MASTER THESIS

A COMPARATIVE STUDY ON CAMPUS SUSTAINABILITY IN HIGHER EDUCATION SECTOR IN HONG KONG AND FINLAND

By

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ABSTRACT

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Abstract:

This thesis presents a comparative study examining the practices of campus sustainability in Higher Education Sectors between Hong Kong and Finland. Campus sustainability is a trend during the last decade as a result of numerous declarations and meetings for sustainable development in Higher education all over the world. In this thesis, the investigated areas are focused on environmental sustainability and Social sustainability.

This study used the content analysis method to analyze public available documents from the selected fifteen Higher education institutions in Hong Kong and Finland. The first stage was a description of the current overall situations of campus sustainability in the two regions. The descriptions are based on the three categories: Green Campus, Energy conservation and efficiency, Sustainability teaching and research. Sustainability reports, environmental reports and sustainability WebPages from the universities from Year 2007 to 2014 are examined. The second stage is a comparative study based on the findings in stage one, to derive the strengths and weaknesses in campus sustainability practices in the two regions. The last stage is to provide recommendations to higher education sectors to improve the weaknesses and hence develop better practices.

The results show that higher education institutions in both regions are working towards campus sustainability. The practices are generally covered all the three categories but main focus areas are various from institutions. The weaknesses in campus sustainability practice in Hong Kong are in the area of renewable energy, staff training and involvement , and external collaborations in research, while that in Finland are Green building, involvement to society and sustainability publications. This thesis make some contributes by providing the overall pictures for campus sustainability in Hong Kong and Finland, which is valuable for governmental and education sectors for future planning; and also the detailed information for individual institutions to learn from each other in the good practices.

Key words: Campus sustainability, Higher Education, Green Campus, Energy efficiency, Sustainability teaching and research, comparative study, content analysis

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LIST OF ABBREVIATIONS:

BREEAM- Building Research Establishments Environmental Assessment Method
ECC- The Environmental Campaign Committee
ESD- Education for sustainable development
FNCSD- Finnish National Commission on Sustainable Development
GBC Finland - Green Building Council Finland
GHESP- The Global Higher Education for Sustainability Partnership
HEIs- Higher education institutions
HKGBC- Hong Kong Green Building Council Limited
HKSAR- Hong Kong Special Administrative Region
HKSCC- The Hong Kong Sustainable Campus Consortium
IUCN- The International Union for Conservation of Nature and Natural Resources
LEED - Leadership in Energy and Environmental Design
NSSD- National Strategy for Sustainable Development
NSCN- Nordic Sustainable Campus Network
RDFHG- Regional District of Fraser Fort George
SD - Sustainable development
SDC- The Council for Sustainable Development
SDD- The Sustainable Development Division
UNEP- The United Nations Environment Program
UNCED- UN Conference on Environment and Development
UNECE- United Nations Economic Commission for Europe
USGBC-The US Green building council
USR- University Social Responsibility
WCED- World Commission on Environment and development
WWF- World Wildlife Fund

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1 INTRODUCTION

1.1 Background

Higher Education Sectors provide territories education and conduct researches for world development. They are having important roles in countries. Higher Education Institutions (HEIs) are mainly responsible for addressing global challenges in a more holistic and realistic manner, to educate future leaders in society and also to investigate possible solutions for the challenges. Sustainable Development (SD) is a trend in the last few decades. With its important role in society, HEIs are also working towards sustainability. The reasons for SD in the higher education sector are both to tackle challenges facing by HEIs and building campuses as living laboratories for SD in society. The Sustainability concept consists of three elements: Environmental Sustainability, Social Sustainability & Economical Sustainability.

In the current situation, HEIs are facing challenging in these three areas. Regarding the large population and various activities taking place in campuses, HEIs could be regarded as societies which have direct and indirect environmental impacts and hence systematic and effective measures would largely reduce the environmental impacts from the operations and activities within universities campuses. Therefore, Environmental Sustainability is required. Moreover, the development of HEIs should be connected to the needs of communities and the well-being of human. Overpopulation and extinction of natural resource lead to inequity within the world and threaten humans' well-being. It is important for HEIs to recognize situations and the demands in local and international communities. As a result, social sustainability must be taken into account. Furthermore, HEIs also act as business entities to a certain extent. They have to maintain large amounts of operations within limited budgets. Both governments funded and private HEIs are required to report to their board of management in the financial aspects. Economical sustainability is also inevitable.

This thesis is aiming to investigate the campus sustainability in Higher Education Sectors, by comparing the current practices between two regions – Hong Kong and Finland. In Finland Higher Education is free of charge to everyone while in HEIs in Hong Kong tuition fees are collected from both citizens and international students. With this big difference in the financial source, economical sustainability will not be discussed in this thesis. Instead, the focuses in this thesis are in Environmental Sustainability and Social Sustainability. Finding out the current situation in campus sustainability in both regions is significant for evolution and thus preparing future strategies. Moreover, the world is facing the same challenges and hence HEIs in different regions should work together. As a result, comparing different sustainability practices would always benefit to HEIs individually as well as for the whole world.

1.2 Motivation for the research

The researcher was raised and educated in Hong Kong before moving to Finland for the master course. During her bachelor studies in 2000s in Hong Kong, the researcher notified that SD was not yet a popular topic in HEIs. After a year of studies in CEM course in Finland, it was discovered that not only business entities but also HEIs have a high potential to develop their sustainability practices. The SD in Hong Kong has been slowly developing since 1990s as The Hong Kong Undergraduate Education reform under "3+3+4" in the fall of 2012 acted as a catalyst of the SD in HEIs in Hong Kong. The large demand in campus facilities and services for the rapidly increasing number of university students cause serious social and environmental impacts. Thus, HEIs and the media pay more attention to the topic and SD in campus infrastructure, and operations became the trend in HEIs development in Hong Kong. At the same time, the researcher noticed that campus sustainability is also developing in universities in Finland. There are campus sustainability organizations and work groups working together to attain SD in HEIs. Being a CEM student, the researcher has participated also in the coursework in CEMS240 Environmental Management Systems, Project Work, which required her to work for the JYY Green Office Project plan with the team. The above experiences have caught the researcher's attention towards the topic of SD in HEIs.

Hong Kong is a developed city in Asia, and Finland is one of the leading countries in Europe. Both places have high reputations in education and a similar population size, while the two regions are largely difference in culture as well as the geography and climate. In order to catch up the world's needs, HEIs in both places should keep an eye on their SD. It is worthwhile for the two places to learn from each other for the improvement of their practices. This thesis would be an interesting one to find out the current situation of SD in the Higher education sector in Hong Kong and Finland. Furthermore, there is lack

of literature comparing the SD practices in the two regions. The result of this thesis would also serve as a guide for the two regions to learn from each other.

1.3 Research Problem and Questions

As the review of empirical studies on SD in HEIs has revealed, the central topics of these studies mainly have been focused on one of the elements, either environmental or social aspects. The overall situations of SD in HEIs in Hong Kong and Finland have not yet been clearly studied. Therefore, this study has attempted to cover the issue of SD in HEIs from the perspective of environmentally and socially sustainable development. It is also a valuable study to investigate the differences between the two regions in the topic. As a result, the research problem of this thesis is

'What are the differences between Hong Kong and Finland regarding Sustainable Development in the Higher education sector? '

This research problem involved answering the following subsequent questions:

1. *'How is Sustainable Development included in Universities?*
2. *'What are the strengths and weaknesses in sustainable development in Higher education sector in the two regions?'*
3. *'How could the two regions learn from each other? '*

In order to have a more thorough study in the SD in HEIs, understanding the details of practices in both environmental and social aspects are essential. Thus, the first sub question is focusing on the three areas: (i) Green campus which including the green buildings, energy conservation and efficiency and waste management; (ii) Social sustainability and public participation which include the involvement of students, staffs and external stakeholders; and (iii) Sustainability teaching and researches in HEIs. By comparing the overall situations of SD in HEIs in the two regions, the strengths and weaknesses can be found out and therefore some recommendations would be driven for the improvements for their SD. The Research problem and sub-questions are presented in the TABLE 1.

TABLE 1: Research Problem and Sub-questions

Research Problem	Objectives
What are the differences between Hong Kong and Finland regarding Campus sustainability in Higher education sector?	To present and compare the difference in practices in Sustainable development in Higher education sector in the two regions.

(continues)

TABLE 1 (continues)

Research Questions:	Objectives
How is Sustainable Development included in Universities?	To present the level of Sustainable development in HEIs , focus on: (i) Green campus; (ii) University Social sustainability; (iii) Sustainability teaching and researches.
What are the strengths and weaknesses in campus sustainability development in the two regions?	To Find out the strengths and weakness by comparing the practices of the selected HEIs in the two regions.
How could the two regions learning from each other?	To provide recommendations for the two regions for a better practice.

1.4 Structure of the thesis

The thesis is structured into 6 chapters as the outline below:

Chapter 1	Introduction	Introduce the background and motivation of this thesis as well as the research problem.
Chapter 2	Methodology	Present the methodology used for answering the research questions and describe the source of data collection.
Chapter 3	Literature Review	Present the key concepts and theories applied in research questions and discuss the related literatures.
Chapter 4	Result	Present the result of content analysis of sustainability related documents of the selected HEIs.
Chapter 5	Discussion	Discuss the findings from analysis with connections to the theories and literatures.
Chapter 6	Conclusion	Summarizes the findings, suggestions for future research. Present the research limitations and evaluate the trustworthiness of the study.

2 RESEARCH METHODOLOGIES

The description of chosen research strategy is in this chapter to assure the transparency of the research. This involves the description of research design as well as the principle methods of data collections and the analysis. . Moreover, the limitations of used methodology used and the data collected are also included in the discussion.

2.1 Research Design

This research was conducted as qualitative research. Qualitative research is aimed at gaining a deep understanding of a specific organization or event, rather than a surface description of a large sample of a population. It is also to explore and discover issues about the problem on hand since there are very little known about the problem (Domegan and Fleming, 2007). The strengths of qualitative studies are appropriate for research that is exploratory or descriptive and that stresses the importance of context, setting and participants' frame of reference (Marshall and Rossman, 2011). The benefits of the qualitative approach are that the information is richer and has a deeper insight into the phenomenon under study. Since this research is firstly to understand and describe the current situations of SD in HEIs, detailed and deeper information are needed for this purpose. Therefore, qualitative research is better suited than quantitative in this case. At the same time, a comparative study is used for answering the second research questions. Comparative research is generally defined in two ways: Either on the basis of its supposed core subject or by means of descriptive features that claims to enhance knowledge as a process (Keman, 1997, Almod et al., 1993). Lor (2014) also mentioned that comparative study aims to identify similarities and difference between social entities. In addition, a set of rules must be developed that direct the research strategy, aiming at explanations rather than at a more or less complete description of phenomena by comparing them across systems, through time , or cross-

nationally. In this thesis, A few cases research Design, which all relevant cases across time and space, is taking place. This research design is on the one hand maximizing the number of cases but on the other hand time is considered to be constant across all cases. The obvious advantage is that the universe of discourse can be extended and thus the scope of comparison widened across time and space (Stimson, 1985). The number of HEIs studies in this thesis is being maximized and divided into two groups (Hong Kong & Finland) by locations. The time is considered for the past 7 years (2007-2014). With this research design, the goal for describing and explaining the difference of campus sustainability between the two regions in the last 7 years can be achieved.

2.2 Data Collection

Document Studies is a type of qualitative research method, which is a systematic procedure for reviewing or evaluating documents in both printed and electronic material. Lincoln and Guba (1985) defined a document as "any written or recorded material" not prepared for the purpose of evaluation or at the request of the inquirer. Documents can be divided into two major categories "public records and personal documents (Guba and Lincoln , 1981). Public records are materials created and kept for the purpose of proving an event or providing accounting while personal documents refer to first person accounts of events and experience. Document studies have their advantages and disadvantages. The advantages are providing opportunity for study of trends over time, inexpensive and useful for determining value, interest, positions, public attitudes and sequences. In contrast, the disadvantages include difficult access to data, time consuming analysis and incomplete or inaccurate information (National science foundation, 1997). In this research, the data collection was based on the document studies, which focus on public records that are publicly available online sustainability reports, environmental reports, annual reports and webpage information of the selected HEIs. Therefore, these are secondary data sources.

The thesis aims to understand and compare the general situation of Sustainable development in Higher education sector in Hong Kong and Finland. Therefore, total fifteen higher education institutions (HEIs) were selected for this study. The selected HEIs include all eight universities which are funded by HKSAR government in Hong Kong, and seven universities located in different parts of Finland. The full name of the HEIs and their initials are presented in TABLE 2.

TABLE 2: List of Universities being studied in this thesis:

	Name of Universities/ HEIs in Hong Kong	Initial
1	City University of Hong Kong	CITYU
2	Hong Kong Baptisti University	HKBU
3	Lingnan University	LNU
4	The Chinese University of Hong Kong	CUHK
5	The Hong Kong Institute of Education	HKIED
6	The Hong Kong University of Science and Technology	HKUST
7	The University of Hong Kong	HKU
8	The Hong Kong Polytechnic University	HKPU

	Name of Universities/ HEIs in Finland	Initial
1	Aalto University	Aalto
2	University of Jyvaskyla	JYU
3	University of Tampere	UTA
4	Lappeenranta University of Technology	LUT
5	Hanken School of Economics	Hanken
6	Kymenlaakso University of Applied Sciences	KyUAS
7	Turku University of Applied Science	TUAS

All eight government-funded universities (shown in TABLE 2) in Hong Kong were selected for this study. There were two main reasons for taking all universities into accounts. First, all these universities have important roles and high rankings locally and globally even their history varies from twenty to over one hundred years. The roles and high rankings drive these HEIs to awareness of SD but there would be different focuses on the practices due to different backgrounds. Second, there are multiple sustainability reports and information sources available on their school webpage. It provides significant data for comparison. However, the timeline of these reports and information is 7 years long (from year 2007 to 2014) due to the limited available online information. The selection of HEIs in Finland was more complicated since there are 39 HEIs under the Ministry of Education and Culture sector in Finland. The first criterion for the selection was based on the location. It aimed to provide a fairer view on the study if the selected HEIs are located in different parts rather than the single part of Finland. The selected HEIs should be located from south to north and from east to west. Nevertheless, many of HEIs in Finland do not have available sustainability information online yet. With this consideration, the second and more important criteria lay in the availability of sustainability data from HEIs. As a result, five universities and two polytechnic (shown in TABLE 2) were selected to be included in this study. The seven HEIs are located in the south, east and west part of Finland while no HEIs in northern part were

selected. The timeline for these reports and information is 4 years long (from 2011 to 2014). The HEIs and the document studied for this thesis are shown in TABLE 3.

TABLE 3: The 15 HEIs and the documents for data collection

	Initial	Source 1	Source 2	Source 3	Source 4
1	HKU	HKU- Sustainability website http://www.sustainability.hku.hk/sustainable-hku	ISCN-GULF Charter Report 2012	Sustainable Report 2013	Annual Report 2013-2014
2	CUHK	CUHK- Campus Planning and Sustainabilty Office website http://www.cuhk.edu.hk/cpso/	Sustainability Report 2011	Campus Master Plan 2010	Annual Report 2013-2014
3	HKUST	HKUST - Healthy, Safety and Environment Office website http://www.ab.ust.hk/hseo/	Environmental Report 2012	HKUST's Green Campus Initiative - A Sustainability strategy (2007)	Annual Report 2013-2014
4	HKPU	HKPU website http://www.polyu.edu.hk/greencampus/en/	Sustainability Report 2011-2012	Newspaper: paper.wenweipo.com/20150130/30ED1501300002.htm	Annual Report 2013-2014
5	HKBU	HKBU Sustainability website https://lowcarbon.hkbu.edu.hk/live/en/	Environmental Report 2008-2009	Sustainable newsletters (every 3 months)	Annual Report 2013-2014
6	CITYU	CITYU Sustainability website http://www6.cityu.edu.hk/sustainability/SustainableCommunity@CityU/SustainableCommunity.htm	CityU today (Magazine) Oct 2014	CityU Green Connections Annual Report 2012-2013	Annual Report 2013-2014
7	LNU	LNU website http://www.ln.edu.hk/	Environmental policy 2010	Strategic Plan 2009-2016	Annual Report 2013-2014
8	HKIED	HKIED Sustainability website http://www.ied.edu.hk/sustainability/	Environmental Report 2011-2012	Annual Report 2013-2014	-

TABLE 3 (Continues)

	Initial	Source 1	Source 2	Source 3	Source 4
9	Aalto	Aalto university sustainability website http://arts.aalto.fi/en/about/sustainable_development/	ISCN-GULF Charter Report 2013	-	-
10	JYU	JYU Green office webpage: https://www.jyu.fi/yliopistopalvelut/tilapalvelut/greenoffice/en/what-the-university-of-jyvaskyla-does/actions-of-the-university-of-jyvaskyla	Environmental Program of the university of Jyvaskyla 2013-2015	JYU Global Responsibility Policy 2014	-
11	UTA	University of Tampere – eco campus website http://www.uta.fi/ekokampus/en/	Sustainable Development Action Plan (SDAP) 2012-2015	-	-
12	LUT	Lappeenranta University Green Campus website http://www.lut.fi/web/en/green-campus	Lappeenranta university of Technology Code of Conduct.	-	-
13	Hanken	Hanken website: http://www.hanken.fi/en/about-hanken/hanken-society	Annual report 2013	-	-
14	KyUAS	KyUAS website: http://www.kyamk.fi/Kyamk/Yleistietoa/Vastuuraportit/Yhteiskuntavastuuraportit%202010-2013/	Annual Responsibility Report 2013 (in Finnish)	Annual Responsibility Report 2012 (In Finnish)	Annual Responsibility Report 2011 (in English)
15	TUAS	Corporate Social Responsibility Review.	-	-	-

2.3 Data analysis

The qualitative content analysis is used as the data analysis method in this thesis. Qualitative content analysis has been defined as "a research method for the subjective interpretation of the content of text data through the systematic

classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005). Patton (2002) also defined it as "any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings". Qualitative content analysis goes beyond merely counting words or extracting objective content from text to examine meanings, themes and patterns that may be manifest or latent in a particular text (Zhang and Wildemuth, 2005). It is mainly inductive, grounding the examination of topics and themes, and also the inference drawn from the data. Moreover, the samples for qualitative content analysis usually consist of purposefully text selection in order to provide answers for the research questions. Regarding the products of qualitative context analysis, the range of the meanings of the phenomenon is usually to be illustrated. In this thesis, the primary aim is acquiring a broad description of SD in HEIs in Hong Kong and Finland. The qualitative content analysis is a tool to achieve the aim by categorizing text data. The following steps are to be used in the analysis: (refer to FIGURE 1)

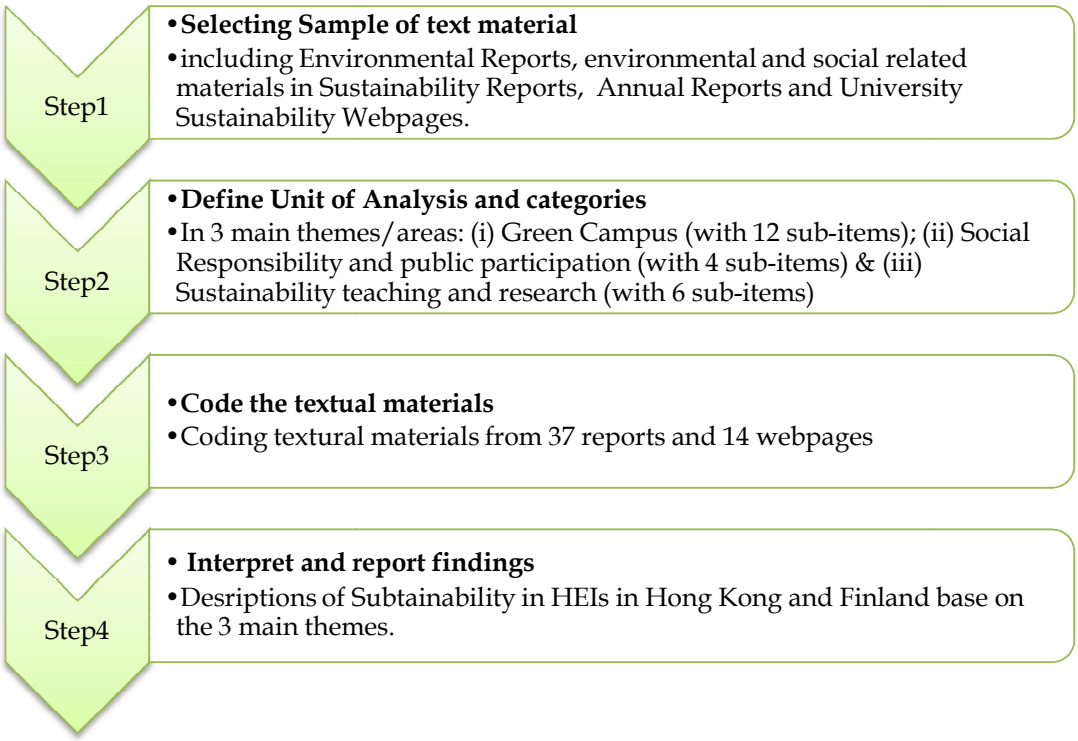

FIGURE 1: Main steps for context analysis

The first step was selecting the *Sample* of text material. Qualitative content analysis can be used to analysis different kinds of data and generally the data are in written form. Since there are plenty of data from existing texts, the choice of the content must be justified by what you want to know (Patton, 2002). As this research is focusing on the environmental and social sustainability, environmentally and socially related information was the *Sample* from

University Sustainability webpage, published Sustainability reports and Annual reports. On the other hands, the entire content of environmental reports would be studied. After reading the materials, the next step is to define the unit of analysis and categories. The *unit of analysis* refers to the basic unit of text to be classified during content analysis (Zhang and Wildemuth, 2005). It may be specific words, phrases or themes. The *units of analysis* in this thesis cover a wide range from single wording to phases so enable to attain the overall situation in the topic. Regarding the framework of categories, it contains the 3 main areas: (i) Green Campus; (ii) University Social Sustainability & (iii) Sustainability teaching and research. Each area has a few sub-items. The coding categories are designed with reference to Green Metric World University Ranking which included conditions and policies related to green campus and sustainability in the universities all over the world. The researcher has looked into different campus sustainability rating systems, such as The College Sustainability Report Card and Greenship, and discovered that The Green Metric World University Ranking provides a more comprehensive system. As a result, the coding categories in this thesis were formed. The final comparison table for content analysis is shown in APPENDIX I. In the final stage, the findings from content analysis should be interpret and reported.

