

Enabling sustainable development with the Caribbean Examination Council (CXC)

CXC Green Engineering from REETA to TAPSEC

During 2018, the Caribbean Examinations Council® received technical assistance support under the Renewable Energy and Energy Efficiency Technical Assistance (REETA) Programme, to improve the capacity and awareness of Caribbean students on sustainable energy issues [1]. The technical assistance provided the following:

- The development of a Digital Toolkit for the Green Engineering Syllabus
- The training of some teachers on the Digital Toolkit developed
- The preparation of a Concept Paper in support of the integration of sustainability in the CXC® Programmes in general (i.e. Greening of the Curricula).

The technical assistance from REETA identified a need for the development of a singular sustainable energy programme which supported a preliminary introduction of sustainable energy at the pre-university level [1]. The need for additional capacity support and institutional strengthening in the mainstreaming of “greening” learning concepts across the Caribbean Qualification Framework (CQF)², especially at levels four (4) through six (6) (i.e., the CSEC® and the CAPE® levels 1 & 2 certifications) was lacking [1].

Greening the CXC syllabus

This program ‘**Mainstreaming “greening” learning concepts in the educational syllabus of the Caribbean Examinations Council,**’ built upon the successes achieved from the REETA program by integrating some “greening” learning concepts into the new and existing syllabus of the Council at the CSEC® and CAPE® levels. It is also provided training to strengthen teaching competences among teachers in the region and enabled an effective administration of the new pedagogical methods that would be employed when sharing the new materials [1].

The TAPSEC’s programme second strategic component: Component 2 – Information and Capacity Building seeks to ensure that the individual, collective and institutional capacity for delivering technical solutions among key players in the renewable energy (RE) and energy efficiency (EE) field are strengthened. To this end, a contract for strengthening the certification

¹ The Caribbean Qualification Framework Model depicted in The Caribbean Community (CARICOM) Human Resource Development 2030 Strategy Unlocking Caribbean Human Potential source: (2017). A Typology Model for A Seamless HRD System. CARICOM Secretariat, Georgetown, Guyana, presents how the various qualification levels (i.e. academic and vocational) are integrated across the Caribbean region’s educational system.

process in RE and EE skills at the Caribbean Examinations Council® (CXC®) level was signed with the consultancy group, the University of Guyana [2].

The CXC syllabus upgrade process

The University of Guyana commenced working collaboratively with the Council on the 6th of July 2020. Together they planned, designed, developed, and implemented the upgrade program with teachers virtually from secondary schools across the region [2]. Figure 1 depicts the CXC syllabus upgrade process.

The university of Guyana consortium researched and established the materials for the greening aspects of the syllabus and CXC organised the teacher training workshops. Periodic reports were generated following the completion of the workshops.

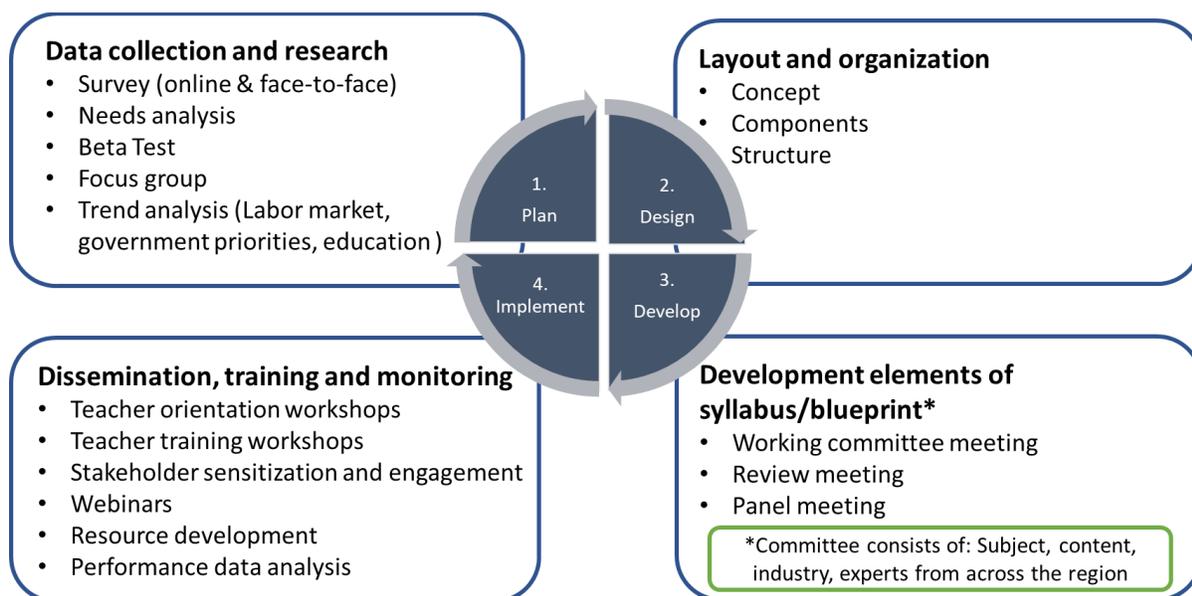


Figure 1 CXC syllabus and curriculum development process

The contract initially allowed for the syllabus development process to be in-person. However, due to the prevailing circumstances surrounding the COVID 19 pandemic the entire program was virtual. The virtual setting imposed innovative ways for teachers to also consider when delivering the materials to their students.

Three sets of workshops were completed in December 2020, and during the months of June to August 2021, a winter boot camp and 25 sensitisation workshops, respectively. The sensitisation workshops were completed to orient the teachers on the material added to the 10 revised CSEC® and CAPE® syllabi, so that they become proficient in the delivery and

assessments. These sessions were increased from 12 to 25 and hosted in 5 countries, namely: Antigua and Barbuda, Barbados, Guyana, Jamaica, and Trinidad & Tobago.

