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Integrating education with consumer behaviour relevant to energy efficiency and climate change at the Universities of Russia, Sri Lanka and Bangladesh (BECK)

Partner report on current state of higher education and its relationship with consumers'behaviouron energy efficiency and climate change

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1 INTRODUCTION

The purpose of this series of country reports is to obtain general philosophical, pedagogical and practical understanding on the status of higher education and its impact on consumer behaviour relevant to energy efficiency and climate change in BECK partner and European partner countries. It will also provide a basis for understanding and evaluating the capabilities of partner institutions on integrated education for energy efficiency and climate change. The results of these reports will inform a capacity building framework, which will form the basis for development of modules on energy efficiency and climate change during the BECK project.

The reporting approach is based on the Capacity Needs Assessment Methodology (CAPNAM) proposed by the United Nations (2013).

The report includes chapters on the following:

• Methodology:

This section describes the methodological approach used to collect and analyse the data that informs the findings presented in this report.

• Context:

Provides an overview of the regulatory, socio-political, and cultural factors that shape policy on the consumer behaviour relevant to energy efficiency and climate change in the country in general, and education in particular.

 Scope and coverage of education policies on consumer behaviour relevant to energy efficiency and climate change by the Higher Education Institution (HEI). Examines the illustrative policy and planning issues relevant to integrated education on consumer behaviour relevant to energy efficiency and climate change.

• Description of capacity types:

Evaluates the existing state of capacities of HEI in the field of integrated education on consumer behaviour relevant to energy efficiency and climate change. As defined by the CAPNAM analytical framework, the four types of categories are institutional, organisational, individual, and the knowledge base.

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2 Methodology

Please describe the methodological approach used to collect and analyse the data that informs the findings presented in this report. For example, this may include focus groups, interviews, document reviews and literature reviews.

- This report is prepared through reviewing available documents and literatures focusing the research interest.
- Besides, few interviews were made with the faculties/head of different departments/faculties, particularly land management and administration faculty and disaster management faculty.
- Moreover, academic profile (2019) of Patuakhali Science and Technology University (PSTU) was used to find out the study programmes and other information.



3 CONTEXT

This section provides an overview of the regulatory, socio-political, and cultural factors that shape policy on the consumer behaviour relevant to energy efficiency and climate change in the country in general, and the education in particular. Please answer following questions.

3.1 Socio-political and cultural context

What are the socio-political and cultural contexts providing the framework for educational policy planning in the field of consumer behaviour relevant to energy efficiency and climate change in the country? Are there any regulations, plans, etc.?

- Human influence on the climate system is clear. This is evident that climate change is the result of increasing greenhouse gas concentrations in the atmosphere and this is because of increasing trend of power consumption, cars and aircrafts use, industrial companies and other activities in the built environment.
- Bangladesh is one of the most likely adverse impact countries of climate change while it is one of lowest energy consuming countries of the world. About 89 kgoe/capita energy consumption and 220 kWh/day/person power consumption making the country as the lowest energy consuming nation after Nepal in South Asia. However, the country is identified as fifth among 171 extreme exposure and high vulnerable countries of the world (UNU-EHS, 2016) and first among 162 countries on the basis of the number of people exposed to cyclone, flood and storm surge (UNISDR, 2011). The magnitude, intensity and frequency of natural hazards in the deltaic Bangladesh have increased in past few decades.
- In one hand inefficient energy consumption leads to climate change and on the other hand climate change has several negative impacts on energy sector. Seasonal and daily temperatures and precipitation changes affect the timing of peak electricity demands and the size of these peaks. Extended periods of drought lead to reduced water availability for hydropower generation as well as water availability for heating/cooling in power plants. Changes in temperature and precipitation affect water availability for cooling power generators. Changes in cloud cover, temperature and pressure patterns directly affect wind and solar resources (affecting resource availability or productivity). Increased intensity and frequency of extreme weather events impacts on energy infrastructure, power plants, and transmission lines.
- Thus, it is high time to take initiatives for savings energy for future generation through changing consumer behaviour by incorporating energy efficiency and climate change in course curriculum at primary, secondary and tertiary level of education.