3 LITERATURE REVIEW

3.1 Sustainable Development in Universities

Sustainable development (SD) first became widely known in the World Conservation Strategy (1980), which was prepared by the joined hand of the International Union for Conservation of Nature and Natural Resources (IUCN), the United Nations Environment Programme (UNEP) and the World Wildlife Fund (WWF). The World Conservation Strategy contains both a perceptive framework and practical guidance for the conservation actions at national and international levels. The strategy gave obvious effect in the awareness of SD. The concept was well established since it was first introduced in the report published by the World Commission on Environment and development (WCED) in 1987:

'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

Sustainable development in universities has become a global issue for higher education policy makers and planners on account of their social status and the realization of environmental impacts from universities operations. The need for SD in university campuses has been stressed in many articles. Simth (1993) expressed that Higher education institutions are integral parts of the larger society's economic, social, and physical landscape. Sustainable development cannot only be a matter of concern at governmental level, but that all institutions, including those of higher education, need to take an active part in the struggle to achieve this goal (Leal Filho et., 1996). Bernheim (2003) stated that academic institutions are an integral part of the automobile-intensive, high-consumption, waste-intensive global landscape. Richardson & Lynes (2007) stated "Institutions of Higher Education(IHE) across the world are physically explaining to meet the demands of growing student populations. HEIs worldwide have responded to the challenge of reducing the ecological footprint of campus operations through campus sustainability advocacy, implementation

strategies and research". Alshuwaikhat & Abubakar (2008) mentioned, universities are 'small cities' which have serious direct and indirect impacts have on the environment due to their large population and various complex activities in campus. Higher education institutions generate environmental impacts through both direct and indirect activities, which included those in classrooms, laboratories, office and catering by students and employees. It is important to estimate these environmental impacts in order to identify more sustainable options for reducing their environmental footprints (Lukman et., 2009). Savelyeva & Mckenna (2011) stressed Sustainability has found its way into all dimensions of academia. Higher education institutions had been considered as essential party for achieving sustainable development.

There is no well-defined but a common view that sustainable university campuses refer to a better balance between economics, social and environmental goals in policy forming as well as a long-term perspective on current campus activities. Some researchers and organizations have presented their views towards Sustainable university campuses. According to Velazquez (2006) et al., a sustainable university is defined as "a higher educational institution, as a whole of as a part, that addresses, involves and promotes, on a regional or a global level, the minimization of negative environmental economic, societal , and health effects generated in the use of their resources in order to fulfill its functions of teaching, research , outreach and partnership, and stewardship in ways to help society make the transition to sustainable life style." The Sustainable University One-stop Shop mentioned a sustainable university project should develop from a systems or holistic perspective, perceiving the campus as a 'learning laboratory', a 'model sustainable community' or a 'sustainability life world' or as a 'learning organization' with regard to sustainability. Cole (2003) stated a sustainable campus that acts to protect and improve the health and well-being of human and ecosystem. It actively engages the knowledge of the university community to address the ecological and social challenges that we face now and in the future. As sustainable concept is applied to universities, it could be the core value in campuses as well as various activities so that all stakeholders in universities are able to meet their needs and maintain these ideals in a long-run.

In order to foster the SD of higher education institutions, events or declarations have been developed since 1990s [APPENDIX II]. In October 1990, the Talloires Declaration was signed in France by twenty leaders from higher education from different parts of the world. The concerns were environmental degradation, pollution, depletion of natural resources, and the threat to human and biodiversity survival. The Kyoto Declaration was launched in November 1993, which addresses the curricula, research, operations, outreach and the need for universities to collaborate. The Global Higher Education for Sustainability Partnership (GHESP) was formed in 2000. The GHESP targets to develop and share effective strategies, models and best practices for promoting higher education for sustainability. The Luneburg Declaration (2001) emphasizes the collaboration between higher education institutions, NGO's and other

stakeholders such as government and United Nations. Abuja Declaration in 2009 focus the inter-institutional collaboration, it also calls for trans-disciplinary approaches in learning and research among African universities. In June 2012, "Rio+20" took place in Rio de Janeiro. The Rio+20 Conference gathered world leaders and thousand of participants from NGOs, private sectors and other groups for discussing the way to build a sustainable future. The Rio+20 Treaty on Higher Education and the Higher Education Sustainability Initiative for Rio+20 lead to an important framework for the sustainable development in University, which evolved 7 principles for Higher education institutions in their strategy planning and implementation. Short term and Long term actions were also mentioned in the Treaty. According to Copernicus Alliance, there are 83 universities have signed the Treaty Rio+20 by 2013. The latest, Nagoya Declaration in 2014, reaffirms the responsibility of higher education for pursuing of sustainable development and commits their support to further advancing sustainable development through education for sustainable development.

3.1.1 Sustainable Development in Universities in Hong Kong

Hong Kong is on the southern coast of China, a well-developed Asian city as one of the world's leading international financial centre. It was a British colony for more than a century and was returned to China as Hong Kong Special Administrative Region (HKSAR) in July 1997. Hong Kong has an extreme population density. According to the statistic from HKSAR government in 2014, it has a total area of 1,104 km2 with a population of over 7.2 million.

In the past four decades, Hong Kong achieves its economic success in Asian-Pacific. However, like most modern cities, Hong Kong also suffer from environmental degradation in the course of achieving a spectacular economic boom since the early 1970s (Chung & Lo , 2002). Pollutions are the serious problem facing by Hong Kong. The threats are not only causing health problems and monetary lost to the citizens, but also negative effects in the international status of Hong Kong and its competitiveness for foreign investment. A 2012 survey by the local American Chamber of Commerce found that a third of respondents had difficult recruiting overseas professions because of Hong Kong's poor air quality. According to a study by University of Hong Kong researchers, there is estimated 3,069 people died prematurely in 2012 due to air pollution and approximate 151,300 were hospitalized for pollution-related illnesses. The medical bills and the value of loss of productivity as a result was HK$39.4 billion.(SCMP 15/01/2013) In order to maintain Hong Kong's productivities and competitiveness, as well as to provide a quality living environment to the citizen , the needs of sustainability is striking in Hong Kong. Hong Kong government has been performing towards SD in different levels since 1980s [APPENDIX III]. The policies and actions are gradually from single focus on pollution problems to multi-discipline with the concept of sustainability, namely: ecological, social, economics, culture and spatial. Numbers of significant committees and units for SD are also established. The

1989 White Paper on "Pollution in Hong Kong- A time to Act" set out a 10 –year environmental protection strategy for controlling pollution. The White paper provided a framework to dealing with the management of waste, sewerage, water quality, air quality, noise, planning against pollution, enforcement and compliance policies and environmental education. In 1990, the Environmental Campaign Committee (ECC) was set up to promote public awareness of environmental issues and encourage the public to contribute actively towards a better environment. ECC is responsible for planning and organizing environmental events and activities for different sectors of the community. China's Agenda 21 in 1994 served as a guiding document for setting medium and long-term plans on economic and social development. Commissioning of the Study on Sustainable Development for the 21st Century in Hong Kong (SUSDEV21) was conducted in 1997 and it is an important milestone of the SD in Hong Kong. The study was commissioned by the Government of the HKSAR and was conceived in response to the need to take account of environmental and social concerns as well as economic aspects when making decisions about the future of Hong Kong. It aimed at introducing the concept of sustainability into decision making by Government as well as introduce the idea of sustainability to the general public and seek their views and ideas. During 1999, the Chief Executive of HKSAR announced the institutionalization of SD as part of the Government's policy formulation and decision-making process. The Council for Sustainable Development (SDC) in 2003 and the Sustainable Development Division (SDD) in 2007 are established for advising Government on the SD and also promoting greater awareness of the concept in the community. Hong Kong Declaration on Sustainable Development for Cities was an outcome by the forum which investigates key challenges to SD for cities and renewed interest in regional and inter-city cooperation and partnerships. Conferences for SD in Hong Kong, such as "Sustainable Business for Our Future" (2010) and "Sustainable Development through Energy Efficiency and Conservation" were held for engaging the business, social and environmental sectors to involve in the SD with consideration on different aspects.

Hong Kong has undergone the transformation into Post-industrial Economy in 1990s. Acceptance of the 'Open Door Policy' adopted by the People's Republic of China (PRC) provided chances for Hong Kong's investors to shift their manufacture operations to Mainland. The Economic restructuring in Hong Kong was a result of outflow of industrial capital to Mainland China. Tertiary innovative sectors, such as research, finance and marketing, and distribution service to investors, started replacing the old industrial structure to provide sound business environment for foreign investor (Chang and Zhang, 2011). Higher education in Hong Kong therefore plays a significant role in enhancing the competitiveness by offering professional training to meet the needs According to the statistic in the Hong Kong Monthly Digest of Statistics (8/2014) from HKSAR, there are eight higher education institutions funded by HKSAR government and 21.1% of the population aged 15 and over were educated to first degree level or above.. In a period of growth and dynamic

change for the education sector in Hong Kong, universities are approaching the challenges by climate change crisis and related sustainability issues. With the introduction of 3-3-4 curriculum system in 2012, which students who enter universities will have to spend four years instead of three, universities in Hong Kong are even facing an extra challenging in their SD. The education reform has lead to the establishment of new colleges, the construction of new buildings and the renovation of existing premises, as well as to handle more campus activities by staffs and students, which cause increase in ecological footprint. Beside government and corporate efforts, tertiary institutions are one of the core strength as they can lead by example and share experience in sustainability. Campus sustainability in universities in Hong Kong became an essential part of the SD in the city.

Hong Kong Declaration, which signed in May 2010 by the Presidents and Vice Chancellors of Hong Kong's eight publicly funded universities, act as a milestone of the Sustainable development in Universities in Hong Kong. The *Hong Kong Declaration* includes a statement of principles regarding the importance of climate change and sustainable development for the universities' core mission of research , teaching , and knowledge exchange; the ethical obligation of educators to provide students, as the future leaders and decisions makers of society, with a thorough understandings of the nature of environmental , social and economic sustainability challenges; the opportunity for universities to serve as models within the community ; and their responsibility to work across the community in forging appropriate solutions. The document also address the signatories to review their own campus operations; establishing targets for the reductions of energy use , greenhouse gas emissions , water use and waste ; as well as the review on teaching curriculum with relevant issues and the reporting systems on environmental performance measures. This declaration provided a practical framework to the higher education sectors in their sustainability projects. The Hong Kong Sustainable Campus Consortium (HKSCC) was accordingly established with the declaration by the eight universities. HKSCC is an organization to provide platform for sharing information and best practices among higher education institutions in Hong Kong.

Even though there is lack of research paper in SD in University in Hong Kong, Alam and Khalil (2011) have studied for the general SD in Hong Kong. The researchers stated that Hong Kong maintain a positive response to the economy and environment due to embracing the high density high rise compact mixed use development. However, addressing the society's integration in the development is lacked in Hong Kong because of the top-down governance and excessive pro-growth bias. On the other hand, some previous researches have examined the SD in universities in China and Asia. It is noted that there are different focus among institutions when it comes to sustainability. According to Lo (2013), Chinese Higher education institutions (HEIs) have a remarkably uniform and narrow interpretation of sustainability: water and energy conservation. This is because the influence of central and local

governments in terms of sustainability agenda. The research also illustrated that Chinese HEIs rely more heavily on non-technical initiatives rather than the more expensive technical initiatives. Tan (2014) et al. also mentioned that the green campus development in China begin with eco-technology and facility energy management with strong enforcement from the government. In Taiwan, the priorities for higher education in sustainability included the promotion of curriculum development that adopts the core values of sustainability across all disciplines; the encouragement of infrastructure renovations and improved techniques and systems with sustainability principles, and support for research and the implementation of innovative and advanced approaches towards achieving sustainability. It is also reported that Taiwan's institutions have been supported by various government agencies and ministries in the last 10 years in becoming more sustainable institutions, in curriculum development and infrastructural reform (Chang, 2010). To the best of my knowledge, sustainability in Hong Kong Higher education institutions has not been studied macroscopically, even though there were researches focused on specified topics such as recycling or energy use in campuses or environmental performance in constructions and hospitality industries.

3.1.2 Sustainable Development in Universities in Finland

Finland, officially the Republic of Finland, is a Nordic country in Northern Europe. Finland was once a part of Swedish and Russia. In December 1917, Finland declared independence and thus the Republic of Finland established. On 1 January 1995, Finland becomes an EU member state. Compare to Hong Kong, Finland has a relatively low population density. According to the statistic on January 2014 by Finnish government, the population in Finland is 5.4 million in the total area of 338,424 km2.

Finland has a mixed economy while manufacturing is still one of the key economic sectors beside service. Electronics, machinery, vehicles and engineered metal products, forest industry and chemicals are among the largest industries. Reference to the *CIA World Factbook 2014*, the GDP composition by sectors is: agriculture 2.9%, industry 25.1% and service 71.9% in Finland. Environmental problems and climate change challenges are also facing by Finland, causing negative effect in their economy and quality of life. SD is highly concerned in the country. The Government of Finland is committed to participating actively in international cooperation to solve those problems and to develop international environmental governance. At the same time, Finland's national sustainable development work is carried out in line with the policies of the United Nations, the European Union, the Arctic Council and the Nordic Council of Ministers.

Since 1990s, Finland government has involved and stressed SD in their strategies and program. The pushing force for SD in university in Finland was as a result of the *Rio Declaration* in Rio UN Conference on Environment and Developmen (UNCED) conference in 1992. The Declaration is an agreement text that specifically support the development of "Sustainable universities" which

involving the strategies development and plans for research and education in sustainability. The Finnish Ministry of the Environment and the Finnish National Commission on Sustainable Development (FNCSD) is leading the strategy development and implementation towards SD in Finland. Finland was one of the first countries to compile its own program for sustainable development in 1998. The program was written according to the Agenda 21 action program approved in 1992 at the UNCED. In 2000, Finland committed to the UN's Millennium Declaration and achieving its common development goals by 2015 at latest. The Finnish Network for SD Indicators was established in the same year. In 2006, FNCSD and the Cabinet approved a new National Strategy for Sustainable Development (NSSD). The strategy named "Towards sustainable choices. A nationally and globally sustainable Finland" provides a guide to various actors in selecting solutions with the principles of SD. In spring 2013, the Finland's NSSD has been revised with a new concept of "Society's Commitment to Sustainable Development". The commitment aims to promote sustainable development across the Finnish society.

Higher education has a significant role in Finnish Society. The welfare of Finnish society is built on education, culture and knowledge. Finnish education system has high reputation in the world and it was ranked best in the world in 2012. The Finnish higher education system consists of two complementary sectors: Polytechnics and universities. Up to 2014, there are 14 University and 24 polytechnics under the Ministry of Education and Culture sector. Under the new Universities Act (June 2009), Finnish universities are independent corporations under public law or foundations under private law (Foundations Act). Finland is one of the most educated nations, the tertiary educational attainment (age 30-34) is 45.1% in 2013 (Education and training Monitor 2014 Finland). Considering Education as strength of the country, Finland can fully utilize the higher education institutions in observing the principles of sustainable development.

The SD in university in Finland was started from early 2000s with the pilot implementation of Baltic 21E program, which formed the basis for the Education for sustainable development (ESD) strategy later. The Finnish Government included the promotion of sustainable development in its development plan for education and research in 2003. This plan serves as a main steering tool for the Ministry of Education. SD is also addressed in the annual performance agreements concluded by the polytechnics and universities with the Ministry of Education. it was mentioned that " the importance of sustainable development will be strengthened in educational policy and in the basic and in-service education for teachers." (NSSD 2006). During the term of 2008 to 2012, FNCSD also addressed education to promote sustainable development. Government policies tend to focus in the ESD in this period. There are also amounts of academic literature related to ESD in Finland and Nordic countries; however, it will be discussed further in section 3.4. UN Higher Education Sustainability Initiative within Rio +20 in 2012 provided a well-equipped framework for Universities in their SD. Signing the

sustainability declaration for universities, *the Rio+20 Treaty on Higher Education* commit to four levels: Culture, Campus, Curriculum and Community Engagement. Universities can set up and review their SD strategy and policy in considering the four components. At the moment, there is not yet a national organization gathering HEIs and providing further support to Sustainable campus development in Finland. Nordic Sustainable Campus Network (NSCN) alternatively acts as the role to strengthen the sustainability efforts already in action in the Nordic Higher education institutions. NSCN was found in 2012 by five universities from the five Scandinavia countries while Aalto University in Finland is one of the founders. The network is aimed to strengthen the role of sustainable development in all university operations with emphasis on campus greening and SD into teaching and research. Up to 2014, NSCN has over 30 member universities which included 18 HEIs from Finland.

Even SD is increasing its role in Finnish HEIs and actions are being taken, there is still lack of literature in terms of its overall trends and situations. Available literatures are mainly focus in the ESD or environmental practices in HEIs in Nordic countries. Emphasizing the basic principles of SD of economic, environmental and social aspects, it appears more useful to conduct contextual studies of practice on how the SD included in Finland's HEIs in current situation.

3.2 Green Campuses

HEIs have discovered that their activities and physical structures providing significant impacts on the environment. Over the past decades, many universities have developing and implementing measures to management their environmental performance and improvement. The process of reducing the multitude of on-and off-site environmental impacts resulting from campus decisions and activities is a part of the greening of HEI (Creighton, 1999). Sustainability initiatives on campus, also called "Greening the campus", are one of the four strategies in all the sustainability initiatives (Velazquez 2006 et. al). According to Alshuwaikhat & Abubakar (2008), green campus initiative is to promote construction of green building and transposition facilities, resource conservations, recycling and management. Savelyeva & Mckenna (2010) describe that greening campuses implies infusing environmentally friendly practices in all dimensions of university operations and infrastructure. Tan (2014) et al. stated "Green campus development will find a new approach to lay equal emphasis on the soft power of green environmental protection and the fixed low-carbon target, and will be full life cycle assessment-oriented." Sharp (2002) concluded that environmentally sustainable campus is a vision of a learning organization and a living laboratory for the practice and development of environmental sustainability. The ways the initiative is implemented are different from each university. Dahle & Neumayer (2001) mentioned that

"although several HEIs have started to implement prudent environmental practices, few are vigorously pursuing greening initiatives throughout their campus operations. In general cases, particular efforts are carried out in one section of a university while other units will lag behind". Nevertheless, core framework of Green campus development should be similar to most of HEIs since the most common used approaches – green building initiative, ISO 14001 and European Eco-Management and Audit Scheme (EMAS) are being referenced. ISO 14001 standards is largely implemented by HEIs in the world including Asia, USA and Europe. As described by European management Journal (2000), the standard is known corporate wide with the purpose of prescribing and implementing environmental goals policies and responsibilities, as well as regular auditing of its elements. EMAS, which was developed in 1993, is designed to bring about changes in environmental performance. In this section, the topic is being discussed with focus on three dimensions: (i) Green buildings, (ii) Energy conservation and efficiency, and (iii) Waste management.

3.2.1 Green Buildings

"Green building" is a term used to describe a building which is higher efficiency in energy and resources, less pollution produced into the air, oil and water, and is healthier for occupants than standard building (Richardson & Lynes, 2007). According to the ISCN/GULF sustainable Campus Charter Principle 1, Individual buildings in campus should minimize its environmental impacts. The focus is also in the optimizing the integration of the built and natural environment, which aims to minimize the disturbance to nature while constructing. The widely used approach –"The green buildings imitative", is a set of projects aim to reduce waste and hazardous materials productions, lower the level of energy consumption and promote the design of energy-efficient buildings. One of the main targets in this initiative is to promote the construction of energy and resource efficient building. A choice of environmentally friendly building materials , design of integrated and flexible systems in buildings , as well as the use of local materials are the significant concerns in green building designs. Currently, there are standards created by members of building industry to grade and certify green buildings. The first green building rating system in the UK in 1990s is the Building Research Establishments Environmental Assessment Method (BREEAM). In 2000, LEED (Leadership in Energy and Environmental Design) developed by the U.S. Green Building Council (USGBC) is released and aim to improve the environmental performance in new buildings. In Hong Kong, BEAM Plus is developed and introduced by Hong Kong Green Building Council Limited (HKGBC). In Finland , the industry is using LEED for certificate while Green Building Council Finland (GBC Finland) is responsible cooperate actors in the construction industry towards the SD. Regarding the SD in universities, certifications of green building from these authorized organizations could be taken as an indicator in evaluation.

