

Developing a Campus Sustainability Assessment Framework for the National University of Malaysia

Z.F. Fadzil, H.S. Hashim, A.I. Che-Ani and S. Aziz

Abstract—Campus sustainability is the goal of a university striving for sustainable development. This study found that of 17 popular approaches, two comprehensive campus sustainability assessment frameworks were developed in the context of Sustainability in Higher Education (SHE), and used by many university campuses around the world. Sustainability Tracking Assessment and Rating Systems (STARS) and the Campus Sustainability Assessment Framework (CSAF) approaches are more comprehensive than others. Therefore, the researchers examined aspects and elements used by CSAF and STARS in the approach to develop a campus sustainability assessment framework for Universiti Kebangsaan Malaysia (UKM). Documents analysis found that CSAF and STARS do not focus on physical development, especially the construction industry, as key elements of campus sustainability assessment. This finding is in accordance with the Sustainable UKM Programme which consists of three main components of sustainable community, ecosystem and physical development.

Keywords—Campus sustainability, campus sustainability assessment, sustainability assessment framework, sustainable campus

I. INTRODUCTION

As a source of knowledge and research institution, universities around the world have responded to the implementation of the concept of sustainable development, to become an entity that can be role models and guidance to the community and other institutions. Various initiatives have been carried out by local and international university campuses as solid supporting evidences to the concept of sustainable development. Talloires Declaration was established to promote ideas of sustainability in teaching, research, operations and outreach at colleges and universities with the University Leaders for a Sustainable Future (ULSF) as the secretariat responsible for the success of this declaration [2]. By March 2012, a total of 437 universities have signed this declaration and attempt to apply the ideas of sustainability in their university systems [8]. Agenda 21, the Sustainable Development Action Plan for Implementation of Sustainable Development, Chapter 36, Promoting Education, Public Awareness and Training, in particular aims to promote education towards sustainable development and increase public awareness of sustainability [5].

Z.F. Fadzil is with the Institute for Environment and Development (LESTARI) 43600 UKM Bangi Malaysia (email: zuhairfikri@gmail.com)

H.S. Hashim is with the Institute for Environment and Development (LESTARI) 43600 UKM Bangi Malaysia (e-mail: drhalimatn@gmail.com).

A.I. Che-Ani is with the Faculty of Engineering and Built Environment 43600 UKM Bangi Malaysia (email: adiirfan@gmail.com)

S. Aziz is with the Institute for Environment and Development (LESTARI) 43600 UKM Bangi Malaysia (email: sarahaziz2000@yahoo.com)

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has also played an important role in creating the United Nations Decade of Education for Sustainable Development (2005-2014) which seeks to emphasize the aspect of education to implement the concept of sustainable development in society [6].

Malaysia is also not left behind in the success of sustainable development of the campus. Universiti Kebangsaan Malaysia (UKM) as a research university in Malaysia has implemented initiatives towards sustainable development. UKM had started the move towards sustainability by establishing the Institute for Environment and Development (LESTARI) on October 1, 1994, aimed at carrying out research and training activities in the field of multidisciplinary sustainability. UKM's Sustainable Campus Programme was established in 2007 dividing the tasks into three main groups i.e. the Sustainable Community, Sustainable Ecosystem Management and Sustainable Physical Development Groups. The main purpose of the establishment of the UKM Sustainability Programme is to conduct research related to sustainability in UKM campus in a more systematic manner.

II. MATERIALS AND METHODS

This study was conducted mainly through literature review of journals and documents analysis to identify the major aspects and elements of a sustainable campus and approaches in assessing sustainability of the campus. The study involves four processes that begin with a review of literature on campus sustainability and campus sustainability assessment approaches, followed by analysis of UKM documents. Reference [7] having found that the CSAF and STARS are two of the most comprehensive approaches, this study examines the key aspects outlined in the CSAF and STARS manuals, and the last process is the selection of relevant CSAF and STARS elements for possible adoption and integration in the UKM campus sustainability assessment framework.

Various documents were analysed, including documents of the Sustainable Campus Group Research Programme, UKM (2009), UKM Sustainable Charter 2007, Sustainable UKM Research Programme, UKM Sustainable Transition Plan 2010-2020, and the UKM Bangi Campus Physical Development Master Plan 2008. These documents are used as reference to identify a framework to assess sustainability in the UKM campus.

