



Implementing and Critiquing the Higher-Ed. Sustainability Evaluation Tool

Jacob Fennick, Tyler Kornacki, Jason Morgan, Isaac Woods

Contents

- Introduction
- Background
 - Sustainability at the University of Worcester
 - The Custom Benchmarking Tool
 - Evaluating a Benchmarking Tool
- Methods
 - Pre-Implementation Analysis
 - Implementation
 - Post-Implementation Analysis
- Results
 - Pre-Implementation Interview Results
 - Implementation Results
 - Module Content Analysis
 - Comparison to STAUNCH
- Conclusions and Recommendations
- Questions



Introduction

- **Project Goal:**
 - Implement and critique a custom benchmark tool to assess the engagement of sustainability in the curriculum and research of the University of Worcester
- **Problem:**
 - Existing sustainability benchmarking tools are not a good fit for the University of Worcester
- **University's Goal:**
 - Maximize inclusion of sustainability in research and curriculum



Sustainability at the University of Worcester


- Ranked 4th most sustainable university in the UK
- EcoCampus Platinum
- Implemented “Sustainability Tool for Auditing University Curricula in Higher Education” (STAUNCH) in 2010 and 2013
- Sponsored this project and the development of the Higher-Ed Sustainability Evaluation



**University
of Worcester**

The Custom Benchmarking Tool

- The Idea of Benchmarking
 - Comparing abstract qualities
 - Part of continuous improvement
- Analysis of Existing Tools
 - Previous team researched 9 tools
- Custom Tool for U. of Worcester
 - Questionnaire format (not a survey)
 - Gradient scaling



HIGHER-ED SUSTAINABILITY EVALUATION: RESEARCH

NAME OF INSTITUTION:

CRITERIA	SCORING					
	0	1	2	3	4	5
R1	Amount of funding from grants and contracts specifying sustainability-related research, relative to the total funding from grants and contracts at the institution, as a percentage.					
	0%	<1%	1-3%	4-7%	8-10%	>10%
R2	Number of published research articles with a focus on sustainability-related issues, relative to the total number of research publications in all areas, as a percentage.					
	0%	<1%	1-3%	4-7%	8-10%	>10%
R3	Number of the institution's academic staff that are currently engaged in sustainability research, relative to the total amount of academic staff who conduct research, as a percentage.					
	0%	1-8%	9-16%	17-24%	25-31%	>31%
R4	Number of academic departments that include at least one academic staff member that conducts sustainability research compared to other areas of research, relative to the total number of academic departments, as a percentage.					
	0%	1-15%	16-30%	31-45%	46-60%	>60%
R5	Does there exist one or more resource centres on campus providing sustainability-related research or services?					
	No					Yes
R6	Does the institution have an ongoing program to encourage students in multiple disciplines or academic programs to conduct research in sustainability?					
	No					Yes
R7	Does the institution have a program to encourage academic staff from multiple disciplines or academic programs to conduct research in sustainability topics? (To count, the program must provide faculty with incentives to research sustainability and specifically aim to increase faculty sustainability research)					
	No					Yes
R8	Has the institution published written policies and procedures that give positive recognition to interdisciplinary, transdisciplinary, and multidisciplinary research during faculty promotion and/or tenure decisions?					
	No					Yes
R9	Does the institution have ongoing library support for sustainability research and learning in the form of research guides, materials selection policies and practices, curriculum development efforts, sustainability literacy promotion, and/or e-learning objects focused on sustainability?					
	No					Yes
R10	Does the institution provide financial incentives to support open access publishing, e.g., a publishing fund to support faculty members with article processing and other open access publication charges?					
	No					Yes

Total Score
/ 50

Evaluating a Benchmarking Tool

- **Define benchmarking**
 - Ongoing, systematic process
- **Key themes**
 - Measurement, comparison, identification of best practices, implementation and suggestions for improvement
- **External Factors**
 - Administrator bias, community values, and stakeholder agenda
- **Identifying strengths of a tool**

External Factors



Benchmark
Measurement and
Comparison



Sustainability

A close-up photograph of a green leaf, showing a dense network of veins. The veins are light green and form a complex, branching pattern across the leaf's surface. The leaf is oriented vertically, with the main vein running from the bottom left towards the top right. The overall color is a vibrant green, with some darker areas towards the bottom right.