Literatures show many advantages of green buildings over traditional building design concepts. Orr (2004) mentioned that the design and construction of green buildings is compromising with environmental benefits as the initial reason. Secondly , costs over the operational life-cycle to the owner or occupier of building would be larger reduced by the means of energy efficient, water savings, mechanical equipment downsizing, reduced insurances and site cleaning costs (Johnson, 2000). It is also interesting to know that green buildings provide better working environments to increase the productivity and customer's satisfaction and thus increasing the profit, stated by Heerwagen (2000). Furthermore, construction of green buildings could benefit HEIs with the positive image and reputations as they could be practically demonstrate the real-life cases to the society. Opportunities are also provided to students to discuss the benefits of green buildings to a wide range of users (Beaudoin and Tremblay, 2002). These benefits are in the line of the concept of SD, which included the economic, environmental and social aspect. Despite the many benefits mentioned, the construction of green buildings in HEIs is still with its barriers- mainly in financial and organizational, while the urban locations would also be area in high density developed countries.

HEIs are also responsible for their economic development. The possible higher initial capital cost of green building always a barrier to suspend the development. Literatures present mixed view regarding the higher capital cost in green building than in traditional buildings. Report named "A Business Case for Green Buildings in Canada" (2005) concluded that green buildings have a higher first cost caused by longer design time and use of nonstandard materials. Eills (2009) present that "Development of a Greener building is likely to add between 5% and 7.5% to construction costs". Bartlett & Howard (2010) stated green building may imply a higher initial cost. Opposite opinions were also mentioned in literatures. Figures published by the US Green building council (USGBC), also indicate that there are no extra construction costs involved in achieving basic certification. Many architects and engineers are finding better ways of achieving energy efficient designs at or below conventional building cost. (Hydes and creech, 2000). The different views in literature are due to various research locations with different level of knowledge and technology in construction of green buildings. However, according to some researchers (Richardson & Lynes, 2007; Samari et al , 2013; Lo ,2015) , the main financial barrier were the perception that green building incur higher construction cost , a lack of incentives to reduce long-term energy and maintenance cost in HEIs. In some Asia countries, the financial barriers are mainly coming from government. For example, the green building in Malaysia is not satisfied and government has a key role in the development of green buildings in Malaysia (Sameri et al. 2013). Lo (2015) also mentioned that one of the key challenges the HEIs face is lack of government and school funding. Apart from financial issue, the other main barrier is organizational barriers. Obtaining a green building involves many parties and procedure in HEIs. For instance, the processes included from quantification of indicators to set specific targets, from building

procurement policies to the choice of recycling materials. (Beaudoin and Trenblau, 2002). The interaction and collaboration between designers and academics staffs are identified as important factors for successful implementation. Without effective communications between facilities and the university or public, and no easily accessible documentation with in-depth information, the motivations towards green building development are slashed among staff and student. The research conducted by Dhle and Neumayer (2001) in London, concluded that urban location can be a barrier because of the lack of space for the construction of new building.

Green building is one of the significant elements in green campus development. With consideration of the many advantages by using green building, it can be described as a big step towards campus sustainability. However, sustainability in campus still cannot be guarantee if there are no long term policy in environmental sustainability and measurement of progress.

3.2.2 Energy conservation and efficiency

The advancement of green campus development cannot remain at the concept of publicity, neither remains at several demonstrations of green buildings. It is necessary to undertake and carry forward the achievements of energy and resource efficient campus (Tan et al., 2014). The focus on energy conservation, energy efficiency and carbon reduction in operation of campus infrastructure and facilities are considered as the hardware of green campus development.

The definition of energy conservation is generally known as the act of saving energy which included the reduction in the amount of energy consumed in a process or system, or by organization or society, through rational use. Hannon (1976) mentioned that the concept of energy conservation appears to be a loophole in the fabric of the energy dilemma. Using less energy in homes, industry and transportation, by both increased efficiency and restricted use of energy, would decrease external dependency and avoid additional environmental impact. Energy conservation is reduced energy consumption through lower quality of energy services such as consumption limits on appliances (Herring, 2006). In general, energy efficient refers to using less energy to provide the same amount of services or useful output. Schipper & Haas (1997) mentioned energy efficiency is simply the ratio of energy services out to energy input. It means getting the most out of every unit of energy you buy. It can be achieved by, for example, replacing old equipment by newer more efficient ones. Despite the difference in two concepts, both conservation and efficiency reduce greenhouse gas emissions thus they are significant elements in green campus development. Tan et al. (2013) stated that energy conservation is the core of the energy and resource efficient campus, aimed to make the construction and operation of campus infrastructure energy efficient is the key point of the energy and resource efficient campus.

Energy efficient campus focuses on campus construction and operations. The initiatives adopted by HEIs towards energy conservation and energy efficiency could be conceptualized into technical and non-technical initiatives.

Lo (2013) introduced that the main difference between technical and non-technical initiatives is that technical initiatives primarily involve upgrading technologies (e.g. install solar panels), whereas non technical initiatives primarily target behavior changes (e.g.: sustainability activities in students). The target of energy efficiency in campuses can be achieved by having better lighting, temperature control, improved ventilation and indoor air quality which contribute to healthy environments by reducing the dangerous air pollutants that cause respiratory disease in campus buildings (Alshuwaikhat & Abubakar, 2008). Previous researches show the technical initiatives are generally adopted to facilitate the achievement of energy efficiency. According to koester et al. (2006), the Facilities Management group in Ball State University has pursued the use of high-efficient equipment retrofits such as variable speed motors and drives on all fan systems and pumps in campus, replacement of windows in selected structures with high-efficiency glazing systems, retrofit of building envelopes with higher levels of insulation, and more effective management system in heating and cooling system. Lo (2013) also stated that the most popular technical initiatives in Chinese HEIs are measured that target lighting, including LED- and solar powered street lighting, compact fluorescent lighting and infra-red lighting controls. Moreover, the use of renewable energy in campus is also part of technical initiatives for energy conservation. For example, solar water heating is popular in china and it has been reported to result in energy conservation savings as high as 30 percent. Ground source heat pump is also applied in Shenyang University in China (Geng et al., 2012). However, it is known that the popularity of technical initiative is various between regions. For instance, the research conducted in London (Dahle & Nuemayer, 2001) reported that none of the institutions has install energy saving devices or renewable energy sources. On the other hand, the non-technical initiative is mainly based on the long term planning on daily operations with the concept of water and energy conservation. It is not only involves the physical actions but also awareness-raising or environmental educations to staff and students. They are main parties to carry out this kind of initiative. Clear action plans are required for the related activities and programs. Wide range of measures can be adopted within campus, such as the restrictions on using energy or water, fees charged for excessive use of energy, awards on energy savings, promotion of energy saving equipment such as bicycle, etc.

There are two key benefits of adopting energy conservation and efficiency in HEIs. Dahle and Neumayer (2001) mentioned that energy conservation can reduce environmental impacts and financial costs. Financial benefit by cost saving in operations is highly recognized by universities. Reducing energy usage by systemic measures would lower the bills to HEIs. For example, the State University of New York saves $9,000,000 annually due to a thorough implementation of energy efficient retrofits and the promotion of energy conserving awareness in its campus (Eagan and Keniry 1998, P.20). Keniry(1998) also explained that renewable energy technologies have now achieved efficiency levels comparable to those of conventional fuels, and are cost-

competitive for many applications. Although alternative energy may not be able to supply all the power needed for a HE institution's operations, it can still be a useful supplement in reducing the amount of electricity that must be bought and thereby save costs (Creighton, 1999, P.120). The other main benefit is reducing the green house emissions. With the complexity of HEIs, which includes various department, organization as well as students and staff, the activities and operations contribute significant greenhouse gas emission. Rauch and Julie (2007) mentioned that green house gas reduction target can be achieved by on-campus mechanisms which range from design and conservation mechanisms to behavioral change.

Energy conservation and efficiency is more people-oriented initiatives in HEIs, which require the participation from management level, administration departments to staffs and student. Hence, it is more generally to be adopted in HEIs nowadays. It has economical as well as environmental benefits when adopting SD practices in HEIs. This area should be highlighted in green campus development. Energy usage, especially electricity, in HEIs both in Finland and Hong Kong are main issues due to the weather of the regions. Electricity using in cooling systems in HEIs in Hong Kong, as well as the heating systems in HEIs in Finland occupied significant part of electricity usage. Since there are very few researches in this area, it would be very interesting to study the energy conservation and efficient situations in HEIs in the two regions.

3.2.3 Waste Management

HEIs generate significant amounts of waste everyday from their academic and management activities, such as municipal solid wastes from staffs and students, organic wastes from campus canteens, hazardous and toxic wastes from academic use, etc. It is expected that universities would drive the efforts towards responsible waste management, because of their moral and ethical obligations, as well as the benefit from reduction of the financial resource. Waste management programs in HEIs in industrialized countries began more than 20 years ago and vary from voluntary and local efforts to institutionalized programs (Armijo et al., 2003). Nowadays, waste management in HEIs can be achieved through 4Rs- Reduce, Recycle, Reuse and Recover.

Reduce

Waste reduction is about reducing waste at source, which means not creating excessive waste in the first place. *Reduce* can be achieved by eliminating the unnecessary use of materials. Paper use is one of the main sources of waste in HEIs. Reference to Vega et al. (2008), , the generation of paper waste could be reducing if the use of electronic media was encouraged. In some university in USA, there are campaigns to reduce generation of paper waste. For instance, the reutilization of Brown envelopes, the reutilization of the unused side of paper for memorandums and the use of printers that print on both sides would largely reduce the consumption and disposal of paper.

Recycle

Recycling programs are one of the most popular initiatives for HEIs in waste management. Some of the higher education initiatives focused on recycling and waste reduction have been very successful (Vega et al., 2008). According the research by Allen (1999), 80% of the colleges and universities in USA have institutionalized waste programs. For example, Brown University in USA has had a waste a waste management program since 1972 and at present recycles 31% of its wastes. Shenyang University in china also adopts water recycling and solid wastes cycling (Geng et al., 2012).

Recycling involve two important procedures, which are waste characterization and collections. Waste characterization is the process to investigate the type of waste generated in a society or organization. These studies at colleges and universities identify campus specific and regionally relevant opportunities for waste reduction and recycling, representing an essential step towards greening the campus (Keniry, 1995; Creighton, 1998). There is no concrete standard on Waste characterization. With reference to Regional District of Fraser Fort George (RDFFG) studies, waste can be categories mainly in Primary group and secondary group. Primary group refers to materials types such as papers, disposable hot beverage cups, plastics, glass, metals, organic materials and electronic wastes. Secondary group are based in the material is recyclable or non-recyclable. In general practices, recycling material in HEIs are papers, metals, organic waste, plastic and glass. After identify the recyclable materials, collection facilitates such as recycling bins, with signage designed can encourage good source separation practice, should be installed all over the campus.

Although recycling is a definite step towards waste reduction, recycling alone will not create an environmentally sustainable waste management program (Armijo de Vega et al., 2003). Other actions are still required to take place.

Re-use

Re-use means using a product more than once, either for the same purpose of for a different purpose. The re-use of materials in an environmentally sustainable manner is encouraging for achieve the elimination of residuals disposal to landfill ((Zero Waste NZ Trust, 1999). In the case of UABC (Vega, 2008), generation of paper waste could be reduced in half if white papers were to be reused. Direct water can also be reused when the level of previous contamination does not interfere with the water –using operation. (Geng et al., 2012) In the case of Shenyang University, the treated wastewater is used for watering in-campus gardens.

Recovery

There are different interpretations of Recovery. One of the meanings is the use of rubbish left after reduce, reuse and recycle, to generate heat and power. Reference to Hong Kong Environment Bureau 201), Recyclable materials placed into recycling bins and sent to recycling outlets are counted as the recovery

quantity. The general understand of Recovery is “waste to energy”. Fewer studies have assessed the composition of solid waste within HEIs to generate other kinds of energy. (Felder et al., 2001; Mason et al., 2004; Armijo de Vega et al., 2008).

Ackerman (1997) mentioned that no efforts had been undertaken to inform people about how recycling works demonstrates the low priority that recycling is current awarded. This statement shows that waste management is not only an initiative; it involves the participation of different parties in HEIs. To conclude, the knowledge transfers within campuses are also essential.

3.3 University Social Sustainability

In this sub-chapter, the concept of university social sustainability is firstly introduced. Following that the discussions in two main areas: (i) University Involvement in society; & (ii) Public participation.

The economic, political and social changes that occurred over the last decades have had impacts towards HEIs all over the world. HEIs need to undergone reform process to meet new challenges they are facing. Ehrlich (2000) mentioned that too many institutions of higher education have adopted individualism, which aim to research and disseminate knowledge and skills for economic development and upward mobility of individuals, or providing training for employment. As a result, their roles in society have been declined. As the world changes, the roles of HEIs are also changing and it is no longer only concentrate on individual achievements. HEIs play a crucial role in creating knowledge societies, which means the development of society, is not only depends on resources but also knowledge transfer. (ASEM worshop, 2011). Felt (2003) pointed out that even the historical , social, political difference between countries , the heart of the debate in HEIs are about the new forms of responsibility towards society and of accountability towards stakeholder. HEIs have direct impact on the future of the world for training professionals and leaders, but also social actors who promote educations with external social reality (Dominguez Pachon, 2009). Khanh (2011) mentioned that the common denominator was the awareness of the changing context that shapes the perceptions and expectations of various stakeholders towards universities. Universities need to revisit their roles with consideration of social sustainability and fostering sustainable development.

In order to discuss the social sustainability in HEIs, it is important to investigate how HEIs react and contribute to the needs of society. As a result, the term ‘Social responsibility’ would be more appropriate in the discussions in this chapter. Social Responsibility has become an increasingly important concept both with the European Union and globally (Vasilescu et al., 2010). The growing awareness of the need to develop a proper understanding of social responsibility is a vital requirement to overcome the current economic crisis

and to open new horizons of development. This need is expressed by a wide variety of social and international actor.(Dyck et al. 2014). "Social responsibility is defined as optimizing markets so that they can help promote and sustain social equity, economic prosperity and environmental integrity" mentioned by Chad Holliday, former chairman of the 154-member WBCSD in April 2001 speech to the United Nations (Holliday 2001). The ISO Strategic Advisory Group on Social Responsibility (2004) noted that social responsibility means "*a balanced approach for organizations to address economic, social and environmental issues in a way that aims to benefit people, communities and society.*" European Union (2011) recommends its member states and big companies to support social responsibility as a way out from the current crisis; it defines social responsibility as one's responsibility for one's impacts on society.. HEIs, being educators, have more special roles to society and hence the concept of University Social Responsibility (USR) should be more specific. Researchers have defined USR in different ways. Dewey (2004) suggested that HEIs should focus on social responsibility to and within their communities, and on the social capacities of the students whom they are educating. Reiser (2008) defines the USR concept as "a policy of ethical quality of the performance of the university community (students , faculty and administrative employees) via the responsible management of the educational , cognitive , labor and environmental impacts produced by the university , in an interactive dialogue with society to promote a sustainable human development.". Vasilescu et al. (2010) concludes that nowadays university's function is training students to have social relevance in different vocations rather than just simple diplomas. HEIs also help students to think beyond individual interest to societal interest. Concerning the social responsibility, the main concern for HEIs should be : grounding academic knowledge in real-world conditions, connecting knowledge to practices , bringing academics and practitioners into closer relationships , improving conditions in local communities, and building democracy and civil society(Ostrander ,2004). In the ASEM Rectors' conference, the concept of USR was introduced in two-fold manner: one was understood as the multifaceted role of today's universities, such as research and higher education for political, economics, technical and other advancement of societies; the other hand, social was interpreted in its stricter sense, touching on aspects relating to equity. Even though the different interpretations of USR, they shared a common view as the educations in HEIs should take consideration of local community and engage students with the real world.

Most of the universities practices as USR are within the framework of quality management and accreditation, which mostly included community or social engagement criteria (Shawyun, 2011). Holm et al. (2014) stated that standards for management systems, which are based on total quality management, might be useful tools for enhance SD in universities. These quality criteria provide processes and mechanisms in the delivery of academic services to society are consistent with institutions' objectives. HEIs need to address their current and future impacts on society in a proactive manner and

ensure ethical practices in all students and stakeholder interactions. Dr Gajaseni (2011) summarized five action points to implement USR:

(i) Universities should reform their curricula by integrating USR and linking with Education for all in order to serve society;
(ii) Universities should gear towards informal learning and social entrepreneurship to eradicate poverty and hunger;
(iii) Universities should enhance research directions to serve global markets as well as local demands of a particular society to response educations for all;
(iv) Universities should promote the role of USR and ensure effective communication and information exchange among all stakeholders; and
(v) Universities should consider not only cooperation within their countries, but should extend it to with other countries and regions.

3.3.1 University involvement to society

In order to fulfill USR, not only appropriate actions but also participations by universities members are essential. First of all, leaders of HEIs should be role models on ethics and the protection of public health, safety, and the environment. Leaders also need to make sure that HEIs support publicly important purposes within the limits of an institute's resource. Secondly, students are the key in USR. Students are not only a passive consumer of tertiary education, but also the gatekeepers to the community and drivers to change (Christ et al.) Therefore, students should learn and gain experience from different level of scales, from local to global. It is important for students to engage in the real world so that the knowledge gained or generated from HEIs could be tested with the complex societal situations. Furthermore, students should be encouraged to participate in community service as well as can be used as a resource by assisting staff in performing SD actions. This kind of activities can enhance student's motivations towards social responsibility behavior. Thirdly, trainings and courses for university staff on USR would be one of the way to increases their awareness and interest towards the topic. Teune and Plantan (2001) discovered that the activities of university staff acting on their own universities' community outreach initiative would alter its effectiveness. It is also a good practice to encourage staff taking part in community services. For example, staffs in Ball state frequently serve on community task forces and committees to help planning and facilitating projects that enhance community sustainability. George Kuh (2005) also mention that Recruit and socialize new staff with character and moral development in mind would facilitate the building of Social responsibility in HEIs. Besides keeping HEIs involve in society, the collaboration between HEIs and Business sector should not be neglected. Dr. Lurent Frideres (2011) pointed out that "businesses are turning into educators, universities are turning into businesses". Macmillan (2009) mentioned that universities are heavily involved in the new techno science, as a result of partnerships with businesses. When researches are linked to business, the focus would always be shifted to the economic side. However, with consideration of the concept of USR, HEIs

should seek the partnership with business sector focusing in increasing social responsibility and human well-being.

3.3.2 Public participation

Key people and stakeholders of HEIs should join efforts to assist each other in the SD. The ways how HEIs engaged in society and public were discussed in the above paragraph. However, Public participation is also an essential part to achieve USR. Alshuwaikhat and Abubakar (2008) mentioned that becoming a sustainable university also requires partnership with private, governmental and non-governmental organizations. Apart from active participations in operations, public participation from external stakeholders also includes the promise for their influence towards the decision affecting those (Boulanger & Brechet, 2005). Velazquez et al.(2006) states that exchange information and make efforts to raise awareness between communities would assist the SD in HEIs. HEIs are usually involved in a variety of dialogues. They are within the national and international levels which include HEIs community and the external stakeholder community (Kantanen, 2005). It is mutual understanding that SD is challenging and need for long-term approaches and the involvement of multiple stakeholders with often conflicting interests. The necessity of open communication between internal and external stakeholders is vital to the success of SD (Christet al. , 2013). Experience shows that giving voices as well as taking advices from different stakeholder groups can help organizational actors to make a change towards a more sustainable university. According to the discussion in the 4th UNESCO Chair Conference on Higher education for sustainable development (2011), modern universities are open places to meet with both the greater scientific community and society at large. It means the interaction with local, regional, and national stakeholders while working on real-life problems relevant to the surrounding community and society.

Regions or countries have various focuses on their USR implementations. 'European universities actively seek links with the industry, whereas Asian ministries seek to engage students in society' mentioned by Associate Professor Teay Shawyun (2011). These provide different patterns among regions regarding the public participation in USR. There is a good demonstration in University of Groningen in Netherland, with emphasis in a Public-private partnership. External stakeholders such as governments, local authorities, NGOs and even business sectors are actively participate in the SD in the University. "*Health aging project*" is one of the examples, which researches are collaborating with the business world through contracts to take on a new form in technology transfer. Moreover, government and regional business representatives are collaborating with the university to develop knowledge-intensive industry in the region. Several European partners were asked if they would like to join the project about healthy ageing. Partners who cooperated positively were Hamburg, Tartu, Uppsala, Copenhagen and Helsinki. This case acts as an example that European universities links with the industry actively. In contrast, the case in University Sains Malaysia (USM) presents that

community service as a core value in its USR. At USM, "Community Consciousness Circle" is used with a view to long-term engagement that impacts both the university and the public. It is a voluntary part but also as core academic activities that learning carried out with full consciousness to engage with the community. USM conducts this kind of activities, not only local activities "empower future talents" which aims to reducing existing and future disparities, but also other nations project such as reconstruction of HEIs in Haiti after the earthquake. The USM case is an example showing Asia HEIs tend to engage students in society in their USR plans.