Regulations and Plans

- Bangladesh along with the other UN countries of the world set 17 Sustainable Development Goals. Among them, 3 goals (goal 7, 12 & 13) are more or less related to integrated education on consumer behaviour relevant to energy efficiency and climate change. Goal-7: Affordable and Clean Energy has 3 targets i.e. (7.1) ensuring universal access to affordable, reliable and modern energy services; (7.2) increasing substantially the share of renewable energy in the global energy mix; and (7.3) ensuring to make double the global rate of improvement in energy efficiency. Goal-12: Ensure sustainable consumption and production patterns has 8 targets. Amongst them, target 12.8 focuses on education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment. Goal-13: Take urgent action to combat climate change and its impacts has 3 targets. Amongst them, target 13.3 emphasizes on improving education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning through incorporating the issues into primary, secondary and tertiary curricula.
- The Bangladesh Energy Regulatory Commission (BERC) was established in March 2003 which is the apex independent and transparent regulator in the power sector (<u>http://berc.org.bd/</u>). Apart from the other activities, BERC is also empowered to ensure energy efficiency in generation, exploration, production, transmission and distribution levels of the related sectors. BERC has a responsibility for formulating Energy Efficiency & Conservation (EE&C) plan.
- National Energy Policy (NEP) 2005 (Amendment, 2008): key objectives are- (i) to ensure sustainable operation of the energy utilities; (ii) to ensure rational use of total energy sources; (iii) to ensure environmentally sound sustainable energy development programmes causing minimum damage to environment; and (iv) to encourage public and private sector participation in the development and management of the energy sector.
- Renewable Energy Policy 2008: It defines the renewable energy targets; by 2015
 Bangladesh will introduce renewable energy 5% of all generation, and by 2020, 10%.
- Bangladesh Climate Change Strategy and Action Plan (BCCSAP) was formulated in 2009. The action plan is built on six pillars e.g. (i) food security, social protection and health; (ii) comprehensive disaster management; (iii) infrastructure; (iv) research and knowledge management; (v) mitigation and low carbon development; and (vi) capacity building and institutional. The third programme of second pillar is awareness raising and public education towards climate resilience which is a continuing process. BCCSAP creates scope of establishment of a center for research, knowledge management and training on climate change through Ministry of Environment and Forests, research organizations and universities.
- BCCSAP also creates scope for ensuring an energy secure and low-carbon development economy. BCCSAP sets five actions for this: (i) study the future energy needs for the country and find out the least cost energy supply path that satisfies future energy demand based on the desired growth path of the economy; (ii) increase energy efficiency in power production, transmission and distribution through appropriate investments; (iii) increase energy efficiency in agricultural and industrial processes through appropriate policies and investments; (iv) increase energy efficiency in domestic and commercial/service sectors



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through appropriate policies and investments; and (v) increase energy efficiency in transport sector through appropriate policies and investments. These actions will be implemented by Ministry of Power, Energy and Mineral Resource; Ministry of Industry, Ministry of Agriculture, Ministry of Communications, Ministry of Finance, Universities and Research Organizations (BCCSAP, 2009).