Methods

Pre-Implementation Analysis



Initial Analysis:

- Analyzing the tool's questions for their usability
- Adjusting questions based on the initial analysis

Faculty Interviews:

- Interviews are a better format in this case than surveys or focus groups
- Implementing semi-structured interviews

Question C10	Is the institution utilizing its campus by having physical locations which specialize in the following areas of sustainability?
Problem	Not all of the areas listed are best suited by having a physical location for them, some of the areas like purchasing or investment & finance do not need physical locations
Improvement	This could be resolved by adjusting the question to say "Is the institution utilizing its campus by having physical locations or policies which specialize in the following areas of sustainability?" This would allow for the areas that do not have a reason to have a physical location because they are better suited to have written policies and directives to still be included.

Implementation

- Used Previously Developed Guide
 - Revised based on Pre-Implementation Analysis
- Conducted Content Analysis of Website
- Conducted Structured Interviews
- Took Field Notes on:
 - Tool Itself
 - Implementation Guide



Curriculum Tool

*1. * Number of courses that include sustainability related topics, themes, or modules, relative to the total number of undergraduate courses offered at the institution, as a percentage.*

Location: University of Worcester website> Start Your Journey> A-Z of Courses. The courses are deemed sustainable if they contain one or more of the keywords from the United Nations 2030 agenda. A regex search can be used to scan each course description for keywords.

Median Score: 13.47%

The SustainabilityTool

- Part 1: Module Analyzer
- Over 1200 Modules
 - Each with Title and Description
- Keyword search
 - Difficult to do by hand
- Automates the search process
 - Keywords in title and description
 - Saves time
- Can be easily run again
 - Useful for future implementation
- Part 2: Research Analyzer
 - Analyzes articles from WRaP

```
110 /* Helper to get a modules info based on its name (sends request) */
111 function getModuleInfo(moduleName) {
112     // Similar ajax to before, but the query is different
113     postData = {
114         mod_code: moduleName,
115         module: "yes"
116     };
117     // Keep track of unresolved requests
118     GlobalWaitingFor += 1;
119     // Send the request
120     $.ajax({
121         type: "POST",
122         url: window.thisURL,
123         data: postData,
124         dataType: "html",
125         complete: function(data, status){
126             if(status == "success") {
127                 readModuleInfo(data.responseText);
128             }
129             else {
130                 console.error(`Could not get informaiton for module !{moduleName}`);
131             }
132         },
133         error: function(xhr, status, error) {
134             console.log(error);
135         }
136     });
137 }
138
```

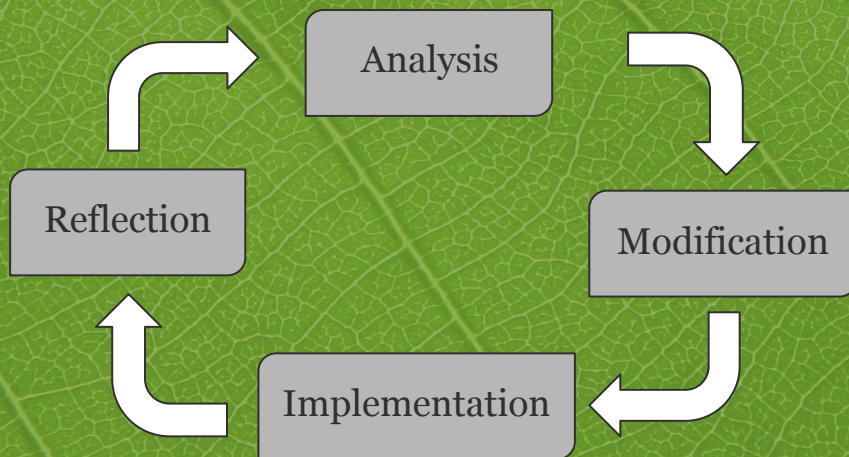
Post-Implementation Analysis

Group Analysis:

- Use of field notes
- Ease of use
 - Time for implementation
- Difficulties during implementation
- Results

Follow-Up Interviews:

- Similar to first round of interviews
- Semi-Structured
- Faculty Members and Administrators
- Is the tool an accurate representation of sustainability?
 - Validation of the tool
 - Source of improvement for the tool



A close-up photograph of a green leaf, showing a dense network of veins. The veins are light green and form a complex, branching pattern across the leaf's surface. The leaf is split horizontally, with the top half being a lighter shade of green and the bottom half being a darker shade. The word "Results" is written in white, bold, sans-serif font in the lower-left quadrant of the image.