The contract period commenced on 1 July 2020 and was extended by 1 month thereby concluding on the 31 August 2021. The revised time frame allowed for 191 person days in total, 161 person days as desk study and 30 virtual training person days. A further extension for desk research and teacher workshops was granted in August 2021 for the development of supporting materials for conducting and reporting on the research components of the School-Based Assessment. The adjustments and extensions facilitated under this contract were cost neutral and the contract total was EUR 108,128.

Results of the greening intervention

The intervention completed by the University of Guyana's team allowed for the strengthen of the CXC® certification process which incorporates knowledge in RE and EE skills. Moreover, teachers across the CARIFORUM member states are better equipped to do the following:

- Deliver and assess the CAPE® Green Engineering subject material
- Integrate “greening” concepts into:
 - CSEC® Technical Drawing
 - CAPE® Building and Mechanical Drawing (BMED)
 - CSEC® Integrated Science
 - CSEC® Social Studies
 - CAPE® Tourism
 - CAPE® Agricultural Science
 - CSEC® Home Economics
 - CSEC® Industrial Technology
 - CAPE® Electrical and Electronic Engineering Technology
 - CAPE® Environmental Science

The expected outcomes of the consultancy are:

- Enhanced teacher training capacity at the regional level resulting in an increased number of teachers capable of delivering and assessing the CAPE® Green Engineering Syllabus.
- A newly revised syllabi at the CSEC® and CAPE® certification levels with relevant “greening” focus.
- A strategy document that outlines the “greening” concepts, the components to be included in each given subject area, the implementation strategy and the broad recommendations to be considered and approved by the Caribbean Examinations Council®.
- Enhanced teacher training capacity at the regional level in the delivery of “greening” content for selected CSEC® and CAPE® subjects.

Green Engineering Workshop

The three-day bootcamp for teachers of CAPE® Green Engineering was held online on December 16-18, 2020, see Figure 2. This online workshop was hosted on the CXC® Learning Institute instead of face-to-face interaction as was previously planned. The three-day training was geared towards strengthen teachers' capacity in the delivery and assessment of the CAPE® Green Engineering Syllabus. The CAPE® Green Engineering caters for lectures, research, laboratory experiments, debates, use of Information Communication Technology (ICT) and case studies. It is one of the nine new generation subjects that was added to the Caribbean Advanced Proficiency Examination (CAPE) in 2016. [3]



Figure 2 The participants at the GE boot camp

Additional materials on RE and EE definitions, techniques, best practices, and projects done in the Caribbean were researched and added to the online CXC® Learning Hub via the GE Digital Toolkit. The digital toolkit provides teachers and students with the resources needed for teaching and learning the concepts of the GE syllabus. The resources in the digital toolkit are organized according to Units, Modules, and Specific Objectives some of the type of resources in the digital toolkit are videos, infographics, case studies, and diagrams.

Teachers were placed into break-out rooms and tasked with developing their lesson plans for any 2 objectives of the energy modules. The teachers practiced using the GE Digital Toolkit to prepare their lesson plans and a lesson plan template was shared with them. Twenty-seven teachers participated in the workshop.

Syllabus review and content upgrade

The TD and BMED syllabus do not refer to sustainable energy nor energy. Therefore, the recommendations were made to incorporate new general and specific objectives that will allow for sustainable energy teaching and learning. The review meeting considered the responses from approximately 10 teachers and 10 students. These sustainable development additions were endorsed by the review committee. Hence, teacher training in these new concepts will be required to accompany these upgrades.

The CSEC® Integrated Science, CSEC® Social Studies, CAPE® Tourism and CAPE® Agricultural Science were re-developed to include the greening concepts and CSEC® Home Economics, CSEC® Industrial Technology, CAPE® Electrical and Electronic Engineering Technology and CAPE® Environmental Science were reviewed and greening concepts identified to support the re-development of the syllabi.

Additionally, e-learning training modules teaching and learning guides were designed and developed for educators to support the successive training and knowledge transfer of “greening” aspects of the newly revised CSEC® and CAPE® subjects. These e-learning training modules and guides can be easily integrated across CXC® existing online platform – CXC® Learning Institute and the Virtual Subject Association on Notesmaster.

Areas for further consideration

Following the boot camp recommendation was made for more teacher-training workshops to be conducted for teachers and prospective teachers of green engineering since this is a new subject area and training for the course is not yet available at teacher training institutions. Also, more time should be allocated for the workshop to allow participants to assimilate the information given.

Conclusion

The Consultants consider ‘greening’ of the syllabus as being synonymous with Education for Sustainable Development (ESD). According to UNESCO:

“ESD aims at developing competencies that empower individuals to reflect on their own actions, [considering] their current and future social, cultural, economic and environmental impacts, from a local and a global perspective. Individuals should also be empowered to act in complex situations in a sustainable manner, which may require them to strike out in new directions; and to participate in socio-political processes, moving their societies towards sustainable development.”

Hence, ‘Greening’ the CXC and CAPE curriculum equips students with the knowledge and abilities required in tackling the 21st century challenges, such as sustainable energy

development, climate change, and the urgent need to transition to a more sustainable way of living.

References

- [1] P. Bynoe, A. Brown-Perry and S. Britton, "Inception Report Mainstreaming "greening" learning concepts in the educational syllabus of the Caribbean Examination Council," CXC, Bridgetown, 2020.
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- [3] I.-N. Guyana, *Green Engineering subject timely for implementation of green economy – Dr Roopnaraine*, Georgetown: INEWS GUYANA, 2016.