Trends of public participation in HEIs in Hong Kong and Finland

There has traditionally been a strong state system and weal civil society in Hong Kong (Chiu and Lui, 2000). People were used to being led by a government whose seat of power and not questioning of policies. HEIs in Hong Kong are independent from government and seem very few chances to work together in the matters of SD in HEIs. According to the SD policies by HKSAR, Higher Education is even not a highlight. The SD in HEIs in Hong Kong are largely depends on the HKSCC which formed by HEIs themselves. Furthermore, the link between HEIs and local community and NGOs seems very week in Hong Kong. There are community actions and involvement in Hong Kong; however they are not very extensive one. Terri (2004) pointed out that education is needed in educators and students to become more aware of the environment and others, to view society as a whole, and thus develop a new concept of how to work together towards common goals. There are few green groups aim at working for SD in Hong Kong, such as Green Power, WWF and Friends of the Earth. They are working to promoting green lifestyle and arousing public concern on local environmental issues and community education. However, none of these groups carries out mobilization activities. These organizations are more like interest groups than community-based organizations (Terri, 2004). They have taken a territorial and international perspective on environmental issues but failed to develop significant links with grassroots organizations and community mobilization in Hong Kong (Chan and Hills , 1997) Private sector , which means business and financial institutions in Hong Kong, is one of the important stakeholders for HEIs since the private sector highly demands the professionals from university for its development . The private sector itself attempt to raise awareness and encourage cooperation on SD issue, which is within the concept of corporate social responsibility (CSR). They also have available funds and capacity to implement changes for SD. However, very few literatures show that there were co-operations or collaborations between HEIs , NGOs, and private sector. Only the Hong Kong Sustainable Development Forum (HKSDF), one of the private sectors who serve as a platform to engage all stakeholders in the current discussion on sustainable development, would be taken part in providing recommendation to SD in HEIs in Hong Kong. To conclude, public participation in HEIs in Hong Kong is still in low level.

Being one of the most developed countries, Finland tends to spend relatively more on education and R&D. The country is also one of the countries has been proved which has quite successfully linked higher education with economic development. At the same time, public participation in HEIs in Finland is in increasing as a result of government actions. The first milestone was reached by The Finnish Higher Education Evaluation Council (FINHEEC) in early 2000s. FINHEEC conducted several university evaluations with a highlight on regional role of universities. External engagements to the universities are being evaluated. In 2001 the Finnish Government published a report named "The regional development of Higher Education". There was a recommendation in the report that active dialogue between different parties would benefit the regional development while cooperation between universities and polytechnics was specially emphasized. The next big step was happened in 2004. The Finnish university legislation was changed to include the civic mission as the third basic function of the universities, after research and teaching. One of the changes is that universities are obliged more than before to engage in interaction with the rest of society and to promote the social impact of their research findings. The changes are mainly due to the application and integration of academic work has become more relevant, together with the needs to meet new stakeholder expectations universities. However, Finnish universities seem to lack overall strategies for regional involvement, which would include curriculum development and community service as well as technology transfer (Kantanen, 2005). Later in 2009 in the world conference on Higher Education: The new Dynamics of Higher Education and Research for Societal change and development, social responsibility of higher education was highlighted in the meeting. Moreover, the Turin Declaration launched in 2009 at the G8 University summit in Turin Italy also emphasis the broad and global engagement to promote SD. The contents of these conferences serve as a drive for USR and public participation in HEIs both in Finland and globally. All these national and international criteria increased the awareness of the topic with HEIs in Finland.

To conclude, increasing complex goals in HEIs results the needs to additional dealings with external matters, which include the demands and needs from stakeholders and the society. Social responsibility includes community services as well as social justice. The way of carrying out daily activities in universities is an important demonstration to achieve responsible living and to reinforce desired values and behaviors in the whole community. Public participation by stakeholders, such as partnership with private, governmental and non-governmental organizations (NGOS) and business sector would create two-way dialogues to exchange opinions and ideas towards SD. The discussion on the general situation of USR and public participation in HEIs in Asia and Europe was conducted in this section. Moreover, several literatures and reports gave general ideas of the situation in USR and public participation in HEIs in Hong Kong and Finland. The in-deep analysis of the situations in this topic will be presented in the later sections.

3.4 Sustainability teaching and research

HEIs are training leaders and decision makers who develop and manage society's institutions in the future. Therefore, teaching and researches in HEIs are required to change from time to time in order to meet the needs for society in current and future situations. Now at the end of the first 21st century, Higher Education is facing the challenges in the environment, resources, human being and etc. There is a need for a rapid and effective incorporation of sustainability concept across all education programs. Eagan and Keniry (1998) stated that many of those who make decisions affecting future attend universities today so HEIs have the potential of teaching sustainable literacy to the politicians, teachers and future decision makers and leaders. Burnett (2008) mentioned that HEIs are asked to equip increasing numbers of learners with the knowledge, skills, and critical thinkings that will ensure their abilities and respond to national sustainable development objectives. Erdelen (2009) pointed out that HEIs play a strategic role in finding solutions to today's challenges and need to train teachers in the conduct of research and develop relevant curricula that integrates the value of sustainable development. Sustainability or SD is a driving force to educators to renew programs to provide knowledge and skills in a range of new areas across industry, government and society in both developed and developing countries. (Desha & Hargroves, 2014). The needs for teaching professions by reforming the teaching and research in HEIs are obviously required in order to deal with the existing challenges. In this section, the holistic concept of ESD would be first introduced, following by the discussion on how universities can integrate sustainable development in academic, which included curricula and researches.

Reorienting the higher education curriculum and research focus is a long term process with lots of challenges. It is not only included relevant subject matters which pursuit inter- and trans-disciplinary approach, but also the development of competence of HEIs educators as well as learners. The curriculum gatekeepers, professional bodies, government agencies, student groups, academic bodies as well as reaching staff have a key role to achieve this. (Copernicus Alliance, 2012). In the last two decades, there have been numbers of declarations and actions which assist HEIs to incorporate sustainability in campuses [APPENDIX III]. These declarations highlight the significant impacts on environment in the global society, and raise the awareness of SD in HEIs. Moreover, the most holistic concept for the topic is Education for Sustainable Development (ESD), which has also been developing through those declarations. The definitions of ESD were mentioned in various literatures. According to the United Nations (2008), "ESD equally addresses all three pillars of sustainable development – society, environment and economy- with culture as an essential additional and underlying dimension. ESD enables all

individuals to fully develop the knowledge, perspectives, values and skills necessary to take part in decisions to improve the quality of life both locally and globally on terms which are most relevant to their daily lives". Wals (2009) define ESD as a learning process (or a teaching-training approach) based on the sustainability ideals and principles and is applied to all levels and types of education. Venkataraman (2010) described that ESD on the hand "encompasses environmental education but sets it in the broader context of socio-cultural factors and the socio-political issues of equity, poverty, democracy and quality of life". Desha & Hargroves (2014) mentioned that ESD increase the capacity of individuals, groups or organizations to act through developing knowledge and skills. Reference to the definitions of ESD, it is generally understand that ESD is applying to all kinds of educations, from basic educations to special training schools, while the ESD in HEIs is continuously gaining its importance in this decade. HEIs have special significances to implement ESD. The aim for ESD in universities is that graduates in their later professional lifes could take social, environmental and economic costs and benefits into considerations in a balanced way when making decisions (Lozano e al. , 2013). Holm et al. (2014) also pointed out that the learning outcomes for ESD include improved systematic and holistic thinking, which needs educations in multidiscipline.

The concept of education to support sustainable development has been explored since 1987 when the SD was first endorsed at the UN General Assembly. In the coming years, there were much more declarations in related to education for SD. Some highlights are as follow: In 1992 issues related to sustainability in education were explicitly listed in the 36 chapters of UN's Agenda 21- "Promoting Education, Public Awareness, and Training" (Wright , 2002). Later in the "World Declaration Higher Education in the 21 st Century" in 1998, it declaims the need for a critical mass of skilled and educated people for SD. Year 2002 was a significant milestone for ESD due to the *Decade of Education for Sustainable Development (DESD) 2005-2014.* The objective of DESD is to educate citizens so that enable to make relevant decisions when facing present and future challenges. One of the focuses on the decade is reorienting educational programs:

"*Rethinking and revising education from nursery school through university to include a clear focus on the development of knowledge, skills, perspectives and values related to sustainability is important to current and future societies.* "(UNESCO - Education for Sustainable Development (ED/PEQ/ESD))

DESD provided a global platform for dialogue in the higher education sector and since then the topic of sustainability get a rapid growth within HEIs. Furthermore, Research is also a very important task in HEIs and it would provide significant contributions towards sustainability. The G8 University Summit Torino Declaration in 2009 highlights the role that higher education institutions and scientific research organizations should play in supporting sustainable and responsible development at both global and local levels. UN mentioned in 2012 that the ESD should be promoted more actively beyond

DESD. There are two declarations which include the solid deliveries and commitments to actions. First, The Higher Education Sustainability Initiative is target to achieve four deliveries including the teaching and research with Sustainability concept by mid-2015. The following meeting will be hold in October 2015 in Paris for "Higher Education for Climate". The other one is The Rio +20 Treaty on Higher Education. It is a long term plan up to 2026, which with seven evolving principle which engaging teaching and research within HEIs and five level of commitment. Up to 2013, there are 83 universities signed the Treaty. The latest one, Nagoya Declaration on Higher Education for Sustainable Development in November 2014, is reaffirming previous relevant commitments such as DESD (2005-2014), the Higher Education Sustainability Initiative and etc.

ESD has already been adopted by many universities worldwide (UNCSD 2012). It is worth to look at the implementations and hence capture feedbacks for continual improvement. Systematic approach to curriculum renewal can facilitate the engagement of ESD in HEIs. With reference to the UI GreenMetric WUR (2013), Sustainability courses, Sustainability research and publications, Sustainability events and organizations are essential elements in education for SD and also acting as indicators to evaluate the performance of ESD in HEIs. Previous literatures demonstrate examples on how ESD integrated in curricular and research. It is noted that sustainability courses can perform in different types and target to different stakeholders, both internal and external. Christ et al. (2014) suggested that ESD could start with additional courses rather than core courses because it is the fastest way to implement. In contrast, the Queensland University of Technology's (QUT) Faulty of Built Environment and Engineering (FBEE) offer a first year common course to all first year undergraduate students since 2005. The course named 'Introduction to Sustainability' was designed to provide a platform to extend the graduate attributes towards sustainability through various courses across the programs. Beside courses to students, HEIs can also offer to external stakeholders. In Tongji University in China, have been running successful training programs over the past two decades for leaders and professionals of urban management and construction. The program participates would continue to interact with the University in sharing experience as well as take part in planning issues (Zhiqiang, 2008). Regarding the researches, HEIs should including concept of sustainability in their research agendas and it can be lead to a further achievement. Southern Carolina's three research universities in USA have a good example. An established mechanical engineering professor tend to change his research focus to develop a more sustainable Habitat for Humanity house and etc, resulted in creating a new course in Sustainable design and development and several new research projects (Barnes & Jerman , 2001). Moreover, sustainability events and organizations take important roles as well. Refer to the case study by Desha & Hargroves (2014), the sustainable development committee in the Delft University of Technology in the Netherlands was formed in late 1990s to take up the challenge of integrating SD

into curriculum and research, as well as organizing awareness-raising activities such as lectures, excursions and workshops. In Spain, CITIES in the Technical University of Catalunya is a interdisciplinary Centre which responsible for integrating sustainability into all areas of the university and also organizing evaluations and update sustainable plans for the Campus (Ferrer-balas et al., 2009). These two examples show that sustainability organizations act as catalysis to systematic approach by promoting SD in HEIs and maintain close communication with different parties.

Trends of sustainability teaching and research in Hong Kong & Finland

Topics of ESD differ from nations to nations. ESD carries with the idea of implementing programs that are locally relevant and culturally appropriate. In some countries, ESD is still leading by those outside the education community. The concept and content of ESD are developed by ministries while they are delivered by educators (Mckeown, 2002). During the UN decade different institutions, regions and nations have developed strategies for ESD. The promotion of ESD in Europe is assisted by a regional strategy developed by the leadership of the United Nations Economic Commission for Europe (UNECE) in March 2005. Generally, the focuses in Europe are increasing on the environment, nature, ecology even discussed the human right, justice, and cultural diversity rather than the aspect of social and economic related to SD (UNESCO, 2012). On the other hand, strategies in the Asia-Pacific region conducted by the regional DESD firstly demonstrated at the Asia-Pacific DESD Regional initiation Nagoya, Japan in 2005, followed by the drafting and finalizing the strategy by the assist of UNESO at Bangkok. Furthermore, a Pacific ESD Framework in the Pacific region initiate is the association to coordinate the Practice of ESD which accredited by Pacific Education Minister Meeting in Fiji in 2006.

The Hong Kong Society has been experiencing numerous transformations due to competitive and fast changing economic environment in Asia as well as the political transition in 1997 from being a British colony to a Special Administrative Region (SAR) of China. With such changes, policy makers and the public expected new and high in the role and functions of school education (Cheng, 2001). In the last two decades the Education and Manpower Bureau implemented numerous initiatives to change school system, including curriculum organizations, applications of information technology and the accountability to the stakeholders (Cheng, 2009). The first wave of educational reforms was happened in 1980s which the attentions were drawn to the improvement of internal process, on external intervention or increasing resources input. As a result, most initiatives proposed by the Education Commission were limited, fragmented and short-term on improvement in school education (Cheng, 2000). The second wave of educational reforms appeared in 1990s. Most policies in this reform are aiming to ensure the quality and accountability of schools to the internal and external stakeholders (Headington, 2000; Heller, 2001). Even thought there was a 'Guidelines on

Environmental Education in School' (Curriculum Development Council , 1992) issued in 1992 for suggesting environmental education to be implemented through a cross-curricular , there was lack of actual policies and supports by government and as a result it was not popular among schools. Fien (1993) also mentioned that the 'guidelines tend to neglect the critical approach to education for the environment with critical environmental consciousness, critical thinking, political literacy and critical praxis. The important point is that all the above are targeting in primary and secondary educations, while both environmental teaching and even sustainable teacher in territory education were still being ignored during that period. At the end of 2000, the 'Curriculum change in nine years' universal education 'was announced. The key components of the curriculum frameworks include eight key Learning Areas, Generic Skills and Values and Attitudes. Moral and Civic Education is one of the tasks in the reform. Between 1997 and 2004, HKSAR Government updated the strategy for promoting IT in education with the aims to provide adequate IT facilities for students and teacher to access information and foster the emergence of community-wide environment conducive to the culture change (Education and Manpower Bureau, 1998). However, the government seems overlooked the potential of using IT in teaching and learning would echoing the development of students' contextualized multiple intelligence for sustainable development, argued by Cheng (2006). ESD was launched in Hong Kong in 2003. The ESD project was one of eight projects funded by the Sustainable Development Fund in Hong Kong (Lee & Williams, 2009). The shift from environmental education to ESD lay at the heart of this project with the focus is mainly on primary educations. The significant reform for higher education in Hong Kong was conducted in school year 2009/2010. The senior secondary education and higher education system change from the existing British system (3+2+2+3) to a new academic structure (3+3+4). Unfortunately, this significant reform on the higher education system does not bring the focus on sustainability teaching and research; the main focuses are still base on student's individual achievement and exposure. Despite there is CSD to promote the SD in Hong Kong, there are no initiatives or regulations from government as a driver or supporter towards SD in HEIs. The current SD in HEIs in Hong Kong seems mainly initiated by NGOs, private sector and the HEI Sector itself. The current information shows that sustainability teaching and research is not being highlighted by government even the awareness of SD in the society is increasing. It would be interested to study the performance of ESD in HEIs in Hong Kong when the link between government and HEIs for SD is so weak.

Finland has gained in implementing ESD in its educational system. In 2003, the Finnish Government included the promotion of SD in its development plan for education and research. The promotion of SD was first been incorporated into the national core curricula in basic education to upper secondary education. The HEIs including both the polytechnics and universities also raise their awareness of the annual performance of SD. Even SD in universities involves various elements to be success, it is noted that Education for Sustainable

development (ESD) is the focus in SD strategy in higher education in Finland. The sustainability teaching and research are being concerned. Baltic 21E program in 2002 provided significant contribution to the SD in Universities in Finland as the country was the first to start the implementation process with a pilot and a trial phase. A special Committee on Education for Sustainable Development was appointed to draw up nation plan for launching the Baltic 21E program in Finland, which included all sectors of the education system, in liberal adult education and in research. This experience gained therefore formed the basis for the ESD strategy, which also serves as Finland's national action plan for the UN DESD (2005-2014, DESD). Finland is a pioneer since the strategy was the first national DESD strategy in the whole of Europe in 2006. The definition of ESD in Finland is 'the individual learner should be having skills and competence relevant to their future professions and future roles as decision-makers. Higher education should also play an active role locally, nationally and internationally in enhancing knowledge and action competence regarding sustainable development through research and education in cooperation with surrounding society' (Ministry of Education in Finland 2006, p.30). The strategy for SD in universities is based on the advancement of science, on the application of scientific information with ethic, on the respect of autonomous position that universities have in society. On the other hand, gaining a deeper understanding of what SD is and permeating all activities with SD concept are the main objective of researches. Similar to the strategy in polytechnics in Finland, their procedure must be based on the principle of SD so students and staff will be able to work and act towards the targets. During the research conducted by the Ministry of Education and Culture in Finland in 2010, it was noted that 75% of the replied universities summarized the content, meaning and objectives of SD very broadly (Vainonen, 2010). This result implies that students, staff or even management level generally notify and experience sustainability learning, teaching or research, but may not understand thoroughly. There are still rooms to improve the SD within Higher education sector in Finland through teaching and research. However, the above studies just provide a general image but no details studies on the performance regarding the Sustainability courses, Sustainability research and publications, Sustainability events and organizations. It is necessary to conduct such research in order to indentify the areas for further actions.

HEIs still have a choice to either move early or wait until enforcement in sustainability teaching and research. Those institutions with higher commitments will not only contribute to human well being, but also other greater rewards such as attracting the best students and staff as well as attracting research fundings. In order to achieve this, it is good to learn from those HEIs with good practices.

4 RESULT

This chapter describes the overall situations of SD in HEIs in Hong Kong and Finland by using content analysis. The answer for the first research sub-question will be demonstrated in the three main areas: (i) Green Campus, (ii) Social Responsibility and public participation and (iii) Sustainable Teaching and Research.

4.1 Green Campus

The descriptions of current development of Green Campuses in HEIs in Hong Kong and Finland are derived in this sub-chapter. Green building, energy conservation & efficiency, and waste management are the main categories being analyses.

4.1.1 Green Building

Green building is reported as a popular element in SD practices in HEIs in Hong Kong. There are 7 out of 8 universities which included *Green building* in their SD practice (see TABLE 4). Regarding the design principle of green building, all the 7 universities are focused on green and sustainable features while 4 of the universities mentioned that their principles are based on the BEAM or LEED standard. Requirements such as Green construction materials and energy efficiency act as the core values in building design. Moreover, it is noted that Green roofs or roof gardens are popular elements in the green building design. In total 5 out of 8 universities have already constructed green roofs or roof garden in their campuses. Green roofs are aiming to increase campus greening

area through planting which enable better air quality as well as be suitable habitat for birds and wildlife. The concept of green building is largely applied to new buildings, that the 7 universities are taking the considerations in their new constructions. However, the concept is not so popular in renovation of existing buildings since only 3 universities mentioned including green features in their renovation projects. Indoor air quality control is also being emphasized in 6 universities. Indoor inspections and smoke-free classroom are examples of the practices while universities targeting to acquire the Indoor Air Quality (IAQ) certificate for all indoor areas.

TABLE 4: Green buildings in HEIs in Hong Kong

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Design principles	BEAM, LEED	BEAM	Green Feature	BEAM, LEED	Sustainable feature	BEAM	Green Feature	N/M
Scope	NB, RV	NB	NB	NB	NB	NB, RV	NB, RV	N/M
Indoor air quality control	N/M	N/M	IAQC	IAQC	Smoke-free	IN	IN	IN

Remarks: N/M: not mentioned; NB: New Building; RV: Renovation; IAQC: Indoor Air Quality Certificate; IN: Indoor inspection.