Further research on key aspects of sustainability is outlined in the CSAF and STARS manuals. This study did not look at the more detailed indicators. Instead the researchers only want to get an overview of the campus sustainability assessment which has been established. An integration exercise was conducted between the frameworks of UKM Sustainability Programme, with the frameworks of CSAF and STARS. The purpose of this study is to see the appropriate application of the main aspects and elements of the CSAF and STARS for the formulation of the UKM campus sustainability assessment framework. With comprehensive manuals for CSAF and STARS, the researchers took the approach that CSAF and STARS's adaptation for application to the UKM campus assessment framework will produce a most comprehensive assessment framework for a sustainable campus.

A. Sustainable UKM Programme's Framework

UKM's efforts towards achieving sustainable development is further strengthened with the establishment of UKM Lestari Programme (Lestari is the Malay word for Sustainability) launched in June 21, 2007. The establishment of UKM Lestari Programme aims to coordinate research and implementation of sustainable development by the faculties, institutes and departments at the university. The program also aims to serve as a model for other institutions in line with the motto 'Sustainable UKM for Malaysia and the World'. This programme is further strengthened with the launch of the Sustainable UKM Charter in 2007, The charter outlines six main principles:

- 1) Display practices that enhance the sustainability of institutions and universities by giving preference to suppliers who practice sustainable development;
- 2) Enhance community well-being and productivity;
- 3) Improve the health of campus ecosystems;
- 4) Promote environmental research and the development of institutions in terms of sustainability;
- 5) Develop planning tools to support decision making that is responsible; and
- 6) Using sustainability indicators to monitor, report and continuously improve sustainability.

To implement this programme smoothly and effectively, the Sustainable Campus Research Cluster was established in 2008, dividing the tasks into three main research groups i.e. the Sustainable Community Research Group, the Ecosystem Management Research Group and the Sustainable Design Research Group (later changed to be the Sustainable Physical Development Group). Fig. 1 shows the details of the areas of research, assessment and evaluation of the fractional areas and elements.

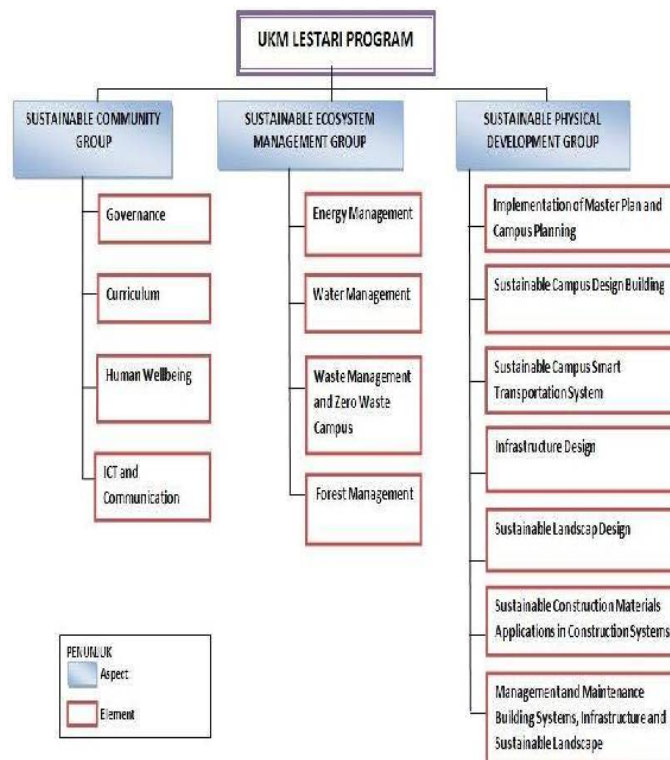


Fig. 1 UKM Lestari Programme Framework

B. Campus Sustainability Assessment Framework (CSAF)

CSAF is the product of a Masters thesis by Lindsay Cole, the work of 15 co-researchers who are experts in campus sustainability, and more than 130 others who helped out with advice, input and ideas along the way [4]. The Sierra Youth Organization Coalition (SYC) has become the body responsible for coordinating the CSAF until now. SYC is a Non-Governmental Organisation (NGO) in Canada with the aim to strive towards sustainable ecological and social prosperity. Through grassroots initiatives, SYC empowers the community to take a variety of solutions-based approach that encourages simple lifestyle, sustainable communities and education for sustainability [9].

