	4			2	2	1
Chile		1		1			1	
China			5	4		2		
Egypt		1	1	2				
France			4	2			2	
Greece		5	4	4	1		3	
Iran			1					
Israel		1						
Italy		2	4			2		
Korea	1	2	1	1			1	
Lebanon							1	
Mexico			4	2	1	2	1	
Netherlands		2	3	5		1		
Russia		1		2				
Spain		2	2					
Sweden		2	1					
Turkey				2				
UK			1	2		2	2	
USA	5	41	20	7	2	9	5	5
Total	**6**	**70**	**57**	**34**	**4**	**20**	**19**	**6**

TABLE 2.1 Classification of respondent by country

There were a total of 203 respondents, which were composed of 60% Male and 40% female participants. A total of twenty-two countries were represented and students made up 84% of the responses. From the 203 responses, there were a total of 216 classifications. This stems from the fact that students are also employed at Universities. A total of thirteen students identified themselves as concurrent employees in the areas of sustainability staff, educational staff and executive management.

It is important to note the significance in the number of respondents. Although 56 respondents were from the AASHE conference, there was also significant participation from a wide variety of stakeholders outside of AASHE. There are not enough respondents to make any definitive conclusions about preferences and behaviors of higher institution stakeholder internationally. There is, however, a substantial amount of respondents that provide adequate data for this level of empirical research.

§ 2.3.1   Student Needs

In order to address student needs, several questions were asked. The first question was meant to create a baseline for understanding what the general perception of the term sustainability was to the students. Students were asked to choose which terms were best associated with sustainability from a list of terms. The results showed that students are associating a wide variety of terms with sustainability which is an affirmation that there is a more fundamental understanding of the depth and ambiguity of the term. The results are shown in Figure 2.3.

Water	98	48%
Society	81	40%
Ecology	90	44%
Resources	102	50%
Food	73	36%
Mobility	62	31%
Energy	99	49%
Career Development	45	22%
GHG Emmisions	78	38%
The selected terms above PLUS others that are not listed	73	36%
Everything on the list and other factors not listed	85	42%

People may select more than one checkbox, so percentages may add up to more than 100%.
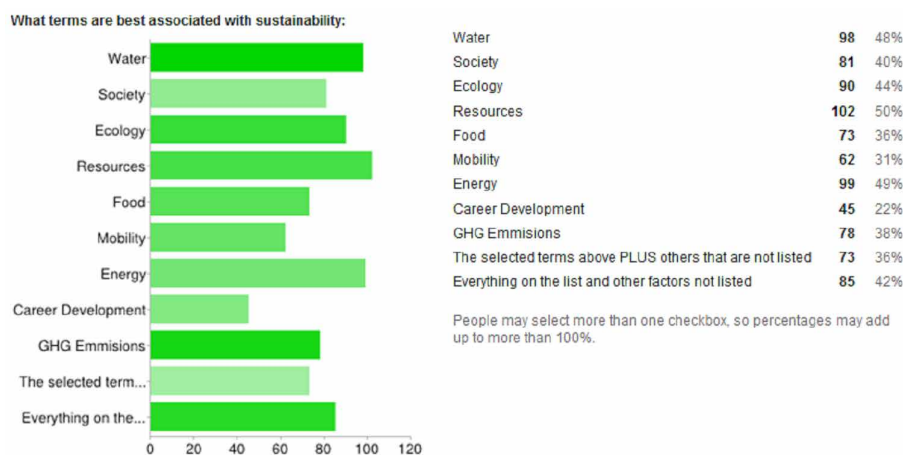
FIGURE 2.1 Terms that respondents associated with sustainability

This understanding was validated by a follow-up question which asked participants to define sustainability. This question did not seek to define sustainability, but rather sought to discover how many participants misunderstood sustainability as being solely an ecological term. The results showed that only 3% of participants related sustainability as being solely an ecological term. It is important to note that there was no noticeable bias that stemmed from AASHE participants.
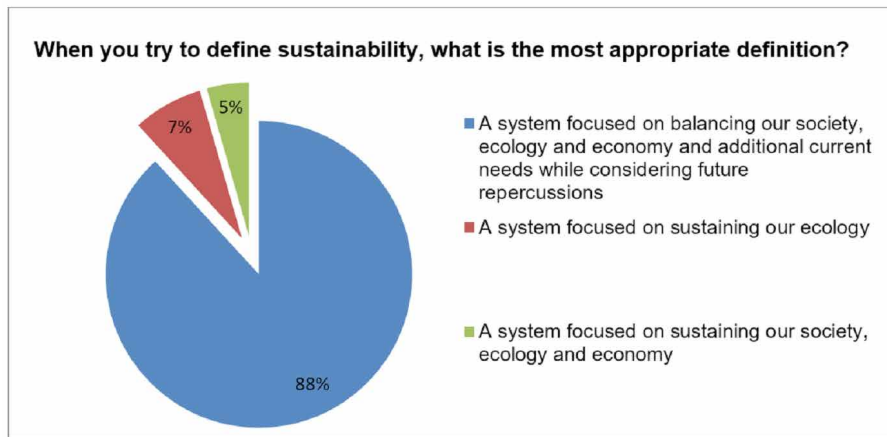
When you try to define sustainability, what is the most appropriate definition?

- A system focused on balancing our society, ecology and economy and additional current needs while considering future repercussions
- A system focused on sustaining our ecology
- A system focused on sustaining our society, ecology and economy

5%
7%
88%

FIGURE 2.2 Defining Sustainability

Overall, the responses to these questions help establish that students are fairly proficient with the term sustainability in the broadest context. The responses suggest that the complexity of the term, as well as the ambiguity, is understood by the students. There is no noticeable bias from AASHE participants; however there is a certain level of bias that may stem from the sustainability inclined participants targeted in the digital promotion.

The survey also validated Bone and Agombar's (2011) conclusion that sustainability is an important part of the student decision making process. When asked if the sustainability of a higher education institution was import in their selection, 90% responded that it did. This helps validate that Bone and Agombar's conclusion is applicable in a more international context rather than just in the United Kingdom.

If you are a student, is the sustainability of a higher education institution important in your selection?

10%
90%

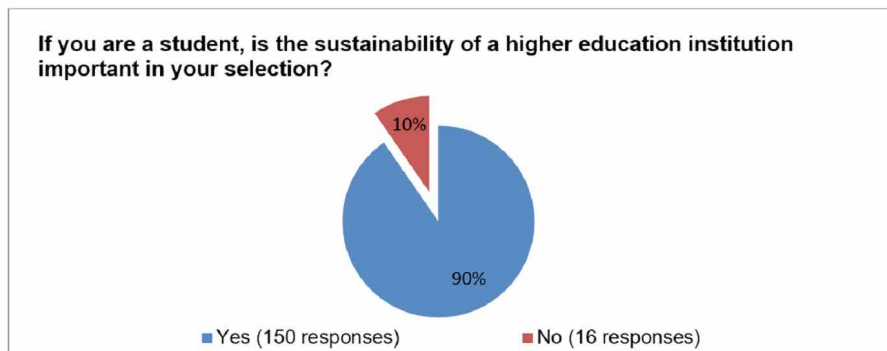■ Yes (150 responses)   ■ No (16 responses)

FIGURE 2.3 Importance of Sustainability in Students Decision Making

A significant finding of this study was the delineation between the concept of sustainability and the practicality of sustainability. Although 90% of students said that sustainability was an important part of their decision making, only 59% said that they would not attend an institution if it was unsustainable. It is interesting to note that AASHE participants were also close to this distribution, seeing as 86% said sustainability was important while only 64% would act on this belief. This deviation is important as it suggests that sustainability within higher education currently is a socially desirable trait that students will not necessarily act on.

If you are a student and an institution was unsustainable, would you attend?

41%

59%

■ Yes (150 responses)   ■ No (88 responses)
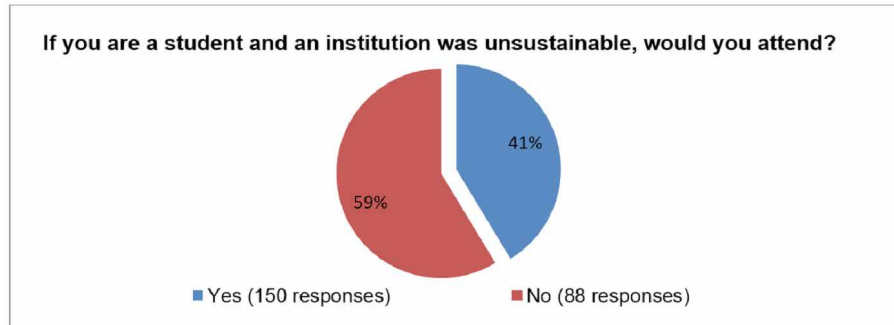
FIGURE 2.4 Students Attending Unsustainable Institutions

The survey also identified methods with which students research the sustainability of higher education institutions. The survey suggests that students use various methods for determining what they believe is the sustainability of an institution. It is important to note that although an institution's marketing may be used in part by students it is only used by 4% of the participants as their sole source of information in order to assess an institution.
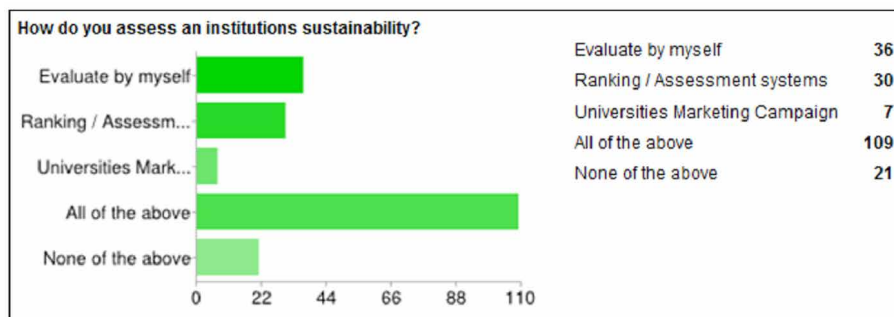
How do you assess an institutions sustainability?

Evaluate by myself	36
Ranking / Assessment systems	30
Universities Marketing Campaign	7
All of the above	109
None of the above	21

Evaluate by myself
Ranking / Assessm...
Universities Mark...
All of the above
None of the above

0   22   44   66   88   110

FIGURE 2.5 Assessment of higher education institutions

§ 2.3.2 Staff and Management Needs

In order to assess the staff and management of an institution, it is important to understand the demographic of the participants that responded to this survey. Of the forty-nine respondents classified as employees, thirteen were also concurrently students. This composition is not necessarily representative of all institutions, however it does raise an important discussion point as to how much student workers influence the transmission of an institutions sustainability initiatives.

The delineation of the conceptual and practical aspects of sustainability is more prominently displayed in relation to employment in higher education. 87% of participants stated that sustainability was important in their job satisfaction, however only 35% would consider working somewhere else if their institution was unsustainable. This result is even more significant when analyzing participants that are solely employees compared to employees that are also students. 88% of the participants that were exclusively employees responded that sustainability was important for their job satisfaction while only 12% would consider working somewhere else. On the contrary, 85% of student employees responded that sustainability was important for their job satisfaction while 46% would actively search for something else if the institution was not sustainable. It is important to note that the AASHE participants also fell very close to this distribution.

This polarization brings up a variety of discussion points that warrant further research in establishing causality for this phenomenon. Initially, the difference between the students and the employee suggest the security of money is more important than sustainability for employees. However this may also suggest that educational initiatives over the last decade have created a sustainability generation gap that is more representative of modern society. It may also suggest other factors, such as the limited uptake of sustainable practices within higher education resulting in few choices for job relocation.

§ 2.3.3 Assessment Methods

Participants were presented with a variety of the most popular rating and assessment systems that are available to determine the sustainability of a higher education institution. 26% of participants did not know of any sort of sustainability assessment systems. These participants were mainly students and are statistically significant as it suggests that the systems, in general, are not known by a sizeable section of their target market. This could be because the area of institutional assessment is over-saturated considering that there are over 20 assessment methods.

The abundance of assessment methods may prohibit integration with institutions marketing campaigns and support incoherent messaging and branding. This assertion is supported by Hemsley and Oplatka (2006) studies that found higher education marketing "incoherent" as well as Selby et. al. (2009) suggestion that "rigorous institutional engagement with marketing sustainability credentials can have a significant impact on the quality and depth of sustainability performance by helping spread, enrich and diversify the institutional sustainability culture." It is significant to note that the AASHE participant provided a very unique response. Of the participants responding, a total of 32% did not know of any sustainability assessment system. This could be for a variety of reasons; however it presents a case that the AASHE participants represent a wide variety of stakeholders.

Of the participants familiar with one or more of the systems, AASHE's STARS was the best known with 88% of participants saying they were familiar with the system, followed closely by the Princeton Review's Green Rating with 67%. The important point to note is that the third most popular system, the College Sustainability Report Card at 62%, has recently been suspended. Also important is the fact that from the AASHE participants, STARS was the best known system, however only 61% knew of the STARS system suggesting that participant were potentially not affiliated with AASHE and not as biased, in terms of assessment systems, as would be initially expected.
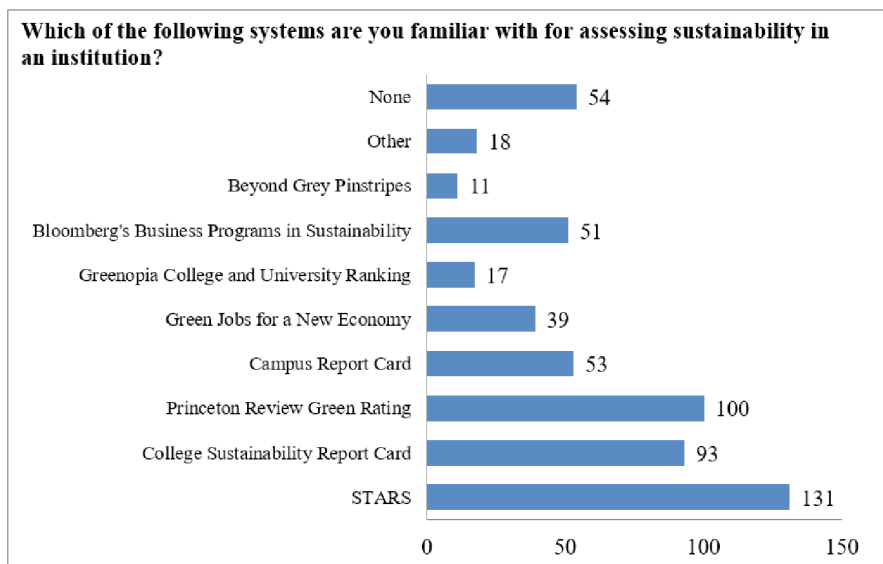

FIGURE 2.6 Familiarity with Assessment methods

Of the 149 respondents familiar with the assessment systems, 60% thought that the STARS was the best method for assessing an institutions sustainability. There was some bias noticed from AASHE respondents as 71% thought STARS was the best system.
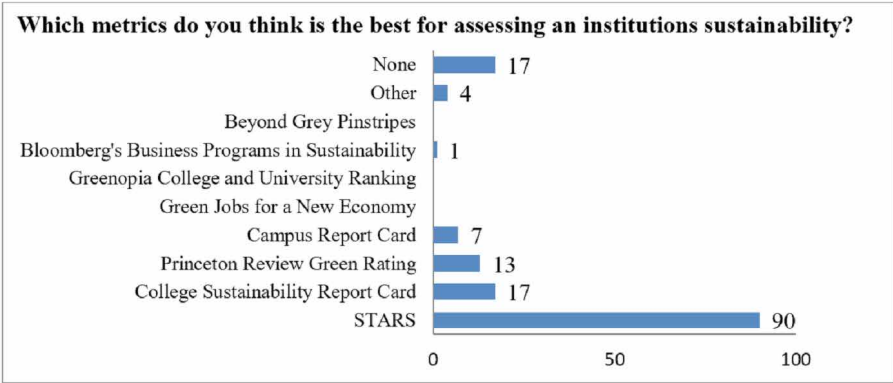

Which metrics do you think is the best for assessing an institutions sustainability?

None	17
Other	4
Beyond Grey Pinstripes	
Bloomberg's Business Programs in Sustainability	1
Greenopia College and University Ranking	
Green Jobs for a New Economy	
Campus Report Card	7
Princeton Review Green Rating	13
College Sustainability Report Card	17
STARS	90

FIGURE 2.7 Best metric for measuring an institutions sustainability

Regardless of their familiarity with assessment systems, an overwhelming 192 of the respondents, or 95%, believed that institutions needed to be uniformly rated on sustainability. This strong percentage clearly shows that stakeholders need to have a more standardized system of assessment.

§ 2.3.4   **Economic Factors**

Economic factors proved to be a major motivation for students to pursue a degree in higher education. Of the students pursing higher education, 71% said they were doing it for personal accomplishment and future employability, 22% said they were doing exclusively for future employability, while only 7% responded to doing it either exclusively for personal accomplishment or for some other reason. This finding shows that the economic factors surrounding the attainment of a degree is a significant factor for all students pursuing higher education. There are some noticeable differences with the AASHE participants, namely that 77% responded that they were pursuing higher education for personal accomplishment and future employability while none of the participants responded to doing it solely for personal accomplishment.
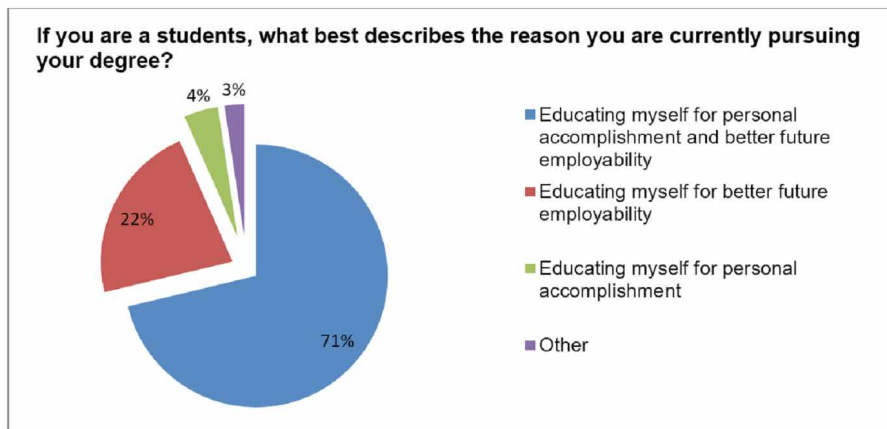
FIGURE 2.8 Motivation for Degree

This significance of economic factors in sustainability is further highlighted by the importance that all participants placed on economic factors as a metric for sustainability. An overwhelming 186 of respondents, or 92%, agreed that employability after completion of a degree was a parameter for measuring institutions sustainability. This belief is also closely upheld by the AASHE participants.

In fact, 162 of respondents, or 80%, went as far as agreeing that an institutions ability to make you more competitive in the job market is more important than sustainability. Of the remaining 20%, it was repeatedly mentioned that the two factors are intertwined and thus inseparable. These results are also in line with the responses from AASHE participants.

§ 2.4 Conclusions and Discussions

§ 2.4.1 Discussion of the Method Used

This survey has collected a variety of useful empirical data, however there are some critical discussion topics that should be considered when using these results and conducting further research.

The first concern is relative to the bias of the survey. A major marketing campaign for the survey was conducted during and AASHE conference, which caters to sustainability aware stakeholders. A major emailing campaign also was conducted by searching for "university sustainability" in Google and emailing the relevant parties which also allows for biased responses. Emailing campaigns were also general in nature to universities throughout the world, however due to the online format and anonymity of respondents it is not possible to pinpoint and measure any bias. Having isolated the AASHE participants in the presentation of the results, it is noted that there is indeed a level of bias in some responses. However useful this may be, it is still unable to eliminate the bias that may stem from sustainability inclined individuals that were reached through digital media. As such, it is suggested that the data should be considered empirical and should best represent sustainability aware stakeholders in higher education rather than all stakeholders within higher education. In order to ascertain more representative results, it is suggested that a much larger sample that encompasses the entire gamma of stakeholders in higher education is conducted.

The promotion of the survey at the AASHE conference also creates the potential for bias towards the preference of STARS as the ideal assessment tool. Although AASHE respondents, as a whole, were less knowledgeable of assessment systems they did show a strong preference towards the STARS system. Although this is a concern, the results would have been the same without the AASHE participants. Furthermore, the results are also supported by other literature that suggests STARS is one of the most popular systems which validates the relevance of the empirical data collected.

Another concern is with the unsecure format of the survey. The survey was conducted online via Google forms and thus could not eliminate respondents from potentially duplicating responses. It also could not geographically locate respondents which raises uncertainty regarding the demographics of the respondents. For example, how do you categorize a foreign national? Is it based on the country in which they are studying or the country in which they are from? These uncertainties limit the usefulness of the survey and raise questions as to how accurately it represents all the countries declared in the survey. The questions should have been rephrased so as to gather data both on the country of origin and the country of study.

Other concerns lie within the survey itself. This survey was conducted in support of research that had already identified key research points and was broad in scope. This paper deals with specific areas of the survey without taking into account the other questions which may have influenced or affected the data. In an ideal situation, a representative group of stakeholders would have been identified and surveyed progressively as research advanced in order to provide some definitive results.

Due to these concerns, uncertainties and the limited amount of responses this data and resulting conclusions should be considered weak evidence and used in conjuncture

with other research to provide meaningful results. Deviation from previously published work and/or new results coming from this data should be used for empirical research and as grounds for further, more definitive, research.

§ 2.4.2   Interpretation of Survey Results
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For the largest part, the survey presented in this paper has helped identify features, trends and needs in higher education in relation to sustainability. The primary stakeholders of institutions of higher education, identified in this paper as prospective/current students, staff and management, have shown a fairly wide understanding of the term sustainability. Only 3% of participants identified sustainability as being a solely ecological term, with the rest of the respondents acknowledging a much broader and varied definition of sustainability. Although no concrete results can be formulated, the results support that there may be a measurable effect from some of these global initiatives at raising sustainability awareness, such as the UN's Decade of Education for Sustainable Development, although again this interpretation is subject to the bias found within survey.

The importance of institutions sustainability in students decision making identified in other literature was validated in this survey as a conceptual notion. However, there was a significant statistical difference between whether a student would actually act on the lack of sustainability within an institution, with 90% of students saying that sustainability was an important part of their decision making yet only 59% said that they would not attend an institution if it was unsustainable. This difference suggests that sustainability is a socially desirable idea but there are other factors that supersede in motivating students.

The same statistical divergence was noted in employability. 87% of participants stated that sustainability was important in their job satisfaction, however only 35% would consider working somewhere else if their institution was unsustainable. This result is even more significant when analyzing participants that are solely employees compared to employees that are also students. 88% of the participants that were exclusively employees responded that sustainability was important for their job satisfaction while only 12%would consider working somewhere else. On the contrary, 85% of student employees responded that sustainability was important for their job satisfaction while 46% would actively search for something else if the institution was not sustainable.

This polarization brings up a variety of possible discussion points that warranty further research in establishing causality for this divergence. However, this survey does suggest a possible correlation between the superseding importance of economic

factors in relation to sustainability. 80% of participants placed more importance on the institution's ability to make you more competitive in the job market rather than the sustainability of the institution. Further studies are suggested in order to validate this potential correlation.

Recommendations

The survey supports unequivocally that stakeholders have two needs that are currently not being addressed. 95% of respondents agreed that there was a need for a uniform rating system of sustainability within institutions of higher education. Of those knowledgeable of the various methods of assessment currently available, AASHE's STARS was the best known (88%) and also the most supported as being the ideal system (60%). The results suggest that STARS could be an ideal system for standardization if it is improved or augmented in order to address a broad range of stakeholders.

Another need that was identified was the lack of economic factors as measures of sustainability. 92% of participants agree that employability after graduation should be included in the measurement of institutions sustainability. This strong support for economic metrics to be included is sustainability assessment should be reviewed throughout the industry in order to initiate discussions as to how to properly combine the existing assessment methods in order to include economic metrics in relation to employability and job competitiveness.

Based on these results, if sustainability was to include the economic factors needed by students, sustainability would better address the needs of students and no longer be just a socially desirable trait. It also suggests that the STARS system could be used as a baseline to integrate these economic factors in order to better serve stakeholders.

As a concluding statement this survey has also displayed a general gap of practicality between stakeholders and the industry. Great progress has been made in a short period of time with academic research and collaboration in sustainability in higher education; however, there is evidence of glaring needs that are not being addressed. Methods for standardizing methodologies, centralizing knowledge and promoting industry-wide initiatives are needed in order to increase the effectiveness of sustainability in higher education.

§ 2.4.4 Outlook

Based on the data collected, conclusions and other literature on the subject a series of research initiatives are recommended in order to provide more definitive results.

Further research on assessment methods needs to be conducted in order to validate the results of this paper. An analysis of the actual assessment methods, similar to others previously done, can help provide guidance on the most effective assessment methods and validate if STARS is really the best method.

Based on the data collected, stakeholders overwhelmingly support a standard rating system for sustainability in higher education. A review of the best methods, with an emphasis on STARS, should be conducted in order to see if it is feasible to have a uniformed rating system and what it may potentially look like.

Finally, further research should be conducted on the economic aspects of sustainability in relation to higher education. Currently there is very little discussion on the economic factors identified in this paper as measures of sustainability within higher education. It is also noticed that the economic factors identified are not uncommon within higher education. A review of systems that currently conduct these kinds of rankings, as well as relevant sustainability assessment system, needs to be conducted in order to identify synergies and collaborations that could better meet the needs of stakeholders.

References

ACUPCC (2009). *Education for Climate Neutrality and Sustainability: Academic Guidance for ACUPCC Institutions.*

Bone, E., & Agombar, J. (2011). *First-year attitudes towards, and skills in, sustainable development.* The Higher Education Academy.

Comm, C.J. and Mathaisel, D.F.X. (2003). *Less is more: a framework for a sustainable university. International Journal of Sustainability in Higher Education.* Vol. 4, 4, pp. 314-323.

Cortese, A. D. (2003). The critical *role of higher education in creating a sustainable future*, Planning for Higher Education, March-May, p. 15-22.