Results

Pre-Implementation Interview Results

- Similarities from Interviews
 - 6 Faculty members were interviewed and 1 replied via email
 - 1 Outlier and 6 in consensus
 - Members agreed that:
 - Lacking Time and Money to incorporate sustainability
 - Should do more with the students sustainability competency



Follow-Up Interview Results

- Reached out to same contacts as the first round
 - 7 Faculty contacted, 3 responses in total
- Common themes
 - Tool yielded a reasonable representation of the University
 - Keyword choice could be revisited
 - Research analysis: keyword set is not ideal for the University's research, may not pick up every item



Comparison to STAUNCH

- Compared both results and methodology
- STAUNCH focuses completely on modules
 - 2010: 24% of modules relate to sustainable development
 - 2013: 34% of modules relate to sustainable development
- Higher-Ed Sustainability Evaluation has wider scope
 - Now: 16.57% of modules relate to sustainability
- STAUNCH methodology differs greatly from ours
- Cannot truly be directly compared



Conclusions and Recommendations

- Tool reflects positively on the University
 - Faculty opinion validates the tool
- Suggest updating the keyword list
 - Remove “work” and “employment”
 - Gave false positives
 - Possibility of creating a unique list for different Universities
- Slight adjustments to tool
 - C10 Change “location” to “location or policies”
 - R1 Amount of funding changed to percentage of funded projects
- Suggest integration of a parallel student literacy assessment
 - Ensure students graduate with a good grasp of sustainable ideas



Acknowledgements

We would like to give thanks to the following individuals, without whom this project would not be possible:

- Dr Heather Barrett, Project Sponsor, University of Worcester
- Dr Susan Jarvis, Project Advisor, Worcester Polytechnic Institute
- Katy Boom, Director of Sustainability
- And all of the University of Worcester faculty members that gave their time for our interviews and helped answer our questions



Questions?



Sources

- AASHE. (2018). *Why Participate in STARS?* Retrieved February 15, 2018, from <https://stars.aashe.org/pages/about/why-participate.html>
- Anand, G., & Kodali, R. (2008). Benchmarking the Benchmarking Models. *Benchmarking: An International Journal*, 15(3), 257-291. <https://doi.org/10.1108/14635770810876593>
- Bankel, J., Berggren, K. F., Engström, M., Wiklund, I., Crawley, E. F., Soderholm, D. H., ... & Östlund, S. (2005). Benchmarking engineering curricula with the CDIO syllabus. *International journal of engineering education*, 21(1), 121-133.
- Berg, B. L. & Lune, H. (2012). A Dramaturgical Look at Interviewing. *Qualitative research methods for the social sciences* (pp. 107-127). Boston, MA: Person.
- Berman-Jolton, J. L., Kuros, A., Madhurkar, K. S., & Rockcross, A. D. (2017). *Critiquing and Developing Benchmarking Tools for Sustainability*. Retrieved from Worcester Polytechnic Institute Electronic Projects Collection: <https://web.wpi.edu/Pubs/E-project/Available/E-project-121417-135515>
- Bernard, H. R. (2011). *Research methods in anthropology : qualitative and quantitative approaches*. Walnut Creek, CA: AltaMira Press. Retrieved from <https://ebookcentral-proquest-com.ezproxy.wpi.edu>
- Bers, T. H. (2006). Limitations of Community College Benchmarking and Benchmarks. *New Directions for Community Colleges*, 2006(134), 83-90. <https://doi.org/10.1002/cc.240>
- Center for Community Health and Development. (2017). Toolkit 12. Evaluating the Initiative. Retrieved from <https://ctb.ku.edu/en/evaluating-initiative>
- Costanza, R., Fioramonti, L., & Kubiszewski, I. (2016). The UN Sustainable Development Goals and the dynamics of well-being. *Frontiers in Ecology and the Environment*, 14(2), 59–59, <https://doi.org/10.1002/fee.1231>
- Haddawy, P., Hassan, S. U., Abbey, C. W., & Lee, I. B. (2017). Uncovering fine-grained research excellence: The global research benchmarking system. *Journal of Informetrics*, 11(2), 389-406, <https://doi.org/10.1016/j.joi.2017.02.004>