The CSAF began as a slightly modified version of Robert Prescott-Allen's Wellbeing Assessment (2001). CSAF has been a guide and followed by 80 campuses in five regions in Canada in 2011 [10]. This showed that CSAF received support from other campuses in Canada for taking part in the CSAF project on their own campuses. Through working with methodological frameworks, trying to shape and mold it to the university campus context, and through piloting it with over 130 different sustainable campus proponents, the CSAF has evolved substantially. The CSAF project that began at the University of Concordia, Canada, had been implemented with the participation of 100 students, 12 faculty and 33 administration staff [3].

The CSAF is the largest scale tool of its kind, containing over 170 indicators. It has been designed as a whole to describe the overall movement of the campus towards

sustainability. Application of the CSAF is a great challenge and an important one, requiring patience, diplomacy, strategic planning and perseverance to complete [4]. Humans are one part of the larger ecosystem, and the larger universe in which we live. Every living and non-living part of this earth has an essential role to play in the function of our world, and a right to continued existence. A model can only describe the complexity of these relationships in a very simplistic way. The 'Egg' of the sustainability model i.e, its nucleus, is meant to help with understanding and describing the wide range of campus sustainability issues included in the CSAF.

The CSAF's simplified egg diagram is an overview of where there are two-dimensional sub-systems i.e the the human dimension and the ecosystem dimension. Cole describes the human dimension of sub-systems or the dimension of the ecosystem, as a good ecosystem can affect the human system to do good. In each sub-system there are five aspects or dimensions that represent the key issues identified in campus sustainability. The ecosystem dimension contains aspects such as air, water, land, materials, and energy. The human dimension contains aspects of knowledge, community, economy and wealth, governance, and health and wellness. These aspects are further broken down into elements and sub elements to achieve the level of indicators of sustainable campus. In short the CSAF campus sustainability assessment framework outlines two dimensions (human and ecosystem), 10 aspects, 32 elements and 33 sub-elements. (See Fig. 2).