Datal-Clayton, B., & Bass, S. (2002). *Sustainable development strategies* (First Edition ed.). London: Earthscan Publications Ltd.

Dola, K. B., Saadatian, O., Tahir, O. M. (2011). *Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches*, International Journal of Business and Social Science, Vol 2, No. 3, 137-146.

Greener U (2010). *Higher Ed Sustainability Ratings, Rankings & Reviews*, A GreenerU Guide.

Hemsley-Brown, J., Oplatka, I. (2006). *Universities in a competitive global marketplace: A systematic review of the literature on higher education marketing*, International Journal of Public Sector Management, Vol 19, 316-338.

Jucker, R. (2002). *"Sustainability? Never heard of it!" Some basics we shouldn't ignore when engaging in education for sustainability.* International Journal of Sustainability in Higher Education, 3 (1), pp. 8-18.

McIntosh, M., Gaalswyk, K., Keniry, L., & Eagan, D. (2008). *Campus Environment 2008 - A National Report Card on Sustainability in Higher Education.* National Wildlife Federation.

Miller, H. (2005). *Creating a Culture of Sustainability: How Campuses Are Taking the Lead.* Herman Miller.

Puukka, J. (2008). *Mobilising higher education for sustainable development – lessons learnt from the OECD study.* Proceedings of the 4th International Barcelona Conference on Higher Education, Vol. 7. Higher education for sustainable development.

Reid, A., & Petocz, P. (2006). *University lecturers' understanding of sustainability.* Higher Education, pp. 105-123.

Ryan, A., Tilbury, D., Corcoran, P. B., Abe, O; Nomura, K (2010). *Sustainability in higher education in the Asia-Pacific: developments, challenges, and prospects*, International Journal of Sustainability in Higher Education, pg. 106-119.

Selby, D., Jones, P., Kagawa, F. (2009) *Sustainability Promotion and Branding: Messaging Challenges and Possibilities for Higher Education Institutions.*

Sherman, D. (2008). *Sustainability: What's the Big Idea? A Strategy for Transforming the Higher Education Curriculum.* Sustainability, 1 (3), pp. 188-195.

Shriberg, M. (2002). *Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory.* Higher Education Policy, 15(2), 153-167.

Stephens, J.C. and Graham, A.C. (2008). *Exploring Change Towards Sustainability in Universities by Adapting Transition Management.* Barcelona : Environmental Management of Sustainable Universities (EMSU) 2008 Conference.

The Princeton Review. (2011). *The Princeton Review's Guide to 311 Green Colleges (2011 Edition ed.),* The Princeton Review.

TSL Education Ltd. (2012). *World University Rankings 2012-2013,* http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking

UN (United Nations) (1987). *Our Common Future*, Oxford University Press, Oxford.

UNESCO (2011). *Education for Sustainable Development.*

http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/education-for-sustainable-development/

UNESCO. (2005). *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability.* Education for Sustainable Development in Action, Technical Paper 2.

TOC

3 Sustainability in Higher Education: Analysis and Selection of Assessment Systems

Sustainability in Higher Education: Analysis and Selection of Assessment Systems

Authors

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Abstract

There is a noticeable increase in interest with regards to sustainability in higher education. As institutions investigate, implement and market sustainability efforts, there is a myriad of sustainability assessment methodologies currently available. Although these assessment systems were created with the intention of helping sustainability in higher education institutions, they have ultimately led to an assortment of standards being used by institutions which do not help students and faculty assess the level of sustainability uniformly between institutions.

This paper combines relevant literature on sustainability assessment with empirical data to suggest an ideal assessment method to be used as the basis for a universal tool. It was found that the STARS system was the most suited system to be used as a basis for a future universal assessment tool.

Over the years there has been an increased focus on sustainability in higher education. Policy makers (UNESCO 2011) and students (Bone and Agombar 2011) have placed a significant emphasis on sustainability, while institutions have responded by actively implementing sustainable initiatives. The term sustainability still has not been unequivocally defined; nonetheless, a plethora of universities are claiming to be sustainable in some way, shape or form. This raises the question of how to define and assess sustainability in higher education institutions.

Numerous publications (Ryan et al. 2010; Glasser 2009; Patrick et al. 2008; Perna et al. 2006) have investigated and analyzed the various assessment systems and with inventories of university initiatives currently available. However, none have gone so far as to suggest which assessment system would be best suited for standardized use. This is seen as a controversial step as the choice will have far-reaching implications in theory and practice (Shriberg, 2002).

In general, there has been resistance to standardizing assessments and/or rating institutions on sustainability. AASHE's STARS, among other prominent sustainability tools, clearly makes the delineation that it is an assessment tool and in no way a rating or ranking system. It can be argued that this apprehension for standardizing sustainability within institutions neither benefits sustainable practices nor helps stakeholders (students, academics and administrators) identify the level of sustainability in an institution.

A standard sustainable assessment system would provide the basis for sustainability in an institution while also providing a standard for sustainability marketing. Selby et al. (2009) came to two very important conclusions about sustainability and marketing:

1 Sustainability messaging tends for the most part to treat 'sustainability' as synonymous with 'environment'.
2 Rigorous institutional engagement with marketing sustainability credentials provides a beneficial feedback loop that deepens and embeds the commitment and adherence by administrators, academics and students.

These two conclusions make a clear case that a standard assessment would benefit by assuring that 'sustainability' is not misrepresented as a solely environmental issue while also assisting with the deepening of sustainability within the institutions culture.

Apprehension for standardizing assessment of institutions is directly opposes the needs of some higher education stakeholders. Maragakis & Dobbelsteen's (2013) empirical study showed that 95% of potential or current students, staff and

management in higher education agreed that there was a need for a uniform rating system. This demand would explain the rise of certain private initiatives, such as Princeton's Guide to 311 Green Colleges (The Princeton Review 2011). By continuing to not act on creating a standardized system, scholars and practitioners may lose the ability to shape assessment and rating criteria for sustainability and could give rise to popular, yet potentially ineffective, methods of assessment that appeal to institutional stakeholders.

In an attempt to move this issue forward, this paper looks to review the existing literature on sustainability assessment methods and compare it to Maragakis & Dobbelsteen's (2013) empirical data in order to provide guidance as to what is the most suitable sustainability assessment system for higher education.

§ 3.2 Methodology

This research focuses on reviewing the key elements from previous literature in order to provide a robust and complete framework for assessing the suitability of sustainability assessment systems. Specifically this research looks to extrapolate the key parameters used to rate sustainability assessment systems and combine them into a more comprehensive system in order to assess current systems in order to determine the most appropriate for use as a universal system.

Once a comprehensive list is created from assessment, a selection of sustainability assessment tools identified by the literature as being ideal will be selected and subjected to evaluation. The evaluation will focus on the framework of each sustainability assessment tool and will award marks of "Yes", "No" and "Partially" in reference to fulfilling the evaluation criteria. To limit bias, each mark will be justified with reference to the sustainability assessments framework.

§ 3.2.1 Research questions

The primary question of this research is to seek the parameters and/or criteria that other authors have used or suggested to assess sustainability assessment tools in higher education.

The second research question is if the combining of these parameters can provide a meaningful comparison of assessment systems in order to determine an appropriate system for universal use.

§ 3.2.2   Approach

A literature review will be conducted in order to identify the parameters and/or criteria in order to perform a review of existing sustainability assessments. A selection of current assessment tools will be selected based on the result from other literature review and from the survey results of Maragakis & Dobbelsteen (2013).

§ 3.2.3   Literature Selection

The general topic of sustainability assessment has been exhaustively studied, perhaps better studied than sustainability itself (Kates et al., 2001). Sustainability assessments have been created for a wide range of international, national, professional and personal initiatives. Everything from sustainable farming to sustainable corporations has some methodology and guidance that is provided for from various sources. An example of this multi-tiered and growing market can be exemplified by the corporate sustainability assessment methods. Some organizations claim to assess the most sustainable corporations in the world, others assess the most sustainable corporations nationally (based on country), while others provide professional third-party sustainability assessment and finally other provide corporate sustainability assessment based on the niche in which that corporation is operating.

In addition to the existence of these sustainability assessments there also have been countless studies on the usefulness, comparison, categorization, etc. of these methods so as to provide discussion and improvement of these methods.

It is noted that the cores of all these assessments tend to be similar in nature. They all attempt to quantify sustainable initiatives using a variety of predefined or proprietary indicators. They all share a level of acceptance and criticism and they all aim to promote sustainability (although the term itself seems to vary greatly). With this in mind, all of these assessments, and the literature associated with them, would be potential sources for review. However, this would be a daunting task and would not necessarily assist in the purpose of this paper.

Thus, the scope of this paper is limited to publication related directly to sustainable assessments in relation to higher education. The literature specifically dealing within this scope is limited and provides key insight into the existing systems currently being used. The literature on this specific subject is assumed to have drawn from the existing knowledge on sustainability assessment allowing this paper to focus on determining the best possible system to be used specifically for higher education.

For this assumption to be successful, significant literature was selected in such a way to provide for a specific review of comparable publication that represents the core of this paper. Of all publications studied from the last decade only two have dealt directly with the strengths and weaknesses of assessment systems for higher education. These are:

1. Shriberg, M. (2002). *Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory*. Higher Education Policy, 15(2), 153-167.
2. Saadatian, O., Dola, K. B. & Tahir, O. M. (2011). *Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches*, International Journal of Business and Social Science, 2(3), 137-146.

These two pieces of peer-reviewed work are assumed to provide guidance for the creation of a scholarly approach to comparing assessment methods. Their methodologies and results will be utilized in this paper, in conjunction with empirical data, to provide guidance for a standard assessment system.

§ 3.3 Review of Literature

§ 3.3.1 Institutional Assessment Tools for Sustainability in Higher Education: Strengths, Weaknesses, and Implications for Practice and Theory (Shriberg, 2002)

Prior to starting the review, it is noted that this publication is outdated in respect to the latest assessment tools and trends within the niche of sustainability in higher education. Although deficient in comparing new methods, the foundations of Shriberg are still relevant and useful for this paper.

Shriberg's paper is arguably the basis for debate on the feasibility of a universal assessment system. The author touches on some of the key points that limit the implementation of a standardized system. Some of findings are:

— An effective tool needs to accurately portray the institutions current status but also integrate motivations, processes and outcomes in a comparable, understandable and calculable way.
— Tools capture baselines but do not provide mechanisms for comparisons.
— Tools converge on the parameters of:
  — Decreased throughput,
  — Incremental and systematic progress,
  — Sustainability education as a core function,
  — Cross-functional reach, and
  — Cross-institutional action.
— A universal tool debatably will overlook contextually important information.
— Sustainability ranking has been avoided due to resistance from administrators and others to ordering campuses on a subjective concept and goal.

The other analysis of the actual strengths and weaknesses of the eleven institutional tools available at the time seem to be subjective and provides more of a narrative opinion piece which is loosely connected to criteria proposed by Orr (2000) and the authors parameters, which are presented in the table below.

CORE ISSUES OF ECOLOGICALLY, SOCIALLY AND FISCALLY SUSTAINING A SOCIETY AND CAMPUS	IDEAL CROSS-INSTITUTIONAL SUSTAINABILITY ASSESSMENTS
Orr (2000)	Shriberg (2002)
What quantity of material goods does the college/university consume on a per capita basis?	Identify important issues
What are the university/college management policies for materials, waste, recycling, purchasing, landscaping, energy use and building?	Are calculable and comparable
Does the curriculum engender ecological literacy?	Move beyond eco-efficiency
Do university/college finances help build sustainable regional economies?	Measure processes and motivations
What do graduates do in the world?	Stress comprehensibility

TABLE 3.1 Parameters for assessing sustainability Assessment in higher education

The author's review of the assessment methods, based on Table 3.1, can provide guidance for this paper. The time lapse since the printing of the article discussed has however seen the revision of the existing systems as well as the introduction of new systems ultimately making the Shriberg's review outdated for the purposes of this paper.

§ 3.3.2 Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches (Saadatian et al., 2011)

This publication, in contrast to Shriberg's (2002), is directly relevant to this paper as it is relatively recent and deals with the predominant assessment methods currently available. Due to the recent nature of this research, it is assumed that the data and conclusions are still relevant and can assist in the development of this paper.

The authors took a different approach to measuring the strengths and weaknesses of the assessment systems. They utilized two theories and three criteria that were used as the basis of their evaluation. The theories were that of triple bottom line (Elkington 1997) and that of avoiding subjective judgment (Connolly et al, 2000), which provided for the criteria of comprehensiveness, novelty and popularity.

The aforementioned theories and criteria formed their parameters of judgment. By conducting a literature review, archival review, interviews and research on internet popularity, the authors concluded that STARS and CSAF were the top scoring in terms of satisfying each of the theories and the three criterions.

Saadatian's work should be applied cautiously, however, as several lapses were identified in the methodology and rigor of the tests. An example is the research conducted on the amount of Google search hits. No exact framework and keywords where provided, effectively eliminating the ability for other researchers to reproduce the results independently. Other critical lapses in presentation and academic rigor, for instance poor referencing and serious grammatical errors, were also noted and necessitate the need for the cautious use of the results.

§ 3.3.3 Conclusions from the literature review

Both pieces of literature are a testament to the difficulties and subjectivity involved with the methodological analysis of the various assessment methods. Due to the vagueness of the term sustainability, along with the limited consensus on quantifiable indicators, there seems to be a certain amount of bias in both publications.

For example, Shriberg (2002) looks to assess the effectiveness of the actual metrics of the assessment methods beyond just the triple bottom line while Saadatian et al., (2011) assumes that the triple bottom line is an effective metric for sustainability and focuses on other criteria to judge the effectiveness of the assessment methods.

In both cases, results can be drawn as to useful methodologies and approaches. Shriberg (2002) offers literature on methods of actually assessing the usefulness of metrics used in the sustainability assessments in higher education. Saadatian et al. (2011) on the other hand explore other dimensions on the effectiveness of assessment methods beyond just the metrics that encompasses popularity and acceptance (preferences) of individuals involved in sustainability with higher education.

The research of Saadatian et al. (2011) needs to be used cautiously as there are some fundamental questions as the quality of the research. However, the results of STARS as one of the highest ranking assessment methods is also in line with other literature from GreenerU (2010), which also found that STARS is one of the most prominent external assessment system because of its comprehensive and holistic nature.

This literature review has provided some key metrics for further analysis. Utilizing Orr's (2000) criteria, the triple bottom line in relation to higher education institutions can be explored in depth for each assessment method. Shriberg's (2002) criteria provide for a more in-depth review of cross-institutional metrics beyond just the social, economic and environmental parameters. While most of the criteria of Saadatian et al. (2011) have been addressed with the previous two metrics, the metric of popularity has not, providing a significant factor for determining the effectiveness of a system.

§ 3.4 Review of Empirical Data

In late 2012, Maragakis & Dobbelsteen (2013) conducted a broad survey of assessment systems within higher education that provided some useful empirical data. These results provide a first step in quantifying the needs of stakeholders (students, staff and management). One of the needs identified, and indeed motivation for this research, was that 95% of respondents agreed that institutions need to be uniformly rated.

The results of the 203 survey respondents showed that the STARS, Princeton Review Green Rating and College Sustainability Report card were the most popular assessment methods, with STARS being the most popular of the three.

Of all the assessment methods, STARS was the clear preference of stakeholders as the most appropriate metrics for assessing sustainability within higher education.

§ 3.5   Discussions from the Literature and Empirical Data Review

One of the most important conclusions from the literature and empirical data review is that each research focused on a different set of assessment systems. This does not affect the usefulness of Shriberg's (2002) findings as his research primarily provides a comprehensive methodology for assessing assessments rather than explicit results. The different sets of assessment systems do however limit the ability of directly comparing the results of Saadatian et al. (2011) with Maragakis & Dobbelsteen (2013).

This inability to directly compare the two research publications also raises questions as to the validity and comprehensiveness of each of the publications. Maragakis & Dobbelsteen's results have provided a section in their data collection for "Other" assessment systems which proved to be statistically insignificant, thus eliminating some of the uncertainty of not including other assessment systems, such as AISHE and CSAF. However, Saadatian et al. have not allowed for any potential assessment omissions and significant questions are raised as to the validity of the results. Even though the results are partially supported by GreenerU (2010), it should be noted that GreenerU is also an inflexible analysis based on a specific set of assessment methods and it could be argued that this raises more questions on the validity and comparison of the two results.

It should nonetheless be noted that STARS is consistently ranked as one of the top systems. Although there is no way to compare the various research results directly, it can be argued that STARS's superiority has been proven both against various methods and through different research methodologies. While this is not a definitive result it does provide for the formation of a trend that STARS is currently the most popular system.

Since the literature and data cannot be directly compared, all the results will need to be considered in this analysis. Saadatian et al. (2011) concluded that STARS and CSAF were the highest ranked assessments based on the research conducted. Based on survey results Maragakis & Dobbelsteen (2013) concluded that STARS was the best assessment method.

It should be noted that GreenerU (2010), which was referenced but not assessed, concluded that STARS and the College Sustainability Report Card were the most popular. As the College Sustainability Report Card has since been suspended, it will not be considered in this research.

§ 3.6   Comparing Assessment Methods

Based on the review, STARS and CSAF are the candidates for most appropriate sustainability assessment system to uniformly rate higher education institutions. A comparison of these two methods using the criteria of Orr (2000), Shriberg (2002) and Saadatian et al. (2011) was conducted using a simple 'Yes', 'No' or 'Partially' measurement. An explanation for each criterion ranking is provided for after Table 3.2.

Although there is a depth of knowledge that exists regarding criteria to judge sustainability assessments, this research has actively chosen to focus on significant work that has dealt solely on this subject. This approach was taken to use a peer-reviewed framework that would promote an unbiased, comprehensive and non-overlapping comparison. Weaknesses in the approach have been noted and it is expected that as new research continues to be published, these criteria may need to be revisited.

	STARS	CSAF
Core issues of ecologically, socially and fiscally sustaining a society and campus (Orr, 2000)		
What quantity of material goods does the college/university consume on a per capita basis?	Yes	No
What are the university/college management policies for materials, waste, recycling, purchasing, landscaping, energy use and building?	Yes	Partially
Does the curriculum engender ecological literacy?	Yes	Partially
Do university/college finances help build sustainable regional economies?	Partially	Partially
What do graduates do in the world?	No	No
Ideal cross-institutional sustainability assessments (Shriberg 2002)		
Identify important issues	Yes	Yes
Are calculable and comparable	Yes	Yes
Move beyond eco-efficiency	Yes	Yes
Measure processes and motivations	Yes	Partially
Stress comprehensibility	Yes	Yes
Saadatian et al. (2011)		
Popularity	Yes	Yes

TOTALS		
Yes	9	5
Partially	1	4
No	1	2

TABLE 3.2 Comparison of STARS and CSAF based on review criteria

For the first criterion, "What quantity of material goods does the college/university consume on a per capita basis," a review of both STARS and CSAF offers multiple areas that touch on this field. However, STARS directly deals with this in Operational (OP) Credit 17: Waste Reduction and categorizes the waste on a per capita basis. CSAF offers multiple indicators that cover this topic; however it fails to provide a per capita figure.

For the second and third criteria, "What are the university/college management policies for materials, waste, recycling, purchasing, landscaping, energy use and building" and "Does the curriculum engender ecological literacy" respectively, both the STARS and the CSAF provide indicators dealing with these subjects, however there is a key difference with the measurements that sets STARS apart from CSAF. CSAF proves to be an excellent tool for measurement while STARS provides both an excellent tool for measurement while also providing guidance. For example, the policies section within the CSAF is based upon the percentage of sustainable policies as compared to the total number of policies within an institution. Although this may provide a more robust way of gaining credit for sustainable policies, STARS looks to actively promote specific verbiage within the various policies and awards credit on a "per section" basis than as an institution as a whole. The same is true with eco-literacy as the STARS method has it integrated in various facets of the educational process while the CSAF approaches it tends to be much more vague and robust.

For the fourth criterion, "Do university/college finances help build sustainable regional economies," it is arguable that neither method fully embodies the regional aspect. STARS provides some verbiage in various sections that promote regional integration, however falls short of providing anything of actual value with regards to this criterion.

For the fifth criterion, "What do graduates do in the world," it is unfortunate to note that neither assessment method has post-graduation metrics.

For the sixth criterion, "Identify important issues," the term "important" is somewhat debatable. This being kept in mind, both methods identify important issues with regards to sustainability. STARS groups the requirements in four overarching themes while the CSAF provides 169 indicators. In both cases, it is arguable as to how "important" the actual composition of each measurement is, however it is apparent that there is substantial effort and thought in identifying the "important" issues.

For both the seventh and the eight criteria, "Are calculable and comparable" and 'Move beyond eco-efficiency," it is apparent that both assessment tools provide their own unique, but effective way for calculating and comparing a robust set of requirements that move well beyond just eco-efficiency. The STARS system offer a calculable and comparable system that is based both on quantitative and qualitative information. The CSAF offers hard metrics based on 169 indicators that provide an overall quantifiable measurement that takes into account both quantitative and qualitative information.

Both tools move well beyond just eco-efficiency, but it is noted that a significant portion of both tools focus the bulk of their metrics, in all facets of the institution, on eco-efficiency.

The ninth criterion, "Measure processes and motivations," provides a slight advantage for the STARS method. While both tools measure process and motivation, STARS provides a more comprehensive and supporting methodology that supports and measures qualitative progress as compared to CSAF's more quantitative approach. This is primarily an issue when trying to deal with motivations as these are more qualitative factors that may be hard to quantify.

For the tenth criterion, "Stress comprehensibility," there are no doubts that both systems, in their own way, stress comprehensibility.

For the eleventh and final criterion, "Popularity," it is clear that both tools are popular. However when trying to say which is more popular, a case can be made that STARS is the most popular of the two. Although both ranked high on Saadatian et al. (2011), in Maragakis & Dobbelsteen (2013) CSAF was indirectly proven to be popular. Although CSAF was not included directly in their survey set, the "Other" category, which could reference CSAF indirectly, was not statistically significant in the results.

§ 3.7 Conclusions and Discussions

§ 3.7.1 Interpretation of Results

The comparison found in this research is a first step in showing that STARS may be the most suitable basis for a uniform rating of sustainability in higher education institutions. Based on criteria set forth in previous research as well as empirical survey results, it is clear that STARS is a methodology that could be used as the cornerstone for a universal rating system.

Although both STARS and CSAF are useful tools for assessment, STARS is notable a better system. Neither system was perfect and both are comparable, however STARS exceeds in fulfilling nine of eleven criteria proposed in this research, in comparison to CSAF's ability to fulfill five. Although the criteria were selected to promote an unbiased, comprehensive and

The research also showed that STARS offers a certain level of guidance as well as assessment. Although this was not a specific topic of research in this paper, it is important as institutions that are interested in applying sustainability will have a tool that will provide guidance and measurement.

Finally, based on the data collected by Maragakis & Dobbelsteen (2013), STARS is clearly preferred by stakeholders. It is also noted that, although not conclusive, various pieces of literature have also ranked STARS as one the better assessment tools, adding validity to this research and the data collected.

§ 3.7.2   Discussion of Method Used for Comparison

The comparison is a first step to combine literature and empirical data to select a universal assessment system for higher education; however the limitations of this research need to be identified.

Firstly, as previously mentioned, this research is based on limited research material that is in many cases empirical, weak or incomparable. There are significant holes within this research resulting from the level of uncertainty in the literature used, especially of Saadatian et al. (2011), and the empirical nature of the survey conducted by Maragakis & Dobbelsteen (2013). These uncertainties could potentially be further researched in order to ascertain if indeed STARS and CSAF are the premier assessment methods to be used as a universal system.

Furthermore, the utilization of Orr (2000) and Shriberg (2002) as criteria is also a limiting factor of this research. Again, as previously discussed, sustainability assessment may be more thoroughly researched than the actual science of sustainability itself (Kates et al., 2001). The assumption that the literature used for this research is a culmination of specific efforts to research sustainability assessment methods in higher education could unknowingly eliminate other useful criteria that could have affected the results of this research.

As a last statement, the actual comparison itself is subject to the bias of the researchers. The 'Yes', 'No' and 'Partially' measurements used to compare the two methods is subjective and based on the interpretation of the researchers. Although most of the measurement results can also be supported by literature (both directly and indirectly referenced by this research), they are still subject to research bias and opinions. For example, are the three levels of measurement selected the most appropriate for this study, or should a scale have been created? What is the quantifiable level of "partially" for each of the eleven criteria?

These are some examples of potential bias in the results. But, considering that this research is conducted as an empirical study and aims to provide a starting point for further research, these limitations should be noted and addressed in further research without discounting the relevance of this study.

§ 3.7.3 Recommendations

Based on the results, it is recommended that further research be conducted on the applicability of STARS as a universal rating system. Although this research has shown it has potential to be the most suitable system for universal use, there are still some concerns and shortfalls of the STARS system that are noticed both in fulfilling the criteria set by this research and in other literature.

§ 3.7.4 Outlook

Based on the results and recommendations, it is recommended that further research be conducted on the applicability of STARS as a universal system. An analysis of the system, focusing on the strengths and weaknesses, and integration of the data from Maragakis & Dobbelsteen (2013) can provide specific insight on the steps needed to make STARS a universally applicable, and acceptable, tool.

§ 3.8 Acknowledgements

References

ACUPCC (2009). *Education for Climate Neutrality and Sustainability: Academic Guidance for ACUPCC Institutions.*

Bone, E., & Agombar, J. (2011). *First-year attitudes towards, and skills in, sustainable development.* The Higher Education Academy.

Comm, C.J. and Mathaisel, D.F.X. (2003). *Less is more: a framework for a sustainable university. International Journal of Sustainability in Higher Education.* Vol. 4, 4, pp. 314-323.

Connolly, T., Arkes, H. R., & Hammond, K. R. (2000). *Judgment and decision making: an interdisciplinary reader,* Cambridge: Cambridge University Press (Vol. 1).

Cortese, A. D. (2003). The critical *role of higher education in creating a sustainable future,* Planning for Higher Education, March-May, p. 15-22.

Datal-Clayton, B., & Bass, S. (2002). *Sustainable development strategies* (First Edition ed.). London: Earthscan Publications Ltd.