- Bangladesh Climate Change Trust 2010: to make necessary action plan for capacity building for adjustment of the people or groups of people of the affected and risky areas resulting from climate change, upgrading their life and livelihood and facing the long term risk, and to take measures for implementation thereof; and to take measures for adaptation, mitigation, technology development and transfer, capacity building and funds for facing adverse effect of climate change on man, biodiversity and the nature.
- Energy Efficiency and Conservation Policy: In the 7th Five Year Plan (2016-2020), energy efficiency and conservation is recognized as an urgent policy priority. The policy effort involves substitution of low thermal efficient gas-fired power plants with more energy efficient plants; incentives for adoption of improved fuel use efficiency and energy conservation technology in industry; and conserving gas consumption by households through proper metering and pricing based on volume of gas consumed rather than a monthly flat rate per stove. The potential for conserving gas through these steps is enormous and the value of gas saved much exceeds the financial cost of implementing these policies.
- Bangladesh Energy Efficiency and Conservation Master Plan (EECMP) up to 2030 addresses to ensure energy efficiency & conservation (EE&C) through education by Ministry of Education and Ministry of Agriculture. Ministry of Education is expected to be in charge of this field and introduce EE&C as one of themes for environmental education. Besides, Ministry of Agriculture will educate irrigation consumers including concerned organizations staffs and introduce renewable energy based irrigation system in massive scale.
- The Sustainable and Renewable Energy Development Authority (SREDA) was formed in 2012. Bangladesh Energy Efficiency and Conservation Master Plan states that SREDA should develop the capacity of energy experts through training programs. Besides, our country's social systems should focus on the capacity development for energy experts; such as university curricula, internal training courses in establishments, publication of educational materials and introduction of success experiences from abroad etc.
- As per EEC Master Plan, the Government will conduct EE&C school/university program, which will be a joint program with SREDA and Ministry of Education. Educational curricula on efficient use of energy and its conservation for primary, secondary and higher educational institutions, universities or autonomous bodies will be prepared by SREDA, Ministry of Education and related organizations and fixed into their syllabus. The School/university Text Book Board will review the curricula periodically. The following actions will be adopted in school/university curriculums: (i) exhibition of video clips and documentaries on energy efficiency and conservation practices and their benefits; (ii) organizing spot quiz; (iii) introduction of appropriate posters in schools; (iv) organizing thematic art competition; and (v) motivational talks by experts or professionals.



3.2 Status of education

What is the current state in education on consumer behaviour relevant to energy efficiency and climate change? Is it important at your country? Please specify.

- In Bachelor, Master, MPhil and PhD level the following courses have been offered in different HEIs in Bangladesh i.e. Energy and Environment; Energy Resources Management; Climate Change; Environmental Systems Analysis; Environmental Policy and Governance; Global Climate Change and Processes; Environmental Management; Energy, Environment and Sustainable Development: Bangladesh Perspective; Environmental and Natural Resources Management (ENRM); Climate Change and Land Transformation; Land Utilization; Urban and Rural Land Studies; Environmental Laws, Protocols and Ethics etc.
- Yes, it's very important for our country because education is one of the key actors of changing human behaviour. Thus, Government of Bangladesh has given emphasized on training and education on climate change, energy efficiency etc. in our 7th Five Year Plan, Energy Efficiency and Conservation Master Plan (EECMP), BCCSAP 2009, and SDGs.

3.3 Funding

Is funding sufficient for integrated education on consumer behaviour relevant to energy efficiency and climate change at your country? Please specify.

- The Bangladesh Climate Change Resilience Fund (BCCRF) is one of the donor financed funding windows in Bangladesh - the BCCRF has been established with an amount of US\$110 million. The BCCRF was created in 2010 with the intention to support the BCCSAP and provide funding for climate change management, primarily adaptation but also mitigation.
- Besides, The Government of Bangladesh has established Bangladesh Climate Change Trust Fund (BCCTF) with its own resource by allocating about US\$100 million in 2009-10. A similar amount has been budgeted for FY 2010-11 as well. The main research areas of BCCTF are: food security, social protection and health, comprehensive disaster management, infrastructure, research and knowledge development, and mitigation and low carbon development.
- The another funding window is the Strategic Programme for Climate Resilience (SPCR) through the Climate Investment Funds (CIFs) at the World Bank, and DFID being the major source of funding.
- But, these funding are not sufficient for integrated education on consumer behaviour relevant to energy efficiency and climate change. In the context of country wide incorporation of the concept at university course curriculum requires integrated education plan and policy, more funding for research and innovation as well as organizing national level seminar, symposium, campaign etc.
- In addition, lack of university funding for R&D and particularly for the field of consumer behaviour, energy savings and energy efficiency.