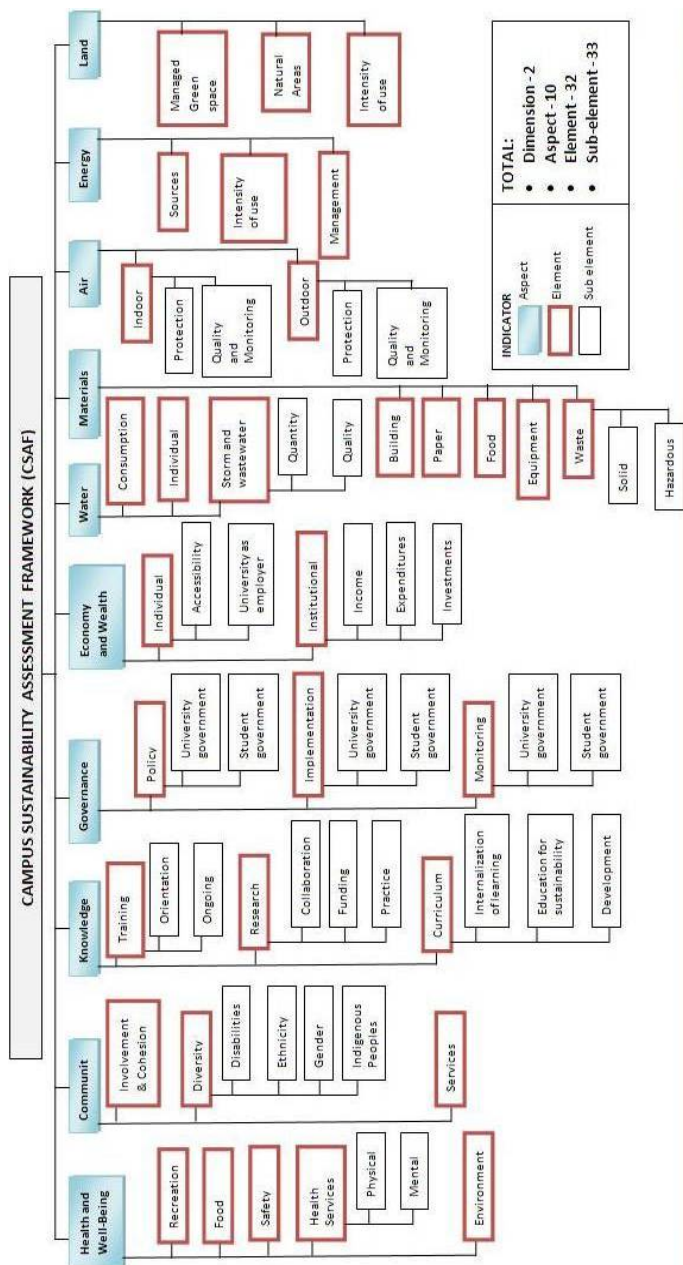


Fig. 2 CSAF Framework

C. Sustainability Tracking, Assessment and Rating System (STARS)

STARS was established in 2006 as a project coordinated by The Association for the Advancement of Sustainability in Higher Education (AASHE). AASHE is an association of colleges and universities in the United States and Canada which seek to build a sustainable future. STARS mission is to promote sustainability in higher education institutions in various sectors, from governance and operations to curriculum and outreach, through education, communication, research and professional development [1].

STARS is a voluntary project, and is a self-reporting framework for recognizing and measuring relative progress toward sustainability by colleges and universities. STARS is designed to: (1) Provide guidance to promote sustainability in all sectors of higher education, from education and research, to operations and administration; (2) Allows means of comparison from time to time in the institution by establishing common standards of measurement of sustainability in higher education institutions; (3) Creates incentives for continuous improvement toward sustainability; (4) Facilitates cooperation and information sharing about sustainability practices and performance in higher education institutions; (5) Recognizes sustainability performance for all institutions, including leaders and beginners; and (6) Building a sustainable community in a stronger campus [1].

STARS technical manual version 1.1 in 2011, adjusted by the Association for the Advancement of Sustainability in Higher Education (AASHE), has been used as a guide. STARS was recorded at 274 campuses in the United States and Canada that have been registered under the STARS and made the user of STARS as a benchmark in their respective campus sustainability activities [11].

STARS outlines the three main categories: education and research, operations and planning, administration and communication. It has 17 categories and 65 credits to complete the criteria in the campus sustainability assessment framework (see Fig. 3). STARS was developed by the credit review assessment of campus sustainability, sustainability reporting from the business, and the level of sustainability.

STARS' credit has been checked using the four criteria of (i) Credit must lead to better performance of the environment, social, or the economy; (ii) STARS credit should be appropriate to most types of institutions; (iii) placing importance to the performance of the current strategy; and (iv) ensures that each credit is objective, measurable, and beneficial [1].

Planning, Administration and Communications, the overall score would be 30 (average of the three categories). Overall scores for up to five levels highlighted by STARS are as follows: (i) STARS Bronze 25; (ii) SILVER STARS 45; (iii) STARS Gold 65; (iv) STARS Platinum 85; (v) Reporter STARS- For institutions that wish to use STARS and submit data publicly but are not pursuing a rating [1]. A university that is classified at a level of current poor performance will normally try to improve its campus sustainability in the future, while the campus which has reached a good level will always maintain the good condition next to the best for years to come.

III. RESULTS

After studying the aspects, elements and sub-elements of STARS and CSAF frameworks, an integration or matching exercise of aspects and elements of the Sustainable UKM Programme, CSAF, and STARS frameworks. This application seeks to look at the suitability of the main aspects and elements of the CSAF and STARS for the development of the UKM campus sustainability assessment framework. CSAF has identified 10 important aspects, namely health and wellbeing, community, knowledge, governance, economy and wealth, water, materials, air, energy and land [4]. STARS outlined three main areas, namely education and research, operations and planning, management and communication [1]. The Sustainable UKM Programme on the other hand has outlined three main aspects of a sustainable campus namely community, ecosystem and physical development.

The result can be seen in Fig. 4. From the general overview it is found that CSAF and STARS do not focus on physical development or the construction industry, particularly in the key elements of assessment. There are also several aspects of the Sustainable UKM Programme that are not positioned as key elements in the CSAF and STARS, such as communication and ICT, campus infrastructure, sustainable design, sustainable design of campus buildings and sustainable campus landscape design. Elements of CSAF and STARS lean more towards aspects of the community, followed by ecosystem and lastly physical development.