Dola, K. B., Saadatian, O., Tahir, O. M. (2011). *Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches,* International Journal of Business and Social Science, Vol 2, No. 3, 137-146.

Elkington, J. (1997). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business,* Capstone Publishing, Oxford.

Glasser, H. (2009). *Strategic Sustainability Initiatives Report,* President's Universitywide Sustainability Committee, Western Michigan University.

Greener U (2010). *Higher Ed Sustainability Ratings, Rankings & Reviews,* A GreenerU Guide.

Hemsley-Brown, J., Oplatka, I. (2006). *Universities in a competitive global marketplace: A systematic review of the literature on higher education marketing,* International Journal of Public Sector Management, Vol 19, 316-338.

Jucker, R. (2002). *"Sustainability? Never heard of it!" Some basics we shouldn't ignore when engaging in education for sustainability.* International Journal of Sustainability in Higher Education, 3 (1), pp. 8-18.

Kates, R.W., Clark, W.C., Corell R, Hall, M, Jaeger, C.C., et al. (2001). *Sustainability science.* Science 292:641–42

Maragakis, A., Dobbelsteen, A. (2013). *Higher Education: Features, Trends and Needs in Relation to Sustainability.* Journal of Sustainability Education, The Institute for Sustainable Social Change.

McIntosh, M., Gaalswyk, K., Keniry, L., & Eagan, D. (2008). *Campus Environment 2008 - A National Report Card on Sustainability in Higher Education.* National Wildlife Federation.

Miller, H. (2005). *Creating a Culture of Sustainability: How Campuses Are Taking the Lead.* Herman Miller.

Patrick, D. L., Murray, T., Bowles, I. A. (2008). *Campus Sustainability Best Practices,* Leading by Example Program, Massachusetts Executive Office of Energy and Environmental Affairs, August 2008.

Perna, T., Carriere, J., Chang, J. (2006) *Sustainability Governance: Evaluating Policy Development and Implementation Structures at the University of Toronto,* Env 421 2006-07, University of Toronto.

Puukka, J. (2008). *Mobilising higher education for sustainable development – lessons learnt from the OECD study.* Proceedings of the 4th International Barcelona Conference on Higher Education, Vol. 7. Higher education for sustainable development.

Reid, A., & Petocz, P. (2006). *University lecturers' understanding of sustainability.* Higher Education, pp. 105-123.

Ryan, A., Tilbury, D., Corcoran, P. B., Abe, O; Nomura, K (2010). *Sustainability in higher education in the Asia-Pacific: developments, challenges, and prospects,* International Journal of Sustainability in Higher Education, pg. 106-119.

Saadatian, O., Dola, K. B., Tahir, O. M. (2011). *Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches,* International Journal of Business and Social Science, Vol 2, No. 3, 137-146.

Selby, D., Jones, P., Kagawa, F. (2009) *Sustainability Promotion and Branding: Messaging Challenges and Possibilities for Higher Education Institutions.*

Sherman, D. (2008). *Sustainability: What's the Big Idea? A Strategy for Transforming the Higher Education Curriculum.* Sustainability, 1 (3), pp. 188-195.

Shriberg, M. (2002). *Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory.* Higher Education Policy, 15(2), 153-167.

Stephens, J.C. and Graham, A.C. (2008). *Exploring Change Towards Sustainability in Universities by Adapting Transition Management.* Barcelona : Environmental Management of Sustainable Universities (EMSU) 2008 Conference.

The Princeton Review. (2011). *The Princeton Review's Guide to 311 Green Colleges (2011 Edition ed.)*, The Princeton Review.

TSL Education Ltd. (2012). *World University Rankings 2012-2013,* http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking

UN (United Nations) (1987). *Our Common Future*, Oxford University Press, Oxford.

UNESCO (2011). *Education for Sustainable Development,* http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/education-for-sustainable-development/

UNESCO. (2005). *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability.* Education for Sustainable Development in Action, Technical Paper 2.

4 Analysis of STARS as a Sustainability Assessment System Universally Usable in Higher Education

Analysis of STARS as a Sustainability Assessment System Universally Usable in Higher Education

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Abstract

Sustainability assessment has become an important tool for measurement of higher education institutions. Although there are many potential tools for measuring an institutions level of sustainability, this paper explores the use of STARS as a system for higher education sustainability that could be used universally by all higher education institutions, as well as enables comparison between institutions. The results of this paper address the effectiveness of STARS to fulfill this need, as well as the further development needed in order to fully encompass sustainability and stakeholder needs.

Introduction:

Over recent years various sustainability assessment systems have been developed for the higher education sector. Both policy makers (UNESCO 2011) and students (Bone and Agombar 2011) have placed a significant focus on sustainability in higher education. Along with the various interpretations of sustainability, higher education institutions have been led worldwide to adopt a wide range of assessment systems to benchmark, report and compare various aspects of institutions' sustainability.

Although all these systems offer a way of quantifying some level of sustainability within higher education, they do not provide a universal template that enables stakeholders such as students, academics and managerial staff, to compare levels of sustainability between institutions. Sustainability has become an increasingly important factor in students decision making and not having a way of comparing sustainability within institutions may lead to erroneous information or poor criteria for selection. For example, there is evidence that sustainability messaging tends, for the greatest part, to treat 'sustainability' as synonymous with 'the environment' (Selby et al. 2009).

Although there is resistance to standardizing assessments and/or rating institutions on sustainability, Maragakis and Dobbelsteen's (2015) research provided justification for the use of AASHE's Sustainability Tracking, Assessment and Rating System (STARS) as a universal sustainability assessment tool. Based on empirical data collected and literature reviews, the STARS system showed that it was the best suited to provide a basis for a sustainability assessment system within higher education institutions that would allow for universal comparison.

Even though the STARS system was shown to be the most suitable of the current available systems, it is not without flaws. Maragakis and Dobbelsteen (2015) showed that there were some lapses within STARS that would need to be addressed in order for the STARS system to truly meet both sustainability assessment criteria. Furthermore, the empirical data collected by Maragakis and Dobbelsteen (2013) also show that STARS overlooks some basic stakeholder needs. This paper explores the weaknesses of the STARS framework identified in these preceding publications.

§ 4.2 The need for a universal system for higher education sustainability

This paper stipulates that an ideal system for higher education sustainability is one that can be used universally by all higher education institutions, as well as enables comparison between institutions.

Within the higher education sector, institutions at a national and international level are ranked and compared with one another on a range characteristics and accomplishments encompassing academic quality, athletics, and even student partying. While this tendency to rate and rank institutions has numerous critics from within and outside the higher education sector, transparent ratings and rankings that are based on measurable and relevant metrics can provide information valuable information to key stakeholders. Most notably, such systems can enable prospective students to choose an institution based on the factors and qualifications that most interest them.

A standardized sustainable assessment system could serve as a standard for sustainability marketing toward prospective students and other stakeholders, assuring that 'sustainability' is not misrepresented as a solely environmental issue while also assisting with the deepening of sustainability within the institutions culture.

Maragakis and Dobbelsteen's (2013) empirical study showed that 95% of potential or current students, staff and management in higher education agreed that there was a need for a uniform rating system. This demand would explain the rise of certain private initiatives, such as Princeton's Guide to 311 Green Colleges (The Princeton Review 2011).

In general, there has been resistance to standardized assessments and efforts to rate higher education institutions on sustainability, a situation that arguably neither benefits sustainable practices nor helps stakeholders identify the level of sustainability in an institution. By resisting the development of a standardized system, scholars and practitioners may lose the ability to shape assessment and rating criteria for sustainability and could give rise to popular, yet potentially ineffective, methods of assessment that appeal to institutional stakeholders.

The objective of this paper looks to build upon previous research that has identified lapses within sustainability assessment systems that directly relate to STARS and analyze them. STARS will be scrutinized based on these criteria utilizing the tool itself as well as stakeholder input. The methodology will be to compile the previous research and stakeholder input in order to disseminate the key lapses currently found in STARS. These analyzed lapses will provide concrete information for improvement of the tool and utilization universally amongst institutions.

§ 4.3 An Overview of STARS

STARS has grown to become a widely used international standard in higher education sustainability assessment. STARS was established and is administered by the Association for the Advancement of Sustainability in Higher Education (AASHE), with broad participation from the higher education community. STARS is a voluntary, self-reporting framework developed to recognize and gauge relative progress toward sustainability for colleges and universities.

The STARS framework is the result of a 2006 call for a campus sustainability rating system by the Higher Education Associations Sustainability Consortium, which was a collaboration of AASHE and other nonprofit-organizations and higher education institutions (AASHE 2005).

The still evolving STARS framework uses generally agreed upon American and international standards as assessment tools to assess and guide universities' decision making concerning sustainability, emphasizing four main categories:

— Education and Research
— Operations
— Planning, Administration and Engagement
— Innovation

§ 4.4 STARS as an Ideal Sustainability Measurement System

Although there is a multitude of literature and academic conversation on STARS' effectiveness and usability within a diverse range of higher education institutions, few have gone so far as suggesting a course of action to make STARS suitable for use in all institutions. The two research publications by Maragakis and Dobbelsteen have identified STARS as the most appropriate assessment tool for sustainability within higher education. However, in both research pieces serious lapses were identified that limit the STARS system from being an ideal universal system.

Preceding research concluded that STARS was the best suited assessment tool for universal use, based on criteria set forth in previous literature specific to sustainability assessment methods (Maragakis and Dobbelsteen 2015), and the empirical results from a survey conducted in 2012 in which 60% of the participants agreed that STARS was the most suitable assessment tool for assessing institutions. These findings support the idea that STARS is the most popular assessment system for higher education institutions, a conclusion that has been validated in other literature (GreenerU 2010; Saadatian et al. 2011).

An ideal sustainability measurement system for the higher education sector, beyond being universally applicable to all higher education institutions would need to appeal both to the founding principles of sustainability within higher education and the needs of the stakeholders interested in the institutions. STARS provides a methodological step towards sustainability assessment for higher education institutions, however it falls short of the parameters of a measurement systems that is universally applicable to all higher education institutions.

§ 4.5   Lapses in the STARS system based upon previous literature

Building on the findings of preceding publications, this research accepts the assumption that STARS is the most appropriate sustainability assessment tool for universal use. In Maragakis and Dobbelsteen (2015), a detailed review of the literature relevant to sustainability assessment systems in higher education systems revealed eleven criteria to be used to assess the most suitable system for universal use. These criteria, and whether each is addressed by STARS are denoted in Table 4.1.

STARS' COVERAGE OF CORE CAMPUS SUSTAINABILITY ISSUES	Addressed by STARS?
Core issues of ecologically, socially and fiscally sustaining a society and campus (Orr, 2000)	
What quantity of material goods does the college/university consume on a per capita basis?	Yes
What are the university/college management policies for materials, waste, recycling, purchasing, landscaping, energy use and building?	Yes
Does the curriculum engender ecological literacy?	Yes
Do university/college finances help build sustainable regional economies?	Partially
What do graduates do in the world?	No
Ideal cross-institutional sustainability assessments (Shriberg 2002)	
Identify important issues	Yes
Are calculable and comparable	Yes
Move beyond eco-efficiency	Yes
Measure processes and motivations	Yes
Stress comprehensibility	Yes
Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches (Saadatian et al. 2011)	
Popularity	Yes

TABLE 4.1   Comparison of STARS based on review criteria (Maragakis and Dobbelsteen 2015)

STARS met nine of the eleven criteria set forth in previous literature. STARS does not address what graduates do in the world at all, which takes into account the extent to which graduates still engage in sustainability-related employment or other activities, and it was found to only partially address how college finances help build sustainable regions. An analysis of the lapses identified in Table 4.1 is provided in the following sections.

§ 4.5.1 Lapse in Regional Economic Assessment

With regards to the question, "*do university/college finances help build sustainable regional economies?*", the STARS system does promote and assess some regional partnerships and initiatives, but falls short of providing concrete methods for higher education institutions' regional integration. This concept is not clearly defined and thus allows room for debate to whether or not the STARS system has fully captured this requirement.

The international study conducted by Puukka (2008) presents a set of criteria to be used to assess the regional impacts of higher education institutions. This study found that higher education institutions' regional engagement is typically related to the following areas:

— Contributions of research to regional innovation,
— The role of teaching and learning in the development of human capital,
— Contributions to social, cultural and environmental development, and
— The role of higher education institutions in building regional capacity to act in an increasingly competitive global economy.

The following assesses the level to which STARS adequately addresses these four areas of regional engagement:

Contributions of research to regional innovation: STARS includes numerous credits under the innovation category, but does not specifically favor or emphasize innovation that is regional in nature. In addition, credits indirectly dealing with regional innovation and advancement are included throughout the STARS framework. **(Partially addressed by STARS)**

The role of teaching and learning in the development of human capital: STARS provides ample credits related to sustainability teaching and learning. However it should be noted that these credits could be fulfilled through more narrowly focused eco-literacy efforts, and thus may not provide a complete framework for approaching

the development of sustainability-literate human capital. This observation warrants further research in order to determine a well-balanced approach for future use. **(Fully addressed by STARS)**

Contributions to social, cultural and environmental development: STARS provides various credits that support both student and institutional involvement in a variety of initiatives that promote integration with regional stakeholder and assist with regional development. **(Fully addressed by STARS)**

Building regional capacity to act in an increasingly competitive global economy: The STARS framework treats economics rather ambiguously. Though economics is often referenced in context with the triple bottom line of society, environment and economy, STARS offers very few credits that directly address this topic. Furthermore, STARS provides no framework for measuring institutions' economic impact on its students. These could include the sustainability of tuition, employability of students post-graduation, opportunity cost of studying. These simple economic indicators indirectly assess the ability for students to help create a more competitive regional capacity. **(Not addressed by STARS)**

Overall, the STARS system partially addresses regional issues but falls short of providing a meaningful framework to fully address regional integration.

§ 4.5.2 Lapse in Post-Graduate Metrics

The most noticeable omission in the STARS system based on the eleven criteria set forth by Maragakis and Dobbelsteen (2015) was in regards to assessing what graduates do in the world.

Prior to assessing this criterion it is important to note that there is no clear definition of what this entails. With regards to sustainability, an assessment of post-graduate impact could encompass a wide variety of parameters that focused on the triple bottom line. These actions could be aligned with measuring the effectiveness of learning outcomes with regards to social, environmental and economic factors, as an example. Irrespective of what this specific criterion entails, without even a basic framework for assessing an institutions' graduates as they develop professionally, there is a clear failure to implement any aspect of this criterion within the current iteration of the STARS framework. The lack of any measure to assess the main product of higher education institutions limits STARS usefulness as a universal assessment tool for sustainability in higher education.

Lapses in the STARS system based on stakeholder needs

Beyond just the eleven criteria set forth in Table 4.1, there is also a significant lapse in STARS from the perspective of the stakeholders.

The results of Maragakis and Dobbelsteen's (2013) empirical survey indicated that 60% of respondents thought that the STARS system was the most appropriate to assess an institutions level of sustainability. However, as shown below in Figure 4.1, the same respondents also have a high level of dissatisfaction with the ability of STARS to offer an all-encompassing and well-balanced system for measuring sustainability.
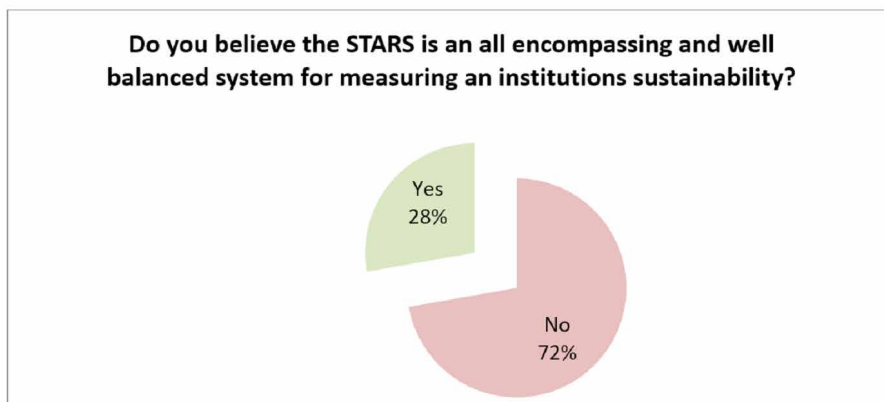
FIGURE 4.1 Responses to STARS performance as a measurement for institutions

The response shows that from the 60% of participants that support STARS as the best assessment method for universal use, 72% of them believe that is not a well-balanced system and indicates that there is significant improvement needed within the STARS framework.

Of the respondents that supported STARS as the best system for assessing an institution's sustainability, 69% offered their opinion on which categories of the STARS system needing improvement. These responses are summarized below in Figures 4.2 and 4.3.

Total Number of STARS Categories Cited as Needing Improvement
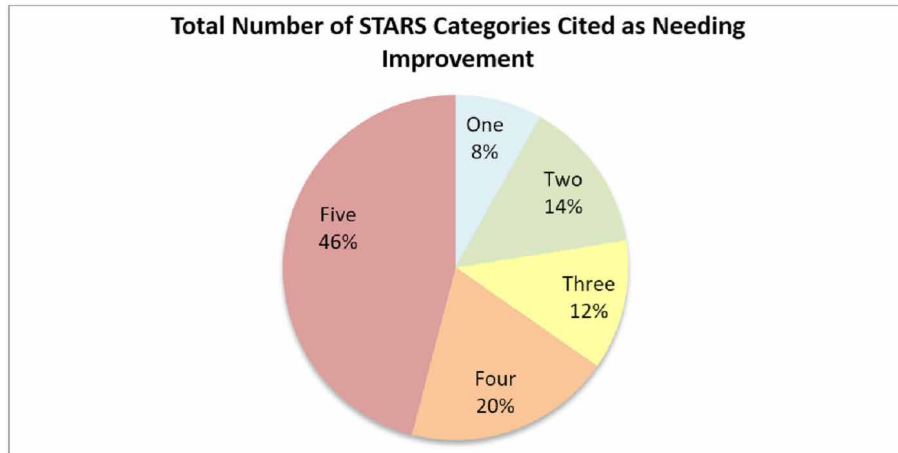
One 8%
Two 14%
Three 12%
Four 20%
Five 46%

FIGURE 4.2 Total STARS Categories needing improvement

Notably, 46% of the opinion offered indicated that all sections of the STARS system need improvement. Of the responses provided, the relative concentrations of the responses are shown in Figure 4.3 which suggests that the most problematic areas within STARS seem to be the subcategories of innovation and operations.

Percentage of responses for improvement in each category

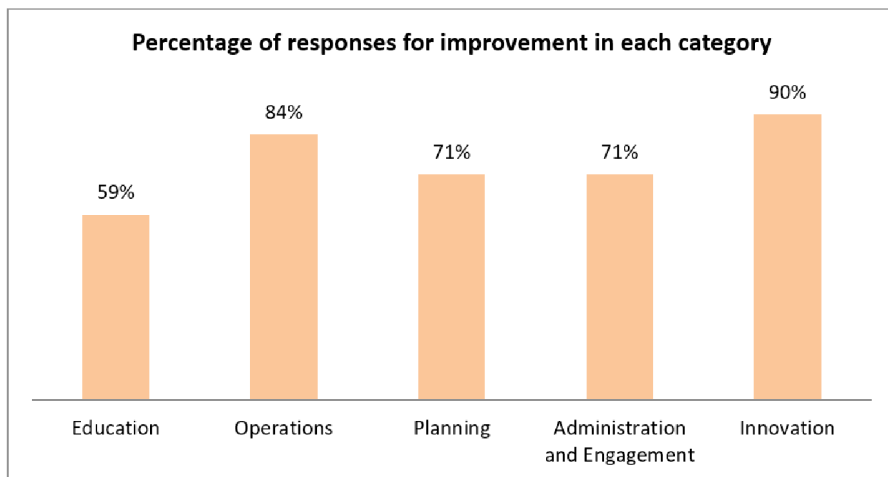| Education	Operations	Planning	Administration and Engagement	Innovation
59%	84%	71%	71%	90%

FIGURE 4.3 Distribution of responses indicating the need for improvement for STARS categories

All the respondents were offered the opportunity to offer suggestions for improvement. Of all the respondents, only seven offered more detailed opinions. These responses, edited for grammar, were as follows:

— The innovation section needs more information.
— The innovation lacks any sort of fundamental framework
— The innovation essential provides nothing noteworthy for progressing a universities path towards sustainability.
— STARS needs to have clear goals for innovation.
— STARS provides very vague guidelines.
— STARS needs to include interim targets, party evaluation and student engagement in each section.
— Operations needs to focus on investment with respects to climate change, fossil fuel companies and carbon risks.

Although these responses do not provide enough information to serve as concrete recommendations for improving STARS, it is noteworthy that the majority of feedback is directed toward the innovation section. These responses, coupled with the high response rate in Figure 3, indicate that innovation seems to be one of the most problematic sub-categories.

Another important result from Maragakis and Dobbelsteen's (2013) empirical survey was that an overwhelming 92% agreed that employability after completion of a degree was a parameter for measuring and for the institution's sustainability.

Using the data from the survey to further research this result, an analysis was conducted on the collected data on what respondents thought were the most important aspects of sustainability. Respondents were asked to rate the most important aspects of sustainability within an institution on a scale of 1-4, with 1 being "Not Important" and 4 being "Very Important". The subcategories of the STARS system were used as well as an additional subcategory of future employability. Figure 4.4 displays the results.
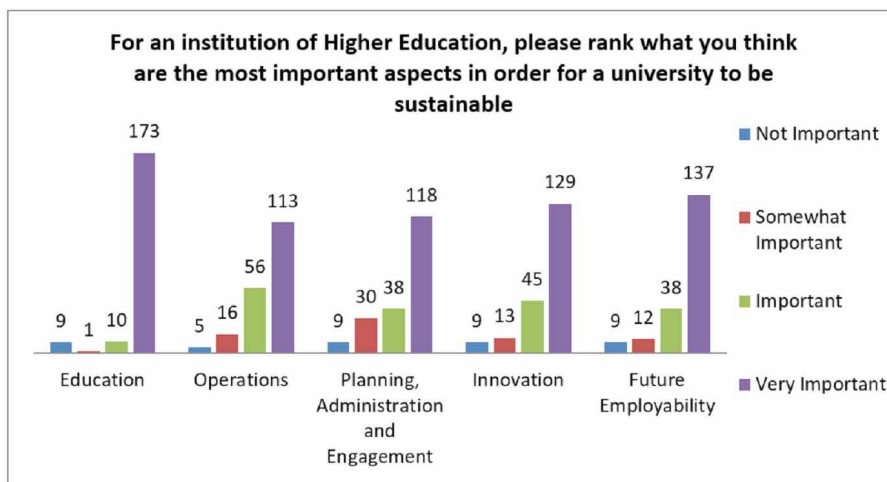
FIGURE 4.4 Important aspects of sustainability to university stakeholders

After education, future employability is the most important aspect that respondents considered necessary for a university to be sustainable. This need is not currently covered in the STARS system, which may limit STARS's usefulness as a universal assessment system.

§ 4.6   Conclusions and Discussions

§ 4.6.1   Interpretation of Results

A review of the lapses within the STARS system identified several major lapses which may limit it from being a universally useable assessment system. A major lapse can be considered anything that is not addressed within the assessment framework. The major lapses identified were the following:

— The role of higher education institutions in building regional capacity to act in an increasingly competitive global economy,
— Lack of post-graduate metrics, and
— Lack of inclusion of employability after graduation.

Each of these major lapses is multi-faceted and needs to be addressed individually. However, there is a common trait that each of lapses share, which is the exclusion of post-graduation economic factors. More specifically, the metric of post-graduation employment is a critical exclusion that would partially address each of the major lapses. Employability, as defined by York (2004), is "a set of achievements – skills, understandings and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy."

For example, if a graduate is employed regionally it could be inferred that the higher education institution is assisting in building the regional capacity to act in an increasingly competitive global economy since there are available jobs. It also addresses part of the question of "What do graduates do in the world?" (Orr 2000) which takes into account the extent to which graduates still engage in sustainability-related employment or other activities. And finally, it comprehensively appeases a key stakeholder demand of employability after graduation.

Along with these major lapses, a minor lapse was acknowledged in the research: the lack of clear definition of the Innovation criterion with STARS. This minor lapse does not necessarily deter STARS from being used universally, but does limit the effectiveness of the tool.

§ 4.6.2   **Discussion of Method Used for Comparison**

The analytical breakdown of the weaknesses within the STARS sustainability assessment method found in the research is an important step towards making the assessment tool into a more universally accepted tool. However, as with any research that is empirical in nature, the limitation of this research needs to be considered in order to utilize the results effectively.

The first concern is the basis of this research. The research is a progression of two other peer-reviewed publications that were empirical in nature. The fact that this research furthers the previous findings is a limiting factor since the initial data is empirical. It is recommended that any use of these findings takes into full account the limited scope of this research, the characteristics of the previous studies reviewed including reviewed works' limitation and potential bias.

Another concern is relative to the bias of the survey, which was also addressed in the first paper by Maragakis and Dobbelsteen (2013). A major marketing campaign for the survey was conducted during an AASHE conference, which caters to sustainability-

aware stakeholders. In the initial publication by Maragakis and Dobbelsteen (2013), the AASHE participants were isolated in order to note the bias. This paper accepts this bias and discloses that it may have influenced the results. As such, it is suggested that the results in this paper should be considered empirical and should best represent sustainability-aware stakeholders in higher education rather than all stakeholders within higher education. In order to ascertain more representative results, it is suggested that a much larger sample that encompasses the entire gamma of stakeholders in higher education is conducted.

§ 4.6.3 Recommendations

Again, the inclusion of employability does not fully address the major lapses within the STARS framework, but provides a critical metric that would help make STARS a more appropriate system and universally useable. This research is not aware of any existing resources that combine general employability with sustainability in higher education. A multitude of work, such as Grant (2009) and Kemp (2011) have addressed the concept of sustainability-aware graduates and sustainability employment but none have dealt with the general term of employability.