3.4 Educational needs

What are the needs in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to 5 major needs at country level):

- To save the nation from climate vulnerability;
- To produce energy experts for determining and controlling consumer behaviour relevant to energy efficiency and climate change through mobilizing the energy savings concept at tertiary level of education;
- To reduce the adverse effects of climate change on energy sector;
- To facilitate people to go to renewable energy use from non-renewable energy; and
- To incorporate the process in national development planning and strengthen public private participation.

3.5 Educational gaps

What are the gaps in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to 5 major gaps at country level):

- The first and foremost gap is lack of specific policy. We do not have any policy that can direct us to facilitate integrated education on consumer behaviour relevant to energy efficiency and climate change. But, we have several other plans and policies that states to incorporate climate change, its adaptation and mitigation measures, energy efficiency and sustainable use issues in education (primary, secondary and tertiary level).
- Lack of research funding to explore the needs of incorporating integrated education on consumer behaviour relevant to energy efficiency and climate change;
- Lack of trained man-power;
- Lack of specific course curriculum/module and
- Lack of available data.



4 POLICIES RELEVENT TO HIGHER EDUCATION, AND THEIR RELATIONSHIP WITH CONSUMER BEHAVIOUR ON ENERGY EFFICIENCY AND CLIMATE CHANGE

This section examines the illustrative policy and planning issues relevant to integrated education on consumer behaviour relevant to energy efficiency and climate change. Please answer following questions.

4.1 Policy and planning

Please describe policy and planning issues currently being addressed by the HEI in the field of integrated education on consumer behaviour relevant to energy efficiency and climate change.

The mission of Patuakhali Science and Technology University (PSTU) is to provide cuttingedge education, research, and training along with develop entrepreneurship at both undergraduate and postgraduate levels for creating skilled and enlightened personnel to serve the nation. As per the part of Government development process, the two faculties namely faculty of Disaster Management and faculty of Land Management and Administration have been incorporated few courses related to energy efficiency and climate change into their course curriculum.

4.2 Gaps in policy and planning

Please describe other, if any, policy issues that are not currently being handled by the HEI but should be considered.

It has already been mentioned that two faculties i.e. faculty of Disaster Management and faculty of Land Management & Administration have been involved with consumer behaviour relevant to energy efficiency and climate change. Bangladesh is a growing population country. Thus, our energy demand is increasing day by day for residential, industrial, agricultural etc. use which may lead to climate change. On the other hand, climate change induced adverse weather condition has been impacted the energy sector. Therefore, we need an individual department/discipline that will produce relevant expert/graduate and contribute in integrated education in energy efficiency and climate change.

N.B. The responses to these questions do NOT require describing each policy and planning issue butonly the identification of the type of issues being addressed and those not being addressed. Thequestions are only meant to understand the scope of coverage of important issues by the HEI.



5 CAPACITY TYPES

This section aims at assessment of the existing state of capacities in the HEI for integrated education on consumer behaviour relevant to energy efficiency and climate change. As defined by theCAPNAM analytical framework, the four types of categories are institutional, organizational, individual, and the knowledge base.

5.1 Institutional capacities

This part describes the institutional capacities at HEI level. Please answer following questions.

1. Please provide brief presentation of the HEI.

Patuakhali Science and Technology University (PSTU) is one of the fast growing new public universities, located in the coastal sub-district Dumki under Patuakhali District. The university carried out its academic program since 1979 establishing Agriculture faculty. Total area of the university is about 90 acres. There are about 3,500 students in the University. The aim of the university is to be a home of excellence for producing competent professionals with improved knowledge and skills to meet national and global challenges.

PSTU provides cutting-edge education, research, training, and develops entrepreneurship at both undergraduate and postgraduate levels for creating skilled and enlightened personnel to serve the nation. For this, the PSTU has been offering undergraduate and postgraduate programmes in Agriculture, Computer Science and Engineering, Business Administration and Management, Animal Science, Veterinary Medicine, Fisheries, Disaster Management, Nutrition and Food Science, and Land Management and Administration.