As illustrated in *TABLE 5*, 5 out of 7 HEIs in Finland are taking *Green Building* as their practice in SD. There is no information about Green building from the data collected from Hanken and TUAS. In contrast with the situation in Hong Kong, the 5 HEIs in Finland do not state international standards such as LEED or BREEAM in their design principle. Instead, the 5 HEIs have different but specified focuses in their design. Aalto and JYU place the core value in energy as Aalto is targeting to acquire "almost zero energy" in the new campus, while JYU is considering energy- efficiency when planning and implementing construction projects. On the other hand, the water consumption issue in the design of new buildings in campus is being emphasized by UTA. LUT has a more comprehensive design principle which included energy efficient, water consumption and carbon footprints. KyUAS does not only apply the principle of SD but also "Life cycle thinking" in its renovation and building projects. The special part of design principles in KyUAS is "Life cycle thinking", which none of other HEIs have mentioned. Life cycle of a building included the stage of design, construction, operation and demolition. This design principle leads to a better performance of a green building at a whole rather than those in single focus. Similar to Hong Kong, the scope of Green Building in HEIs are both new buildings and renovation project. *Table 5* shows the result that more attention is paid to new construction works than renovation projects. Only 3

HEIs take the concept of green buildings into account in their renovation projects. Regarding the indoor air quality control, the data shows that it is not widespread in the HEIs in Finland. Only Aalto has set up an indoor quality working group to report, coordinate, document and disseminate information about air quality issue. All of the other 6 universities provide no information about the indoor air quality controls in their reports. There is also no related certificate system reported in all data collected.

TABLE 5: Green buildings in HEIs in Finland

	Aalto	JYU	UTA	LUT	Haken	KyUAS	TUAS
Design principles	Almost zero energy	Energy efficiency	Water consumption issue	Energy efficient, Water consumption, carbon footprint	N/M	Principle of SD, Life cycle thinking	N/M
Scope	NB,	NB, RV	NB	NB, RV	N/M	NB, RV	N/M
Indoor air quality control	Work group	N/M	N/M	N/M	N/M	N/M	N/M

Remarks: N/M: not mentioned; NB: New Building; RV: Renovation.

4.1.2 Energy Conservation and efficiency

Energy conservation and efficiency is a major part of Green Campus as all the universities in Hong Kong are taking measures in this area. As mentioned in chapter 3. 2.2, using energy efficient appliances is a common practice in HEIs. Reference to TABLE 6, energy efficient light fitting and fixtures such as LED, T5 & T8 are the most popular appliances. This result is matching the research conduct by Lo (2013) which mentioned lighting is the most popular appliances in energy efficient. 7 out of 8 universities stated that such lightings are installed in campuses and student accommodations. Sensors and timers for lightings are also facilitating energy conservation. Due to the hot weather in Hong Kong, air conditioning (AC) occupied the largest part of electricity consumption in HEIs. Energy efficient appliances for air conditioning system become significant in energy efficiency as also mentioned in chapter 3.2.2. 5 universities reported their advanced AC systems; examples are Environmental AC plants, high efficiency AC chillers, Fan coil controls and heat pumps to capture heat waste from AC plants. Moreover, computer appliances such as notebooks, desktops, drivers and servers are modified in order to achieve energy efficiency. Concerning the energy conservation program, it is noted that both technical and non-technical initiatives are being used. Technical initiative such as centralized

PC systems & AC systems can reduce the level of electricity used by controlling the operation hours and service levels. The other example is to upgrade facilitates and adopt new technologies and use of energy efficient appliances as mentioned above. 3 universities – HKU, HKUST and CITYU implement performance contracting in cooperate with local electricity provider -China Lighting and Power Company (CLP). Performance contracting is a means of raising money for investments in energy efficiency that is based on future savings. The target is to use the saving by introduction of new energy efficient technology to offset the cost of purchasing in installing, operating and maintaining the technology. Non technical initiatives target to behavior changes and hence 4 out of 8 universities integrate staff and student trainings in their energy conservation program. As illustrated in TABLE 6, renewable energy is being adopted in universities in Hong Kong despite it is narrow use in certain levels. Except no information reported by HKUST and the general statement of "renewable energy device" by HKU, the other 6 universities demonstrated the use of renewable energy. Solar energy is the top ranked renewable energy among these 6 universities, which is the same situation as in china as reference to the research by Geng et al. in 2012. The applications are not only limited to produce hot water and lightings, but also mosquito killing devices and irrigation systems. Furthermore, wind energy is also being used in CUHK and HKBU for wind turbines. Last but not least, measures regarding transportation are also the means to achieve energy conservation and efficiency. As a small city with an advanced public transport network, encouraging staff and students to use public transport to commute is effective and easy to carry out. HKPU, HKBU and CITYU take this as the core transportation policy. Due to the big campus areas in CUHK and HKUST, the two universities offer shuttle buses for staff and students to and within campuses. The use of bicycles is gaining its popularity as HKU and CUHK are promoting this in campuses. Conveyance system such as cycling tracks and bicycle parking places are constructed for this purpose.

TABLE 6: Energy Conservation and efficient in HEIs in Hong Kong

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Energy Efficiency Appliance	PC	LED lamp	LED lamp, Eco-fan, lighting Timer & sensor , Eco Chiller & Heat-pump (AC),	LED & T5 Lamp, Eco-Chiller (AC), Eco plant (AC) , Central driver	LED & T5 Lamp, Sensor, AC plant,	LED Lamp, Eco-plant (AC), Heat-pump (AC), Web-base power mgt.	Fluorescent tubes, Sensor	LED, T5, T8 Lamp, Fan coil control (AC), Green IT

(continues)

TABLE 6 (continues)

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Energy Conservation Program	EPC, Energy audit Retrofitting program	Cost/ saving sharing , New tech.	C/D PC system, EPC, Education program,	C/D AC system, Regular Checking , Staff training	Energy saving devices	C/D PC system, Pilot, EPC, Staff training	C/D AC system, Energy Audit	C/D AC system, Staff training
Renewable energy	Renewable energy device	Solar hot water, Hydraulic ram pumps, Wind turbines , solar lights	N/M	Solar photovoltaic system	Solar: water heater, insect killing device, street lamp; etc. Wind turbine	Solar panel, Solar water heating	Solar park lights	Solar hot water system
Transport	Car-share, Bikes, Pedestrian campus	Bus for staff, Eco-vehicle, Cycling track	Shuttle bus for staff, Ride-sharing, Electric vehicles	public transport, Car-sharing, Electric vehicles	Use of public transport	Eco-mode transport	N/M	N/M

Remarks: N/M: not mentioned; LED: light-emitting diode; AC: Air-conditioning.EPC: Energy Performance Contract; C/D: Centralized.

In Finland, HEIs generally pay attention to energy conservation and efficient in their sustainability practices. As shown in *Table 7*, all the HEIs are taking measures in this area even though Hanken does not provide much information about their practices. Similar to Hong Kong, the lighting fixtures and fittings are the main focus in the category of energy efficient appliances. 4 out of 7 HEIs pointed out that energy efficient lightings such as LED lamp and energy saving light bulbs are installed in their campuses. Moreover, Building automation is applied in all 5 HEIs. Building automation means the centralization and interlinking of software and hardware to monitor and control the institutional facilities. It includes but is not limited to air conditioning systems, heating systems, ventilation systems and lighting systems in buildings. It serves as the most common item for achieving energy conservation and efficiency in HEIs in Finland. In order to reduce the heat lose and thus decreasing the energy waste during the cold weather in Finland , 2 HEIs - LUT

and KyUAS also take into consideration the thicker insulation and advanced window types. Apart from using technical initiatives as mentioned, non-technical initiatives are also implemented to change staff and student behavior towards sustainability. 5 out of 7 HEIs mentioned that trainings and promotions to encourage staff and students to act environmentally friendly is part of their energy conservation program. These are aiming to reduce the energy use in the daily routines, teachings and operations within and between campuses by taking proactive steps. Regarding renewable energies in HEIs, the findings illustrated a special pattern of renewable energies. Renewable energies seem not commonly employed in HEIs since only 4 HEIs owns their own renewable energy generation facilities. However, it is shown that in these 4 HEIs there are wider ranges of renewable energy technology as well as a wider coverage in applications. For example, wind energy, solar energy and geothermal energy are employed in Aalto. Those facilities are not only providing heat and electricity to few buildings but also serve as an academic purpose. The other example in LUT is that the University own wind turbine and solar power plant in campus areas. Despite lacking renewable energy facilities in the campuses of KyUAS, the HEI is collaborating with the local company for construction of wind power energy in Kymenlaakso. Furthermore, there is one point to be highlighted. Use of renewable energy acquired by outsourcing is growing in popularity within HEIs in Finland. The 3 HEIs – JYU, UTA and TUAS reported that renewable energy is being imported or going to be imported to campuses. The portion of renewable energy being used by HEIs in Finland is increasing. In addition, HEIs in Finland provide more concrete measures to deal with the transportation issue. According to the data, 4 HEIs not only promote walking but also offers different means to encourage environmental friendly transportation. For instance, campus bicycles and electric bicycles are available for staffs and students to lend, subsidiary tickets for public transport or even shuttle buses supplied. Besides, some HEIs encourage the use of teleconference which target to reduce the needs of traveling and thus achieve energy saving. JYU, UTA and KyUAS encourage staffs to use teleconferencing.

TABLE 7: Energy Conservation and efficient in HEIs in Finland

	Aalto	JYU	UTA	LUT	Hanken	KyUAS	TUAS
Energy Efficient Appliance	LED lamp, AC system	Energy efficient lightings, Lighting control system	Building automation	Smart grid system, Building automation system, Lightings, Thicker insulation	N/M	Energy saving light bulbs, Windows, Heating system.	N/M

Remarks: N/M: not mentioned; AC: Air-conditioning.

(Continues)

Table 7 (Continues)

	Aalto	JYU	UTA	LUT	Hanken	KyUAS	TUAS
Energy Conservation Program	Daily operations, teach-plans	Staff training and communication	Optimize power consumption & take proactive steps; Promote and raising awareness	Research and implement the energy efficiency technology	Target to reduce 5% electricity consumption by end of 2016	automation enable efficient energy conservation, Centralized management of IT equipment.	encourage students and staff act eco-friendly
Renewable energy	Small scale wind turbine (research use), Solar heat & electricity, Geothermal heat pump	One wind turbine , Target on import renewable energy	Hydropower, Introducing solar and wind power	Wind turbine, Solar power plant (also academic use)	N/M	Not within campus but construction of wind power energy in the city with local company.	48% from outsourcing renewable energy, N/M on campus RE generation.
Transport	campus bike for staff, Bike center, Car park limits, E-car for internal logistics , walking , Plan of subway	Campus bicycles in use, Biogas vehicles owned by dept., Promote teleconferencing,	Policy on travel mode, teleconferencing, use of foot, Provide bike for commuting between campus Subsided commuting ticket for public transport	Electric bikes , electric vehicles, new electric bus between LUT and city centre	N/A	Promote teleconferencing, Promote public transport, Promote use of bike or walking.	Focus on work related driving with TUAS vehicles and staff's private vehicle.

Remarks: N/M: not mentioned; AC: Air-conditioning.

4.1.3 Waste management

Waste management in this sub-chapter is not limited to solid waste but also water waste. The universities in Hong Kong generally use the 3R- "*Recycle, Reuse and Reduce*" as the main concepts in waste management. All the 8 universities take actions in *Recycle*. With reference to *TABLE 8*, the most common facility (100% used among the 8 universities) is recycling points and bins. Universities establish recycling points with different types of recycling bins not only in campuses but also in student hostels. These recycling points are mainly collecting solid wastes such as paper, plastic, bottles, aluminum cans, battery and etc. Moreover, 50% of universities in Hong Kong pay attention to food waste recycling. CUHK, HKUST, CITYU and HKIED introduce food waste recycling program and collaborate with campus catering units. They collect food waste in students' canteens and use composting machines to produce fertilizer for farming. CUHK even implement more programs in recycling issue, for examples, providing recycled materials as a raw material to some social enterprises for their products and organizing flea markets within campuses. *Reuse* is generally mentioned in waste management principles in university reports but there are not details in every university. Only 3 of 8 universities have mentioned their actions with *Reuse* principles. The actions include collection of second hand items such as computer & electrical appliance, furniture and clothing for donation to charity. CUHK & CITYU also reuse of construction materials such as false ceiling tiles from other construction projects in Hong Kong. All the 8 universities also target to reduce waste in campuses and the main focus is on reduction of paper use. With the same concept mentioned by Vega et al. (2008) in chapter 3.2.3, Vitalizing operations can largely reduce the use of paper. Electronic filing of document, electronic communications like emails and e-newsletters, online platforms for teaching like downloading notes and exercises from internet, are widely used. Moreover, the green practices in offices such as printing in 2-sides, reuse of old envelopes are also implemented in different departments. In additional to reducing paper use, it is also a good practice to reduce food waste. However, only one university- CUHK is promoting "less rice" in students catering. Beside the 3R concept, purchasing policies in HEIs is also an important element in waste management. According to *Table 8*, 6 out of 8 universities have included green considerations in their purchasing policies although LUN and HKIED did not cover this area. Green procurement is highly used in the 6 universities. It comprises different stages from tendering to delivery of products. Selection of responsible suppliers and green products, use of electronic procurement systems, making choices of delivery methods are required to be considered. These considerations would facilitate reduction in solid waste as well as the greenhouse emissions. Apart from solid waste, water waste is also part of the waste management in HEIs. The key ideas are to reduce the use of water or recycle waste water in any other potential uses. The findings show that the most common measure to reduce water use in universities in Hong Kong includes the use of water saving devices like low-flow water taps, timers and sensors for

irrigations and Dual-flush toilets. Some of the universities also make use of the makeup water in cooling tower in Air-conditioning system or swimming pool water for irrigation purpose. This illustrated the reuse of waste water in campuses.

TABLE 8: Waste Management in HEIs in Hong Kong

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Recycle	Recycle bins, 10 types of solid waste to be recycle	152 recycle points, Flea market, F/W to farming ,	Recycle bins, Recycle cooking oils, F/W composting machine	Recycle box design by students	12 type recycle material, Recycle Stations, bins and cage	Comp-oste green waste & dry leaves to make fertilizer,	Recycle bins, Recycle Points	Solid waste & F/W recycle program in campus
Reuse	WM principle	PC & electric appliance donate to charity, Resell or reuse of Construction material	Collect 2nd hand items to donation, Garage sales to sell unwanted goods	Banner for long term use	N/M	Reuse flow-away furniture, Construction materials ,	mention as WM principle	mention as WM principle
Reuse	WM principle	PC & electric appliance donate to charity, Resell or reuse of Construction material	Collect 2nd hand items to donation, Garage sales to sell unwanted goods	Banner for long term use	N/M	Reuse flow-away furniture, Construction materials ,	mention as WM principle	mention as WM principle

(Continues)

TABLE 8 (Continues)

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Reduce	Virtual-izes operations in campus	Internal e-filing, E- com.	Promote "less rice", Online workflow, Promote e-publishing, E-procure, E-apply, E- com..	Promote the use of IT, Web-base teaching	Sustain office scheme: Teach green practice in office , Review the set up of printer	Renew/ repair element , Encourage 2-side printing , Reuse envelope, E- com., E-filing	E-com. , Print both sides, Reuse old envelopes	mention as WM principle
Purchasing	Sustain-able food option, Green policy in supply chain	Green policy in supply chain, GP	GP, E-procurement, Green practice in tender	GP, Green policy in supply chain	GP	GP	N/M	N/M
Water conservation program	Recycle grey-water, Use of low-flow water tap , Dual-flush toilet	Water saving device, Reusing water for irrigation, Seawater for flushing .	Water saving device Ground-water for irrigation	Recycle AC water , Water saving device	N/M	Recycle water for irrigation, Water saving device	Water saving device , Rain water for irrigation	N/M

Remarks: N/M: not mentioned; GP: Green Procurement; E-com. : Electronic communication; F/W: Food Waste.

It was noted that there is very little information about waste management in one of the HEIs- Hanken. Therefore, the results in this part are based on the other 6 HEIs. Even though recycling points or centers are not mentioned in all 6 HEIs, they are in the majority (4 of 6 HEIs) as measures regarding recycling in HEIs. However, most of the reports do not mention the details of recycling materials and student accommodation is excluded from the scope. Flea markets are being organized in 2 of 6 HEIs for recycling unwanted goods between students. The other 2 HEIs – JYU & TUAS also value the promotion of recycling by training staff and students and by publishing waste sorting instruction. As

illustrated in *TABLE 9*, 4 HEIs take measures regarding '*Reuse*' covering daily operations in offices to scaled schemes. Replacement of disposable dishes by durable dishes in offices is an example in daily operations while collecting old furniture and books to donate or sell are examples of scaled schemes. Regarding the initiatives in 'Reduce', HEIs are also focus on reduction of paper use. With the help of Information Technology, applications such as electronic communication, electronic administration, electronic teaching and exams are being used in 6 HEIs and largely reduce the use of paper. Use of hand towels to replace paper in toilets is also a measure used in JYU. In LUT, there are also schemes in partnership with campuses catering to reduce personal bio-waste. The findings show that purchase policies in 6 HEIs include the green considerations. The Green procurement procedure, which was described in the previous paragraph, is implemented in 5 of 6 HEIs. It is worth noting that the use of fair-trade and organic food in catering is also highlight in 2 HEIs – Aalto and UTA. Regarding water waste, there is just general statement like "Target to reduce the water use "in most of the report in these 6 HEIs. The finding shows that these HEIs in Finland are taking consideration in water conservation more than waste management. At the same time, no details about waste water treatment were found in those studied document.

TABLE 9: Waste Management in HEIs in Finland

	Aalto	JYU	UTA	LUT	Hanken	KyUAS	TUAS
Recycling	Recycle points, Recycle centre ,	Waste sorting instruction , Recycle points in campuses, Renew recycle bins	Recycle room, Recycle shelf, Flea market	Recycle Points,	N/M	Flea market	Training for recycle to staff and student.
Reuse	Collect old tables & phones, Internal reuse of pallets	Reuse of furniture, Replace of disposable dish by durable dishes in office	Books in library donated or sold, Reuse of furniture and equipment	Replace of disposable dish by durable dishes in office	N/M	N/M	N/M

(Continues)

Table 9 (Continues)

	Aalto	JYU	UTA	LUT	Hanken	KyUAS	TUAS
Reduce	Use of E-source (email, e-book) E-com.	Share of equipment , Use of hand towels to replace papers	E-teaching, E-service, E-administration, E-exam	Reduce personal bio-waste with catering service, E-teach, E-contract	E-exam	E-service, E-com.	N/M
Purchasing	GP, Well planned logistic, Use of local , fair-trade & organic food	GP	GP, Use of fair-trade products in canteen	GP,	N/M	N/M	GP
Water conservation	N/M	Monitor water consumption in properties	Consider Optimization of water consumption in equipment and furniture purchasing	Target to reduce 20% of water consumption. (no details)	N/M	Water flow furnishing	Set as target but no detail

Remarks: N/M: not mentioned; GP: Green Procurement; E-com.: Electronic communication.

4.2 Social Sustainability and public participation

The descriptions of current development of Social sustainability in HEIs in Hong Kong and Finland are derived in this sub-chapter. The results are to be presented in the two areas: (i) University involvement in society & (ii) Public participations.

4.2.1 University involvement in society

As illustrated in TABLE 10, Students and staff in universities in Hong Kong are generally involved in social activities. All the eight universities have their own

programs or schemes to get students involved in society. There are both environmental activities and social activities being organized by universities for the local society. Regarding the environmental activities, employing students as green ambassadors is one of the most popular activities held in universities in Hong Kong. Half of the 8 universities (CUHK, HKUST, and HKBU & HKIED) recruit their students as Green ambassadors and target to promote and teach other students to help society towards green life and low carbon practices. The examples of related activities are tree plantings in urban areas, workshops on organic farming and promotion events for vegetarian food. The findings also show that all the 8 universities have policies to make students participate in community services. These policies aim to help students to develop their ethics and responsibility towards the society. The programs include volunteering activities such as cleaning beaches, visiting elderly and disabled, and also meetings to engage student to provide innovative solutions to community needs. Beside connection between universities and local society, the two universities- CUHK and HKIED also highlight the need of involvement in regional and international communities. Exchange programs or traineeships are recommended to their students to get wider exposure.

According to TABLE 10, most of the universities in Hong Kong have programs to get staff involved in SD while only LNU does not mention staff involvement in sustainability. However, the contents of programs are more likely as internal rather than external actions to the society since the findings in this area are biased towards the environmental side. Moreover, the environmental aspect is emphasized more in such programs. The 4 universities (CUHK, HKUST, HKPU & HKBU) implement some environmental initiatives for staff in campuses which focused on daily activities and routine operations. Examples are: Green office programs, appointing environmental coordinators in each department, recruiting staff as green buddies and ambassadors to promote environmental sustainability in campuses. On the other hand, the findings show that it is not yet popular to encourage university staff to take part in society activities. Only 2 universities (HKUST & HKPU) contain programs to organize activities to promote social interactions between the universities and community. Moreover, there are rooms to increase trainings to staff towards sustainability. With reference to the findings, only HKU, HKPU and HKIED expressed that providing opportunities on sustainability trainings to staff can facilitate universities to meet environmental and social sustainability objectives.

Last but not least, the channel for students and staff to express or exchange their opinions to the campus development is also part of the social responsibility for HEIs. . The channels could be staff organizations, student unions, any internal organizations or even an online feedback system. However, only 3 of 8 universities (HKPU, HKBU, and CITYU) have channels for students and staff to provide opinions and negotiate with management. The main idea in these 3 universities is setting up internal organizations to deal with opinion exchange and discussions for the strategy towards sustainability. The result

shows that the interactions between university staff and the management in HEIs in Hong Kong are still in low level.