Outside the realm of sustainability in higher education, the employability of graduates can be considered a much scrutinized topic. There are a multitude of assessments that deal directly or indirectly with employability after graduating a higher education institution. These assessment vary in scope and nature internationally, however they usually care at least one parameter that includes employability after graduation as a metric for success.

It is recommended that further research be conducting in order to find an already existing economic assessment that tracks employability after graduation and integrate it into the STARS framework. Although the criteria for finding an ideal economic assessment would need to be researched, it can be stipulated based on the findings of this paper that the assessment would need to be international in nature, already utilized by institutions and students for decision making and address the key lapses of STARS.

It is also recommended that further definition is applied towards the research criterion of STARS. Innovation is a key driver both in the field of sustainability and in higher education institutions. Innovation should have a clearer communicated methodology to address stakeholder needs.

References:

ACUPCC, *Education for Climate Neutrality and Sustainability: Academic Guidance for ACUPCC Institutions* (2009).

Bone, E. and Agombar, J., "First-year attitudes towards, and skills in, sustainable development," *The Higher Education Academy* (2011).

Comm, C.J. and Mathaisel, D.F.X., "Less is more: a framework for a sustainable university," *International Journal of Sustainability in Higher Education* (2003): Vol. 4 (4), 314-323.

Cortese, A. D., "The critical role of higher education in creating a sustainable future," *Planning for Higher Education* (2003): March-May, 15-22.

Datal-Clayton, B., and Bass, S., *Sustainable development strategies* (London: Earthscan Publications Ltd., 2002).

GCSP, *Sustainable Pathways Toolkit for Universities and Colleges: Indicators for Campuses*, (Augene: Good Company, 2002).

Grant, M., *Education for Sustainable Development and Employability*. (Bristol: Institute for Sustainability, Health and Environment, University of the West of England, 2009).

Greener U, *Higher Ed Sustainability Ratings, Rankings* and *Reviews*, (A GreenerU Guide, 2010).

Hemsley-Brown, J. and Oplatka, I., "Universities in a competitive global marketplace: A systematic review of the literature on higher education marketing," *International Journal of Public Sector Management* (2006): Vol. 19, 316-338.

Jucker, R., "Sustainability? Never heard of it! Some basics we shouldn't ignore when engaging in education for sustainability," *International Journal of Sustainability in Higher Education* (2002): Vol. 3 (1), 8-18.

Kates, R.W. et al. "Sustainability science," *Science* (2001): Vol. 292, 641–42

Kemp, S., "Marrying ESD and employability to create sustainability literate graduates," (Presentation, University of South Hampton, 2011).

Maragakis, A. and Dobbelsteen, A., "Higher Education: Features, Trends and Needs in Relation to Sustainability," *Journal of Sustainability Education* (2013).

Maragakis, A. and Dobbelsteen, A., "*Sustainability in Higher Education Analysis and Selection of Assessment Systems,*" *Journal of Sustainable Development* (2015): Vol. 8, (3).

McIntosh, M. et al., *Campus Environment 2008 - A National Report Card on Sustainability in Higher Education*, (National Wildlife Federation, 2008).

Miller, H., *Creating a Culture of Sustainability: How Campuses Are Taking the Lead*. (Herman Miller, 2005).

Puukka, J., *Mobilising higher education for sustainable development – lessons learnt from the OECD study. (*Proceedings of the 4th International Barcelona Conference on Higher Education (2008): Vol. 7).

Reid, A. and Petocz, P., "University lecturers' understanding of sustainability," *Higher Education* (2006): 105-123.

Ryan, A. et al., "Sustainability in higher education in the Asia-Pacific: developments, challenges, and prospects", *International Journal of Sustainability in Higher Education* (2010): 106-119.

Saadatian, O. and Dola, K. B., and Tahir, O. M., "Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches," *International Journal of Business and Social Science* (2011): Vol. 2 (3), 137-146.

Selby, D. and Jones, P. and Kagawa, F., "Sustainability Promotion and Branding: Messaging Challenges and Possibilities for Higher Education Institution," *Sustainability* (2009): Vol. 1, 577-555.

Sherman, D., "Sustainability: What's the Big Idea? A Strategy for Transforming the Higher Education Curriculum," *Sustainability* (2008): Vol. 1 (3), 188-195.

Shriberg, M., "Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory," *Higher Education Policy* (2002): Vol. 15(2), 153-167.

Stephens, J. C. and Graham, A.C., "Exploring Change Towards Sustainability in Universities by Adapting Transition Management," (Barcelona: Environmental Management of Sustainable Universities Conference, 2008).

The Princeton Review, *The Princeton Review's Guide to 311 Green Colleges, (*The Princeton Review, 2011).

TSL Education Ltd., *World University Rankings 2012-2013,* http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking

United Nations, *Our Common Future* (Oxford: Oxford University Press, 1987).

UNESCO, *Education for Sustainable Development*. http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/education-for-sustainable-development/

UNESCO, *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability.* (Education for Sustainable Development in Action, 2005: Technical Paper 2).

Yorke, M., "Employability in higher education: what it is –what it is not", *Learning* and *Employability*, 2004: Series 1. http://www.heacademy.ac.uk/assets/documents/tla/employability/id116_employability_in_higher_education_336.pdf

5 Is Higher Education Economically Unsustainable? An Exploration of Factors that Undermine Sustainability Assessments of Higher Education

Is Higher Education Economically Unsustainable? An Exploration of Factors that Undermine Sustainability Assessments of Higher Education

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Abstract

As students continue to review the sustainability of higher education institutions, there is a growing need to understand the economic returns of degrees as a function of a sustainable institution. This paper reviews a range of international research to summarize the economic drivers of higher education attainment. Although the cost inputs to higher education are fairly well understood, the economic return of a degree is not. Students misperception of economic returns coupled with a dynamic definition of employability create the framework for unsustainable debt loads for graduates.

This paper proposes three metrics that can be used to assess the economic sustainability of students graduating higher education that can be used to supplement the broader definition of sustainability within higher education.

§ 5.1 Introduction

Is the discussion surrounding sustainability within higher education missing a key parameter?

The general topic of sustainability assessment has been exhaustively studied, perhaps better studied than sustainability itself (Kates et al., 2001). With relation to higher education numerous scholars (e.g. Ryan, Tilbury, Corcoran, Abe, Nomura, 2010; Glasser, 2009; Patrick, Murray, Bowles, 2008; Perna, Carriere, Chang, 2006) have investigated and analysed the various assessment systems and inventories of university initiatives currently available. Along with individual institution's efforts, there are a growing number of external certifications gaining popularity, such as the Sustainability Tracking, Assessment & Rating System (STARS) and Campus Sustainability Assessment Framework (CSAF) (Maragakis & Dobbelsteen, 2015). These initiatives show willingness of institutions to become more sustainable, while also providing them with 'sustainability' marketing materials.

As institutions continue their sustainability efforts, there is evidence that suggests that sustainability in higher education is missing a key component sought by students. Maragakis and Dobbelsteen (2013) conducted a survey of sustainability assessment systems within higher education that provided empirical data that identified a gap in current assessment methodologies. The study showed that 92 percent of participants agreed that employability after graduation should be included as a measure of sustainability while the most prominent external assessments currently do not address this aspect (Maragakis & Dobbelsteen, 2013).

The unequivocal concern of students is not a new discovery as other research also supports these numbers (Becker, 1964; Anchor, Fiserova, Mariskova & Urbanek, 2011; WU, 2011; Menon, Pashourtidou, Polycarpou & Pashardes, 2012). It is, however, a fairly novel concept with regards to being identified as a metric for sustainability. This paper looks to review the existing literature regarding the economic returns of higher education and highlight gaps between students' expectations and reality.

§ 5.2 Methodology

This research focuses on a literature review assessing relevant economic parameters associated with higher education attainment. The literature available on the economic return of degrees is sizeable and has been well studied over the last decades. The scope of this research is to identify useable information that can be used within the current identified needs and perceptions of sustainability in higher education.

The research presented applies to all forms of higher education, both academic and applied science. The research looks to provide an international view of the subject that specifically addresses trends and realities within higher education after 2010.

One aspect that will not be reviewed in depth is the difference between technical and non-technical (social science) degrees. Although a very relative topic, these differences are not seen as being the root cause of capturing metrics and, as such, are not part of the scope of this study. This study looks to focus on the underlying expectations associated with the financial incentives of a degree. It is assumed that the correct metrics will be robust and flexible enough that they can be universally used and would automatically adjust for different types of degrees.

§ 5.3 Research questions

The research question underlying the study presented is:

— Should employability be considered as a parameter of sustainability assessments within higher education?

Outcome of this question will help to answer the main question:

— Can a set of factors be extrapolated to help guide the creation of a future metric for sustainability assessment of higher education?

§ 5.4 Approach

A broad ranging literature review was conducted in order to explore the gaps between students' financial expectations and post graduate metrics. Based on the results of the literature review, the author's expert judgment was used to extract key information from peer reviewed research and used them to propose several new economic metrics for consideration.

In order to discuss this topic with relation to sustainability in higher education, it is first important to baseline the meaning of the term 'sustainable'. The term sustainability is a highly debated word that still remains to be unanimously defined. However the word sustainable is a more readily accepted word. Based on the World Commission on Environment and Development (1987) definition of 'sustainable development', a development that meets the needs of the present without compromising the needs of future generations, it means to be able to establish and maintain a balance between ecological and economic values, and equity across regions of the world. As Elkington (1997) proposed, the term can be divided into ecological, social and economic factors. Since Elkington, the first two factors have been investigated more extensively than the economic aspect of sustainability within higher education assessments.

To this extent, this research topic is novel and there are limited peer-reviewed studies that directly lend themselves to the sustainability aspects of economics of higher education. Thus, for this research to provide results, it will need to tie in various tangential fields associated with higher education. These include both government and academic lead research and, in some cases, well documented public responses.

Based on this approach there is the potential for promoting bias. This may stem from the amalgamation of various fields and there is a risk of inadvertently combining the literature in a way to support a specific belief. Although this bias cannot be measured this research aims to limit it by including various authors from other fields. It is expected that the varying views of authors and the necessary consensus required to achieve results will help limit any potential bias.

§ 5.5 Literature Selection

It should be noted that the general topic of economic returns from higher education has been studied empirically and theoretically since the 1960s and has, arguably, produced tens of thousands of publications that could directly or indirectly support

this paper. In order to encompass the most recent trends on this subject, literature selection was limited to peer-reviewed literature conducted post 2010. Literature selection was drawn from international sources to maintain the studies breadth and comprehensiveness. The literature identified to be presented reflects relevant literature that helps provide specific insight as to how to tie in economic parameters into sustainability assessments in higher education.

§ 5.6   Review of Literature

§ 5.6.1   Tuition fee

As a general starting point, there is a plethora of public exposure regarding the cost of higher education. Tuition costs are an often-debated topic internationally. From the tuition fees hike riots in the UK (Cammaerts, 2013) to the 'skyrocketing' tuition costs in America (State of the Union Address, 2012) higher education is a focal point in media and public policy.

Tuition is a discrete figure that is often the starting point of assessing a higher education institution, but it is also not appropriate as a universal measure of comparison. Tuition is a result of an institutions pricing relative to the economic environment. Economic drivers such as location, the country's Gross Domestic Product (GDP), median salary, inflation, etc. help shape tuition numbers. Affordability is a term often used to normalize tuition relative to these economic parameters. Countries run their own statistic relative to higher education affordability, which helps guide policy. On a global level, affordability comparison is offered through various venues such as Education Policy Institute, which focuses on providing educational opportunities for all students, and the Higher Education Strategy Associates, which provide higher education decision makers with various metrics and strategic services.

As can be seen through various studies and national strategies, the price of tuition is often a barometer of social health and inclusiveness. Research spans the higher education lifecycle from secondary school through graduation. Cowan (2011) showed that a decrease in tuition also decreases risky health behaviours in youths as it increases their drive for a better future through higher education. Hübner (2012) looked at state-wide differences in Germany and found that a €1000 increase in tuition fees reduced enrolment by 2.7 percent. Hemelt and Marcotte (2011)

looked at 4-year public universities in the US and found a $1000 decrease in tuition increased enrolment by about 2.5 percent. In the US, student debt greatly influences the graduation likelihood of students from the bottom 75 percent of the income distribution (Dwyer, McCloud & Hodson, 2012), while in Ireland, tuition was abolished during the mid-nineties hoping to increase participation from students in low socio-economic status (Denny, 2014).

As research continues internationally, it is unclear if tuition levels are indeed a barrier limiting social equality. This is because there is an underlying expectation that higher education is an investment that will increase a graduate's future wages. Various studies have generalized higher education attainment as a financially lucrative proposition (Walker & Zhu, 2011; Anchor et al., 2011 and others). Seeing education as an investment means that tuition may not act as a barrier if the returns outweigh the investment. But not all degrees are equal in providing a return on investment.

§ 5.6.2 Employability

There is no doubt that the expansion of higher education has contributed fundamentally to the transformation of society through the development of human competencies (Organisation for Economic Co-operation and Development [OECD], 2011). However, human competencies are not necessarily synonymous with financial gains. Although this has been proposed since the 1960s (Becker, 1964) there is growing literature on the economic outcomes of different degrees. For example, there seems to be international convergence that social sciences are less favourable for employment (Menon et al., 2012; Schomburg & Teichler, 2011). Tangentially, there is a growing sentiment amongst graduates and post-graduates that a Bachelor's degree is not enough (Schomburg & Teichler, 2011).

Social science degrees, for example, often articulate a 'pie-in-the-sky' proposition that while low initial salaries are to be expected after graduation, the skills they have acquired in undergraduate studies (e.g. critical thinking) will be highly valued by employers over time and result in higher salaries later on during their career (Rajecki & Borden, 2011). However, after investigating salaries across 120 different undergraduate majors, Rajecki and Borden concluded that mid-career salaries are highly correlated with starting salaries, and that the salaries earned by those who completed a degree in social sciences are below average compared to other fields. Therefore, this 'pie-in-the-sky' proposal that value may be seen later may not be an accurate depiction of what future degree holders may expect to experience. It also leads to further discussion as to the importance of employability after graduation.

Although the definition of employability for graduates remains unclear it still persists to be a major motivation for students. The Bologne process in Europe, which aimed to create comparable, compatible and coherent systems of higher education in Europe (European Higher Education Area, 2014) also increases the mobility of high-level skills and labour and contribute to increased employment, productivity and growth (House of Commons Education and Skills Committee, 2007). With regard to students, Maragakis and Dobbelsteen (2013) found 92 percent students agree that employability be included as a sustainability metric for higher education. This corresponds to academics also calling for employment to be a measure of sustainability (N. Ashford, Hall & R Ashford, 2012).

Increasing the complexity of measuring employability of graduates are the realities of 'underemployment' and 'overeducation'. Underemployment is defined as those working part-time due to lack of full-time jobs, or those working part-time who would like to work more hours (Bell & Blanchflower, 2011). Underemployment has been a growing concern since the financial crisis of 2008 and remains persistent (Ashford et al., 2012).

Simultaneously, overeducation has been a growing phenomenon in the modern job market. Overeducation is defined as someone whose respective levels of education exceed the requisite levels needed to perform their jobs (Linsley, 2005). The research by Carroll and Tani (2013) points to the growing concern surrounding overeducation in Australia and throughout the world.

§ 5.6.3   **Financial Return**

The literature review sheds light on the complexities surrounding the financial parameters surrounding higher education attainment. The commitment required to obtain a higher education degree will always involve some sort of cost to the student, whether it involves time, money and/or a combination of the two.

The literature review generally covered topics that, for the most part, are widely discussed both socially and academically. Tuition prices, financial and social returns of higher education are prevalent in every layer of modern society. However there seems to be some contradictory information with regard to the economic returns of higher education.

There seems to be stark contradiction in assessing the financial returns of higher education. There are ample sources such as Walker and Zhu 2011, Anchor et al. 2011 and others which show that higher education will lead to greater financial returns.

Although the framework of the research is sound, the generalization of the results needs to be questioned. It is clear that the economic returns of a social science are not equal to that of a science, technology, engineering or math (STEM) degrees. And even within the STEM degrees there are differences in economic returns depending on the path selected and the educational attainment (Schomburg & Teichler, 2011).

These studies also have not taken into account the modern reality of underemployment and overeducation. Now more than ever it is important for students to understand their opportunities and economic returns after graduation in order to make correct life decisions. It can be inferred that the economic burden of higher education may outweigh the employment returns based on the level of employability of a graduate.

§ 5.6.4 Discussion of the Literature Review with Relation to Sustainability in Higher Education

The literature does not present discrete tools that would allow for financial assessment of higher education within the context of sustainability assessments. In order to make a more accurate forecast of the economic returns of a higher education degree one needs to understand both the inputs and the outputs of the degree.

The inputs for students to make a decision are readily available. A basic calculation utilizing the tuition, duration and miscellaneous costs can easily be obtained to create a realistic projection of the cost of the degree.

The financial outputs of the educational attainment are nebulous at best. Peer reviewed studies exist arguing the general positive economic returns of higher education (Walker & Zhu, 2011; Anchor et al., 2011) while others indicate the inaccuracy of these claims (Rajecki & Borden, 2011; Menon et al., 2012; Schomburg & Teichler, 2011). A proxy to financial return may be the employability of a graduate, but this is far from being a discrete metric considering the complication of measuring underemployment or over education. Not knowing the expected return for an investment, or not being able to correctly forecast it, puts the student in an inopportune framework for making decisions. With regards to how sustainable higher education is, the literature review reveals a clear disconnect between student expectations and results.

This disconnects in the literature shows how students can get themselves into a financial unsustainable situation. Not knowing the returns of a higher education investment may lead to an unsustainable financial burden that may actually worsen an individual's standing. These results also coincide with American student loans which are currently skyrocketing and are unsustainable (State of the Union Address, 2012).

Translation to metrics for sustainability assessment

Based on the research above several key pieces of work have been extrapolated and made into self-containing questions. These questions look to provide a framework for integrating discrete economic metrics regarding with regards to the sustainability of a higher education degree.

Question 1: What is the average yearly salary of graduates with that specific degree within 12 months of graduation?

This question stems from the strong correlation that Rajecki and Borden (2011) identified between mid-career salaries and starting salaries. Rajecki and Borden (2011) also noted a notable difference between fields of studies so the question asks for the results of that specific degree to allow direct student comparison. A 12 month window is allowed so as to capture a suitable period of time after graduation.

Question 2: What is the ratio of full time / part time employed graduates with that specific degree within 12 months of graduation?

Underemployment is defined as those working part-time due to lack of full-time jobs, or those working part-time who would like to work more hours (Bell & Blanchflower, 2011). Since underemployment has been a growing concern since the financial crisis of 2008 and remains persistent (Ashford et al., 2012) this question looks to provide students with a more meaningful number than just 'employability'. A 12 month window is allowed so as to capture a suitable period of time after graduation.

Question 3: What percent of graduates with that specific degree are employed in a position whose level of education exceeds the requisite levels needed to perform their job?

The research by Carroll and Tani (2013) points to the growing concern surrounding over education and this question uses Linsley (2005) definition to capture the level of over education experienced by a graduate of a specific degree within the market place.

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§ 5.7 Conclusions and Discussions

§ 5.7.1 Interpretation of Results

From its inception, the OECD has stressed the importance of human competencies for economic and social development (2011). This, in general, can be translated as a growth of an individual in a personal and/or professional context. This guidance could also be inferred to as general guidance for sustainability assessments in higher education.

Thus for a degree to be assessed as sustainable in the economic context there needs to be at least two discrete elements presented to students for their economic decision making. The first is the cost of the education. This is a relatively straightforward calculation in which the parameters are readily available (tuition, opportunity costs, etc.).

The second element is the financial return of investment from the degree. This element presents the students with the varying monetary returns from different types of degrees and institutions. This would allow the student to decide on which institution to enrol in and the type of degree they would like to pursue based on their needs to develop their personal competencies. This should also be incorporated in sustainability assessments of higher education institutions.

The concepts presented in this paper are not new. In fact, the economic returns of degrees have been well studied in both an empirical and theoretical framework since the 1960's. However well studied these concepts are it is interesting that they still remain out of sustainability assessment of higher education institutions. Sustainability assessment, it seems, have actively avoided this topic. This is understandable as academic institutions tend to focus on progressing human competencies, knowledge and innovation. However there is another aspect of higher education that is driven by students and should encompass both the human competencies and economic development. Considering the growing student debt burden and the literature presented in this paper, it seems that sustainability assessments not including economic returns are missing a key parameter that may be contributing to the current unbalanced system.

The research presented spans a multiple fields in an attempt to capture a holistic review of current academic thought on the economic parameters surrounding the decision making of students that could be applied to sustainability assessments. The review covered qualitative and quantitative research and, in many cases, found potential contradictions, which made comparison of the research challenging. These challenges provide two valuable insights that may benefit future research.

The first insight is that apparent contradictions mainly stem from different point of views. For example, a broad analysis of higher education attainment may indeed find an increased rate of return while a more focused study may reveal a positive return for STEM fields and a negative return for social sciences. This means that the data needs to be carefully reviewed as it is not necessarily contradictory but rather biased towards a specific point of view. This makes the application into a sustainability assessment even more difficult as there will need to be some assumptions made by the assessment which may not necessarily achieve the desired results.

The other insight is that there is not yet a complete research surrounding the economic lifecycle of modern higher education. There is a general framework of understanding the inputs that go into accomplishing a degree, but the outputs are not discretely understood so as to provide guidance for sustainability assessments. Even some general metrics of post-graduate metrics may be incomplete or obsolete due to the changing market place and the drivers of employment that continuously affect the return of investment of a degree.

The research is subject to weakness as the amalgamation of all these topics can create distortion of facts. The economic inputs and outputs of higher education has produced a wealth of knowledge over the last several decades and the proper guidance needed for sustainability assessments may not be identified without the engagement of subject matter experts. Interpretations may lead to false assumptions which would increase omissions and limit critical review.

This weakness also lead this research to set a very prescriptive description within the questions. Each question specified the results based upon the specific degree. This level of granularity is lacking from this literature reviewed but provides a clear assumption that aims to students making decisions as to which higher education path to follow.

§ 5.7.3   Recommendations

This study has highlighted the importance of understanding the economic returns of higher education within the framework of sustainability assessment. A degree should not be marketed as sustainable unless it addresses the economic return of the future graduate. In order to do this, further research should be undertaken to address some general parameters to help students in decision making.

One of the critical pieces of this research was to propose a framework for assessing an institutions ability to provide a degree that is economically sustainable within the framework of current student demands and sustainability assessments. This is a novel discussion in the context of sustainability assessments of higher education institutions, although not so novel in the general discussion of economic returns from higher education.

The research identified that economic returns must be more granular than just the institution; the metrics need to address the performance of the specific degree within the institution in order to provide a clear message to the students. This level of granulator would provide a robust method for assessing cross institutional performance of similar degrees.

With this in mind, further research needs to identify what are the most appropriate aspects to be measured as an economic output of a higher education degree within sustainability assessments. Traditional models that address rate of employability after graduation are not comprehensive enough. A framework should be researched that is robust and flexible enough to help students both now and in the future while keeping in mind that this is applying to the assessment of sustainability of an institution.

References

Anchor, J., Fiserova, J., Marsikova, K.,& Urbanek, V. (2011). Student expectations of the financial returns to higher education in the Czech Republic and England: Evidence from business schools. *Economics of Education Review, 30,* 673–681.

Ashford, N. A., Hall, R. P., & Ashford, R. (2012). Addressing the Crisis in Employment and Consumer Demand: Reconciliation with Financial and Environmental Sustainability. *The European Financial Review, October-November 2012*, 63-68.

Becker, G. S. (1964). *Human capital, a theoretical and empirical analysis with special reference to education*. Chicago: Chicago University Press.

Bell, D. N. F. & Blanchflower, D. G. (2011). Youth Underemployment in the UK in the Great Recession. *National Institute Economic Review, 215*.

Bone, E., & Agombar, J. (2011). *First-year attitudes towards, and skills in, sustainable development*. The Higher Education Academy.

Cammaerts, B. (2013). The Mediation of Insurrectionary Symbolic Damage: The 2010 U.K. Student Protests. *The International Journal of Press/Politics*, *18 (4)*, 525-548.

Carroll, D. & Tani, M. (2013). Over-education of recent higher education graduates: New Australian panel evidence. *Economics of Education Review, 32,* 207–218.

Comm, C. J. & Mathaisel, D. F. X. (2003). Less is more: a framework for a sustainable university. *International Journal of Sustainability in Higher Education*, *4 (4)*, 314-323.

Connolly, T., Arkes, H. R., & Hammond, K. R. (2000). *Judgment and decision making: an interdisciplinary reader*. Cambridge: Cambridge University Press.

Cortese, A. D. (2003). The critical role of higher education in creating a sustainable future. *Planning for Higher Education, March-May*, 15-22.

Cowan, B. W. (2011). Forward-thinking teens: The effects of college costs on adolescent risky behavior. *Economics of Education Review, 30,* 813– 825.

Datal-Clayton, B., & Bass, S. (2002). *Sustainable development strategies*. London: Earthscan Publications Ltd.

Denny, K. (2013). The effect of abolishing university tuition costs: Evidence from Ireland. *Labour Economics, 26,* 26–33.

Dwyer, R.E., McCLoud, L. & Hodson, R. (2012). Debt and Graduation from American Universities. *Social Forces, 90*, 1133-1155.

Elkington, J. (1997). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. Oxford: Capstone Publishing.

European Higher Education Area (2014) *Bologna Process – European Higher Education Area*. Retrieved from http://www.ehea.info/

GreenerU. (2010). *Higher Ed Sustainability Ratings, Rankings & Reviews* (A GreenerU Guide). Retrieved from http://www.greeneru.com/.

Hemelt, S. W., & Marcotte, D. E. (2011). The impact of tuition increases on enrollment at public colleges and universities. *Educational Evaluation and Policy Analysis, 33 (4)*, 435–457.

Hemsley-Brown, J., & Oplatka, I. (2006). Universities in a competitive global marketplace: A systematic review of the literature on higher education marketing. *International Journal of Public Sector Management, 19*, 316-338.

House of Commons Education and Skills Committee. (2007). *The Bologna Process: Government Response to the Committee's Fourth Report of Session 2006-2007*. London: The Stationery Office Limited.