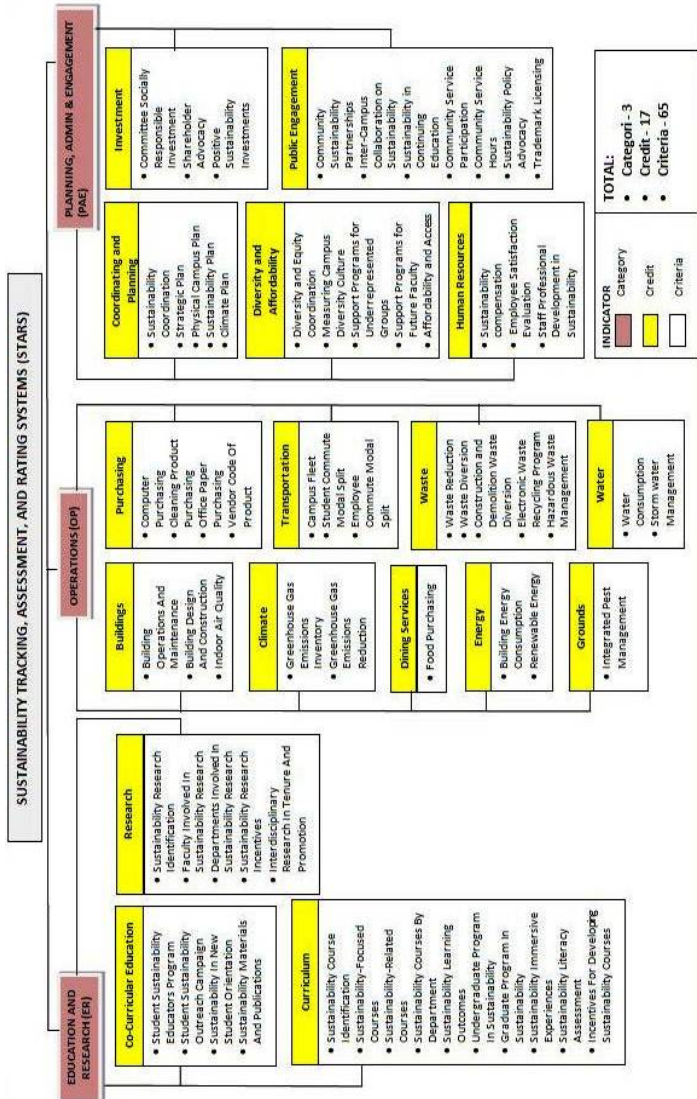


Fig. 3 STARS Framework

STARS introduces a rating system and it is a measurement tool in a college level of achievement. This level will be known at the end of the assessment in which the calculations are summed and rated whether a campus achieves Platinum, Gold, Silver, Bronze or Reporter STARS level. Five levels of achievement can be identified with an average total score produced. For example, if a campus acquires 20 percent of the category of Education and Research, 30 percent of the Operations category, and 40 percent of the category of