Sources

- Happy Planet Index. (n.d.). *About the HPI*. Retrieved February 03, 2018, from <http://happyplanetindex.org/about>
- Kates, R., Parris, T., & Leiserowitz, A. (2016, June). *What Is Sustainable Development? Goals, Indicators, Values, and Practice*. *Environment Magazine*. Retrieved from <http://www.environmentmagazine.org/Editorials/Kates-apr05-full.html>
- Kempner, D. E. "The Pilot Years: The Growth of the NACUBO Benchmarking Project." *NACUBO Business Officer*, 1993, 27(6), 21–31.
- Kopnina, H., & Meijers, F. (2014). Education for sustainable development (ESD) Exploring theoretical and practical challenges. *International Journal of Sustainability in Higher Education*, 15(2), 188-207, <https://doi.org/10.1108/IJSHE-07-2012-0059>
- The Millennium Project. (2015). *State of the Future Index*. Retrieved February 03, 2018, from <http://107.22.164.43/millennium/SOFI.html>
- Moriarty, J. P. (2011). A Theory of Benchmarking. *Benchmarking: An International Journal*, 18(4), 588-611. <https://doi.org/10.1108/14635771111147650>
- Nilsson, M., Griggs, D., & Visbeck, M. (2016). Map the interactions between sustainable development goals: Mans Nilsson, Dave Griggs and Martin Visbeck present a simple way of rating relationships between the targets to highlight priorities for integrated policy. *Nature*, 534(7607), 320+. Retrieved from http://link.galegroup.com/apps/doc/A455613251/HRCA?u=mlln_c_worpoly&sid=HRCA&xid=b44e3000
- Nunez, V. C., Macfarlane, J., & Halama S. (2017). *Critiquing a sustainability research benchmarking tool*. Retrieved from Worcester Polytechnic Institute Electronic Project Collection: <https://web.wpi.edu/Pubs/E-project/Available/E-project-050417-064548/>
- Patterson, J. G. (1995). *Benchmarking basics: looking for a better way*. Menlo Park, CA: Crisp Publications. Retrieved from <https://ebookcentral-proquest-com.ezproxy.wpi.edu>
- Ryan, G. & Weisner, T. (1998). Content Analysis of Words in Brief Descriptions: How Fathers and Mothers Describe Their Child. In de Munck, V. C., & Sobo, E. J. (Eds.), *Using Methods in the Field: A Practical Introduction and Casebook* (pp. 57-68). Walnut Creek: Altamira Press, Sage Publications, Inc.
- Sayed, A., Kamal, M., & Asmuss, M. (2013). Benchmarking tools for assessing and tracking sustainability in higher educational institutions: identifying an effective tool for the University of Saskatchewan. *International Journal of Sustainability in Higher Education*, 14(4), 449-465, <https://doi.org/10.1108/IJSHE-08-2011-0052>

Sources

- Shriberg, M. (2002). Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory. *International Journal of Sustainability in Higher Education*, 3(3), 254-270, <https://doi.org/10.1108/14676370210434714>
- Tierney, A., Tweddell, H., & Willmore, C. (2015). Measuring education for sustainable development: experiences from the university of Bristol. *International Journal of Sustainability in Higher Education*, 16(4), 507-522, <https://doi.org/10.1108/IJSHE-07-2013-0083>
- United Nations General Assembly. (2015, October 21). *Transforming our world: the 2030 Agenda for Sustainable Development*. Retrieved from http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- United Nations Development Program. (n.d.). *Human Development Index (HDI)*. Retrieved February 03, 2018, from <http://hdr.undp.org/en/content/human-development-index-hdi>
- University of Worcester. (2017, November 15). *Facts and Figures*. Retrieved January 26, 2018, from <https://www.worcester.ac.uk/discover/facts-and-figures.html>
- University of Worcester. (2017, November 13). *Sustainability Achievements*. Retrieved January 26, 2018, from <https://www.worcester.ac.uk/discover/sustainability-achievements.html>
- Walk, K. (1998). How to Write a Comparative Analysis. Retrieved February 14, 2018, from <https://writingcenter.fas.harvard.edu/pages/how-write-comparative-analysis>
- Worcester City Council. (n.d.). *Sustainable Worcester*. Retrieved January 26, 2018, from <https://www.worcester.gov.uk/sustainability>
- World Commission on Environment and Development. (1987). *Our Common Future*. Retrieved from <http://www.un-documents.net/our-common-future.pdf>