Hübner, M. (2012). Do tuition fees affect enrolment behavior? Evidence from a 'natural experiment' in Germany. *Economics of Education Review, 31 (6)*, 949-960.

Jucker, R. (2002). *"Sustainability? Never heard of it!" Some basics we shouldn't ignore when engaging in education for sustainability. International Journal of Sustainability in Higher Education, 3 (1)*, 8-18.

Kates, R. W., Clark, W. C., Corell R., Hall, J. M., Jaeger, C. C., Lowe, J. J., …Dickinson, N. M. (2001). Sustainability science. *Science, 292*, 641–642.

Linsley, I. (2005). Causes of overeducation in the Australian labour market. *Australian Journal of Labour Economics, 8 (2)*, 121–143.

Maragakis, A., & Dobbelsteen, A. (2013). Higher Education: Features, Trends and Needs in Relation to Sustainability. *Journal of Sustainability Education, 4*.

Maragakis, A., & Dobbelsteen, A. (2015) *Sustainability in Higher Education Analysis and Selection of Assessment Systems*, Journal of Sustainable Development.

McIntosh, M., Gaalswyk, K., Keniry, L., & Eagan, D. (2008). *Campus Environment 2008 - A National Report Card on Sustainability in Higher Education*. National Wildlife Federation.

Menon, M.E., Pashourtidou, N., Polycarpou, A. & Pashardes, P. (2012). Students' expectations about earnings and employment and the experience of recent university graduates: Evidence from Cyprus. *International Journal of Educational Development, 32,* 805–813.

Organisation for Economic Co-operation and Development. (2011). *Education at a Glance 2011: OECD Indicators*. OECD Publishing. doi: 10.1787/eag-2011-en.

Patrick, D. L., Murray, T., & Bowles, I. A. (2008). *Campus Sustainability Best Practices*. Massachusetts Executive Office of Energy and Environmental Affairs. Retreived from: http://www.mass.gov/eea/docs/eea/lbe/lbe-campus-sustain-practices.pdf

Perna, T., Carriere, J., & Chang, J. (2006). Sustainability Governance: Evaluating Policy Development and Implementation Structures at the University of Toronto (Project for Env 427). University of Toronto. Retrieved from: http://www.environment.utoronto.ca/upload/undergraduateresearchreports/421governance-group06-07.pdf

Puukka, J. (2008). Mobilising higher education for sustainable development – lessons learnt from the OECD study. *Proceedings of the 4th International Barcelona Conference on Higher Education, 7.*

Rajecki, D., & Borden, V. M. (2011). Psychology Degrees: Employment, Wage, and Career Trajectory Consequences. *Perspectives on Psychological Science, 6,* 321-335.

Reid, A., & Petocz, P. (2006). University lecturers' understanding of sustainability. *Higher Education, 51,* 105-123.

Ryan, A., Tilbury, D., Corcoran, P. B., Abe, O., & Nomura, K. (2010). Sustainability in higher education in the Asia-Pacific: developments, challenges, and prospects. *International Journal of Sustainability in Higher Education, 11,* 106-119.

Saadatian, O., Dola, K. B., & Tahir, O. M. (2011). Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches. *International Journal of Business and Social Science, 2 (3),* 137-146.

Schomburg, H., & Teichlet, U. (2011). *Employability and Mobility of Bachelor Graduates in Europe Key Results of the Bologna Process*. Rotterdam: Sense Publishers.

Selby, D., Jones, P., & Kagawa, F. (2009). Sustainability Promotion and Branding: Messaging Challenges and Possibilities for Higher Education Institutions. *Sustainability, 1,* 537-555.

Sherman, D. (2008). Sustainability: What's the Big Idea? A Strategy for Transforming the Higher Education Curriculum. *Sustainability, 1 (3),* 188-195.

Shriberg, M. (2002). Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory. *Higher Education Policy, 15(2),* 153-167.

State of the Union Address, The. (2012). Retrieved from: http://www.whitehouse.gov/the-press-office/2013/02/12/remarks-president-state-union-address

Stephens, J. C. & Graham, A. C. (2008). *Exploring Change Towards Sustainability in Universities by Adapting Transition Management*. Environmental Management of Sustainable Universities (EMSU) 2008 Conference: Barcelona.

The Princeton Review. (2011). *The Princeton Review's Guide to 311 Green Colleges (2011 Edition ed.)*. The Princeton Review. Retrieved from: http://www.centerforgreenschools.org/docs/Guideto311GreenColleges.pdf

TSL Education Ltd. (2012). *World University Rankings 2012-2013*. Retrieved from: http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking

Walker, I., & Zhu, Y. (2011). Differences by degree: Evidence of the net financial rates of return to undergraduate study for England and Wales. *Economics of Education Review, 30,* 1177– 1186.

World Commission on Environment and Development. (1987). *Our Common Future*. Oxford: Oxford University Press.

Wu, C., (2011). High graduate unemployment rate and Taiwanese undergraduate education. *International Journal of Educational Development, 31,* 303–310.

6 Earning Capacity of Sustainable Education – A Review of Current Perceptions Regarding the Salaries, Under-employment and Over-education of Higher-Education Graduates and their Potential Application in Sustainability Assessments

Earning Capacity of Sustainable Education - A Review of Current Perceptions Regarding the Salaries, Under-employment and Over-education of Higher-Education Graduates and their Potential Application in Sustainability Assessments

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Abstract

There is a growing need to understand the economic returns of degrees as a function of a sustainable institution. The empirical data presented in this paper suggests that there is a difference between the economic perception of higher education stakeholders and reality. The data showed that the most important economic metric for a graduate is full-time employment. This metric, although important, is incomplete and does not address other important factors such as starting salaries and under-employment. This indicates a gap between reality and perception considering stakeholders expectation that education should not cost more than of 15% of future salaries and that the debt be repaid in less than ten years. Student's focusing on full-time employment rather than the holistic economic realities of their educational choices may lead to an unsustainable future which is currently not captured in higher education sustainability assessments.

§ 6.1   Introduction

Sustainability. A word so prevalent in modern marketing that most do not realize it has yet to be unanimously defined. Sustainability has various definitions throughout multiple professions. This lack of clear definition creates the potential for misuse, misunderstanding or even misrepresentation of the word. The WCED definition of sustainable development (Brundtland et al., 1987) may be a more commonly known definition stating: "a development that meets the needs of the present, while not compromising the needs of future generations". In practice that definition is still open to debate.

Higher education has seen a steady use of the term sustainability since the Talloires Declaration in 1990. Since then, thirteen major international declarations have been created to support this process and a steady stream of sustainability assessment tools to support them. Policy makers (UNESCO, 2011) and students (Bone and Agombar, 2011) have placed a significant emphasis on sustainability within higher education and institutions have responded by actively implementing sustainable initiatives as demonstrated by numerous sustainability reporting services, such as the Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking, Assessment and Rating System (STARS) and the Princeton Review's Guide to Green Colleges.

Rather than try to define the term in relation to higher education, Maragakis and Dobbelsteen conducted a survey to understand what stakeholders looked for in sustainable institutions (2013). The empirical data collected suggested that one of the

gaps in current assessment systems is the lack of economic parameters surrounding higher education attainment. This was a significant step as it provided support of potential economic driven gaps in sustainability measurements and tools being used in higher education.

The economic returns of higher education have been studied thoroughly over the last several decades as can be seen in various OECD reports (Tremblay et al., 2012). This vast research has not yet made a direct connection as to how economic returns could be useable within sustainability assessments of higher education institutions. Therefore, combining economic metrics with current sustainability assessments is a novel concept yet to be fully explored. Respondents to Maragakis and Dobbelsteen (2013) survey highlighted that student's general sought "employability" as the main economic parameter to be included in sustainability assessments. However, the term employability is more convoluted than it may initially sound given that employability does not have a universally accepted definition. A literature review by Maragakis and Dobbelsteen (2015) recommended that three questions be used to assess one's employability: namely the starting salary, under employment and over education.

This paper looks to explore these three metrics via a survey in order to explore students perceptive. The results will be used to explore the utilization and implementation within sustainability assessments in higher education.

§ 6.2   Methodology

§ 6.2.1   Research Question

The primary question of this research was:

What is the importance of starting salary, under employment and over-education to higher education stakeholders?

The secondary research question was:

Do the stakeholders believe this information should be reported by higher education institutions?

Which trends or features of higher education stakeholders can be identified in regards to the economic returns of degrees?

§ 6.2.2   Survey Outline
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The aim of this study is to validate the theoretical significance of yearly compensation, over-education and under-employment of graduates by conducting a survey that would provide quantitative insight into the perception of higher education stakeholders.

This survey was created with the input from a diverse group of international participants representing sustainability initiatives and higher education. The participants represented stakeholders from higher education institutions including executive leadership, management, teaching, students and prospective students. The groups input assisted in creating a survey for a defined demographic within the higher education industry. The survey was created for direct stakeholders in higher education, which for this paper is defined as potential or current students, staff and management.

This paper focused on quantitatively validating the three metrics proposed by Maragakis et. al. (2015) and capturing the perception of higher educational stakeholders. The metrics proposed, as well as the literature supporting them, are as follows:

1   *What is the average yearly compensation of graduates with that specific degree within 12 months of graduation?*
This question was extrapolated from the strong correlation that Rajecki and Borden (2011) identified between mid-career salaries and starting salaries. The findings showed that a higher starting salary supported a higher mid-career salary and that a low starting salary and hard work was often not enough to reach the same mid-career salary.

2   *What is the ratio of full-time / part-time employed graduates with that specific degree within 12 months of graduation?*
Underemployment is defined as those working part-time due to lack of full-time jobs, or those working part-time who would like to work more hours (Bell and Blanchflower 2011). Since underemployment has been a growing concern since the financial crisis of 2008 and remains persistent (Ashford et al. 2012) this question looks to provide students with a more meaningful number than just "employability".

3   *What percent of graduates with that specific degree are employed in a position whose level of education exceeds the requisite levels needed to perform their job?*

The research by Carroll and Tani (2013) points to the growing concern surrounding over education and this question uses Linsley (2005) definition to capture the level of over education experienced by a graduate of a specific degree within the market place.

§ 6.2.3   Survey Questions and Data Collection

The questions were initially extrapolated from the literature and then underwent a two-week review from a diverse set of international higher education stakeholders. The survey was created on February 28, 2015 and accepted responses through March 15, 2015.

The survey was created using Google forms and was promoted utilizing various channels of communication. It was heavily promoted through key contacts within universities in North America, Europe, Asia, Africa and Australia.

Social media tools such as Facebook, Google, LinkedIn and others were used to promote the survey to spur responses. Physical surveys were also gathered in various North American sites.

It is important to note that these metrics are new to the discussion regarding sustainability assessments of higher education but not to the general discussion surrounding the economic return of higher education. In fact, the economic returns of higher education have been one of the well-studied, and highly debated topics, in higher education since the emergence of alternative higher education institutions in the 1960's that were employer-oriented and closely integrated with the labor market (Tremblay et al., 2012).

§ 6.3   Survey Results

§ 6.3.1   General Survey Characteristics

The survey received a total of 232 responses during a sixteen-day window. 189 responses were submitted digitally while 43 were manually collected and input. Of the 43 that were manually collected, 36 were geographically located in the Midwestern portion of the United States.

STAKEHOLDER	Africa	Asia	Australia	Europe	North America	South America	TOTAL
Administrator		1		1	4		6
Female				1	1		
Male		1			3		
Alumni		2	1	20	23		46
Female				10	11		
Male		2	1	10	12		
Faculty				6	5		11
Female				2			
Male				4	5		
Future First Time Student				1	35		36
Female				1	20		
Male					15		
Graduate Student	1		2	66	23	1	93
Female			1	33	10		
Male	1		1	33	13	1	
Professional Considering Further Education				7	8	2	17
Female				3	4		
Male				4	4	2	
Undergraduate Student	2			17	4		23
Female				4	2		
Male	2			13	2		
TOTAL	3	3	3	118	102	3	232

TABLE 6.1 Respondents by academic situation, gender and geographic location

Table 6.1 provides insight into some strengths and weaknesses of the data set. By gender, the results are slightly skewed towards a male's perspective with 129 male responses compared to 103 female responses. Based on the demographics, it can be generalized that the responses reflect a European/North American perspective, with a majority of respondents being graduate students.

An interesting observation is the composition of the respondents by geographic location. Europeans represent a majority of the responses for both the Graduate and Undergraduate academic situation, while Future First Time students almost entirely reflect North American respondents.

Responses Regarding Starting Salaries

Several questions were geared at trying to address if salaries were a driving factor in higher education. Three questions were asked specifically in order to try to isolate the underlying perception:

1   Would you pursue a degree which may not offer you a higher salary upon graduation? This question is aimed at identifying if salaries are the primary driver for pursuing higher education.

2   Would you expect a higher salary by pursuing a higher education level than you currently have? This question was created in order to capture that students were primarily driven to pursue higher education for both personal development while still expecting economic benefits from their studies.

3   Would you expect to find better employment by pursuing a higher education than you currently have? This question looked to ascertain if students pursuing higher education expected a general improvement in their professional status that was not necessarily tied to monetary gains.

Stakeholder	Would you pursue a degree which may not offer you a higher salary upon graduation?			Would you expect a higher salary by pursuing a higher education level than you currently have?			Would you expect to find better employment by pursuing a higher education than you currently have?		
	Yes	Maybe	No	Yes	Maybe	No	Yes	Maybe	No
Administrator	2		4	4		2	4		2
Alumni	23	2	21	17	10	19	12	4	30
Faculty	9		2	5	1	5	4	1	6
Future First Time Student	16	7	13	25	10	1	36		
Graduate Student	52	2	39	60	17	16	55	21	17
Professional Considering Further Education	9	1	7	11	3	3	10	4	3
Undergraduate Student	12		11	19	3	1	19	3	1
Total	**123**	**12**	**97**	**141**	**44**	**47**	**140**	**33**	**59**

TABLE 6.2 Perceptions of employment related outcomes from higher education

42% of respondents were driven solely but monetary returns while around 60% expected a higher salary after graduation or better employment. An interesting observation is that 100% of future first time student's believed that higher education would help them find better employment.

A noticeable spike is observed in alumni's responses to if they expect higher further education to provide better employment. A majority of alumni respondents did not believe they would find better employment than they currently had, although they were relatively split in terms of expecting a monetary return from further education.

Another interesting observation is the perceptions of the administrators. While the majority did not believe that students should be driven by monetary returns, they did expect a higher salary or better employment for graduates.

Stakeholder	Is it important for universities/colleges to provide students with the average starting salary of graduates based on the degree?			Is knowing the starting salary of a degree important to you?		
	Yes	Maybe	No	Yes	Maybe	No
Administrator	5	1		5	1	
Alumni	29	9	8	34	4	8
Faculty	7	3	1	6	2	3
Future First Time Student	24	6	6	27	6	3
Graduate Student	59	14	20	57	21	15
Professional Considering Further Education	16		1	11	6	
Undergraduate Student	14	5	4	11	7	5
Total	154	38	40	151	47	34

TABLE 6.3 Perceptions of salary information

Table 6.3 shows stakeholders strong support and demand for salary information. Over 65% of respondent declared their support for the importance of starting salary information and that universities/colleges provide this information. Of significant interest is the strong support that universities/colleges provide students with the average starting salary from both administrators and professionals considering further education.

§ 6.3.3   Responses Regarding under Employment

Stakeholder	Should a graduate expect full time or part time employment?			Is it important for universities/colleges to provide statistic of Full-time/Part-time employment rates of graduates within 12 months of graduation?		
	Full time	Part time	Other	Yes	Maybe	No
Administrator	4	2		4	1	1
Alumni	40	3	3	41	3	2
Faculty	10		1	9	1	1
Future First Time Student	35	1		30	3	3
Graduate Student	87		6	81	7	5
Professional Considering Further Education	15	1	1	16	1	
Undergraduate Student	20	3		17	4	2
Total	**211**	**10**	**11**	**198**	**20**	**14**

TABLE 6.4 Responses to what type of employment a graduate should expect

There is an overwhelming support from stakeholders that they expect Full Time employment and that universities should share this information with potential students. The responses that comprise the "Other" category in "Should a graduate expect full time or part time employment?" typically responded that it was up to the graduate's preference.

STAKEHOLDER	Yes	Other
Administrator	5	1
Alumni	42	4
Faculty	9	2
Future First Time Student	36	
Graduate Student	79	14
Professional Considering Further Education	15	2
Undergraduate Student	21	2
Total	**207**	**25**

TABLE 6.5 Responses to the question referencing the period of time after graduation in which a graduate should expect to find employment. "Is a 12 month period after graduation an appropriate period for use?"

Again there is an overwhelming support for a 12-month period. Some of the "Other" recommendations given were for a shorter duration or a time lapsed data collection at multiple ranges after graduation.

It should be noted that this question may have been confusing, with several respondents offering a response which highlighted their confusion. Specifically, due to the international participation it seems like the English utilized could have been simplified or made clearer in order to accommodate the audience.

§ 6.3.4   Responses Regarding Over-Education

STAKEHOLDER	Yes	No
Administrator	1	5
Alumni	18	28
Faculty	7	4
Future First Time Student	21	15
Graduate Student	47	46
Professional Considering Further Education	7	10
Undergraduate Student	10	13
Total	**111**	**121**

TABLE 6.6 Responses to the question "Should a graduate be satisfied with employment in a position where their education exceeds or does not match the requisite levels needed to perform the job?"

An interesting trend can be seen when reviewing the general mixed response to over-education. Administrators were strongly opposed to over-education and were supported by the majority of alumni, while the rest of the stakeholders were somewhat neutral. This result seems to support the strong idealism of the administrators and the realities of the alumni's. This is interesting as the two ends of the educational spectrum seem to agree while the various stakeholders in-between do not seem to have a preference, which may indicate a focus on gaining a job placement rather than a specific job field or position.

§ 6.3.5 Responses Regarding General Perceptions towards Financial Payback of Higher Education

STAKEHOLDER	I don't believe graduates should have debts	Less than 5%	Between 5-10%	Between 10-15%	Between 15-20%	Greater than 20%
Administrator		1	1	2	1	1
Alumni	12	9	15	7	2	1
Faculty	2	2	2	4	1	
Future First Time Student	3	20	7	3	1	2
Graduate Student	18	16	29	22	4	4
Professional Considering Further Education	1	2	8	3	1	2
Undergraduate Student	6	4	10	2		1
Total	**42**	**54**	**72**	**43**	**10**	**11**

TABLE 6.7 Responses to the question "How much of a graduates future salary should be allocated to repay student debts?"

72% or respondents expect to pay less than 10% of future earnings for education while 90% expect to pay less than 15%. This is a strong indication of stakeholder economic expectations from higher education. Viewing this same data by geographically filtering by North America and Europe we can also observe another trend.

STAKEHOLDER	I don't believe graduates should have debts	Less than 5%	Between 5-10%	Between 10-15%	Between 15-20%	Greater than 20%
Europe (%)	27	18	31	15	5	3
North America (%)	10	29	31	22	2	6

TABLE 6.8 European and N. American percentage response to the question "How much of a graduates future salary should be allocated to repay student debts?"

Table 6.8 provides the perceptions of Europeans compared to North Americans. It is notable that Europeans seem to have a preference for a graduate to not have an economic burden, while North American seems to tolerate a small amount of debt. This indicates that Europeans have a perception that higher education should not leave a graduate with student debt. It also seems that the majority of stakeholders perceptions converge and that debt higher than 15% is not acceptable.

STAKEHOLDER	I don't believe graduates should have debts	Less than 1 year	Between 1-5 years	Between 5-10 years	Between 15-20 years	Greater than 20 years
Administrator		1	2	2	1	
Alumni	9	4	14	11	5	3
Faculty	2		4	4	1	
Future First Time Student	8	9	14	5		
Graduate Student	14	13	29	27	9	1
Professional Considering Further Education	2		8	5	1	1
Undergraduate Student	6	3	6	7	1	
Total	41	30	77	61	18	5

TABLE 6.9 Responses to the question "How long after graduation should a graduate expect to be paying for student debts?"

62% or respondents expect to pay off all debts in less than 5 years with 90% expect to pay back all debts in less than 10 years. 30% of stakeholders believe that there should be no student debts or less than 1 year to pay back – a perspective not shared by the majority of administrators and faculty.

§ 6.4 Conclusions and Discussion

§ 6.4.1 Conclusions Regarding Employability Based on the Responses to Starting Salaries, Under-Employment and Over-Education

Before proceeding with the discussion, it is important to note the scope of this research. This paper looks to assess the general perception of higher education stakeholders regarding starting salaries, employment and over-education utilizing a relatively small dataset. The data could be used for other assessments and provide further insight on specific tendencies, relationship and correlations within the data. This will hopefully be used by others in future research.

At an absolute level, the stakeholder's response shows a clear preference placed on employment. The data supports a trend that a majority of the stakeholder in higher education expect a graduate to secure full-time employment. This is also supported with empirical data from Maragakis and Dobbelsteen (2013) results that stakeholders were primarily focused on employability. This result is to be expected considering the OECD (2011) shows that the employment rate for tertiary education is 27% higher than for those who have not completed an upper secondary education.

Even though the employment metrics was strongly supported, both starting salary and over-education were met with mixed opinion with respondents not showing an unequivocal preference. This relative uncertainty contradicts the strong expectations regarding both payback period and future allocation of funds regarding the debt incurred through higher education.

More than 90% supported that education should cost less than 15% of their future wages while 90% supported that they should be in debt for less than 10 years. This response, when compared specifically to the relative apathy towards starting salary, hints at a gap in stakeholder's expectation versus realities.

In order to have a clear understanding of a payback period or future repayment of debt one would require, at the very least, the total costs and total return of an investment in order to assess the economic burden. The responses above lend themselves to support that stakeholders assume that employment after graduation is the most important thing, while salaries and over-education are secondary in nature. This creates an uncertain future for graduates: one where a student's focuses on full-time employment rather than the holistic economic realities of their educational choices may lead to an unsustainable future.

The data set represents a perception of little or no student debt. Rothstein and Rouse (2011) demonstrated how no student debt fundamentally changes employment decisions of graduates. When students were relieved of any student debt, the changes in employment choices were large enough to entirely offset the effect of student debt on average after-tax, after-loan-payment earnings in the first years after graduation (Rothstein and Rouse, 2011). This indicated that students without debt pursued jobs without using starting salary as a primary decision maker.

This perception though is disconnected with reality. Higher education in most countries involves some sort cost (tuition, living expenses or other) that require a student to pay out of pocket and/or incur debt (Usher and Medow, 2010). There is a growing amount of public, political, academic and professional focus on student debt as it is having adverse effect on society. In the United States it has climaxed to the point that the president's State of the Union address directly refereed to student loans as skyrocketing and unsustainable (State of the Union Address, 2012).

Relating this to sustainability assessments in higher education, a graduate's economic sustainability after university becomes all the more critical. As Noam Chomsky has repeatedly stated, high tuition acts as a debt trap that sharply restricts choices after graduation (Chomsky, 2013). With this in mind, one may argue that a higher education institutions focusing their efforts on the non-economic aspects of sustainability may be creating graduates that are, in fact, less able to live a sustainable lifestyle.

To conclude, the stakeholders have repeatedly shown that the most important economic metric for a graduate is full-time employment. This metric, although important, is incomplete and does not address the economic realities holistically. As a minimum, students who will be investing money in higher education should also consider their future salary expectations so as to make a more sustainable decision.

§ 6.4.2   Discussion on Limitation and Uncertainties

Due to this methodology, there is the potential for promoting bias in the results. The promotion of the survey through digital media may promote bias based on the researcher's contacts and groups. Although the survey was promoted on various sites, there may have been a tendency to receive more responses from technical rather than social science stakeholders.

The results are also limited in their usefulness due to their empirical nature and limited international perspective. The data collected primarily represented North America and Europe. Furthermore, the data set also showed a tendency for Europeans being graduate respondents while North Americans being first time students.

§ 6.4.3 Recommendations

The results show the stakeholders have a definitive threshold both on the monetary investment and return of higher education. These thresholds need to be validated and further assessed in order to determine the effects of any gaps between expectations and reality for stakeholders.

References

Anchor, J., Fiserova, J., Marsikova, K., & Urbanek, V. (2011). Student expectations of the financial returns to higher education in the Czech Republic and England: Evidence from business schools. *Economics of Education Review, 30*, 673–681.

Ashford, N. A., Hall, R. P., & Ashford, R. (2012, October-November). Addressing the Crisis in Employment and Consumer Demand: Reconciliation with Financial and Environmental Sustainability. *The European Financial Review,* 63-68.

Bell, D. N. F., & Blanchflower, D. G. (2011). Youth Underemployment in the UK in the Great Recession. *National Institute Economic Review,* (215).

Bone, E., & Agombar, J. (2011). *First-year attitudes towards, and skills in, sustainable development.* The Higher Education Academy.

Brundtland, G. H. (Ed.) et al. (World Commission on Environment and Development). (1987). Our Common Future; Oxford University Press, Oxford, UK / New York, USA

Carroll, D., & Tani, M. (2013). Over-education of recent higher education graduates: New Australian panel evidence. *Economics of Education Review, 32*, 207–218

Chomsky, N. Interviewed by Grujicic, S. (2013). *The Lab magazine,* July 15, 2013. Retrieved from https://chomsky.info/20130715/

Cowan, B. W. (2011). Forward-thinking teens: The effects of college costs on adolescent risky behavior. *Economics of Education Review, 30*, 813–825.

Denny, K. (2013). The effect of abolishing university tuition costs: Evidence from Ireland. *Labour Economics, 26*, 26–33.

Dwyer, R. E., McCLoud, L., & Hodson, R. (2012). Debt and Graduation from American Universities. *Social Forces, 90*(4), 1133-1155.

Hemelt, S. W., & Marcotte, D. E. (2011). The impact of tuition increases on enrollment at public colleges and universities. *Educational Evaluation and Policy Analysis, 33*(4), 435–457.

Hübner, M. (2012). Do tuition fees affect enrollment behavior? Evidence from a 'natural experiment' in Germany. *Economics of Education Review, 31*(6), 949-960.