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TABLE 10: University involvement to society in Hong Kong

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Student involvement	Campus policy allow students to take part in community to promote HKU, Engage students to provide innovation solutions to community needs	Green buddy program, Program to develop interest & commitment to serve the local, regional & international communities	Green ambassador program to education to create positive influence on green life, Volunteer activities in community	Student union to provide opinion & negotiation with management, various communities to participate in activities in community.	Green ambassadors, Take part to devise strategies to promote low carbon campus practice, Liaise with HEIs through organization in school	Internal organization to communicate with department in university, External organization to take part in external activities	Self-learning & Research scheme (OSL) since 2006	Green education ambassador program, Overseas study tours, Local training scheme with NGOs and other Uni.
Staff involvement	Wide range of staff training opportunities , Grants for professional development	Green office program for all department, Green buddy program & warden scheme to encourage staff involvement.	Program of "ride-sharing" to encourage staff acting green, Volunteer activities in the community	environment Coordinator, Staff organizations to discuss & negotiate with the management , activities promote social interaction Funding, leave for professional development.	Take part to devise strategies to promote low carbon campus, Liaise with HEIs through organization in school, Campus Green ambassadors	Internal organization to communicate with department in university	N/M	Promote staff development in meeting the environmental objects

Remarks: N/M: not mentioned;

References to TABLE 11, Hanken & TUAS have no information about student involvement in sustainability and thus findings are only attained from the other 5 HEIs. The result shows that HEIs in Finland are encourage their students to take part into sustainability but it is mainly focused in campuses. 4 HEIs - Aalto, UTA, LUT and KyUAS stated that their students get involved in internal organizations such as the student union and different student organizations in order to contribute to SD in campuses. There is a good example that students in LUT take part in the development of operating models and infrastructure of green campus. On top of that, 2 HEIs- UTA and KyUAS also encourage students to take part in training and courses which are related to sustainability. With reference to the finding, only JYU shows their students getting involved directly in communities, by taking part in exchange or internships in developing countries. Other HEIs have no data about the students' involvement in community activities in their reports yet. Overall, the student involvement in society is still in a low level at the current stage.

Regarding the staff involvement, there are various initiatives among HEIs in Finland with 6 Finnish HEIs in this study working on this. Firstly, HEIs provide information to staff towards sustainability. UTA provides guidelines to teachers and researcher on introducing courses while LUT prepare Ethical code of conduct to all the staff. KyUAS also provide additional training about sustainability to their staff. Secondly, HEIs set up channels for staff to communicate internally within campuses or externally with other stakeholders. 3 of the HEIs (JYU, LUT & TUAS) emphasize the importance of these communications which lead to suggestions for improvements. Thirdly, teachers and staff are encouraged to contribute themselves directly in campus sustainability. 2 HEIs included actions for instance taking part in environmental activities and conducting research on sustainable development.

Except the involvement by staff, it is noted that Aalto and TUAS also take into consideration staff well-being in their social responsibility. Aalto has a statement in their report as 'Promote equality, gender & age balance and multicultural working environment'. TUAS also pays attention to internationalization of staff and regional or Organizational Corporation of staff.

In conclusion, HEIs in Finland tend to get student and staff involved in SD in campus. There are different kinds of initiatives implemented which are more focused on the buildup of sustainable knowledge for students and staff themselves. According to the reports and web pages studied in this thesis, there are very few activities that involve students and staff directly in local, regional or international communities. As a result, University involvement in society is still in a very low level.

TABLE 11: University involvement to society in Finland

	Aalto	JYU	UTA	LUT	Hanken	KyUAS	TUAS
Student involvement	Student take part into student organizations for sustainability	Students take part in exchange or internships in developing countries	Take part in administrative bodies or working groups, Take sustainable courses.	Take part in the development of operating model and infrastructure of green campus.	N/M	Student union for interaction with stakeholders, Take part in practical training and lectures.	N/M
Staff involvement	Promote equality , gender & age balance and multi Cultural working environment.	Provide a channel through which employee can initiate or suggest improvement, monitoring feedback from employee	Main theme in HR is sustainable working life, Developing teacher competency, Provide guidelines to teachers and researchers on introducing course, Promote research on sustainable development	Internal and external communications for environmental awareness & Green campus to staff, Ethical code of conduct.	N/M	Encourage staffs to take part into environmental activities, Engage staff into governing body, additional training to staff , Teacher and staff exchange.	Internationalization of staff, Regional / organization corporation of staff. Internal communication of staff

Remarks: N/M: not mentioned

4.2.2 Public Participation

In chapter 4.2.1, the result of how students and staff involve in society are discussed. This sub-chapter continues describing the situation on how is the public participation in SD in HEIs.

As illustrated in TABLE 11, there are high levels of public participation in SD in HEIs in Hong Kong. All 8 universities have their own initiative for other stakeholders' engagement. One of the important ways for other stakeholders' engagement is to set up the communication channel. The 4 out of 8 universities in Hong Kong have set up such channels. HKU and CUHK conduct consultation meetings with stakeholders from the community for the discussion of campus planning and development while CITYU also maintain communication with organizations and local residents in its long term development and there is the Sustainability Summit as a dialogue between academics and policy experts in 2014. HKBU is not yet holding such meetings

but it provides an online platform such as email and online forms on web pages to receive opinions on campus development. Beside effective communication between stakeholders, collaborations with other stakeholder are also one way to get them involved in campus sustainability development. All 8 universities in Hong Kong are collaborating with the community to implement some campaigns for the SD. Examples of activities include acting with local families in organic lifestyle and reduce carbon footprint by HKBU, establish 'eco-park' allowing community to learn organic farming by HKUST and events jointly organized by local NGOs to promote environmental issues by HKIED. All these campaigns and activities are targeting to enhance access and relationships with the community. Moreover, there are 2 universities (CUHK & HKUST) which engage potential contracts and suppliers for better green practice. The covered areas are from construction projects and materials, to campus operations and also food choices in campus catering. It is also worth highlighting that LNU has been implementing a special scheme named 'Service-learning and research scheme' since 2006. The scheme is a compulsory requirement for all the students in the university and it is aimed to offer learning opportunity for students to apply knowledge in practice. Each student in LUN must participate in some activities in this scheme which are carried out in collaborated with the community.

Referencing the TABLE 12, all 8 universities in Hong Kong have made certain external commitments. HKSCC is the organization specially set up for the SD in HEIs in Hong Kong and all the eight government-funded universities are members. As mentioned in Chapter 3.1.1, HKSCC is a platform for HEIs in Hong Kong to exchange and share their opinions. By joining HKSCC, it also illustrated that universities are committed to perform better towards campus sustainability. Furthermore, HKBU committed with local organizations as a fellow member of the Hong Kong green purchasing charter. On the other hand, more universities (HKU, CUHK, and HKBU & CITYU) are committed to international organizations such as ISCN, Tallories Networks, McDonnell Academy global energy & environment partnership, Cross-state green university consortium and Connect4Climate with the World Bank.

The findings show that public participation in HEIs in Hong Kong is being valued. HEIs are active to seek other stakeholders' engagement and also take part into public organizations. It is not only involving the external stakeholders in local level but also in international level. HEIs in Hong Kong are also keen at external commitment, which would be helpful for SD in campus.

TABLE 12: Public Participation in Hong Kong

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Other Stakeholder Engagement	Community consultations with local resident for campus planning, Enhance access and relationships with community	collaborate with community, Green campus tour , Engage supplier contractors for green practices, Stakeholder engagement meetings for preparing the Campus development plan	Partnership with potential contracts & suppliers for better green practice, Support local and global campaigns, establish 'eco-park' allow community to learn organic farming.	Provide funding & prize to support the SD in community, Community service campaign to get community involved.	Activities to act with local families in organic lifestyle and reduce carbon footprint, Email & webpage to receive opinion on campus development.	Sustainability summit (2014) as a dialogue between academics and policy experts, Communication with organization and local resident in long term development, Promote knowledge transfer as a core means of contribution in community	Service-learning and research scheme since 2006 offer learning opportunity for students to apply knowledge in practice, Civic engagement as a graduation requirement since 2016/2017, Collaborated with carious NGOs.	Activities to jointly organized by local NGOs to promote environmental issues, Partnership with local and overseas HEIs for exchange program ,Join Ocean park & local environmental organization for holding education activities
External Commitment	HKSCC, ISCN, Tallories Networks, Association for advancement of sustainability in HEIs, McdonnellAcademy global energy & environment partnership.	HKSCC, Cross-state green university consortium	HKSCC	HKSCC	HKSCC, Fellow member of the Hong Kong green purchasing charter, 2011-2012 earth partners	HKSCC, Joint collaborative agreement between cityu and ASU , Connect4 Climate with world bank and over 200 institution partners around the world.	HKSCC	HKSCC

According to the findings presented in TABLE 13, HEIs in Finland also have a high level of engagement from other stakeholders. All seven HEIs in this study stated the other stakeholder engagement in their reports and WebPages. Regarding the communications between stakeholders, 2 HEIs (Aalto & JYU) are encouraging constant interaction and dialogue with local communities, municipals, regional and civil societies. Moreover, there is a trend of cooperation with companies and academic partners. 4 out of the 7 HEIs in Finland have demonstrated this kind of cooperation. Aalto and Hanken conduct constant cooperation with companies for exchanging and sharing views. LUT also works together with academic and business partners and they are also run green projects with local companies. TUAS stated that it collaborates yearly with nearly 3000 organization while UTA is also developing the waste monitor system with participation from other stakeholders. In addition to collaborate with locals, Aalto also has international collaborations and alliance with other universities. All these collaborations enhance public participation since they not only provide opportunities to HEIs to contribute themselves outside campuses , but also give chances to the external stakeholders to understand and even give opinions to HEIs. Furthermore, some HEIs take into consideration of stakeholders' needs & expectations in their development plans. LUT plans to include regional units in its environment management by the end of 2020 while KyUAS makes that consideration as a central role in the enhancement of UAS's regional influence.

It is found that there is a different pattern on external commitment for the 7 HEIs in Finland in this study. Reference to the findings in TABLE 13, it is noted that UTA and TUAS provides no information about external commitments. A different picture from Hong Kong, as there is no common commitment (like HKSCC) by all HEIs in Finland. NSCN, as introduced in Chapter 3.1.2, tend to be more common among the HEIs since Aalto and LUT have signed the commitment to this organization. Other local organizations such as polytechnic network for sustainable development and higher education consortium of Southern Finland , as well as international organizations like ISCN, Baltic university program and Nordic 5 tech University alliance are also gain certain level of commitment from HEIs in Finland. In the overall situation, public participation in HEIs in Finland gets its standing but it also has lots of rooms to be more popular and thorough.

TABLE 13: Public participation in Finland

	Aalto	JYU	UTA	LUT	Hanken	KyUAS	TUAS
Other Stakeholder Engagement	Constant cooperation with companies, Constant interaction with local communities and public sector, International collaboration and alliance with other Uni.	Active involvement in the UNiPID network and promote related dialogue, Uni.actors are encouraged to engage in cooperation and dialogue with municipal, regional and civil society.	A system for monitoring waste generated by operations will be developed together with other actors	Regional units will be included in the environment management by the end 2020, Green projects with local company, Working together with academic and business partner	Networking with companies for exchange and share views	Stakeholders need & expectation have a central role in the enhancement of UAS regional influence, .	Collaborates yearly with nearly 3000 organization
External Commitment	Nordic 5 tech University alliance, NSCN, ISCN, NUAS	University' s role as a significant as a globally responsible actor.	N/M	NSCN, ISCN, EUA, HUMANE, SEFI	Member of PRME champions leadership group,	Baltic University program, Polytechnic network for sustainable development , higher education consortium of Southeast Finland	N/M

Remarks: N/M: not mentioned

4.3 Sustainable Teaching and Research

In Chapter 4.3, the general situations of sustainable teaching and research in HEIs in Hong Kong and Finland are presented. In order to have a clearer picture on the topic, the discussions are conducted by the following elements: (i) Sustainability courses, (ii) Sustainability researches, (iii) Sustainability events, (iv) Sustainability organizations, (v) Sustainability publications & (vi) Sustainability website.

The general situation of sustainable teaching and research in HEIs in Hong Kong are summarized in TABLE 14. Firstly, all 8 universities provide courses related to sustainability. Most of the universities except LNU offer

undergraduate or postgraduate program related to SD. Due to the core focus of the institution, HKIED also provide only 1 undergraduate & 1 master program in the theme of SD. The findings show that sustainability courses are not compulsory to all students. Even though there are numbers of related courses for students who major in sustainability, students in other majors may not be able to get sustainability education. The only possible way for other students to participate in sustainability courses is through General Education (GE) programs. GE programs are implemented in some universities and they allow students to study in courses with different themes than their major. With reference to *Table 14*, 5 out of 8 universities (CUHK, HKUST, HKPU, LNU & HKIED) are offering sustainability courses in GE programs to full time degree students. Therefore, it indicates for students in most universities sustainability courses are not compulsory but can be taken on their own accord. The findings also show that those courses are only available to HEIs' students while there is still no offer to external stakeholders.

Regarding the sustainability researches, all 8 universities have listed the numbers of related researches in their reports or school webpage. The figures show that sustainability research is gaining its importance among the universities. The research areas cover both environmental and social sustainability. However, details of the research are neither listed out in reports nor available in webpage. But interested parties are able to contact with those research for further information.

All universities in Hong Kong organize sustainability events with objectives to educate students to be sustainable. Formal events such as seminars, exhibitions, workshops and conferences are held occasionally in campus. World class scholars and experts are invited to share their views and expertise in SD. On the other hand, other events which target to raise the awareness of SD to students are also popular in all universities. Examples are 'Green Drinks@HKU' to bring speakers to present and discuss with students and staff, or 'Green Monday 'to promote sustainable food choices in staff club restaurants in HKPU. Aiming to provide more environmental information to student, HKBU even set up the Renewable Energy Information Corner in campus to demonstrate the applications of renewable energy to students.

Setting up sustainability organizations is not only promoting the SD in HEIs but also facilities its implementations. 5 out of 8 universities (HKU, CUHK, HKUST, HKPU & CITYU) in Hong Kong have already founded sustainability committees or an office for setting up strategy and long term support to SD. While 2 other universities (HKBU & HKIED) established environmental, health and safety committees. In addition, 3 universities (HKU, CUHK & HKUST) also have various student organizations which promote campus sustainability. Only LNU lack official sustainability organizations. Furthermore, websites and publications are effective measures in sustainability teaching. 7 out of 8 universities (all except LNU) maintain sustainability websites providing updated information and news to the public. In similar situations, these 7 universities also publish sustainability reports or environmental reports

annually. These reports are available online for the public and thus the data of this study is also partly based on them. Some universities simultaneously publish SD new-letters regularly.

To conclude, universities in Hong Kong are generally taking actions towards sustainable teaching and research. Even though courses are mainly offered to students but there are other means of publications which are able to transfer sustainable knowledge to the public. Last, it is noted the trend of SD research in universities is also growing.

TABLE 14: Sustainable Teaching and Research in Hong Kong

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Sustainability Course	9 of 10 faculties offering SD courses in U/D & P/D level, New education aims to address SD issue, Labeling of courses	7 programs in U/D & P/D with SD element, 30 courses related to green topics in GE program.	88 courses in U/D & P/D related to environmental issues, 'common core program' is in U/D curricle	14 courses under GE program, 23 program in U/D & P/D.	8 courses in U/D & P/D program.	58 courses in U/D & P/D, take part in the pilot program of sustainability literacy test.	GE program include social topics	1 bachelor program & 1 master course in education for SD, Some GE courses, Minor studies as a choice.
Sustainability Research	'Environment' is 1 of strategic Research area	Over 150 projects, a new institute of environment, energy & sustainability.	46 research projects related to SD in 2012	53 research projects related to SD in 2013-2014	conduct Sustainability-pertaining research studies	More than 60 research project related to SD in 2013-2014	9 main focuses of research is within sustainability	1 Environmental research projects were launched in 2011

Remarks: N/M: not mentioned; G/E: General Education; U/D: undergraduate; P/D: postgraduate

(Continues)

TABLE 14 (continues)

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Sustainability event	'Green-connections'(monthly) connect students & community 'Green Drinks @HKU' bring speakers , 'Green films"	Forums, conferences, seminars, workshops, training sessions	Green events in campus every month, Seminar in campus occasionally	Campus sustainability week, 'Green Monday in staff club restaurant, Exhibitions , forums , conferences , Environmental week annually.	Renewable Energy information corner, Seminars, eco-tours, visits, workshops, Low carbon event funding scheme	Sustainable submit, Seminars , exhibitions	Focus on environmental issues like green campus week	Speeches, exhibitions, seminars
Sustainability organization	Sustainability office , 9 Students organizations, 2 full time staffs & several part-time research assistant.	CPSO as a unit to support long term SD, "YES" for collecting reuse & recycle material , 11 SD student organizations	ESSCon set up as strategic plan on SD., 3 students groups, Workgroup on campus energy efficiency .	Campus sustainability committee	Environmental health & safety committee, Action group (BEE) to promote green actions	Sustainability committee, Safety and health committee, student organizations,	N/M	Health , safety and environmental committee, environmental group , centre of education in Environmental sustainability

Remarks: N/M: not mentioned; G/E: General Education; U/D: undergraduate; P/D: postgraduate

(continues)

TABLE 14 (continues)

	HKU	CUHK	HKUST	HKPU	HKBU	CITYU	LNU	HKIED
Sustainability publications	Sustainable report, ISCN-GULP Charter Report	Sustainable Report , Types of SD publication (e.g. newsletter, e-magazines) in school webpage.	Environmental Report, Sustainable guide for Students, 'Green channel' as online news	Sustainability Report	Environmental report , Sustainability News letter every 3 months	Environmental report annually	N/M	Environmental report Annually
website	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

Remarks: N/M: not mentioned; G/E: General Education; U/D: undergraduate; P/D: postgraduate

The overall picture on sustainable teaching and research in Finland is illustrated in TABLE 15. Regarding sustainability courses, the HEIs present in different way than those in Hong Kong. HEIs generally emphasize the trend rather than state the number of sustainability courses in their institutions. The findings show that sustainability courses in Finland are growing in importance. Despite that, only Aalto included it as mandatory courses for undergraduate students, the other 4 HEIs (JYU, UTA , LUT and KyUAS) mention that they are inputting resources in curriculum design to ensure sustainable contents and introducing the courses to students. UTA and KyUAS have already promoted SD courses as elective to students. The Finnish University Partnership for International Development (UnPID) network, as emphasized by Aalto, JYU& UTA, is one of the highlights in this discussion. UnPID is a partnership network between eleven Finnish universities in promotion and implementation of SD in HEIs. UnPID coordinates a joint virtual studies minor program in SD so students in the networked universities are able to take these courses. The benefit is the networked universities can share the resource in organizing sustainability course and thus give more opportunities to students to take part.

All 7 HEIs in this study include sustainability research. Similar to the above, HEIs are describing their trends rather than stating the number of sustainability research conducted. One of the features in sustainability research in Finnish HEIs is setting up of research groups. The 3 HEIs – Aalto, JYU and UTA stress on forming research groups or centers to enhance research projects. The groups or centers are collaborating locally and internationally with universities, research institutions, businesses and even countries. The other

feature is that HEIs are usually providing clear objectives to their sustainability researches. For examples, JYU promotes the solution-focused research into the theme of global responsibility, LUT is targeting to build long term well-being from their green energy technology research, and TUAS is focusing on RDI activity in the field of environmental science.

5 out of 7 HEIs describe their sustainability events in reports or on their webpage. Seminars are the most popular events since 4 of the HEIs (JYU, UTA, and LUT & KyUAS) organize seminars related to sustainability occasionally. Moreover, environmental activities are becoming common among the HEIs. Examples included environmental campaigns by JYU, cycling day by UTA & selling unwanted furniture in Hanke. The findings signify the sustainability events in HEI in Finland tend to be ad-hoc and in a limited style. Therefore, there is room to expend such events in other forms and widen the scope.

Each of the studied HEIs in Finland has their own sustainability organizations. Aalto, JYU & TUAS established sustainability offices or working groups specialized in SD. The other 2 HEIs have organizations that focus on environmental aspects, at which LUT found green campus team while Hanken appointed a green office coordinator. In addition, UTA formed its own fair & ethical trade support team to support the development of social sustainability. In KyUAS, The CSR report editorial Board is responsible to work out documents to report the SD in campus. Apart from managerial organizations, some HEIs such as Aalto and JYU also founded sustainability organizations by students.

Regarding the sustainability media, the findings demonstrated that publication is not common. Only 1 HEIs, Aalto has published the sustainable report. The reports prepared by KyUAS & TUAS are focused on social aspects. LUT is going to publish its first environmental report in 2015. The other two HEIs – JYU & UTA plan to publish no related reports but they published SD action plans. Sustainability websites is also not available from all the HEIs in this study. Only half of these HEIs established sustainability website to provide information to the public. This situation makes it difficult for the public to understand the current SD in HEIs.

To summarize, HEIs in Finland definitely pay attention in sustainability teaching and research. They generally have clear targets as well as actions to achieve this. Some HEIs have better practices while some are still at the beginning level. The way to show the public about the sustainable work done by HEIs is also weak. Overall, HEIs in Finland could still improve themselves to obtain a better performance in this area.