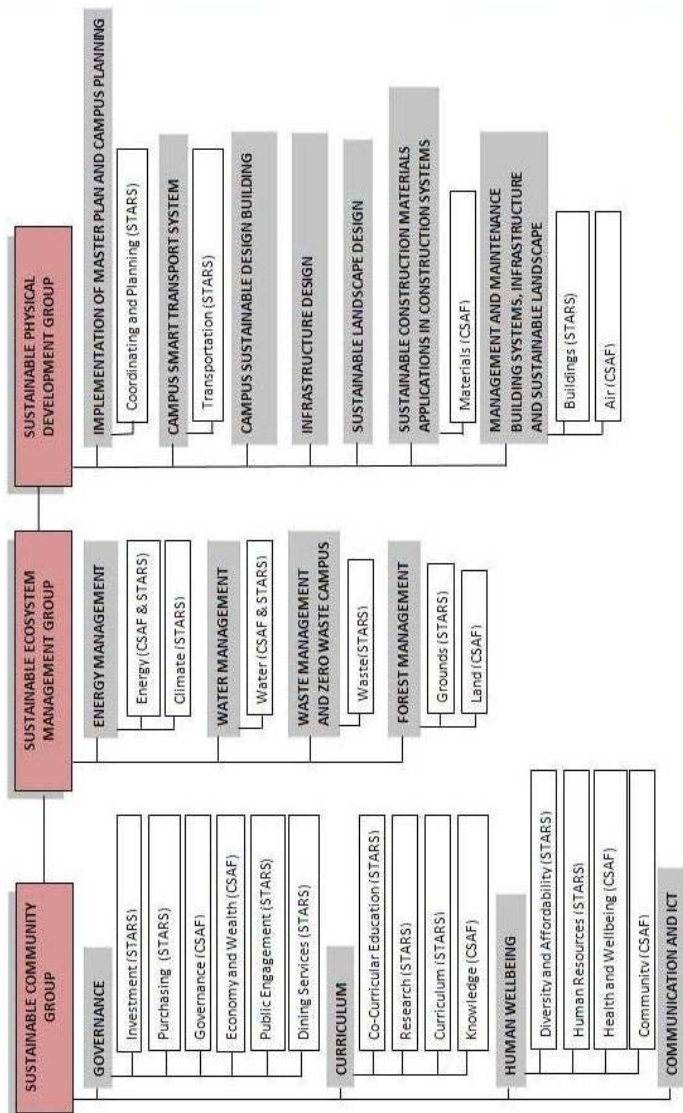


Fig. 4 Main Elements of Integration STARS and CSAF Framework in Sustainable UKM Programme

IV. DISCUSSION

CSAF and STARS frameworks are recognized as being more comprehensive when compared to other approaches in the assessment of campus sustainabilities. However, the results of the analysis in this study show that the CSAF and the STARS give more emphasis on community and ecosystem components than on physical development. In other words, physical development is not taken as a key component of the CSAF and the STARS sustainability assessment. However physical development is listed in STARS and CSAF, specifically in measurement indicators. This may be due to the fact that physical development of the components are already evaluated based on the measuring device with in-depth detailed buildings assessment such as by Leadership in Energy and Environmental Design (LEED), as indicated in the user manual of CSAF and STARS. Therefore, physical development need not be placed as a key component of CSAF

and STARS. This situation is different from the Sustainable UKM Programme that has put physical development as a key aspect, apart from the community and ecosystem.

V. CONCLUSION

UKM has been carrying out appropriate sustainable development initiatives focusing more on UKM campus environment in the early stages. In developing a UKM Campus Sustainability Assessment framework, the operational manuals of CSAF and STARS can be used as a basis and guide. The most important lesson learnt is that each campus is responsible for ensuring the overall efforts towards achieving sustainable development according to its own characteristics and situation, objectives and aspirations, issues and problems, needs and limitations. In conclusion, campus sustainability frameworks at the global level need to be analysed in terms of its performance in the context of the local environment and whether it is appropriate to apply to the local community.

ACKNOWLEDGMENT

Sponsored and financial support by Universiti Kebangsaan Malaysia (UKM) or the National University of Malaysia through Projek UKM *Arus Perdana* research grant, Sustainable Development and Regional Development: Transition Towards a Sustainable Campus (UKM-AP-PLW-04-2009/1) and UKM Sustainable Community Research Group (OUP-2012-059).

REFERENCES

- [1] AASHE. 2011. STARS Technical Manual version 1.1.
- [2] Administrative Update One. Association for the Advancement of Sustainability in Higher Education AASHE.
- [3] Association of University Leaders for a Sustainable Future (ULSF). 1994. The Talloires Declaration: 10 point action plan. Available at: <http://www.ulsf.org/pdf/TD.pdf> [accessed 20 July 2010].
- [4] Cole L. 2003. Assessing Sustainability on Canadian University Campuses: Development of a Campus Sustainability Assessment Framework. B.Sc dissertation. Canada: Royal Roads University.
- [5] Cole L. 2003. Campus Sustainability Assessment Framework (CSAF) appendix v. Royal Roads University Canada.
- [6] UNCED. 1993. Agenda 21: The United Nations Programme of Action from Rio. New York: United Nations Conference on Environment and Development.
- [7] UNESCO. 2007. The UN Decade of Education for Sustainable Development (DESD 2005-2014): The First Two Years. Available at: <http://unesdoc.unesco.org/images/0015/001540/154093e.pdf> [accessed 20 Julai 2010].
- [8] Saadatian O., K. Dola, E. Salleh, O.M. Tahir, 2011. Identifying strength and weakness of sustainable higher educational assessment approaches. International Journal of Business and Social Science Vol. 2 No. 3. 137-146.
- [9] Websites: http://www.ulsf.org/programs_talloires_signatories.html. (accessed 14 March 2012)
- [10] Websites: <http://www.syc-cjs.org/sustainable-campuses>. (accessed 2 March 2012)
- [11] Websites: <http://www.syc-cjs.org/regions>. (accessed 1 March 2012)
- [12] Websites: <https://stars.aashe.org/Institutions/?Sort=rating>. (accessed December 2011)