Kristinsson, J., & Dobbelsteen A. van den (Eds.). (2012). *Integrated Sustainable Design.* Delftdigitalpress.

Linsley, I. (2005). Causes of overeducation in the Australian labour market. *Australian Journal of Labour Economics, 8*(2), 121–143.

Maragakis, A., & Dobbelsteen, A. (2013). *Higher Education: Features, Trends and Needs in Relation to Sustainability.* Journal of Sustainability Education, The Institute for Sustainable Social Change.

Maragakis, A., & Dobbelsteen, A. (2015). Sustainability in Higher Education Analysis and Selection of Assessment Systems. *Journal of Sustainable Development, 8*(3).

Menon, M. E., Pashourtidou, N., Polycarpou, A., & Pashardes, P. (2012). Students' expectations about earnings and employment and the experience of recent university graduates: Evidence from Cyprus. *International Journal of Educational Development, 32*, 805–813.

OECD. (2011). *Education at a Glance 2011: OECD Indicators.* OECD Publishing. http://dx.doi.org/10.1787/eag-2011-en

Rajecki, D., & Borden, V. M. (2011). Psychology Degrees: Employment, Wage, and Career Trajectory Consequences. *Perspectives on Psychological Science,* 321-335.

Rothstein, J., & Rouse, C. E. (2011). Constrained after college: Student loans and early-career occupational choice. *Journal of Public Economics, 95*, 149-163.

Schomburg, H., & Teichlet, U. (2011). *Employability and Mobility of Bachelor Graduates in Europe Key Results of the Bologna Process.* Sense Publishers

State of the Union Address, The. (2012). Retrieved November 24, 2014, from http://www.whitehouse.gov/the-press-office/2013/02/12/remarks-president-state-union-address

The Princeton Review. (2011). *The Princeton Review's Guide to 311 Green Colleges.* The Princeton Review.

Tremblay, K., Lalancette, D., & Roseveare, D. (2012). *Assessment of Higher Education Learning Outcomes: Feasibility study Report.* OECD. Retrieved from http://www.oecd.org/education/skills-beyond-school/AHELOFSReportVolume1.pdf

UN (United Nations). (1987). *Our Common Future.* Oxford University Press, Oxford.

UNESCO. (2011). *Education for Sustainable Development.* Retrieved from http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/education-for-sustainable-development/

Usher, A., & Medow, J. (2010). *Global Higher Education Rankings 2010: Affordability and Accessibility in Comparative Perspective*. Higher Education Strategy Associates.

Walker, I., & Zhu, Y. (2011). Differences by degree: Evidence of the net financial rates of return to undergraduate study for England and Wales. *Economics of Education Review, 30*, 1177–1186.

Wu, C. (2011). High graduate unemployment rate and Taiwanese undergraduate education. *International Journal of Educational Development, 31*, 303–310.

7 Validating the Need to Include the Economic Returns of Graduates as a Metric of a Higher Education Institutions Level of Sustainability

Validating the Need to Include the Economic Returns of Graduates as a Metric of a Higher Education Institutions Level of Sustainability

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Abstract

Higher education institutions play an important role in sustainability, in their own management and operation, in research and education, and in the undergraduate and graduate degrees they deliver. Often ignored, economic sustainability and future

perspectives of students are important indicators too. The research presented in this paper validates that a student's post-graduation economic performance should be part of a higher education institution's metric for sustainability. The data collected in this research, as well as in other research, shows that almost 90% of respondents agree that economic metrics should be considered part of a higher education institutions level of sustainability. While there is no doubt about the economic gains of higher education, the results indicate that students utilizing a manageable 8% repayment of economic debt would be in debt for decades after graduation, further supporting the need for institutions to inform their stakeholders before such a life changing commitment.

§ 7.1   Introduction

Higher education has seen a steady use of the term sustainability since the Talloires Declaration (1990). Since then, thirteen major international declarations have been created to support this process and a steady stream of sustainability assessment tools to support them. Policy makers (UNESCO, 2011) and students (Bone & Agombar, 2011) have placed a significant emphasis on sustainability within higher education and institutions have responded by actively implementing sustainable initiatives. With all these initiatives, focus and subsequent marketing, there is still no clear definition as to what sustainability means as applied to higher education institutions.

Rather than trying to define the term in relation to higher education, Maragakis & Dobbelsteen (2013) conducted a survey to understand what stakeholders looked for in sustainable institutions. The empirical data collected suggested that one of the gaps in current assessment systems is the lack of economic parameters, namely "employability" after graduation.

However, employability is a convoluted term. Employability is more than just obtaining work; a literature review by Maragakis et al. (2016a) recommended that three criteria should be used to assess one's employability due to their importance to future job-seeking graduates:

1   Starting salary, as it was highly correlated to mid-career salary levels (Rajecki & Borden, 2011),
2   Under-employment, which is defined as part-time work when full-time work is desired, as it has become a growing concern after the financial crisis of 2008 (Ashford et al., 2012), and
3   Over-education, which is defined as being overqualified for the employment position, as this is also a growing phenomenon (Carroll & Tani, 2013).

These three criteria were further explored by Maragakis et al. (2016b) to gain insight on the perceptions held by higher education stakeholders. The data collected indicated that there was a strong preference for students to be employable after graduation, although students where not particularly concerned with starting salary or under-employment. Stakeholders also had a strong preference regarding the relatively value of higher education as an investment: specifically that education should cost less than 15% of their future wages while also taking less than 10 years to repay.

This research intends to bridge the gap between the economic expectations and realities of higher education and validate the need for economic metrics to be used when assessing a higher education institutions level of sustainability. Combining economic metrics with current sustainability assessments is a novel concept although the economics surrounding the returns of higher education have been studied thoroughly over the last several decades (Psacharopoulos & Patrinos, 2004). This research aims to identify the need based both on stakeholder's requirements and also through data that suggests that the economic burden of higher education is unsustainable.

§ 7.2 Background

This paper focuses on validating empirical research regarding the metrics used for reporting sustainability in higher education institutions. This research specifically looks to explore the inclusion of post-graduate economic returns as part of a higher education institutions measurement of sustainability.

In 2013, Maragakis & Dobbelsteen's empirical evidence indicated that economic factors were a major motivation for students to pursue a degree in higher education.

Of the students pursuing higher education, 71% said they were doing it for personal accomplishment and future employability, 22% said they were studying exclusively for future employability, while only 7% responded to studying either exclusively for personal accomplishment or for some other reason. This result shows the importance of economic factors surrounding the attainment of a degree. In fact, in another questions 80% of stakeholders agreed that an institution's ability to make you more competitive in the job market is more important than sustainability. Of the remaining 20%, it was repeatedly mentioned that the two factors are intertwined and thus inseparable.

The same study also identified the need of economic factors to be used as a measure of sustainability. 92% of participants identified that employability after graduation should be included in the measurement of institution's sustainability.

Maragakis & Dobbelsteen (2015) proposed a framework for comparing sustainability assessment utilizing parameters and criteria set forth by other researchers in the field of sustainability in higher education. Utilizing this framework they compared two popular sustainability assessments. The primary focus of the research identified STARS as an assessment that would be a better basis for a universal assessment system while also highlighting that neither popular method tracked "what graduates are doing in the world," a criteria set for by Orr (Penn State Green Destiny Council, 2000). While this criteria was not specific to the employability of the graduate, it shares some commonality with post-graduate metrics on the economic reality of a graduate.

Maragakis et. al. (2016a) studied the importance of understanding the economic returns of higher education within the framework of sustainability assessment. A degree should not be marketed as sustainable unless it addresses the economic return of the future graduate. The research proposed three criteria for assessing the economic sustainability of an institution; starting salaries (based on studies from Rajecki & Borden, 2011), employment (based on studies from Bell & Blanchflower, 2011 and Ashford et al. 2012) and over education (based on studies from Carroll & Tani, 2013 and Linsley, 2005).

Maragakis et. al. (2016b) showed that, at an absolute level, the stakeholder's response shows a clear preference placed on employment. The data supports a trend that a majority of the stakeholder in higher education expect a graduate to secure full-time employment. This supports the empirical data results from Maragakis & Dobbelsteen (2013) that stakeholders were primarily focused on employability and is also validated by the OECD (2011) data showing that the employment rate for tertiary education is 27% higher than for those who have not completed an upper secondary education.

Even though the employment metrics was strongly supported, both starting salary and over-education were met with mixed opinion with respondents not showing an unequivocal preference. This relative uncertainty contradicts the strong expectations regarding both payback period and future allocation of funds regarding the debt incurred to obtain a higher education. More than 90% supported that education should cost less than 15% of their future wages while 90% supported that they should be in debt for less than 10 years. This response, when compared specifically to the relative apathy towards starting salary, hints at a gap in stakeholder's expectation versus realities.

§ 7.3   **Methodology**

§ 7.3.1   **Research Question**

The primary question of this research is to validate if a student's post-graduation economic performance should be part of a higher education institutions metric for sustainability. This was done by collecting data from stakeholder which:

1   Asked stakeholders directly: "Should a student's economic well-being be a measure of a higher education institutions sustainability?"
2   Gathered data on stakeholder economic realities for before, during and after higher education and identifying any unsustainable trends.
The secondary research question was to validate the need for this metric by comparing previous perceptions with real data provided by stakeholders.

§ 7.3.2   **Website**

The domain www.sustainingeducation.com was purchased and a website was developed using Wordpress. The website was developed to be focused on data collection while offering users relevant reference material. Four webpages were created:

1   An overview page with a general introduction and explanation.
2   An economic calculator page which was driven by a custom widget that collected data while computing "real-time" results from visitors that used the calculator.
3   An assessment webpage which allowed users to rate popular sustainability assessments based on fourteen different criteria.
4   A resources page which gave links to supporting material and other useful resources.

Upon completion of the website, two weeks of testing were conducted in order to debug the site and respond to problems. Small changes were made to improve user interface across various platforms (desktop, tablet, and mobile). The total time for development and testing took three months.

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§ 7.3.3 Calculator Outline

The economic calculator utilized a custom widget which was programmed to run various equation and give live results to visitors while also collecting data. The calculator fields are outlined in Table 7.1 and summarize the Field#, Title, Description and Function.

FIELD #	TITLE	DESCRIPTION	FUNCTION
Field 1	Currency	Some key currencies were included to increase user interface by adding a currency symbol in front of the numerical values	None
Field 2	How much will your education cost you?	Manual input by user of a numeric number	This is to identify how much the education will cost to be factored into the total cost of education (capital + opportunity cost)
Field 3	Will you be taking out a loan for your education?	Drop down menu of Yes or No	This is to identify how many respondents are looking to take out loans for their education.
Field 4	Loan Rate	Manual input by user of a numeric number	This is to identify the loan rate of respondents. It is assumed to be a fixed rate loan at the amount declared by the respondent.
Field 5	How many years will your education take?	Manual input by user of a numeric number	This is to identify how much opportunity cost the education will require (Field 5 x Field 6 x Field 8)
Field 6	WITHOUT further education, what is your current/expected yearly compensation (salary plus benefits)?	Manual input by user of a numeric number	This is the establish the base salary for a comparison of opportunity cost
Field 7	WITH further education, what is your current/expected yearly compensation (salary plus benefits)?	Manual input by user of a numeric number	This is to establish future salaries used for repayment of total cost of education (capital + opportunity costs)
Field 8	Will you be working during your education?	Drop down menu of Full -Time, Part -Time or No-I will not be working	This field captures a high the high level opportunity cost of the education. This defaults to assume: Full - Time Employment = No loss based on current/expected salary Part - Time Employment = 50% loss based on current/expected salary multiplied by years to complete education No= 100% loss based on current/expected salary multiplied by years to complete education

>>>

FIELD #	TITLE	DESCRIPTION	FUNCTION
Field 9	Should a student's economic well-being be a measure of a higher education institutions sustainability?	Drop down menu of Yes or No	This is to collect data for the primary purpose of this research, which was to validate if students believe if the economic metrics of higher education should be included in sustainability metrics of higher education institutions.
Field 10	Gender	Drop down menu of Male or Female	This is to identify gender
Field 11	Location	Drop down menu of N. America, S. America, Europe, Australia, Asia and Africa	This is to identify location
Field 12	Academic Standing	Drop down menu of Future First Time Student, Undergraduate student, Graduate/post graduate student, Professional considering further education, Other.	This is to identify the type of respondent
Field 13	Calculator button	Calculate	This button calculates Fields 1 through 13 and returns the results in field 14 through 20
Field 14	At 5% of your future salary:	How many years it will take to pay back the total debt (including opportunity cost) at the level of the predicted future salary	This informs the user of the results calculated from their inputs of the above fields
Field 15	At 15% of your future salary:	How many years it will take to pay back the total debt (including opportunity cost) at the level of the predicted future salary	This informs the user of the results calculated from their inputs of the above fields
Field 16	At 25% of your future salary:	How many years it will take to pay back the total debt (including opportunity cost) at the level of the predicted future salary	This informs the user of the results calculated from their inputs of the above fields
Field 17	At 75% of your future salary:	How many years it will take to pay back the total debt (including opportunity cost) at the level of the predicted future salary	This informs the user of the results calculated from their inputs of the above fields
Field 18	Monthly payment required to pay back educational investment in 5 years:	How much money it will take to pay back the total debt (including opportunity cost) for the years identified in the title	This informs the user of the results calculated from their inputs of the above fields
Field 19	Monthly payment required to pay back educational investment in 15 years:	How much money it will take to pay back the total debt (including opportunity cost) for the years identified in the title	This informs the user of the results calculated from their inputs of the above fields
Field 20	Monthly payment required to pay back educational investment in 30 years:	How much money it will take to pay back the total debt (including opportunity cost) for the years identified in the title	This informs the user of the results calculated from their inputs of the above fields

TABLE 7.1 Calculator overview

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FIGURE 7.1 Calculator inputs screen shot

§ 7.3.4   Data Collection

A period of two months, from November 15, 2015, through January 15, 2016, was allowed for data collection in which the calculator widget gathered data from users while website statistics were tracked for unique visitors and pages visited. A digital campaign was initiated in December 20, 2015. The campaign consisted of posting on social websites such as Facebook and LinkedIn and an email to 110 people on December 20, 2015.

§ 7.4   **Results**

§ 7.4.1   **Website Results**

After the two month period, a total of 654 unique visitors visited the website and generated with 663 page views. The calculator page was by far the most popular generating 430 views, with the assessment page generating 120 views, the home page generating 99 views while the resources page generated 14 views. The calculator during the two month period collected data from 408 responses.

§ 7.4.2   **Calculator Results**

Responses were received from all over the world but the majority of responses were from North America and Europe as is seen in Table 7.2 below.

CONTINENT	Responses	% of Responses
Africa	4	1%
Asia	15	4%
Europe	125	31%
North America	195	48%
South America	69	17%
Total	**408**	**100%**

TABLE 7.2 Respondents by continent

Respondents represented a wide range of student stakeholders, namely future students, current students, or professionals considering to pursue higher education. Respondents have consistently supported that student economic well-being should be a measure of a higher education institutions sustainability as seen in Table 7.3. It is noteworthy that the ratio of 90% in favor to 10% opposed has been collected by this research is also supported by the data collected from Maragakis & Dobbelsteen (2013) and Maragakis et al. (2016b).

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ANSWER	Responses to "Should a student's economic well-being be a measure of a higher education institutions sustainability?"	% of Respondents
No	43	11%
Yes	365	89%

TABLE 7.3 Responses on the inclusion of economic metrics in an institutions level of sustainability

As would be expected, respondents expected a relative increase in salary from finishing higher education, as shown below in Table 7.4.

CONTINENT	Expected average increase in salary after completing higher education
Africa	381%
Asia	244%
Europe	159%
North America	174%
South America	252%

TABLE 7.4 Expected average increase in salary after completing higher education

The results in Table 7.4 show a clear expectation that higher education should bring significant economic returns. This is aligned with the OECD (2012) analysis that shows that the net present value of undertaking higher education is positive.

CONTINENT	Absolute Repayment of Higher education (years)
Africa	1.2
Asia	2.1
Europe	5.7
North America	4.6
South America	1.9

TABLE 7.5 Absolute Repayment Period

The absolute repayment period in Table 7.5 was calculated on by taking the total burden of higher education divided by the average expected increase in wages. From a strictly investment point of view, the perceived returns of higher education offer a strong financial investment. The perceived increase in salary, if allocated 100% to repaying the total burden of the degree, would be expected to repay the investment in

less than six years in the worst case scenario. It is interesting to note that Africa, Asia and South America expect a much lower [period of repayment than the North America and Europe.

However, allocation of 100% of gains is neither supports the requirements of stakeholders nor is sustainable. Maragakis et al. (2016b) identified that more than 90% of stakeholders expected that education should cost less than 15% of their future wages while payback should be in less than 10 years. While this was stakeholder perception, a more realistic and sustainable repayment should be considered at 8%. Baum & O'Malley (2003) pointed out that an exact level of acceptable debt burden is not formally defined, but they suggest a benchmarks of 8%. In fact, some research shows that anything above 8% is considered unmanageable and at increased risk of default (Gross et al., 2009).

CONTINENT	Years to repay higher education at 8% of future expected salary	Years to repay higher education at 15% of future expected salary
Africa	12.0	6.4
Asia	15.2	8.1
Europe	40.8	16.6
North America	29.9	17.8
South America	14.6	7.8

TABLE 7.6 Repayment duration in year for 8% and 15% payback of expected future salary

In terms of the majority of stakeholder preferences, the data in Table 7.6 shows that North American and Europeans did not meet the ten-year payback expectation at 15% repayment. However, in terms of repayment at a sustainable level, no single continent average was below the ten year payback period.

CONTINENT	Yes	No
Africa		4
Asia	2	13
Europe	80	45
North America	83	112
South America	22	47
Total	**187**	**221**

TABLE 7.7 Expected loans by continent

It is noteworthy that the data in Table 7.7 shows that there is a relatively equal split between respondents expecting to take on a loan for higher education. 46% indicated that they were going to assume a loan while 54% indicated that they were not.

Conclusions and Discussion

Conclusion: is a Student's Economic Well-being a Measure of a Higher Education Institution's Sustainability?

The primary point of this research was to verify if economics metrics should be included when assessing a higher education institutions level of sustainability. This was tested both by directly asking stakeholder and also gathering information to determine unsustainable trends.

The data collected showed that 89% of respondents agreed that a student's economic well-being is a measure of a higher education institution's sustainability. This strong response is not unique considering equally strong responses to Maragakis & Dobbelsteen (2013) and Maragakis et al. (2016b). What is interesting to note is that in all these studies, around 90% of respondents have supported economic metrics in sustainability assessment. These three studies were conducted with different audiences, in different years and utilizing slightly different criteria but they all point to an overwhelming support of the inclusion of economic parameters in sustainability assessments of higher education institutions. Considering that students are the ultimate client of these assessments, their repeated needs should be considered and implemented.

In terms of economic realities, respondents seemed to accurately understand the relative returns of higher education. The expected returns from European and North American students seemed to be realistic when compared to OECD (2012) numbers. While the understanding of the gains was well understood, the reality of sustainably paying back this debt was not.

At an absolute level, higher education provides a strong repayment when the relative gains are used to offset the incurred debt. However individuals do not respond to the debt this way, with 90% of respondents wanting to allocate a maximum of 15% of their future earnings to debt repayment. Based on this expectations, North Americans and

European would find themselves in debt for longer than the maximum ten years they would be willing to tolerate. But these are their expectations and not reality.

Using the benchmark maximum acceptable repayment of 8% (Baum & O'Malley, 2003; Gross et al., 2009), all stakeholder took more than 10 years to payback their economic burden. Even more troubling, Europeans and North Americans remained in debt for decades. This payback period is definitely well beyond the expectations and perceptions of stakeholders. Furthermore, it essentially puts the 46% of respondents taking out loans in either an unsustainable situation where they will be repaying debt for the majority of their lives or a situation where they will have to default on their loans. The data supports claims by Noam Chomsky that high tuition acts as a debt trap that sharply restricts choices after graduation (Chomsky, 2013). This data also highlights the need for the inclusion of economic metrics in sustainability assessments.

While this study is empirical, the data strongly supports that economic well-being of graduates should be included as a metric for sustainability in higher education institutions. Firstly, in this research, as in other previous research, it has been overwhelmingly requested by stakeholders. Beyond the stakeholders wants though, this research has put quantifiable data against perceptions and realities and shown that the majority of stakeholders will either be in debt for decades to come or have to default on loans, both of which are unsustainable for the individuals and society.

With this in mind, higher education institutions that are claiming to be sustainable need to include the economic metrics in their assessments and marketing materials. On the fundamental principal of sustainability, a university should not claim to be sustainable if it is placing an unsustainable debt on its graduates.

§ 7.5.2   Discussion on Limitation and Uncertainties

Due to this methodology, there is the potential for promoting bias in the results. The promotion of the survey through digital media may promote bias based on the researcher's contacts and groups. Although the survey was promoted on various sites, there may have been a tendency to receive more responses from technical rather than social science stakeholders.

The results are also limited in their usefulness due to their empirical nature and limited international perspective. The data collected primarily represented North America and Europe. Furthermore, the data set also showed a tendency for Europeans being graduate respondents while North Americans being first time students.

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While the ratio of calculator responses to unique visitors was 408/430, unique responses could not be tracked. Each time the response the calculator collected did not track unique IP addresses which means that the data collected may not be from 408 unique sources and contain multiple scenarios from the same user.

§ 7.5.3   Recommendations
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The results show that economic metrics should be included as a metric of sustainability, but show that the exact economic burden rate is still not formally defined. Further research on what an acceptable debt level should be for inclusion in sustainability metrics should be explored.

References

Ashford, N. A., Hall, R. P., & Ashford, R. (2012). Addressing the Crisis in Employment and Consumer Demand: Reconciliation with Financial and Environmental Sustainability. *The European Financial Review, October-November 2012*, 63-68.

Bell, D. N. F. & Blanchflower, D.G. (2011). *Underemployment in the UK in the Great Recession*. National Institute Economic Review, No. 215. http://dx.doi.org/10.1177/0027950111401141

Bone, E., & Agombar, J. (2011). *First-year attitudes towards, and skills in, sustainable development*. The Higher Education Academy.

Baum, S. & O'Malley, M. (2003). College on Credit: How Borrowers Perceive Their Education Debt. *Journal of Student Financial Aid, 33*(3). http://publications.nasfaa.org/jsfa/vol33/iss3/1

Carroll, D. & Tani, M. (2013). Over-education of recent higher education graduates: New Australian panel evidence. *Economics of Education Review, 32*, 207–218. http://dx.doi.org/10.1016/j.econedurev.2012.10.002

Chomsky, N. Interviewed by Grujicic, S. (2013). The Lab magazine, July 15, 2013. https://chomsky.info/20130715/

Gross, J., Cekic, O., Hossler, D. and Hillman, N. (2009). What Matters in Student Loan Default: A Review of the Research Literature. *Journal of Student Financial Aid, 39*(1), 19-29.

Linsley, I. (2005). Causes of overeducation in the Australian labour market. *Australian Journal of Labour Economics, 8*(2), 121–143.

Maragakis, A., Dobbelsteen, A. (2013). Higher Education: Features, Trends and Needs in Relation to Sustainability. *Journal of Sustainability Education*, The Institute for Sustainable Social Change.

Maragakis, A., Dobbelsteen, A. (2015). Sustainability in Higher Education Analysis and Selection of Assessment Systems. *Journal of Sustainable Development, 8*(3). http://dx.doi.org/10.5539/jsd.v8n3p1

Maragakis, A., Dobbelsteen, A. and Maragakis, Al. (2016a). Is Higher Education Economically Unsustainable? An Exploration of Factors that Undermine Sustainability Assessments of Higher Education, *Discourse and Communication for Sustainable Development, 7*(1).

Maragakis, A., Dobbelsteen, A. & Maragakis, Al. (2016b). Earning Capacity of Sustainable Education - A Review of Current Perceptions Regarding the Salaries, Under-employment and Over-education of Higher-Education Graduates and their Potential Application in Sustainability Assessments, *Journal of Sustainable Development; 9*(3). http://dx.doi.org/10.5539/jsd.v9n3p261

OECD. (2011). *Education at a Glance 2011: OECD Indicators*, OECD Publishing. http://dx.doi.org/10.1787/eag-2011-en

OECD. (2012) *Education Indicators in Focus.* June, 2012. http://dx.doi.org/10.1787/22267077

Penn State Green Destiny Council (2000). Penn State Indicators Report 2000: Steps Toward a Sustainable University. State College, PA.

Psacharopoulos, G. & Patrinos, H. A. (2004) Returns to Investment in Education: A further Update. *Education Economics, 12*(2). http://dx.doi.org/10.1080/0964529042000239140

Rajecki, D., & Borden, V. M. (2011). Psychology Degrees: Employment, Wage, and Career Trajectory Consequences. *Perspectives on Psychological Science, 6,* 321-335. http://dx.doi.org/10.1177/1745691611412385

Rothstein, J. and Rouse, C. E., (2011). Constrained after college: Student loans and early-career occupational choice. *Journal of Public Economics, 95*, 149-163. http://dx.doi.org/10.1016/j.jpubeco.2010.09.015

Saadatian, O., Dola, K. B., Tahir, O. M. (2011). Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches. *International Journal of Business and Social Science, 2*(3), 137-146.

Shriberg, M. (2002). Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory. *Higher Education Policy, 15*(2), 153-167. http://dx.doi.org/10.1108/14676370210434714

The Talloires Declaration. (1990). Tufts European Center, Talloires, France: Proc., Rep. and Declaration of the Presidents Conference.

UNESCO (2011). Education for Sustainable Development. http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/

Usher, A. & Medow, J. (2010). *Global Higher Education Rankings 2010: Affordability and Accessibility in Comparative Perspective*. Higher Education Strategy Associates.

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8 Stakeholders Perceptions of a Universal Sustainability Assessment in Higher Education - A Review of Empirical Evidence

Stakeholders Perceptions of a Universal Sustainability Assessment in Higher Education - A Review of Empirical Evidence

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Abstract

The progress of sustainability within higher education has steadily increased in focus over the last decade and has increasingly become a topic of academic research. As institutions investigate, implement and market sustainability efforts, there is a myriad

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of sustainability assessment methodologies currently available. This assortment of standards being used by institutions do not help students and faculty assess the level of sustainability uniformly between institutions.