Climate change is a global issue in modern era. The university is also working for a long time to meet the change challenges. Thus, the university has opened two new faculties namely faculty of Disaster Management and Land Management and Administration. The academic programmes are adopted with commitment to provide and mentoring our students a global career by the updated curricula. We, therefore, present an environment for teaching, research and entrepreneurship development in various disciplines of the university. We believe our success lies in our passion for teaching, learning and research. Our challenge for the future is to build on this strong base to establish ourselves firmly among the leading universities.

- 2. Please describe general model of studies according to different levels (bachelor, master, PhD).
 - Bachelor Degree: 4-5 years
 - Master Degree: 1 year
 - PhD Degree: 3-4 years
 - Diploma courses: Post-graduate diploma (PGD) in ICT and Disaster Management, certificate course on seed technology and certificate course on artificial insemination & reproduction.



- 3. Please provide key facts and figures about the HEI:
- 3.1. Number of students: 3500 (approx.)
- 3.2. Number of academic staff: 226
- 3.3. Student/Academic staff ratio: 15:1

3.4. Number of Faculties (please specify): 08 (Agriculture; Computer Science and Engineering; Business Administration and Management; Animal Science, Veterinary Medicine; Fisheries; Disaster Management; Nutrition and Food Science; and Land Management and Administration)

- 3.5. Number of graduates: 2945
- 3.6. Number of study programmes: Bachelor, Master, Ph.D, PGD

3.7. Number of international academic partners: 08 (Boda University, Norway; Hohenheim University, Germany; University of Salford, UK; University of Copenhagen, Denmark; University of Canberra, Australia; Kyungpook National University and Sunchon National University, South Korea; and North Eastern Hill University, India)

3.8. International rankings of the HEI (if any): Not yet.

4. Please describe main education and research areas of the HEI.

- <u>Agriculture</u>: Agricultural Botany, Agricultural Chemistry, Agricultural Extension and Rural Development, Genetics and Plant Breeding, Horticulture, Plant Pathology, Soil Science, Agricultural Engineering, and Agronomy
- <u>Business Administration and Management</u>: Human Resource Management, Market Analysis, Management Information System, Accounting and Information System, and Financial Management
- <u>Computer Science and Engineering</u>: Software Engineering, Electrical Technology, Information System Analysis and Design, Computer Programming, Simulation and Modeling, and Data Warehouse and Mining
- <u>Fisheries:</u> Fish Culture, Fisheries Microbiology, Inland Fisheries Management, Fish Food Chemistry, Fish Processing, Fish Breeding, Fishery Products Technology, and By-Products
- <u>Nutrition and Food Science</u>: Food Chemistry, Food Processing and Preservation, Community Medicine, Public Health, Community Nutrition, Maternal and Child Health, Nutritional Management, and Chronic Diseases
- <u>Animal Science and Veterinary Medicine</u>: Anatomy and Histology, Virology, Dairy Science, Toxicology, Poultry Science and Nutrition, Pathology and Parasitology, Animal Products and By-products Technology, Genetics and Animal Breeding
- <u>Disaster Management:</u> Environmental Science, Green and Renewable Energy, Different aspects of Disaster Risk Management, Hazards and Disaster Studies, Climate Change Processes and Impacts, Waste Management, Spatial Science, Geo-information science, Watershed Management, Geographical Information System, Digital Image Analysis, Disaster Resilience Engineering, and Environmental Impact Assessment
- <u>Land Management and Administration</u>: Climate Change and Land Management, Land Management in Disaster Prone Area, Geographical Information System, Remote Sensing, Geomorphology, Digital Image Analysis, Cartography, Natural Resource Management,



Environmental Impact Assessment Energy Saving and Land Use, Land laws and policies, Land Administration, Land survey, and Land information system

5. Is there any strategic priorities given to integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI level? Please specify.

 Not directly. In earlier section, we mentioned that we have incorporated few courses regarding energy efficiency and climate change at our faculty curricula (faculty of disaster management and faculty of land management and administration).