TABLE 15: Sustainable Teaching and Research in Finland

	Aalto	JYU	UTA	LUT	Hanken	KyUAS	TUAS
Sustainability Courses	UnPID network studies , Mandatory courses 'our common environment' as an introductory course, 2 master & 1 bachelor SD program, More than 89 courses related to SD	UnPID network studies, Adequate resources are ensured to maintain and develop already existing education on global sustainability	UnPID network studies, Academic service support building of multidisciplinary SD study module, the module as electives, Curriculum design &teaching policy guidelines with SD, Added SD labeling in Curricular	Environmental education included in curriculum , Basics of SD will be included in studies of 80% masters level graduates, 3 bachelors & 4 master program in SD topic.	Internal & external Internationalization With mandatory exchange semesters in education program.	Promote SD courses , still elective course to students	2 degree program related to SD, 4 bachelor & 2 master courses focus in SD
Sustainability Researches	3 main research group for sustainability, 5.2% of all doctoral dissertation & 56/1224 master dissertation in SD topic.	Research cooperation with developing countries, Solution-focused research into the themes of global responsibility is promoted.	Set up research centre include different uni., research institutes and business, set up work group to enhance research project	Green energy technological research promotes economic and technological development and builds long lasting well-being for the future	The quality of research is achieved by international community engagement	Research project target to develop product for social benefit	RDI activity in the field of environmental science is one of TUAS strongest areas, Current 22 research project related to SD.

(continues)

TABLE 15 (continues)

	Aalto	JYU	UTA	LUT	Hanken	KyUAS	TUAS
Sustainabilily events	N/M	Seminars, Environmental Campaign	Sustainability day seminar, Cycling day	Research seminar	Hanken cleaning day for selling furniture not in use in university.	Seminar, individual events to promote environmental friendly.	N/M
organizations	Sustainable office , Some students SD organization	SD working Group , Student group from Student Union	Own Fair & Ethical trade support team	Green campus team	Green office coordinator	CSR report editorial Board	Working group for SD
publications	Sustainability Report, ISCN sustainability report	Environmental Action Plan, Global responsible action Plan.	Sustainable development action plan 2012-2015	Environmental Report is preparing for 2014-2015, Code of conduct	N/M	Responsibility Report	Corporate Social Responsibility Review document
website	Yes	No	Yes	Yes	Under development	Yes (in Finnish only)	No

Remarks: N/M: not mentioned

5 DISCUSSION

5.1 Compare the differences of campus sustainability in HEIs between Hong Kong and Finland

In Chapter 5.1, there are discussions on the difference of campus sustainability between Hong Kong and Finland mainly based on the results in Chapter 4 and on the researchers own experience. The discussion is with the same structure as chapter 4, which is (i) Green Campus, (ii) University social sustainability & (iii) Sustainability teaching and research .

5.1.1 Green Campus

Green building in HEIs is a popular concept both in Hong Kong and Finland since 12 (7 in Hong Kong & 5 in Finland) out of the 15 HEIs in this study have incorporated this concept into their sustainable development. Both Hong Kong and Finland incorporate the Green building concept into new buildings and renovation projects. However, there are some differences in the design principles. HEIs in Hong Kong are more targeting to get certifications from international organizations such as LEED or BEAM. As a result, they are focused on the various indicators of such international standards in their designs. In contrast, the findings in this thesis shows that designs of current green buildings in HEIs in Finland are more specific in certain areas, for examples energy efficiency or water conservation. The international certifications are also not mentioned in the studied reports. However, the researcher in this thesis questions if HEIs in Finland are really neglecting these international standards. It is highly possible that HEIs are considering these international standards in their design principle while only the specific area was highlighted in their reports. The other obvious difference in Green building between the two regions is Indoor Air Quality (IAQ) Control. All 8 universities in Hong Kong are taking action in IAQ control while there are only Aalto and

UTA paying attention in this topic. There is serious air pollution and common use of air conditioning in Hong Kong while the air quality is considered to be of a good level in Finland. These conditions may probably lead to the difference in the awareness of IAQ in the two regions.

All 15 HEIs in both regions are paying attention to energy conservation and efficiency. The methodology to achieve energy conservation and efficiency in campuses used by HEIs in Hong Kong is generally similar to those in Finland even through there are some varieties in details. Regarding energy efficient appliances, HEIs in both regions are focusing on lighting fixtures and fittings such as LED or T5 tubes. Due to high usage of air-conditioning in Hong Kong, the focus is also on the air conditioner modules while HEIs in Finland pay more attention to automatic systems which control various equipment centrally. Both HEIs in Hong Kong and Finland mentioned that staff education & training could facilitate in achieving energy conservation. However, HEIs in Hong Kong are not only acting internally with staff, but also cooperate with local professional bodies in the form of energy performance contracting. When considering transportation in SD, HEIs in both regions are promoting the use of environmental friendly vehicles and public transportation, as well as the use of bicycles or walking. But it is really interesting to see the difference on the level of promotion. There is a high level of promotion in using environmental friendly vehicles and public transportation with little encouragement for the use of bicycles or walking in HEIs in Hong Kong. The situation is totally reversed in Finland. The findings also demonstrate the distinction of renewable energy applications. Solar energy is the monopoly renewable energy used in campus in Hong Kong while there are various types of renewable energy used in HEIs in Finland. The differences are likely due to the technology available as well as the geographic limitations.

The findings show that HEIs in Hong Kong have higher rate of participation in waste management than HEIs in Finland. However, regarding the contents of waste management, both regions are covered most of the areas and nearly the same as each other. For example, recycling points and flea markets are established as initiatives in recycling in both regions. Reusing is also applied in the HEIs in Hong Kong and Finland for waste minimization despite the difference in reusing items. Both regions have good practices over each other, such as reuse of construction materials in Hong Kong and reuse of books and dishes in Finland. In the actions taking for reducing waste, both HEIs in Hong Kong and Finland are focusing on virtualization of operations and conduct web-based teaching and learning. It is worth highlighting that in Finland, paper is replaced by hand towels which can largely reduce the paper waste. Green procurement is implemented in purchasing in 11 HEIs in the two regions. Both are paying attention to the selection of responsible suppliers, selection of sustainable products; consider green transportation methods etc. It is noted that the water conservation program is quite different from each other. In Hong Kong, HEIs tend to recycle grey-water to use in irrigation or flushing water and install water saving devices. In contrast, HEIs in Finland are taking

proactive actions by careful planning in order to reduce the use of water. At last, the summary of comparison on green campus between Hong Kong and Finland is shown in TABLE 16.

TABLE 16 : Comparison on Green Campuses between Hong Kong and Finland

Green Campuses	HEIs in Hong Kong	HEIs in Finland
	GREEN BUILDING	
1)Design Principle	• Focus on international standard (e.g: LEED, BEAM) • Target to achieve standard certificates	• Focus on specific area (e.g: energy efficient or water) & No international standard mentioned • Target to better environmental performance •
2)Scope	• Both New buildings & Renovation projects	• Both New buildings & Renovation projects
3)Indoor Air Quality Control (IAQ)	• Pay high attention to IAQ	• Low awareness in IAQ
	ENERGY CONSERVATION & EFFICIENT	
4)Energy efficient appliance	Mainly: • (i) Lighting fixture & fitting and • (ii) Air conditioner module	Mainly: • (i) Lighting fixture & fitting and • (ii) Automation system
5)Energy conservation Program	Mainly: • (i) Energy performance contracting with local company & • (ii) Education to staff	Mainly : • (i) encourage, teaching and training staff & • (ii) Focus on daily operations.
6)Renewable Energy	• Focus on Solar energy • installed in campus	• Various Source (Solar, Geothermal, Wind, Hydropower) • Some installed in campus, few outside campus
7)Transportation	• Highly promoting the use of environmental friendly vehicles • Highly promoting the use of public transport • Some encouragement on using of bicycles	• Highly promoting the use of Bicycles or walking • Some promotion of the use of environmental friendly vehicles

(continues)

TABLE 16 (continues)

Green Campuses	HEIs in Hong Kong	HEIs in Finland
WASTE MANAGEMENT		
8)Recycle	• Recycle Bins / Points around campuses • Flea markets • Composite bio-waste into fertilizer	• Recycling points • Flea markets
9)Reuse	• Furniture • Electrical appliance • Construction materials	• Furniture • Phones • Books • Dishes
10)Reduce	• Through virtualization of operations (e.g : Electronic- applications, Electronic- communication) • Web-base teaching & learning • Green office approach to reduce the use of paper	• Through virtualization of operations (e.g : Electronic- applications, Electronic- communication) • Web-base teaching & learning • Replace paper by hand towel.
11)Purchasing	• Green procurement • Sustainable Food Options	• Green procurement • Fair-trade or organic Food Options
12)Water conservation	• Reuse of grey-water • Water Saving device	• Proactively reduce the use of water by better planning.

5.1.2 University social sustainability

The comparison on university social sustainability between Hong Kong and Finland is demonstrated in TABLE 17. There are differences on the student involvement between two regions. In Hong Kong, students take part into sustainable development both internally and externally while students in Finland are more active in campus. Students in both regions get involve in internal SD organizations to provide opinions and negotiate with management. They also participate in trainings and courses to gain the knowledge about SD. Activities such as 'Green ambassador' are even popular in Hong Kong in order to involve students in sustainability. However, the findings show that there are higher student involvements in society in Hong Kong. All 8 HEIs in Hong Kong have their policies allowing students to take part in and provide innovative solutions to community needs. In addition, volunteer works to serve local, region & international communities are always organized by HEIs. In contrast, there is relatively low in student involvement in society in Finland according to the findings in this thesis. Only JYU mentions about student

placements in developing countries for social sustainability purpose while there is not much information from other universities in this area.

In the area of staff involvement, HEIs in Hong Kong and Finland are encouraging their staff to take part into sustainability campaigns and activities. And it is interesting to find out that most of such activities are focus on environmental sustainability. The findings in this study also show that HEIs in Finland tend to provide different types of SD information and trainings to their staff while there are no such offers from the HEIs in Hong Kong. However, it is noted that staff involvement in society is low in both regions. Even though there are volunteer activities in community holding by HEIs in Hong Kong, it is still low in participation because only 2 HEIs provide such activities to their staff. In Finland, it is show that there are more methods for staff to get involve to society. For instant, external communication with other stakeholders, teaching & staff exchange and conduct research on SD topic. However, such methods are only demonstrated in 2 of the studied Finnish HEIs. In summary, staff involvement in society in both regions is low and it needs some actions to improve the situation.

Other stakeholders' engagement is valued by all the 15 HEIs in this study. HEIs in both places set up communication channel between HEIs and the communities. The channels are included community consultants or stakeholder engagement meeting. In Hong Kong there is also online channel to express opinion while it is not yet mentioned in Finnish HEIs in their reports. Moreover, cooperation with external parties such as NGO, local and international business entities and academic partners are also included in initiatives by HEIs in both regions. The finding shows HEIs in Hong Kong and Finland are doing good job to provide different means to get other stakeholders engagement. However, the researcher is questioning how the actual situation on the participation by public is because the figures derived from this thesis can only show the effort put by HEIs but the reactions from other stakeholder are neglected.

The result shows that HEIs are generally willing to make external commitments since 13 out of 15 HEIs in this study are connected with external organizations. The characteristic for HEIs in Hong Kong is that they all are committed to a local organization HKSCC while Finnish HEIs are widely joining different international organizations. However, it is always a good practice to have external commitment and it could always act as a driven force as well as external controllers to HEIs for their SD.

To conclude, it seems that HEIs in Hong Kong has a more thorough planning than Finland in achieving University social sustainability, which is a wider cover in both internal and external involvements. On the other hand, Finnish HEIs offers more SD training opportunities to staff. However, HEIs in both regions still have many ways to improve their performance in this area.

TABLE 17: Comparison on university social sustainability between Hong Kong and Finland

University Social sustainability	HEIs in Hong Kong	HEIs in Finland
University involvement to society		
1)Student involvement	Internal: • Organizations as channel to provide opinion and negotiation with management • Green ambassador for promoting environmental practice to students External: • Policy allow students take part and provide innovative solutions to community needs • Volunteer works to serve local, region & international communities	Internal: • Get involve into international organizations in SD • Take part in training and courses External: • Only JYU mention about placements to developing countries
2)Staff involvement	Internal: • Campus activities to get staff involved (e.g: green office scheme , sharing – ride program) • Staff organizations to negotiate with management • Take part in devising strategies External: • Volunteer activities in community	Internal: • Provide information to staff (e.g guidelines and ethical code of conduct to teachers & researcher) • SD Training to staff • Internal communication of staff • Take part in environmental activities in campus External: • External communication with other stakeholders • Teaching & staff exchange • Conduct research on SD topic.

(continues)

TABLE 17 (continues)

University Social sustainability	HEIs in Hong Kong	HEIs in Finland
Public Participation		
3)Other stakeholder engagement	• Communication channel (e.g. meetings , consultation , online form) • Collaboration with community (e.g: NGO, business , local & oversea HEIs)	• Communication with local community, municipal, region & civic society. • Take consideration of stakeholders' needs & expectation in development plan. • Cooperation with local & international companies and academic partners.
4)External commitment	• Locally (HKSCC) • Industrial (Green Purchase charter) • International (ISCN, Tallories Networks)	• Locally (High Education Consortium of Southern Finland) • International (ISCN, Blatic University Program , Nordic 5 tech University alliance)

5.1.3 Sustainability teaching and research

There are some differences in sustainability teaching and research in HEIs between Hong Kong and Finland. Even HEIs in both regions offer bachelor and master degrees major in sustainability subjects, the current situations of offering sustainability courses to students in other majors are difference. In Hong Kong, more than 60% of the HEIs have already offering sustainability courses in the General Education program so students are able to take part into it by their own according. However, there is still in the stage of promoting sustainability content in curriculum while only Aalto University but no others has already included these courses as mandatory for their bachelor students. However, it is important to raise that the UnPID course used between Finnish HEIs is a very well-organized and effective, which is worth to introduce the concept in Hong Kong.

When comparing the difference in sustainability research, it is noted that forming research groups or research centers is more stressed in HEIs in Finland than that in Hong Kong. In addition, Finnish HEIs tend to collaborate with local and international universities in their researches. There is also very clear objectives for sustainability research in most of the Finnish HEIs. In contrast, HEIs in Hong Kong only listed the number of sustainability researches conducted while there are not much detail about their research organizations and specific research objectives.

HEIs in Hong Kong provide wider range of sustainability events than those by HEIs in Finland. They are not only holding seminars, but also exhibitions, workshops and conferences. HEIs in both universities are also organizing environmental events from time to time. The main difference between two regions is that in Hong Kong there is some long-term exhibition centers/ corners established in campuses while Finnish HEIs are concentrated in ad-hoc activities.

Regarding the sustainability organizations, it is more common to find official sustainability committee in HEIs in Hong Kong than in Finland even though some of the HEIs formed environmental organizations. In addition, more student organizations related to SD are found in Hong Kong than in Finland according to the findings in this study. On the other hand, the results also show that there is big difference in sustainability publications in two regions. Nearly all HEIs in Hong Kong publish sustainable reports or environmental reports while these publications are still not popular in HEIs in Finland, despite SD actions plans are available to public. It is also noted that newsletters and magazines related to sustainability are commonly issued by HEIs in Hong Kong.

TABLE 18: Comparison on sustainability teaching and research between Hong Kong and Finland

Sustainability teaching and research	HEIs in Hong Kong	HEIs in Finland
1)Sustainability Courses	• Bachelor & Master program in SD focus • Included in General education as elective	• Bachelor & Master program in SD focus • Promote Sustainability content in curriculum • UnPID course
2)Sustainability Research	• Number of SD research listed • Cover both social & environmental	• Forming research group or centre • Collaborate with local & international universities • Clear objective for sustainability research
3)Sustainability Event	• Seminar, exhibitions, workshop & conference • Environmental events • Long-term teaching corner in campuses	• Seminar • Environmental event

(continues)

TABLE 18 (continues)

Sustainability teaching and research	HEIs in Hong Kong	HEIs in Finland
4)Sustainability organizations	• Sustainability committee • Environmental office • Student organizations	• Sustainability office/ work group • Environmental organization
5)Sustainability Publication	• Sustainable reports • Environmental Reports • Newsletter or magazines	• Sustainability report (only Aalto Uni.) • SD action Plan
6)Sustainability website	• Common in HEIs	• Only half of studied HEIs

In summary, HEIs in Hong Kong and in Finland are using similar initiatives to achieve campus sustainability. Both regions attempts technical and non-technical initiatives. However, their focuses areas are different from each others in different categories as explained above. It can also conclude that HEIs in Hong Kong are more reply on existing resources for SD in shorter term while Finnish HEIs tend to seeking proactive solutions to long term SD.

5.2 Strength and weakness in campus sustainability in Hong Kong and Finland

The results of this study firstly provide overall pictures of campus sustainability in HEIs in Hong Kong and in Finland. By comparing the findings, it is also allowed to figure out the strengths and weaknesses in campus sustainability in both regions. These findings are very useful for future strategy plannings in campus development. In this sub-chapter, it is going to answer the second research question: *'What are the strengths and weaknesses in campus sustainability development in the two regions?'*

As illustrated in TABLE 19, there are both strengths and weaknesses in the three areas in campus sustainability in Hong Kong. First of all, it is noted that the design principle in green building is one of the strengths. Based on the criteria from international standard, design principles become more thorough and thus can take various considerations into buildings. Moreover, buildings with this kind of design principle are targeting to attain certifications from authorized organizations. Most of the HEIs have obtained BEAM certificates or other green building awards in some of their campus buildings. As mentioned in chapter 3.2.1, it is not only to achieve energy and resource efficient buildings, but also act as the indicator so that external parties or public would understand

better on the level of green buildings in a HEI. Secondly, the waste management in HEIs in Hong Kong is under wide coverage since the recycling of grey water is one of the highlights in waste water management. The recycling takes place directly from the waste source to the new usage. For example, water from air-conditioning cooling tower or swimming pool water directly transfers to the use of irrigation water. This kind of waste water recycling is easy, effective and requires minimum resource and thus it should be promoted and widely used. Furthermore, despite that Alam & Khalil (2011) stated that social integration in development is lacked in Hong Kong; the findings in this study reveal the statement is only partly correct. Student involvement in society is one of the strengths since there are numbers of social activities and volunteer works opportunity provided by HEIs to students. Moreover, HEIs in Hong Kong set up good communication channels for external stakeholders, which include both face to face meetings and online platforms. Surprising result is also shown in the part of public participation. Even though the actual participation rate from external stakeholders is not derived since it is out of the scope of this study, the findings show that social integration in development is built up in HEIs since HEIs are strong in providing opportunities to students involve in society as well as sufficient channels to public. Last but not least, HEIs in Hong Kong are proficient in sustainability publications. Most of the HEIs establish well-structured sustainability reports or environmental report. In addition, sustainability websites are also available in school WebPages. It shows that HEIs are excellent in presenting their situation of campus sustainability and the effort they have put. It is really important to HEIs because these publications allows public to be aware of the SD in HEIs and they can also help HEIs to gain reputations.

On the other hand, there are some weaknesses that HEIs should be notified. Unlike the situation stated by Lo (2013) that HEIs are heavy on non-technical initiative in china, HEIs in Hong Kong combining the use of technical and non-technical initiatives. However, it is noted that one of the weaknesses in campus sustainability is the limited types of renewable energy sources. There is only solar energy used in HEIs in Hong Kong even it is used in different means. As a result, the development of all other renewable energy sources is cramped. Moreover, there is lack of staff trainings in sustainability despite of some environmental activities in campus which encourage staff to take part in. Staff trainings are important to make people understand the concept of SD and also how they can contribute. It would also raise the awareness and the interests from staff in sustainability topics. Therefore, lack of trainings may lead to low motivation and participation from staff in SD activities. Furthermore, the findings also display that staff involvement in society is relatively low. Universities only offer limited number of activities for staff to involve in society. Last, the main weakness would be the lack of external collaboration in sustainability researches. The findings is consistent with the situations stated in chapter 3.3.2 , which stated NGO are more like interest groups than

community-based organization (Terri, 2004) and the links between HEIs and local community and NGOs seem very week in Hong Kong.

TABLE 19: Strength and weakness in campus sustainability in HEIs in Hong Kong

Campus sustainability in Hong Kong	
Strengths	**Weaknesses**
• Thorough design principle in green building	• Limited types of renewable energy
• Make use of grey water, e.g : recycling.	• Lack of training for staff in sustainability topics
• students take part in community	• Low level of staff involvement to society
• Good communication channel set up for external stakeholders	• Lack of external collaboration in Sustainability research
• Sufficient sustainability publications.	----------
• Available of sustainability website	----------

The strengths and weaknesses in campus sustainability in HEIs in Finland are listed in Table 20. Both technical and non-technical initiatives to achieve sustainability are being implemented in Finnish HEIs. The use of renewable energy is one the strong area for Finnish HEIs. The findings show that HEIs are applying various types of renewable energy such as geothermal, wind, solar and hydropower energy. This strength may be as the result of more advanced technology and the geographic advantages in Finland. As mentioned in the discussion in chapter 3.2.2, popularity of technical initiative is various between regions. Similar to the situation in Hong Kong, the waste management in HEIs in Finnish is doing a good job and proactive planning to reduce use of water could be considered as one of the strength. Refer to the literature reviews, energy and resource conservation are always discussed with the advanced technology and changing humans behaviors. However, Finnish HEIs bring forward proactive ways to reduce the use of water by better plannings, which demonstrate the idea of 'prevention is better than cure' in waste problem. Furthermore, the online sustainability courses platform-UniPID is also consider as strength even the overall situation in providing sustainability courses has to be largely improved. The UniPID network allows sustainability course in a more convenient and resource efficient way. The idea of UniPID is superior even though the network should be largely extended. The last strength in Finnish HEIs is the strong structure in research team with external partners. The current situation in research aspects is partly achieving the target stated in Ministry of Education in Finland 2006, that Higher education should also play an active role locally, nationally and internationally in enhancing knowledge and action competence regarding sustainable development through research and education in cooperation with surrounding society.