A universal framework was proposed for facilitate stakeholder's review of comparing sustainability assessments in higher education. This research reviews the creation of the framework and results from testing in an online environment. The lack of data collected during the testing phase provides some anecdotal evidence regarding what stakeholder consider important in terms of sustainability within higher education and may also indicate that there is no need for a universal sustainability assessment in higher education to be used directly by stakeholder.

§ 8.1   Introduction

There is a growing public expectation that universities should start focusing on delivering sustainability. Students not only place high value on many aspects of sustainability, but also express that sustainability concerns are a significant factor in university choices (Bone & Agombar 2011).

Maragakis & Dobbelsteen (2013) conducted a survey to understand what stakeholders looked for in sustainable institutions. 95% of the respondents to the empirical study agreed that there was a need for a uniform sustainability rating system for higher education institutions while 92% agreed that employability after graduation should be a measure of an institutions sustainability.

With regards to a uniform rating system, numerous publications (Ryan et al., 2010; Glasser, 2009; Patrick et al., 2008; Perna et al., 2006) have investigated and analyzed the various assessment systems available to universities. However, none have gone so far as to suggest which assessment system would be best suited for standardized use. While stakeholders would prefer one system, it is seen as a controversial step as the choice will have far-reaching implications in theory and practice (Shriberg, 2002).

Maragakis & Dobbelsteen (2015) conducted a literature review of sustainability assessments to create a theoretical framework for a universal system. Utilizing previous assessments from Orr (Penn State Green Destiny Council, 2000), Shriberg (2002) and Saadatian et al. (2011) they identified eleven criteria for reviewing sustainability assessments which was proposed as a framework for reviewing assessments. However this framework did not include direct any direct reference to the employability criteria.

The term employability is a convoluted term. A literature review by Maragakis et al. (2016a) recommended that three parameters should be used to assess one's employability due to their importance to future job-seeking graduates, namely starting salaries (based on studies from Rajecki & Borden, 2011), employment (based on studies from Bell & Blanchflower, 2011 and Ashford et al. 2012) and over education (based on studies from Carroll & Tani, 2013 and Linsley, 2005).

These three parameters were further explored by Maragakis et al. (2016b) to gain insight on the perceptions held by higher education stakeholders. The data collected indicated that there was a strong preference for students to be employable after graduation, although students where not particularly concerned with starting salary or under-employment.

This research looked to validate stakeholder needs for a uniform system by providing a framework for reviewing assessments. Utilizing the theoretical framework proposed by Maragakis & Dobbelsteen (2015) and including the three parameters for employability an online tool was created for stakeholders to rate assessment systems, with the hopes of validating the framework and also providing insight into a potential assessment system appropriate for universal use.

§ 8.2   **Background**

This paper focused on validating stakeholder's needs for a uniform sustainability assessment in higher education by testing a theoretical framework that was supported by academic research and stakeholder input.

In 2013, Maragakis & Dobbelsteen's empirical evidence indicated that there was a need for a uniform assessment system for sustainability in higher education that did not yet exist.

90% of stakeholders responded that the sustainability of a higher education institution was important in their selection, a conclusion also reached by Bone & Agombar's (2011). The survey identified that stakeholders were using a variety of methods to assess an institutions level of sustainability. It is interesting to note in Figure 8.1 that many respondents declared to either solely evaluate an institutions sustainability or use a mix of various resources available to them, implying that they were engaged and knowledgeable in the topic of sustainability within higher education institutions.

How do you assess an institutions sustainability?

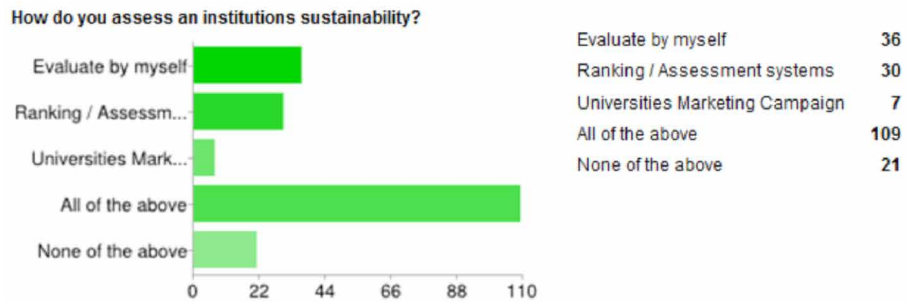|	
Evaluate by myself	36
Ranking / Assessment systems	30
Universities Marketing Campaign	7
All of the above	109
None of the above	21

FIGURE 8.1 Assessment of higher education institutions (Maragakis & Dobbelsteen, 2013)

Of the participants familiar with one or more of the systems, AASHE's STARS was the best known with 88% of participants saying they were familiar with the system, although only 60% agreed that it was the best method for assessing an institutions sustainability.

Of the students pursuing higher education, 71% said they were doing it for personal accomplishment and future employability, 22% said they were studying exclusively for future employability, while only 7% responded to studying either exclusively for personal accomplishment or for some other reason. This result shows the importance of economic factors surrounding the attainment of a degree. In fact, in another questions 80% of stakeholders agreed that an institution's ability to make you more competitive in the job market is more important than sustainability. Of the remaining 20%, it was repeatedly mentioned that the two factors are intertwined and thus inseparable.

The same study also identified the need for economic factors to be used as a measure of sustainability. 92% of participants identified that employability after graduation should be included in the measurement of institutions sustainability.

Maragakis & Dobbelsteen (2015) proposed a framework for comparing sustainability assessment utilizing parameters and criteria set forth by other researchers in the field of sustainability in higher education. The eleven criteria set forth are found below in Table 8.1.

Core issues of ecologically, socially and fiscally sustaining a society and campus by Orr (Penn State Green Destiny Council, 2000)
What quantity of material goods does the college/university consume on a per capita basis?
What are the university/college management policies for materials, waste, recycling, purchasing, landscaping, energy use and building?
Does the curriculum engender ecological literacy?
Do university/college finances help build sustainable regional economies?
What do graduates do in the world?
Ideal cross-institutional sustainability assessments (Shriberg, 2002)
Identify important issues
Are calculable and comparable
Move beyond eco-efficiency
Measure processes and motivations
Stress comprehensibility
Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches (Saadatian et al., 2011)
Popularity

TABLE 8.1 Framework for reviewing sustainability assessment systems

Utilizing this framework, the research highlighted that popular assessments available did not track "what graduates are doing in the world," a criteria set for by Orr (Penn State Green Destiny Council, 2000). Additionally, it was identified that neither the proposed framework nor any of the popular assessment included employability.

In order to explore the parameters surrounding employability, Maragakis et al. (2016a) studied the economic returns of higher education within the framework of sustainability assessment. The premise was that a degree should not be marketed as sustainable unless it addresses the economic return of the future graduate. The research recommended that three parameters should be used to assess one's employability:

1   Starting salary, as it was highly correlated to mid-career salary levels (Rajecki & Borden, 2011),
2   Under employment, as it has become a growing concern after the financial crisis of 2008 (Ashford et al., 2012), and
3   Over education, as this is also a growing phenomenon (Carroll & Tani, 2013)

The result of this research provided three necessary parameters to address the term employability. These parameters, combined with the original framework proposed by Maragakis & Dobbelsteen (2015), were hypothesized to provide a more holistic review of sustainability assessment systems within higher education.

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§ 8.3 Methodology

§ 8.3.1 Research Question

The primary question of this research is: Can a holistic framework be created that will aid stakeholders in reviewing a universities level of sustainability?

The secondary research question is to validate if STARS is still the preferred assessment by stakeholders.

§ 8.3.2 Website

The domain www.sustainingeducation.com was purchased and a website was developed using Wordpress. The website was developed to collect data for this research while also offering users relevant reference material. Four webpages were created:

1. An overview page with a general introduction and explanation.
2. An economic calculator page which was driven by a custom widget that collected data while computing "real-time" results from visitors that used the calculator.
3. An assessment webpage which allowed users to rate popular sustainability assessments based on fourteen different criteria.
4. A resources page which gave links to supporting material and other useful resources.

Upon completion of the website two weeks of testing was conducted in order to debug the site and respond to problems. Small changes were made to improve user interface across various platforms (desktop, tablet, and mobile). The total time for development and testing took three months.

§ 8.3.3 Assessment Outline

A rating system was created using a custom widget which was programmed to allow users to rate systems based on the criteria from the proposed framework. As can be

seen in Figure 2, the user interface was simple and allowed users to hover over the 1-5 star rating scale and select their preference. The rating level was set to continuously update and reflect the average user rating, with statistics given directly to the user so they could judge the relative popularity.

Users were given the option to rate STARS, GreenMetric, Princeton Review and Greenopia.

A slight modification was made from the original eleven criteria set forth by Maragakis & Dobbelsteen (2016a). The criteria "popularity" was removed since the ratings statistics would imply the relative popularity level. Additionally, an overall rating was allowed for each assessment so as to allow for an overall feedback from users.

The fourteen criteria used for the assessment webpage were:

1. Overall rating
2. What quantity of material goods does the college/university consume on a per capita basis?
3. What are the university/college management policies for materials, waste, recycling, purchasing, landscaping, energy use and building?
4. Does the curriculum engender ecological literacy?
5. Do university/college finances help build sustainable regional economies?
6. What do graduates do in the world?
7. Does the assessment identify important issues?
8. Is the assessment criteria calculable and comparable?
9. Does the assessment move beyond eco-efficiency?
10. Does the assessment measure processes and motivations?
11. Does the assessment stress comprehensibility?
12. What is the full time employment rate of graduates with that specific degree within 12 months of graduation?
13. What is the average yearly compensation of graduates with that specific degree within 12 months of graduation?
14. What percent of graduates are employed within their desired field 12 months after graduation?

§ 8.3.4 **Data Collection**

A period of two months, from November 15, 2015 through January 15, 2016, was allowed for data collection. A digital campaign was initiated in December 20, 2015. The campaign consisted of posting on social websites such as Facebook and LinkedIn and an email to 110 people on December 20, 2015.

§ 8.4   Results

§ 8.4.1   Website Results

After the two-month period, a total of 654 unique visitors visited the website and generated with 663 page views. The calculator page was by far the most popular generating 430 views, with the assessment page generating 120 views, the home page generating 99 views while the resources page generated 14 views.

During this time period, the calculator collected 408 responses while the framework collected a total of five complete reviews during the two-month period. The statistics are found in Table 8.2.

PAGE	Page Views	% of Total Site Views	Responses	Response Rate
Calculator	430	65%	408	95%
Assessment Page	120	18%	5	4%
Home Page	99	15%	N/A	N/A
Resources	14	2%	N/A	N/A

TABLE 8.2 Page Statistics

§ 8.4.2   Assessment Results

The website views highlight that the bulk of the interest was in the calculator page. The calculator page gathered 65% of the total views, receiving almost 4 visits for every 1 visit to the assessment page or home page. This indicates that visitors were primarily interested in the calculator page and either went directly to it from links in the original solicitation for visits or were forwarded the specific site through other visitors.

The data also indicates that there was a significant difference in the response rate of the calculator vs the assessment page. While the calculator collected responses for 95% of the visitors the assessment page only collected complete responses from 4% of the page visits.

Of the responses received, STARS receiving the best overall rating and the most amount of complete responses, as shown in Table 8.3.

ASSESSMENT	Overall Ranking	Complete Responses
STARS	4.4/5	5
GreenMetric	3.3/5	4
Princeton Review	2.3/5	4
Greenopia	1.3/5	3

TABLE 8.3 Assessment Results

§ 8.5 Conclusions and Discussion

§ 8.5.1 Conclusion: the Need for a Universal Sustainability Assessment System

The primary purpose of this research was to validate the need for a universal assessment system in higher education. The research utilized empirical data to create a framework that provided stakeholders the ability to directly rate prominent sustainability assessment systems. Considering that a majority of respondents in Maragakis & Dobbelsteen (2013) had indicated that they conduct their own evaluation, this research was set up as a practical way of applying theoretical research and gaining real data.

If the test generated ample results, the utilization of the tool would provide validation for both the universal framework and also validate if STARS was indeed the assessment of choice amongst stakeholders. The results would allow for an analysis and conclusions regarding the framework and the assessments. The actuality of the research resulted in very little data actually being collected which has ultimately restricted the primary purpose of this research to anecdotal conclusions rather than measureable results.

However, the lack of data collection has provided some unexpected interpretations and conclusions.

On the same website, during the same trial period, an economic calculator received significantly more visitors than the assessment page, at almost a 4 to 1 ratio. This may be an indication that the economic returns of higher education were more pertinent to a website visitor than the actual assessment system. This supports the various research that economic returns are of paramount importance to stakeholders.

Respondents in this study were not only less interested in the assessment page, but were also highly unlikely to compete the rating form. The economic calculator gathered 408 responses compared to the 430 visitors, converting 95% of site visits to useable data. The assessment page collected a total of five complete ratings compared to the 120 visitors, converting just 4% of visits to useable data.

There are many reasons that visitors may not have provided data. On interpretations is that, considering both the relatively low visitor rates and the low conversion rate of visitors to useable data, it can be inferred that the framework is not appealing for stakeholders. This lack of interest could originate from a variety of factors, including the complexity of the framework, the multitude of supporting literature that each assessment systems has or that the average user may not have time or interest to provide meaningful feedback. No specific driver could be conclusively argued, however the results do raise some questions regarding stakeholder perceptions.

In previous research, stakeholders claimed to spend time assessing institutions on their own implying that they had working knowledge of an institutions initiatives and assessment systems. This interpretation of stakeholder's perceptions may merit further exploration though considering the lack of results generated by this study. Specifically, there should more research done on what stakeholders actually need in order to understand an institutions sustainability. For example, it may be an unrealistic expectation that stakeholders understand the full scope and depth of knowledge supporting each sustainability assessment. Each assessment system has a group of knowledgeable professionals that create, support and justify their methodology and it may be unrealistic to assume that the average stakeholder can review, interpret and review each assessment system.

The relatively low amount of data collected may also be explained by the psychological phenomenon of behavioral discounting. This occurs when individuals tend to engage in behaviors that have more immediate, short term rewards, and "discount", or engage less in, behaviors that have distal, long term rewards (Frederick, et al., 2002). In the case of this study, while stakeholders report that the sustainability of an institution is an important metric, it may be viewed as a distal reward for future generations. Therefore, the ability to access a more immediate and personally salient reward, the economic calculator, may have created a situation in which the assessment of a sustainability framework, which would impact future generations, was "discounted".

The poor data collection does not provide conclusive results on the usability of the framework or recommendations on a preferred assessment systems suitable for universal use. It can be argued that it offers empirical data that supports that there cannot be a universal assessment system. The debate thus far on the controversies of creating a universal system has been based on literature, opinion and little testing. This research provides a data point, albeit empirical, that a universal framework was not utilized. While the reason for the lack of utilization is not clearly identifiable, the lack of responses does provide a small piece of data that questions the need for a universal system.

The inability to collect data for this research while gathering significant data for economic returns points to stakeholder apathy towards driving the discussion surrounding sustainability assessments. Previous research also seems to indicate that sustainability may be a "want" more than a "need." One of the conclusions from Maragakis & Dobbelsteen (2013) highlighted that while 90% of students said that sustainability was an important part of their decision making, only 59% said that they would not attend an institution if it was unsustainable, which also supports that sustainability is desirable but not mandatory.

Regardless of how the results are interpreted, they do seem to support the conclusion by Selby et al. (2009) that rigorous institutional engagement with marketing of sustainability credentials provides a beneficial feedback loop that deepens and embeds the commitment and adherence by administrators, academics and students. The user ultimately discounted the framework at a grassroots level which leaves the ultimate responsibility on the creators of the various assessments as well as the institutions themselves to implement, improve and uphold sustainability initiatives and marketing material. A next step would be for institutions and assessment providers to work together and guide the average user to a simple, transparent and meaningful way of understanding what each sustainability assessment provides.

§ 8.5.2   Discussion on Limitation and Uncertainties

Due to the methodology of the research, there is the potential for promoting bias in the results. The promotion of the survey through digital media may promote bias based on the researcher's contacts and groups. Although the survey was promoted on various sites, there may have been a tendency to receive more responses from technical rather than social science stakeholders.

There was a limitation of the data collected for the framework due to the time limitations of this research. Due to the research being conducted concurrently with the economic calculator, the original purpose of the research may have been impacted

due to behavioral discounting. Pressing factors to students, such as debt, are more salient due to the direct personal impact, therefore the sustainability framework was discounted in the presences of the economic calculator. This limited the collection of data regarding the framework and did not allow for the comprehensive testing required to achieve a more concrete result.

The results may also be biased based on the interpretations of the empirical data. There is not a clear understanding of why data was not collected and thus is subject to the researcher's perspective.

There are also limitations on the usefulness of the rating system website itself. The site was not created by a professional website developer and may have limited the usefulness on various mediums, such as smartphones, tablets, etc. While extensive tests were conducted to improve user interface, the fact that so few reviews were collected may indicate that the tool itself was not aligned with the technological expectations of users.

Finally, there are other assessments that could have been utilized in this study. The selection of the assessments in this particular study are a reflection of empirical data collected over and are notably more reflective of North American preferences. While all the assessments in this study have a global reach, they may not necessarily reflect the prevalent assessment systems found within each country/continent.

§ 8.5.3   Recommendations

The results indicate that stakeholders may not be interested in comparing assessment systems in depth, particularly in the presence of more personally saliently tools, such as assessing student debt. Further research should be conducted beyond empirical studies to see if there is a reason to create a universally acceptable sustainability assessment system, or if the current systems should be left as is to evolve organically into something that will be utilized both by institutions and supported by stakeholders.

References

Ashford, N. A., Hall, R. P., & Ashford, R. (2012). Addressing the Crisis in Employment and Consumer Demand: Reconciliation with Financial and Environmental Sustainability. *The European Financial Review, October-November 2012*, 63-68.

Baum, S. & O'Malley, M. (2003). College on Credit: How Borrowers Perceive Their Education Debt. *Journal of Student Financial Aid, 33*(3). http://publications.nasfaa.org/jsfa/vol33/iss3/1

Bell, D. N. F. & Blanchflower, D.G. (2011). Underemployment in the UK in the Great Recession. National Institute Economic Review No. 215. http://dx.doi.org/10.1177/0027950111401141

Bone, E., & Agombar, J. (2011). *First-year attitudes towards, and skills in, sustainable development*. The Higher Education Academy.

Carroll, D. & Tani, M. (2013). Over-education of recent higher education graduates: New Australian panel evidence. *Economics of Education Review, 32*, 207–218. http://dx.doi.org/10.1016/j.econedurev.2012.10.002

Chomsky, N. Interviewed by Grujicic, S. (2013). The Lab magazine, July 15, 2013. https://chomsky.info/20130715/

Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of Economic Literature, 40*, 351-401. http://dx.doi.org/10.1257/002205102320161311

Glasser, H. (2009). *Strategic Sustainability Initiatives Report, President's Universitywide Sustainability Committee*, Western Michigan University.

Gross, J., Cekic, O., Hossler, D. & Hillman, N. (2009). What Matters in Student Loan Default: A Review of the Research Literature. *Journal of Student Financial Aid, 39*(1),19-29.

Linsley, I. (2005). Causes of overeducation in the Australian labour market. *Australian Journal of Labour Economics, 8*(2), 121–143.

Maragakis, A., Dobbelsteen, A. (2013). Higher Education: Features, Trends and Needs in Relation to Sustainability. Journal of Sustainability Education, The Institute for Sustainable Social Change.

Maragakis, A., Dobbelsteen, A. (2015). Sustainability in Higher Education Analysis and Selection of Assessment Systems. *Journal of Sustainable Development, 8*(3). http://dx.doi.org/10.5539/jsd.v8n3p1

Maragakis, A., Dobbelsteen, A. & Maragakis, Al. (2016a). Is Higher Education Economically Unsustainable? An Exploration of Factors that Undermine Sustainability Assessments of Higher Education. *Discourse and Communication for Sustainable Development, 7*(1).

Maragakis, A., Dobbelsteen, A. & Maragakis, Al. (2016b). Earning Capacity of Sustainable Education - A Review of Current Perceptions Regarding the Salaries, Under-employment and Over-education of Higher-Education Graduates and their Potential Application in Sustainability Assessments. *Journal of Sustainable Development; 9*(3). http://dx.doi.org/10.5539/jsd.v9n3p261

OECD. (2012) Education Indicators in Focus. June, 2012. https://www.oecd.org/edu/skills-beyond-school/Education%20Indicators%20in%20Focus%206%20June%202012.pdf

Patrick, D. L., Murray, T., Bowles, I. A. (2008). Campus Sustainability Best Practices, Leading by Example Program, Massachusetts Executive Office of Energy and Environmental Affairs, August 2008.

Penn State Green Destiny Council. (2000). Penn State Indicators Report 2000: Steps Toward a Sustainable University. State College, PA.

Perna, T., Carriere, J., Chang, J. (2006) Sustainability Governance: Evaluating Policy Development and Implementation Structures at the University of Toronto, Env 421 2006-07, University of Toronto.

Rajecki, D., & Borden, V. M. (2011). Psychology Degrees: Employment, Wage, and Career Trajectory Consequences. *Perspectives on Psychological Science, 6*, 321-335. http://dx.doi.org/10.1177/1745691611412385

Rothstein, J. & Rouse, C. E., (2011). Constrained after college: Student loans and early-career occupational choice, *Journal of Public Economics, 95*, 149-163. http://dx.doi.org/10.1016/j.jpubeco.2010.09.015

Ryan, A., Tilbury, D., Corcoran, P. B., Abe, O; Nomura, K. (2010). Sustainability in higher education in the Asia-Pacific: developments, challenges, and prospects. *International Journal of Sustainability in Higher Education*, 106-119. http://dx.doi.org/10.1108/14676371011031838

Saadatian, O., Dola, K. B., Tahir, O. M. (2011). Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches. *International Journal of Business and Social Science, 2*(3), 137-146.

Shriberg, M. (2002). Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory. *Higher Education Policy, 15*(2), 153-167. http://dx.doi.org/10.1108/14676370210434714

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The Talloires Declaration. (1990). Tufts European Center, Talloires, France: Proc., Rep. and Declaration of the Presidents Conference.

UNESCO (2011). Education for Sustainable Development.http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/education-for-sustainable-development/

Usher, A. and Medow, J. (2010). Global Higher Education Rankings 2010: Affordability and Accessibility in Comparative Perspective. Higher Education Strategy Associates.

9 Summary and Conclusions

This doctoral dissertation presented the creation of a holistic framework that would aid students in reviewing sustainability tools, assessments and marketing. The previous chapters present the methodological, peer-reviewed approach towards this research that consisted of qualitative and quantitative methods which combined relevant literature and stakeholder needs.

In Chapter 2, a survey was conducted to identify features, trends, and needs in relation to sustainability in higher education. It indicated that there was a stakeholder need for a universal sustainability assessment system in higher education while also identifying a gap in current assessment systems; namely not including the economic well-being of graduates.

In Chapter 3, a qualitative review was conducted to develop a theoretical framework for comparing sustainability assessments. It was empirically tested and resulted in a methodological framework for comparing assessment systems.

In Chapter 4, the framework was utilized for a gap analysis on the prominent STARS assessment systems. During the research, the framework itself was identified as having a gap because it did not address the economic metrics that were needed by stakeholders.

In Chapter 5, a qualitative review was conducted to determine the best economic metrics to be applied in sustainability assessments. The economic return of a degree is a very well-studied topic but it is novel, and controversial, to include post-graduate economic metrics in sustainability assessments. Three metrics were proposed to be used in sustainability assessments: under-employment, starting salaries and over-education.

In Chapter 6, a quantitative study was conducted to determine the best economic metrics to be applied in sustainability assessments. Stakeholders identified employment being their most important driver, but unsustainable perceptions were also identified in terms of the cost of education and the repayment of educational debt.

Utilizing the research, a website was created to test both the framework and economic metrics to validate their usefulness and relevancy to stakeholders.

In Chapter 7, the relevance of the economic calculator was validated. Stakeholders strongly agreed that the metrics should be included in sustainability assessments. Furthermore, the data collected validated that a majority of stakeholders would accumulate an unsustainable amount of debt.

In Chapter 8, the validation of the framework lead to inconclusive results. The low amount of data collected led to some anecdotal evidence that there may be no need for a universal assessment system for sustainability.

The present chapter summarizes the main additions to science presented in this dissertation while also answering the research questions posed in the introduction. It also presents a discussion to the greater meaning of this dissertation and provides recommendations for future research.

This chapter will consecutively discuss the following:

— Additions to science
— Answering the research questions
— Discussions on key results, limitations, scope and the controversy of this topic
— Recommendations
— Outlook

§ 9.2 Additions to Science

Practical and theoretical additions to science have been made by this dissertation. The practical additions have been made surrounding the need for economic metrics to be included in sustainability assessment in higher education. The theoretical additions have been made surrounding the need for a universally acceptable sustainability assessment in higher education.

§ 9.2.1 Practical additions to Science

There is a definitive need for the inclusion of economic metrics in sustainability assessments. Chapter 1, Chapter 5 and Chapter 6 all provided roughly a 90% agreeance from stakeholders that economic metrics should be included in sustainability assessments. Beyond just the stakeholder needs, there is also the quantifiable evidence that education is economically unsustainable.

The fact that there is a growing international student debt crisis is not new. However, in terms of sustainable debt, this research has identified gaps in student's economic perceptions versus realities. In Chapter 5 students perceive that they can assume a higher level of debt repayment than is sustainable. While this perception is in and of itself flawed, it is further challenged when the realities of the economic data collected in Chapter 6 showed that even at the unsustainable level of debt identified in Chapter 5, graduates would still be in debt for much longer that they expect. Even if graduates were to maintain a sustainable debt repayment of 8% they would still carry the economic burden from higher education for decades to come.