6. What are the needs at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major needs):

- To contribute in producing quality energy expert to serve the nation;
- To play role in saving non-renewable and promoting use of renewable energy;
- To create knowledge regarding sustainable energy consumption related to climate change;
- To help in disseminating the knowledge of energy saving behaviour among the community people; and
- To be a part of national planning and development process.

7. What are the gaps at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major gaps):

- Lack of course/module;
- Lack of trained manpower;
- Lack of funds for conducting research as well as creating and disseminating knowledge;
- Lack of climate change and energy consumption related data sharing platform; and
- Lack of specific policy.



5.2 Organisational capacities

This part describes the organisational capacities pertinent to integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI. Please answer following questions.

1. Is integrated education on consumer behaviour relevant to energy efficiency and climate change sufficiently included in the curricula of HEI? Please specify according to different levels (bachelor, master, PhD):

1.1. Study programme level (Please list relevant study programmes): B.Sc. in Disaster Management; M.Sc. in Disaster Management; and B.Sc. in Land Management and Administration.

1.2. Study subject level (Please list relevant study subjects/modules): Climate Change Process and Impacts; Green and Renewable Energy; Environmental and Natural Recourses Management (ENRM); Climate Change and Land Transformation; Land Utilization; and Urban and Rural Land Studies.

1.3. Study topic level (Please list relevant study topics): Energy, renewable and non-renewable energy, energy distribution, built environment, energy resource conservation strategy, resource planning cycle, carrying capacity, climate change, adaptation to global warming mechanisms, methods and measures, climate change mitigation options, land use and energy efficiency, urban planning and greenhouse gas emissions, urban development and climate change etc.

2. Is funding sufficient for integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI? Please specify: We do not have sufficient funding for integrated education on consumer behaviour relevant to energy efficiency and climate change at our university level. Every year, we usually get a negligible amount of fund for doing multidisciplinary research from University Grant Commission (UGC), Bangladesh. In addition, our teachers seek fund from different development agencies, but these fund are being used in individual level and none are related to integrated education on consumer behaviour relevant to energy efficiency and climate change.

3. What are the needs at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change related to organisation of study process (please list up to five major needs):

- To develop MOOC modules for BSc/specialists, MSc and PhD and lifelong learning;
- To establish modern multi-disciplinary courses linked to climate change and consumer behaviour related to energy efficiency in the built environment;
- To enhance capacity of teachers, staffs and students;
- To strengthen educational and scientific collaboration as well as networking with partner universities; and



 To get benefit of Simulated Big Data Interuniversity Networked Affective Educational Centre (the BECK Centre) where disciplines will provide their data, information and knowledge.

4. Please list up to five major gaps in integrated education on consumer behaviour relevant to energy efficiency and climate change related to organisation of study process:

- Absence of available MOOC modules for BSc/specialists, MSc and PhD and lifelong learning;
- Lack of modern multi-disciplinary courses linked to climate change and consumer behaviour related to energy efficiency in the built environment;
- Lack of capacity of teachers, staffs and students;
- Insufficient educational and scientific collaboration with the partner universities of BECK project; and
- Lack of access to Simulated Big Data Interuniversity Network.



5.3 Individual capacities: Staff skills

This part describes the individual staff capacities pertinent to integrated education onconsumer behaviour relevant to energy efficiency and climate change at HEI. Please answer following questions.

1. How many academic staff works at your unit? (which implements the project): 06 (Six)

2. Is there sufficient number of teachers who specialise in integrated education on consumer behaviour relevant to energy efficiency and climate change? How many?

2.1. At university level: No, we do not have enough sufficient number of teachers who have expertise in integrated education on consumer behaviour relevant to energy efficiency and climate change. Our 26 teachers have expertise on climate change/disaster management and energy efficiency.

2.2. At your unit/department: No, but our three teachers who specialise on climate change/disaster management and energy efficiency.

3. Is there sufficient number of researchers who specialise in consumer behaviour relevant to energy efficiency and climate change? How many?