There are also certain weaknesses in campus sustainability in HEIs in Finland. First, Green building can be classified as one of the weaknesses. Even though the findings shows HEIs take Green building as a practice, there is generally in single focus. Unlike the HEIs in Hong Kong, Finnish HEIs are not referring to international standards in design principle even LEED is the organization certificate green buildings in Finland. As my best knowledge, green building exists in the current campuses in HEIs, such as Ruusupuisto in JYU. However, there are no any certifications and thus it is very hard for public to notify the actual situation. The presentation of green building situation in campuses is rather weak in Finland in current stage. Secondly, university involvement in society is very low among HEIs in Finland. The findings illustrated that student and staff is mainly participating SD activities within campus while the services and involvement in communities are lacked. Refer to the definition of USR mentioned in chapter 3.3, it is not only measure the performance of the university community, but also include an interactive dialogue with society. HEIs in Finland currently achieve the first part of the requirements while they are very weak in the second part. Therefore, Finnish HEIs must take action to improve this situation in order to obtain social sustainability. Even though sustainability research is one of the strength, sustainability course in contrast is considered as a weakness due to low chances for all HEIs students to participate. Literatures mention that Finland is a pioneer as the strategy was the first national DESD strategy in the whole of Europe and the individual learner should be having skills and competence relevant to their future professions and future roles as decision-makers. The findings, however, demonstrated the current situation has not yet caught up with the targets. It is no doubt that bachelor and master programs in the theme of sustainability are available in HEIs, but the chances for students in other major to attend sustainability course is low. The last weakness in this discussion is sustainability publications and websites. There are currently very few sustainability publications and website available in Finnish HEIs. It leads to the similar consequence that the public is difficult to notice the actual circumstances in campus sustainability.

TABLE 20: Strength and weakness in campus sustainability in HEIs in Finland

Campus sustainability in Finland	
Strengths	**Weaknesses**
• Various type of renewable energy	• Limited focus in design principle in Green building
• Proactive way to reduce use of water by better planning	• Lack of students involvement to society
• Various trainings to staff	• Lack of staff involvement to society
• Well-structured Online course-UnPID	• Lack of sustainability courses for all students
• Strong structure in research team with external partners.	• Lack of sustainability publications
--------	• Lack of sustainability website

5.3 Suggestions for improvement in HEIs

After finding out the strengths and weaknesses, this sub-chapter is aim to answer the third research question, which to provide recommendations for Higher Education sectors in two regions for better practices in campus sustainability. The recommendations are made by referring the principle of Hong Kong declaration and Rio+20 treaty introduced in chapter 3.1.1, as well as the good practices in two regions. The recommendations also target to improve the weaknesses mentioned in chapter 5.2.

5.3.1 Recommendations for HEIs in Hong Kong

Recommendations for HEIs in Hong Kong for campus sustainability are provided for the four main areas : (i) Renewable energy, (ii) Staff training, (iii) Staff involvement and (iv) external collabration in sustainability research.

Renewable energy is a trend of energy use in near future. HEIs in Hong Kong should put more resources to investigate the possibility of wider range of renewable energy sources in campus. The initial cost of investigating renewable energy may be higher but in long run it could be paying-off so that it should not stop HEIs to go forward to the use of renewable energy. Therefore, the management of HEIs, and even government should reconsider the financial supports in the renewable energy developemnt. Moreover, It is noted that the spaces limitation and lack of expertise may be obstacles for the current development of renewable energy in Hong Kong. Therefore, it is suggested that HEIs in Hong Kong should proactively seeking the collobration with local and international expertises to find out the most possible solutions in this area.

Secondly, staff trainings can be managed in short-run and long run. In short run, HEIs have to provide staff with individual professional training related to SD. It would be introduction sessions, sustainability workshops and lectures in sustainability topics. After learning the concepts and theories of sustainability, it is important to use and practices in real situations. Therefore, it is suggested that HEIs could include sustainability in the workflows and operations in campuses, while serve as continous trainings to staff. It is also the best way for staff to embedding professional competencies in SD.

In order to increase staff involvement , there are mainly two recommendations. Empowering staff to lead change is one of the important actions. Current structures limit the chances for staff leadership for SD since their opinions may not have influencent. Even there are actions by staff but it is more likely to follow the instructions from top management. As a result, empowering staff in the strategy devising could increase their motivation to get involve in campus sustainability. The areas should not only limited to the operations within campuses, HEI staff should also be able to influence universities decisions related to community. The other recommendation

encourages staff involvement in sustainability indiretly. It is possible to revise promotion criteria so that sustainable development related work is recongised and rewarded in the career development pathways and embed within position descriptions and responsbilities.

The last recommendations are making for sustainability research. It is suggested that HEIs should in collabration with external parties , such as local and international business entities and academic bodies. In order to achieve this goal, HEIs need to invest in transdiscuplinary research , which is a way to bring multiple stakeholders and areas of expertise together to address global challenges in areas. It helps to understand trends of societal development and define the role of teachings and researches in HEIs in contributing to more sustainable futures. Moreover, it is also a good idea to set up research centres on certain research topics and themes and including different universities , research institutes and business for exchanging ideas, opinions and expereinces.

FIGURE 2: Recommendations for improvement in HEIs in Hong Kong

5.2.3 Recommendations for HEIs in Finland

Recommendations for HEIs in Finland for campus sustainability are provided for the four main areas : (i) Green Building, (ii) Student and Staff involvement, (iii) Sustainability courses and (iv) Sustainability publications and websites.

Compare to the situation in Hong Kong, Finland has more land for constructing green building in HEI campuses. It is one of the innate advantage for potential devleopment of green building in Finnish HEI campuses. Therefore, it is really worth to investigate more in this area. The first

recommendation is to adopt the multi-discipline design in green buildings. Not only the single focus on electricity or water consumption but including more disciplines can lead to the world class green buildings. The better perforamnce of a green buildig is not only bring economical benefit but also a good reputation to HEIs. It is also recommended that HEIs in Finland target to rearch international standards and get certications for their green buildings. As mentioned in chapter 3.1.1, these kind of certificate is a kind of the indictors for the public to evaluate ,and understand the actual situation in a easiler way.

Similar to the situation in Hong Kong, students and staff involvement in sustainability, especially involvement in society, is needed to rise. Again, empowering students and staff to lead changes in and increase the opportunity of leadership would be able to change the current situation. Refer to an article in global university network for innovation, students also can come up alternatives and drive initiatives for changes due to the less burdened by the treadmill of academic production and the pressures it creates. Empowering staff in strategies devising can also enhance their motivations in acting towards sustainability. Actually integrating students and staffs deeply into the governance process, universities can make a major step towards sustainability. Last but not least, it is also important to setting up students' organizations to promote SD activities within campuses and communities.

With considerations of the objective in DESD, it is to education citizens to enable making relevant decisions when facing present and future challenges. The objective implied that this education should be generally included everyone in a society. Therefore, at least in HEIs every student should be able to attend sustainability courses. The recommendation to Finnish HEIs is to review the degree structures and add in sustainability courses to each student. The practice, General education, which is common in HEIs in Hong Kong would be one of the ideas to achieve this goal. Students are required to participate in General Education courses which include sustainability theme as one of the requirements for graduation. This method can ensure HEI students attain certain level of knowledge in SD.

Actually Finnish HEIs are working hard towards sustainability by different actions. However, it may be only known by the internal stakeholders while external bodies can only obtain very few information. As the best knowledge of the researcher, HEIs in Finland adopts more sustainability practices in reality than those mentioned in documents. For examples, collections of bio-waste in student catering and sorting of wastes for recycle are very common in Finnish life as a result of their norms and general practice. However, these practices are not yet fully recorded in HEIs' publications. Thus it may lead to under-estimation on the evaluation of campus sustainability when documents or publications are the only sources being investigated. Setting up sustainability websites and establishing sustainability publications would provide such information to the public. Sustainability websites can always update relevant news and campus development more frequently while publications like sustainable reports could be prepared in regular basis. All

these channels allow both internal and external stakeholders to keep in touch with campus sustainability development.

FIGURE 3: Recommendations for improvement in HEIs in Finland

6 CONCLUSION

Sustainable development in HEIs is reflected across campus management, curriculum, research, student and community engagement activities. This thesis has studied the current situation of campus sustainability in HEIs in Hong Kong and Finland through these areas. Therefore, this is a complex task since multi areas are being investigated. Green campus, university social sustainability and sustainability teaching and research are the three main categories presented in this thesis. The results show that both HEIs in Hong Kong and Finland are working seriously and continuously within these three categories. HEIs in both regions are attempting initiatives in most of the areas even the focuses are different from regions as well as individual HEIs. HEIs are taking various initiatives which include advanced technology, changing humans' behavior and also partnership with different sectors. Even there are some weak points in their current practices; the overall situations of campus sustainability in HEIs in the two regions are satisfactory.

The findings in this thesis provide a fresh view on campus sustainability in HEIs than those views mentioned in literatures, even few points are still consistence with previous researches. Even previous research by Alam and Khalil (2011) mentioned that the society involvement to SD is low due to high governance; the findings in this research give another point of views. HEIs in Hong Kong are largely increased the channels to receive society opinions in their development. In addition, the partnerships between HEIs and private sectors and other stakeholders like NGOs are also increasing. Society involvement to SD is increasing. Second, campus sustainability in Hong Kong is inconsistence with this in China. HEIs in Hong Kong use integrated approach in SD, while Chinese HEIs in Mainland are still adopting remarkable uniform and narrow approach which is mainly focus on non-technical initiative as mentioned by Lo (2013). The findings in sustainability teaching and research in Finnish HEIs also show the differences from literatures. Since many literatures such as Blatic21E program and NSSD(2006) highlight the ESD in Finland since 2000s, it supposes that the sustainability courses should be well-developed for all students in Finnish HEIs. However, the findings in this research illustrated

that such courses are still not developed as a common study for all students even though UnPID is well developed as elective courses to students in 11 HEIs in Finland. The results in this research show inconsistence with the previous findings in literatures that Finland is a pioneer of ESD. On the hand, this research proves the consistence in three points. First, the results show that HEIs in Hong Kong is lack of connections to government, which is consistence with previous literature. During investigating the data in this research, there are totally no evidences showing that HEIs are working together or supported by HKSAR government in SD in campus. Secondly, the findings illustrate that sustainability research is weak in HEIs in Hong Kong as it is consistent with the statement of 'this significant reform on the higher education system (3+3+4) does not bring the focus on sustainability teaching and research'. The lack of supports and guidelines on sustainability research limited its development in HEIs in Hong Kong. Last but not least, the pioneer status on sustainability research in Finnish HEIs is consistent with the research focuses in literatures such as Blatic21E program and NSSD(2006). Research centers in SD topics and partnerships with business and other academic parties are common in Finnish HEIs. The inconsistence mentioned above may due to the fast changing environment in HEIs and insufficient understandings on SD strategies used by HEIs. Therefore, continuous researches related to this thesis are needed.

This thesis provides three main contributions. First, it provides the overall pictures of campus sustainability in HEIs in Hong Kong and Finland. According the researchers' best knowledge, there is no such research conducted. Therefore, this information is provided in a macro-level, which would be very useful for governments and education sectors for their future planning. The results of this thesis provide detail descriptions to the current sustainable development in higher education sectors in Hong Kong and Finland. This information gives ideas for governments and education sectors to review their own policies to facilitate campus sustainability in HEIs. Second, the strengths and weaknesses in HEIs practice were derived by comparative study between two regions. This information is valuable to both regional education divisions and individual HEIs. The discussions between individual HEIs and the regional education division could be therefore focus on the weaknesses for improvement while the experience in strength areas could be shared with each other. To a certain extent, the direction for future strategies is given through this study. Thirdly, HEIs are able to learn from each other and develop better sustainability practices by referencing the good practices. This information is provided in a micro-level, which individual HEIs can get to know all other HEIs in the practices in particular areas. Different practices are conducted by different institutions in same topic but one would integrate them to develop even better practice. Therefore, this thesis provides a platform for HEIs to learn from each other.

6.1 Limitations and future research

Like all studies, this thesis also has limitations. First of all, the discussion is mainly based on the data collected from the sources which only describe the facts. The considerations on culture, geographic and political are totally neglected in this study. As we know that university strategies and policy are highly depending on the government, neglecting on political factor may result to an incomplete analysis. It is also noticed that culture is largely affecting one's behavior. While this study includes areas related to staff and students behavior, as well as there are large culture differences between Hong Kong and Finland, this factor should be taking into account. Last, the geographic factor which includes the climate and resources availability may affect the initiative taken by universities. As a result, this thesis tends to be a pure description and discussions on the campus sustainability in HEIs while the reasons behind were not examined. The second limitation is relative minor but it is also worth to mention. The timeline for the studied documents in this thesis is from Year 2007 to 2014 due to the limited availability of some documents from some HEIs. The seven-year difference may lead to unfair comparison. However, since some documents are being used for few years and they are the most updated available, this study is still based on the data collected from these sources.

As mentioned before, only limited numbers of researches are related to campus sustainability in two regions, especially in Hong Kong. Therefore, there are potentials for future studies. This research is focused on the campus sustainability initiatives taken by HEI, the actual participation rates as well as the effectiveness is not yet been investigated. Therefore, future research would be in this area. Moreover, with considerations from the result in this study, future research can also be focus on the reasons behind the current circumstances. Potential topics can be investigating the driven and barriers for sustainable development in HEIs in Hong Kong / in Finland. This research provides the overall picture for campus sustainability but it is also required to find out the reasons lead to current situation and hence relevant parties can take suitable actions to change the situation. Moreover, future researches could be conducted in a specific area which universities find a greater interest, such as Green building development in HEIs, to obtain a more detail information and a better understanding on its history.

6.2 Evaluation of the research

This last sub-chapter is to evaluate the trustworthiness of this research. According to Shenton (2004), the evaluation of trustworthiness is based on the four criteria: (i) creditability, (ii) transferability, (iii) dependability, and (iv) confirm ability.

Creditability

Lincoln and Guba (1985) stated that ensuring credibility is one of the most important factors in establishing in trustworthiness. The research method is first explained clearly in chapter 2. Comparative studies and content analysis are used in this research and demonstrated as a suitable methodology for answering all the research questions. Context analysis is simply keeping the data in order and in sequence build up the main characteristic and trend for the report. On the other hand, comparative studies provide the framework in finding out the similarity and difference of data and hence to answer the sub-questions of this research. Moreover, literatures used in this thesis are collected from different sources such as journals, reports and government publications, which provide accurate and many-sided views in the topics. Literature review in Chapter 3 cover the key concepts in the research question so that readers of this thesis could develop an early familiarity of the research topic. Furthermore, the literatures are invaluable source which can be used to examine the current findings with previous research findings to assess the degree to which the research's' results are congruent with those of past studies.

Transferability

The findings of this research can be extent to other situations. Stake and Denscombe (1998) suggest that the findings would be used in broader groups even each case may be unique. Even the result is focusing on HEIs in Hong Kong and Finland, it can also use as a source for other studies in macro or micro level. Macro level like intercontinental studies in Asia or in Europe, as well as micro level such as researches based on type of HEIs classified by professional area or seniority can also make use of the results of this research. As stated in chapter 6.2, potential researches in the future would also take this research as the basis for their research questions.

Dependability

In order to address the dependability issue more directly, the processes within the study should be reported in detail (Shenton, 2004). Even this research is conducted in single method – content analysis only, it does not reduce its dependability. In Chapter 2, the research design is detail explained and the resource of data collection is listed in Table 3. Readers of this thesis would understand thoroughly the extent of current research, both the content examined and the period of time engaged. This information is able to get checking on the reliability of the research, which is not a repeating works with the same methodology, same context and same result.

Confirmability

According to Shenton (2004), the concept of confirmability is the qualitative investigator's comparable concern to objectivity. The sources of data used in this research are coming from publications in universities websites. All these documents and information are provided in written form and being reviewed by the management levels in HEIs before publication. Therefore, the

data is considered to be pertinence and reflects the facts. As a result, it is confirmed that there is not the characteristic or preferences of the researcher being input in this research.

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APPENDIX I: Comparison Table for Content Analysis

	Category/ Area	HEIs in Hong Kong								HEIs in FInland						
	Name of HEIs	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
A	**Green Campus**															
A1	Design Principle															
A2	Scope															
A3	Indoor Air Quality Control															
B	**Energy conservation & Efficiency**															
B1	Energy Efficient Appliance															
B2	Energy conservation Program															
B3	Renewable Energy															
B4	Transportation															
C	**Waste Management**															
C1	Recycle															
C2	Reuse															
C3	Reduce															
C4	Purchasing															
C5	Water Waste															
D	**University Social Sustainability**															
D1	Student Involvement															
D2	Staff Involvement															
D3	Other Stakeholder engagement															
D4	External commitment															
E	**Sustainability Teaching & Research**															
E1	Sustainability Courses															
E2	Sustainability Research															
E3	Sustainability Events															
E4	Sustainability Organization															
E5	Sustainability Publication															
E6	Sustainability Website															

APPENDIX II: Declarations related to Sustainability in higher education

Year	Event / Declaration
1990	Tallories Declaration, Presidents Conference , France
1991	Halifax Declaration, Conference on University Action for Sustainable Development, Canada
1992	Association of University Leaders for a Sustainable Future founded , USA
1993	Kyoto Declaration , International Association of Universities Ninth Round Table, Japan
1993	Swansea Declaration, Association of Common waelth Universisities' Fifteenth Quinuennial Conference, Wales
1993	COPERNICUS University Charter, Conference of European Rectors (CRE)
1996	Ball state University Greening of the Campus Conference (Also in 1997, 1999, 2001, 2003, 2005, 2007 and 2009)
2000	Global Higher Education for Sustainability Partnership (GHESP)
2001	Luneburg Declaration on Higher Education for Sustainable Development , Germany
2004	Declaration of Barcelona
2005	Graz Declaration on Committing Universities to Sustainable Development , Austria
2009	Abuja Declaration on Sustainable Development in Africa: the role of higher education in SD, Nigeria
2009	Torino (Turin) Declaration of Education and Research for Sustainable and Responsible Development , Italy
2009	World Conference on Higher Education (UNESCO)
2010	G8 University Summit: Statement
2011	Copernicus Character 2
2012	People's Sustainability Treaty on Higher Education
2012	UN Higher Education Sustainability Initiative within Rio +20
2014	Nagoya Declaration on Higher Education for Sustainable Development

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APPENDIX III: Development of SD in Hong Kong

Year	Event/ Activities
1989	White Paper on "Pollution in Hong Kong- A time to Act
1990	Establish Environmental Campagin Committee (ECC)
1991	1st Review of Progress on the 1989 White Paper- Savng our Environment
1993	2nd Review of Progress on the 1989 White Paper- The Hong Kong Environment: a Green Challenge to the Community"
1994	China's Agenda 21
1996	3rd Review of Progress on the 1989 White Paper- Heading towards Sustainability
1997	Commissioning of the Study on Sustainable Development for the 21st Century in Hong Kong (SUSDEV 21)
1998	4th Review of Progress on the 1989 White Paper- Sustainable Development: A Green Future"
1999	Policy Address- Quality People , Quality Home
2000[i]	Establishment of the Joint Working Group on Sustainable Development and Environmental Protection
2001	Setting up of the Sustainable Development Unit (SDU)
2002	Setting up of the Sustainable Development Unit (SDU)
2003	Establishment of the Council for Sustainable Development (SDC)
2004	Hong Kong Declaration on Sustainable Development for Cities
2009	Hong Kong Declaration on Sustainable Development for Cities
2010	Framework Agreement on HK/ Guangdong Co-operation on Environmental Protection and Ecological Conservation
2010	"Climate Dialogue -2010 Climate Change International Conference" and C40 workshop
2013	Conference on Sustainable Development through Energy Efficiency and Conservation

Reference to the Sustainable Development Online Resource Centre

APPENDIX IV: Declarations and action plans promoting education for sustainability

Year	Declaration
1990	The Talloires Declaration
1992	Agenda 21
1997	Thessaloniki Declaration
1998	World Declaration Higher Education in the 21st Century
2000	United Nations Earth Charter
2001	Luneburg Declaration
2002	Ubuntu Declaration
2002	Decade of Education for Sustainable Development (DESD) 2005-2014
2009	G8 University Summit Declaration
2009	World Conference on Higher Education Communique
2010	AASHE Call to Action
2012	People's Sustainability Treaty on Higher Education

Reference to Higher Education and Sustainable Development (2014), P10