Sustainability assessment in higher education needs to include economic metrics rather than just focusing on the ecological and societal aspects of sustainability. If sustainability assessments do not implement economic metrics their effectiveness and relevancy to engender sustainability will be undermined by the economic realities of graduates. Chapter 7 highlights this preference; while there was a robust participation the economic calculator there was significantly less interest in the sustainability framework.

§ 9.2.2 Theoretical additions to Science

The theoretical additions have been made surrounding the need for a universally acceptable sustainability assessment in higher education. Overwhelmingly, experts globally oppose a universal method of measuring sustainability in higher education. However, Chapter 1 identified that stakeholder want a universal system. This aligns with the literature that students are increasingly driven by a university's level of sustainability while also highlighting the vulnerabilities stakeholders have to "greenwashed" sustainability marketing.

This research created a theoretical model for a universal framework for comparing sustainability assessment. Chapter 2 lead to the creation of a framework using peer-reviewed literature while also conducting an initial test to determine viability. Chapter 3 further applied the framework and found that it had gaps due to the lack of economic metrics identified as a stakeholder need in Chapter 1. After identifying economic metrics in Chapter 4 and 5, the final framework was created and tested to see stakeholder acceptance.

Unfortunately, the test of the tool did not result in quantitative data to either dispel or validate the tool. Stakeholders, when presented with the option of the economic calculator or sustainability assessment, optioned overwhelmingly to spend their time on the economic calculator rather than on sustainability assessments. Without data to back up the framework, it is still a novel theoretical idea added to the science regarding sustainability assessments.

§ 9.2.3 Summary on Additions to Science

Summarizing, this research has provided a practical and theoretical addition to science. Chapter 1, 4, 5, 6 and 7 have provided evidence that economic metrics should be included in sustainability assessments in higher education. Stakeholders demand it, economic perception versus realities are creating unsustainable economic burden on graduates and the current assessment systems do not include economic metrics, leaving them incomplete and potentially irrelevant considering that economic concerns drive stakeholders.

It has also provided a novel theoretical framework for comparing assessment systems that includes economic metrics. Chapter 1, 2, 3, 4 and 5 have provided the metrics needed based on qualitative and quantitative data. While this tool has a sound theoretical base, it still remains untested as Chapter 7 failed to provide the necessary data to prove the relevance of the framework.

§ 9.3 Answering the Research Questions

This section gives detailed answers to the research question and the sub-research question posed in the introduction. The overview of the research methodology is also presented summarizing each chapter's research objectives, results and how it influenced this dissertation.

§ 9.3.1 Primary Research question:

Can a holistic framework be created that will aid stakeholders in reviewing a universities level of sustainability?

The answer to the question was a partial yes, as described below.

Yes, a holistic framework can be created. Stakeholder's needs were identified in Chapter 1, and the theoretical framework was created using peer-reviewed literature in Chapter 2. Chapter 3 highlighted the lapses in the framework between the literature and stakeholder's needs which lead to Chapter 4 interdisciplinary review of economic metrics that were tested in Chapter 5 and ultimately included in the framework.

Yes, it would theoretically aid stakeholders in reviewing a universities level of sustainability. Other assessments/frameworks to date lack the economic parameters that have been repeatedly demanded by stakeholders. This framework has included the economic metrics and, in theory, would now holistically address stakeholder needs in reviewing a universities level of sustainability.

The data collected was inconclusive in validating if the framework aided stakeholders in reviewing a universities level of sustainability... The test that was created to see if the framework met stakeholders need failed to receive the feedback that was expected and did not produce conclusive results. The lack of responses led to three possible interpretations of the outcomes that, while meaningful, did not address the primary research objective of validating the framework.

1   The lack of feedback may indicate that the frameworks approach was too technical (and potentially overwhelming) for respondents.
2   The framework addressed comparing assessment systems while stakeholders were looking to for a universal assessment system. The framework created may not have been the solution required by the stakeholders.
3   It may also have been "discounted" by respondents who, when faced with the immediate rewards of the economic calculator, optioned to bypass responding to the framework.

...but the economic metrics were shown to aid stakeholder's review of a universities level of sustainability. The economic aspects of the higher education were well received by stakeholders who used the tool and provided 90% support that economic metrics should be included in a universities level of sustainability.

§ 9.3.2   Sub-Research questions:
....

What are the features, trends, and needs in relation to sustainability in higher education?

Overall, higher education stakeholders seem to have a broad interpretation of the term "sustainability," with only 3% identifying it as a solely ecological term.

Sustainability seems to be a socially desirable idea, but not the key factor in decision making. 90% of stakeholders responded that a higher education institution's level of sustainability influenced their decision making, but only 59% said they would not attend an institution if it was unsustainable. The same statistical divergence was noted in employability. 87% of participants stated that sustainability was important in their job satisfaction, however only 35% would consider working somewhere else if their institution was unsustainable.

The key needs identified in relation to sustainability in higher education was the need for a uniform rating system and inclusion of economic parameters in sustainability assessments. 95% of respondents agreed that there was a need for a uniform rating system of sustainability within institutions of higher education while 92% of participants agree that employability after graduation should be included in the measurement of institutions sustainability.

Is there a comprehensive framework to compare assessments? If not, could one be created through existing peer-reviewed literature?

No, there was not one comprehensive framework for comparing assessments. Three pieces of literature were identified that dealt with this specific topic. While each of publications offered useful parameters for comparing assessments, there were unique criteria set forth in each paper. Thus a comprehensive framework could be developed using peer reviewed literature.

Do existing assessments cover the features, trends and needs of stakeholders in relation to sustainability in higher education?

No. The literature available on comparing assessment lacked a key criteria requested by stakeholder: employability.

Should employability be considered a parameter of sustainability assessments within higher education?

Yes, but not utilizing the term "employability." Employability is a vague term that primarily has three components: starting salary, under-employment and over-education. In order to address stakeholder's needs for employability, these three criteria should be considered a parameter of sustainability assessments rather than just "employability".

What is the importance of starting salary, under employment and over-education to higher education stakeholders?

Full-time employment was the most important aspect to stakeholders. Starting salaries and over-education are met with mixed opinion with stakeholders not showing an unequivocal preference. This relative uncertainty, especially on starting salaries, seems to contradict strong stakeholder's expectations that education should cost less than 15% of their future wages while also being debt for less than 10 years after graduation.

Can a test be conducted to validate why a student's post-graduation economic performance should be part of a higher education institutions metric for sustainability?

Yes, post graduate economic performance should be considered part of a higher education institutions measure for sustainability. A test was conducted that showed that the current economic burden of higher education is not aligned with stakeholder's expectation in terms of debt repayment. Based on stakeholder expectations, a majority of graduates would either be in debt for decades after completion of their degree or would never be able to repay their debt. Both of these scenarios can be considered socially unsustainable and should be part of a higher education institutions measure of sustainability.

Can a test be conducted to validate that stakeholders want a universal sustainability assessment for higher education institutions?

Inconclusive. A test was conducted but did not generate data that would indicate an appropriate universal sustainability assessment system. During the test, stakeholders actively responded to economic parameters concerning higher education sustainability while shunning a universal approach to reviewing sustainability assessments.

§ 9.3.3   Research Overview

Figure 9.1 outlines the general flow of the research starting from the objective to the testing and validation. The research started from identifying the features, trends and need of stakeholders, gradually evolving into the sub-research questions that drove the scope of each of the peer-reviewed papers.
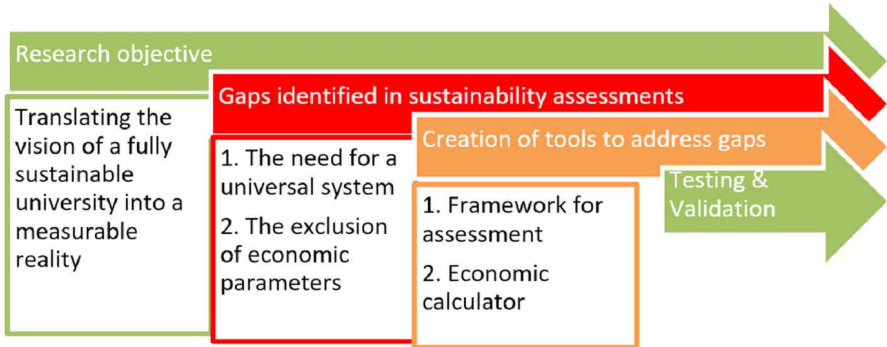

FIGURE 9.1 Research flow

Figure 9.2 breaks down the details of the research questions and the results that guided Chapters 2-7 and ultimately led to the conclusions summarized previously.
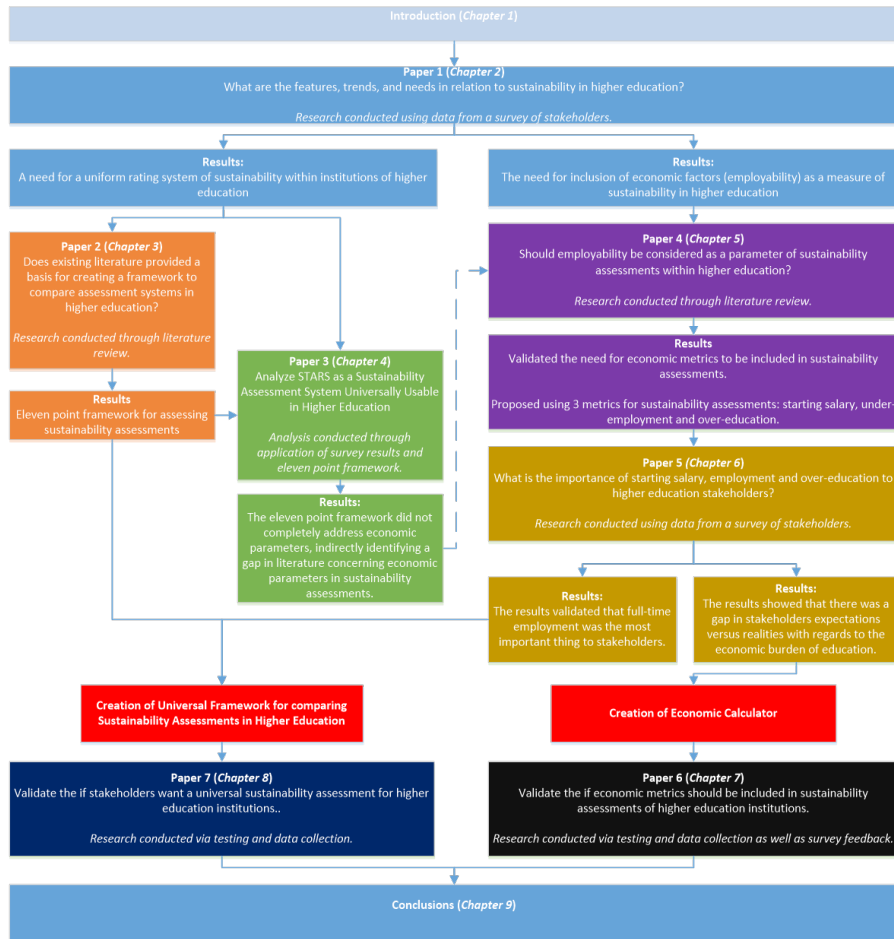

FIGURE 9.2 Research Overview

§ 9.4   **Discussions on the key results and limitations of this research**

This section discusses the relevance, and controversy, surrounding the key results from this dissertation. It also looks to take a critical look at the data and provide the limitation based on the approach and scope of the studies.

§ 9.4.1   **Key Results**

There were two primary results from this research:

— Practical data that supports the need for the inclusion of economic metrics in sustainability assessments
— A theoretical universal framework for comparing sustainability assessments.

§ 9.4.1.1   **Economic Parameters**

Even without this research, there is a known and growing crisis regarding student debt. While the student debt crisis is predominately located in the United States it is also a growing internationally. What this research has accomplished is highlighting the misalignment between stakeholders and institutions with regards to defining sustainability.

Institutions and academics have actively omitted the economic parameter of higher education from sustainability assessments. They have made a calculated effort to emphasize the ecological and social aspects of sustainability while completely disregarding the economic realities of the educational choice of their students.

There have been a range of responses and rationale as to why economics should not be included as a metric of an institutions level of sustainability, such as:

— This will make education a commodity
— Institutions should focus on education, not on the economic well-being of graduates
— The data is too hard to collect
— The assessment should measure the "institutions" level of sustainability in terms of its economic, ecological and societal footprint
— These are decisions that a student should make prior to pursuing higher education and have nothing to do with sustainability

All of these reasons, quite frankly, go in the face of any definition of sustainability used by institutions. A quick review of the declarations, non-profit organizations and experts in the field all support that higher education is the key to making a sustainable society.

Higher education is facing its greatest challenge ever in meeting its responsibility to provide the knowledge and educate citizenry that will lead to a thriving civil society... Higher education plays a unique and critical role, one often overlooked, in making a healthy, just and sustainable society and a stable climate a reality (ACUPCC, 2009).

— H*ow can an institution be deemed sustainable if it is creating a graduate that will be indebted for decades to come?*
— *How can an institution focus on empowering students on ecological and societal sustainability when upon graduation they will be driven by the economic realities of their debt, which may drive unsustainable behavior?*
— *If an institution is focusing just on its level of sustainability, should it not take into account the impact that its indebted graduates have on the surrounding region/world?*

Sustainability assessments are the most relevant assessments to include economic parameters. The exclusion of the economic wellbeing of a graduate leaves a lopsided, ineffective approach that will undermine the long term benefits of any sustainability initiative. It could be argued that it is misleading for any institution to market itself as "sustainable" if it does to not include the economic well-being of its graduates.

§ 9.4.1.2   Theoretical Framework

The culmination of this dissertation was hypothesized to be the solution to translating the vision of a fully sustainable university into a measureable reality. The empirical research from Chapter 2 supported the hypothesis and showed that stakeholder unequivocally wanted a universal assessment of sustainability in higher education. This need, identified by stakeholders, guided this dissertation to create a theoretical framework that, conceptually, worked. It was based on peer-reviewed literature from the experts and augmented to include what stakeholders wanted.

When the conceptual framework was presented to stakeholders there was, surprisingly, limited data collected. The low response rate, especially when compared to the sizeable response rate to the economic calculator, may infer several results:

— **There is no need for a universal comparison of assessment system.** Rather, like Selby et al. (2009) pointed out that rigorous institutional engagement with marketing of sustainability credentials will provide a beneficial feedback loop that deepens and embeds the commitment and adherence by administrators, academics and students. In this case, the theoretical framework in and of itself is a success as it has added to the discussion and feedback to continue to commitment of the institutions.

— **Sustainability is a socially desirable idea in higher education.** The same stakeholders that wanted a universal assessment within higher education in Chapter 2 also provided data that indicated sustainability was not their main driver in decision making. When presented with the opportunity to engage with sustainability assessments, users instead opted for the economic calculator, a significant driver in their decision making. This kind of preference could also be explained by behavior discounting, where immediate rewards are valued more than long-term rewards (Frederick et al., 2002). The more immediate needs, such as the economic calculator, are weighted more heavily than future wants, such as the sustainability framework. This interpretation also indirectly validates the usefulness of the assessment framework since it has included the economic aspects which drive higher-education stakeholders.

— **The concepts and parameters surrounding sustainability are complex.** The general topic of sustainability assessment has been exhaustively studied, perhaps better studied than sustainability itself (Kates et al., 2001). While stakeholder claims to spend time assessing institutions on their own, the fact is that each sustainability assessment has a depth of knowledge and justification behind it that is probably not full assessed by the stakeholder. Each assessment system has a group of knowledgeable professionals that create, support and justify their methodology. A user may be overwhelmed with not only having to digest each assessments methodology, but also bring it to relative terms and compare it based on criteria that is subject to interpretation. Furthermore, the depth of these assessment systems may not be targeting what stakeholders consider to be variables of "importance" or interest. This supports Selby et al. (2009) claim that the end user is a point of feedback rather than the creator of sustainability assessments.

— **The tool was not what stakeholders were looking for. Ultimately the stakeholders were looking for a universal assessment system.** This tool helps but the concepts and framework regarding each assessment system, but is not prescriptive in being an actual assessment system. The low response rate may suggest that the tool itself was not useful for the end user.

§ 9.4.2   Limitation of research

As an overarching statement, this research is empirical in form. This research of this dissertation has dealt with new concepts that do not have directly available data sets. The surveys, literature and the data collected were broad in scope, cross-disciplinary and relatively small. The results should be interpreted as a starting-point for further definitive studies to arrive to a final conclusion.

Throughout this research, technology has been advancing exponentially and there is a limitation to the technology used at each stage of the research. Initially the surveys were collected utilizing Google surveys, which was a relatively new service that had limitation in collecting data but offered the best services for the limited budget available. The first Google survey was unsecured and was exposed to potential double submission from respondents, although they were reviewed to eliminate any apparent double submissions (example: two sequential submissions with the exact same data). Had there been more money available during this first survey an alternative survey collection would have been selected that would have eliminated such potential bias.

The economic calculator was subject to multiple entries from a single user. The calculator was created with the intention of providing live feedback for the users while collecting data. Data was collected through a "silent" feature, meaning each time the user clicked the "Calculate" button and refreshed the results the corresponding data was collected. Due to the coding of the widget, the IP addresses were not collected. Reviewing the data, there were no apparent double entries of data (the exact same data sequentially) and there also does not seem to be multiple entries from a single user. While multiple entries from a single user would skew the sample size, the multiple iterations also offer a perspective on how various methods a user would consider funding their studies.

The website was created utilizing Wordpress on a limited, self-funded budget. This means that the website was not created by a professional website developer and was antiquated when compared to more expensive apps and widgets. This may have limited shareability amongst respondents and also skewed the data collection for the assessment framework by not making it as "user friendly" on mobile phones as some of the newer applications.

There was also a time limitation set for data collection. Data collection timelines were limited to correspond with availability of the researcher considering a busy work/ professional life. The data collected for Chapter 6 corresponded with a relative spring downtime professionally, while Chapter 7 & 8 data was during the winter holiday period of December/January. While this was an optimal time to collect and assesses data from a professional and personal workload, it also may have limited the data set

considering that there may have been more optimal times during the year. Under other conditions a more appropriate time for data collection, such as before the start of a semester, multiple data sets (Fall and Spring) or a longer submission period may have provided a more robust data set.

Specific to time limitations, the validation test found in Chapter 7 and 8 may have limited the data collected for the framework. While the data, or lack of data, also provided valuable insight it may not have given the framework the comprehensive testing required to achieve a more concrete result. Pressing factors to students, such as debt, are more salient due to the direct personal impact, therefore the sustainability framework was discounted in the presences of the economic calculator.

Like with all scientific work, there is a certain bias of the researchers. Since the data in this research was based on empirical data and theoretical concepts, the results were susceptible to the perspectives of the authors. This research branched out into sciences that were not originally expected. The research had initial expected to deal with aspects of the built environment within a higher education institution and ventured heavily into economics, psychology and broad-spanning metrics. The dissertation dealt with bias proactively by including outside authors from cross-disciplinary fields, especially on the theoretical studies.

§ 9.5 Recommendations

The conclusion that economic metrics should be included in sustainability assessments in higher education institutions has an empirical support from within this research and is supported with large data sets from other fields. In three different instances approximately 90% of stakeholders agreed that economic metrics should be included in sustainability assessments, a surprisingly consistent response rate considering the empirical nature of the data. The data collected on stakeholder preferences on payback periods indicated that the economic burden of higher education may led to an unsustainable economic debt load. Internationally there is a student debt crisis.

While the data collected did not validate the framework, it is still a useable concept that provides a starting point for further definitive research on translating the vision of a sustainable institution of higher education into a measurable reality. Specific research should be conducted on:

- What are the acceptable debt loads for students and are they sustainable?
- What are the key indicators that higher education institution should track regarding economic metrics?
- How to effectively communicate economic metrics to stakeholders in a way that is holistic with regards to sustainability?
- Utilize the framework for a comprehensive review of all sustainability assessments currently available (not just STARS and CSAF) to identify strengths and weaknesses

§ 9.6 Outlook

Over the last five years of research I have witnessed the continual evolution within sustainability assessments in higher education. The progress is exciting and there will continue to be advances over the next decade.

Overall, this dissertation found that sustainability assessments seem to be getting it (mostly) right. While the metrics and methodology vary, there is no question that these assessments are adding value to a universities sustainability efforts. The assessments seemed to be advanced in the social and environmental aspects of pedagogy, both theoretical and practical, while also holding the institution accountable for the actual management of the facilities by promoting transparency and rewarding operational efficiency.

The next step for sustainability efforts in higher education institutions will be to focus on a student's lifecycle: what happens during and after the student's tenure. The ability of a university to produce a sustainable minded student has, to some degree, already been achieved. More and more schools have initiatives, clubs, and social events that expose students to sustainability. The next major milestone is to make sure that these lessons and experienced are carried beyond the university setting and into the graduate's everyday life.

This is not a quantum leap for universities, but it is a significant change to the discussion surrounding sustainability in the university setting.

Universities are already tracking what graduates are doing after completion of their degree. And if the universities themselves are not tracking, there are plenty of for/nonprofit organization dealing with this matter.

Specific to this dissertation, the economics surrounding education have been, and will continue to be, well studied so the application of economic metrics into sustainability assessments would be relatively simple. This, by all accounts found within this dissertation and the general global growth of student debt, is needed.

The real change will need to come from university leadership. These leaders will have to support and promote that a graduate's actions in the world is also a metric of the institutions sustainability. This is the feedback loop that will help improve institutions of higher education and their sustainability initiatives and continue to foster the improvement that is needed to empower the next generation of leaders.

References for non-published chapters

ACUPCC, *Education for Climate Neutrality and Sustainability: Academic Guidance for ACUPCC Institutions* (2009).

Ashford, N. A., Hall, R. P., & Ashford, R. (2012). Addressing the Crisis in Employment and Consumer Demand: Reconciliation with Financial and Environmental Sustainability. *The European Financial Review, October-November 2012*, 63-68.

Association of Commonwealth Universities. (1993). *The Swansea Declaration.* Swansea, Wales, U.K.: Proc., Association of Commonwealth Universities' 15th Quinquennial Conf.

Association of European Universities. (1994). *CO-operation programme in Europe for research on nature and industry through coordinated university studies.* Geneva: Association of European Universities (CRE).

Baum, S. and O'Malley, M. (2003). *College on Credit: How Borrowers Perceive Their Education Debt.* Journal of Student Financial Aid: Vol. 33, No. 3. http://publications.nasfaa.org/jsfa/vol33/iss3/1

Bell, D. N. F. and Blanchflower, D.G. (2011). *Youth Underemployment in the UK in the Great Recession.* National Institute Economic Review No. 215.

Bone, E., and Agombar, J. (2011). *First-year attitudes towards, and skills in, sustainable development.* The Higher Education Academy.

Chomsky, N. Interviewed by Grujicic, S. (2013). The Lab magazine, July 15, 2013. https://chomsky.info/20130715/

Comm, C. J. & Mathaisel, D. F. X. (2003). Less is more: a framework for a sustainable university. *International Journal of Sustainability in Higher Education*, *4 (4)*, 314-323.

Datal-Clayton, B., & Bass, S. (2002). *Sustainable development strategies.* London: Earthscan Publications Ltd.

Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). *Time discounting and time preference: A critical review.* Journal of Economic Literature, 40, 351-401.

Gómez, F., Sáez-Navarrete, C., Lioi, S. and Marzuca, V. (2015). *Adaptable model for assessing sustainability in higher education.* Journal of Cleaner Production, (107). 475-485.

Gross, J., Cekic, O., Hossler, D. and Hillman, N. (2009). *What Matters in Student Loan Default: A Review of the Research Literature.* Journal of Student Financial Aid, 39.1: 19-29.

Kates, R. W., Clark, W. C., Corell R., Hall, J. M., Jaeger, C. C., Lowe, J. J., ...Dickinson, N. M. (2001). Sustainability science. *Science, 292*, 641–642.

Lester Pearson Institute for International Development, Dalhousie University . (1991). *Creating a common future: An action plan for universities. Follow-up to Halifax conference on university action for sustainable development.* Halifax, N.S., Canada: Dalhousie University.

Linsley, I. (2005). *Causes of overeducation in the Australian labour market.* Australian Journal of Labour Economics, 8(2), 121–143.

Penn State Green Destiny Council (2000). *Penn State Indicators Report 2000: Steps Toward a Sustainable University.* State College, PA.

Rajecki, D., & Borden, V. M. (2011). Psychology Degrees: Employment, Wage, and Career Trajectory Consequences. *Perspectives on Psychological Science, 6,* 321-335.

Saadatian, O., Dola, K. B., Tahir, O. M. (2011). *Identifying Strengths and Weakness of Sustainable Higher Educational Assessment Approaches*, International Journal of Business and Social Science, Vol 2, No. 3, 137-146.

Selby, D., Jones, P., & Kagawa, F. (2009). Sustainability Promotion and Branding: Messaging Challenges and Possibilities for Higher Education Institutions. *Sustainability, 1,* 537-555.

Shriberg, M. (2002). *Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory.* Higher Education Policy, 15(2), 153-167.

Steinemann, A. (2003). Implementing Sustainable Development through Problem - Based Learning: Pedagogy and Practice. *Journal of professional Issues in Engineering Education and Practice , 129* (4), pp. 216-224.

The Princeton Review. (2011). *The Princeton Review's Guide to 311 Green Colleges (2011 Edition ed.).* The Princeton Review. Retrieved from: http://www.centerforgreenschools.org/docs/Guideto311GreenColleges.pdf

The Talloires Declaration. (1990). Tufts European Center, Talloires, France: Proc., Rep. and Declaration of the Presidents Conference.

UN. (1992). *Report of the United Nations conference on environment and development. Agenda 21, Chapter 36: Promoting education, public awareness, and training.* Earth Summit Agreements.

University of Lüneburg. (2001). *Higher education for sustainable development: Towards the world summit on sustainable development 2002*. Lüneburg, Germany: The Lüneburg declaration, University of Lüneburg.

Velazquez, L., Munguia, N., Platt, A., & Taddei, J. (2006). Sustainable University: What Can Be The Matter? *Journal of Cleaner Production* , pp. 810-819.

World Commission on Environment and Development. (1987). *Our Common Future*. Oxford: Oxford University Press.

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