- 3.1. At university level: No
- 3.2. At your unit/department: No
- 4. Please describe the current state of the staff training in HEI. Is it sufficient?
 - At present curriculum development, research methodology, administrative, financial and managerial training are being provided by the HEI but, these are not sufficient because along with the mentioned issues our staffs need academic performance development training, training on lecturing etc.

5. Please describe the current state of the staff training on consumer behaviour relevant to energy efficiency and climate change. Is it sufficient?

 At present our HEI doesn't offer any training for its staff on consumer behaviour relevant to energy efficiency and climate change.

6. Does the academic staff have flexibility in designing its own skill development plans or does it have to follow a centrally determined package?

 Yes. All academic staffs have flexibility in designing their own skill development plans. In addition, University also has central packages for improving staff capacity and skill.



7. Is there staff stability or does it suffer from high turnover among such professionals?

Having staff stability

8. What staff skills are required for integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major needs):

- Curriculum/module development skill on consumer behaviour relevant to energy efficiency and climate change;
- Community engagement skill/motivational skill;
- Innovation skill: methods of behavioural change or instrument that can save energy;
- Ability to continue the effort; and
- ICT skill e.g. big data networking/sharing skill.

9. Please list up to five major gaps in integrated education on consumer behaviour relevant to energy efficiency and climate change related to staff skills:

- Lack of knowledge on consumer behaviour relevant to energy efficiency and climate change;
- Lack of curriculum/module development trainings;
- Lack of ICT trainings related to big data networking or sharing;
- Lack of resources (books, journals etc.); and
- Insufficient research fund.



5.4 Access to Information, Knowledge and Technology

Access to information, knowledge and technology is becoming increasingly critical for sustaining long-term growth and development of education. It relates to the capacity to enable academic staff and students to mobilize, access and use information and knowledge, including access to and effective use of internet. Please answer following questions.

1. Do students and teachers have access to the novel educational resources on consumer behaviour relevant to energy efficiency and climate change? Please specify:

1.1. Printed learning materials in national language: Yes, but all are related to climate change and disaster management. We do not have any novels in our library that are directly related to consumer behaviour relevant to energy efficiency and climate change.

1.2. Printed learning materials in English or other languages: Yes, but all are related to climate change, disaster management. We do not have any novels in our library that are directly related to consumer behaviour relevant to energy efficiency and climate change.

1.3. Online learning materials (open-source videos, simulators (calculators and software), case studies, text material) in national language: Yes, but all are related to climate change, disaster management. We do not have any novels in our library that are directly related to consumer behaviour relevant to energy efficiency and climate change.

1.4. Online learning materials (open-source videos, simulators (calculators and software), case studies, text material) in English or other language: Yes, but all are related to climate change, disaster management. We do not have any novels in our library that are directly related to consumer behaviour relevant to energy efficiency and climate change.

2. Does HEI use MOODLE for educational purposes? Not yet

3. Does HEI use computer-based intelligent systems, MOOCs, computer learning systems, big data mining for educational purposes? Please specify: Not yet

4. Does HEI use software for integrated education on consumer behaviour relevant to energy efficiency and climate change? Please specify: Not yet, we don't have any software regarding the issue.

5. What Information/Knowledge/Technology is required for integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major needs):

- Access to printed learning materials related to energy efficiency consumer behaviour;
- Access to online learning materials related to energy efficiency consumer behaviour;
- Energy efficiency technology;
- Access to the big data network related to energy efficiency consumer behaviour; and
- Trained staff.



6. Please list up to five major gaps in access to information, knowledge and technology pertinent to integrated education on consumer behaviour relevant to energy efficiency and climate change:

- Absence of printed learning materials related to energy efficiency consumer behaviour;
- Absence of online learning materials related to energy efficiency consumer behaviour;
- Lack of research fund for innovating energy efficiency technology;
- Absence of big data network related to energy efficiency consumer behaviour; and
- Inadequate trained staff.