

The Third International European Citizen Science Association (ECSA) Conference

Levering Secondary Schools in Promoting Citizen Science on PIECE Approach: Student-Centred Learning for Whole-Person Development

The Chinese Foundation Secondary School

Authors:

Mr. Ho Tik Shun, Mr. Chung Cheuk Hung Vincent, Ms. Leung Yue Shan Jennifer, Dr. Chan Pik Ying, Dr. Chuck Chi Pang

Extended Abstract:

Citizen Science plays a crucial role in science education. Secondary school students are particularly good citizen scientists since they have been equipped with basic project skills and the school provides them learning opportunities to participate in rewarding citizen science projects. Schools offer a harmonious venue for establishing learning communities amongst schoolmates, teachers and parents to sparkle citizen science projects with their own learning pace and levels for whole-person development. Secondary students can scaffold their learning scope widened through collaboration with professional scientists for the sake of the society, then leveraging themselves to be citizen scientists.

This paper demonstrates a school model of how particularly The Chinese Foundation Secondary School(CFSS) in Hong Kong East promotes Citizen Science to the community with the “PIECE” Approach. With PIECE approach, the number of active CFSS student scientists surged by 63.03% while participation hours multiplied by 2.25-folds from school year 16/17 to 18/19.

(1) P: Project learning on Sustainable Development;

Project learning equips students with critical thinking skill, problem-solving skill, creativity and innovation for citizen science projects, to improve living standards with optimized utilization of the limited resources. CFSS incorporates project learning into curriculum such that citizen science projects can be worked out to achieve the 17 Sustainable Development Goals(SDGs) advocated by the United Nations. The school organized a thematic exhibition titled “HKSciFest 2018: Citizen Science x Sustainable Development” to demonstrate highlights of invention and investigation student projects on Sustainable Development, outreaching 3000 citizens.

(2) I: Interdisciplinary collaboration – STREAM and Global Awareness;

STREAM is the acronym of Science(S), Technology(T), Reading & wRiting(R), Engineering & Robotics(E), Art & Design(A) and Mathematics(M). Global awareness is an understanding of how environmental, social, cultural, economic and political factors impact the world. To tackle global issues through Citizen Science, students should have all-round perspective and foresight. CFSS was invited to launch our STEM exhibit to the community in the 3-day DSS STEM Fair in 2018. Invention project exhibits included “EggCellent Supercapacitor”, “1357 Smart Recycling Bin”, “Basketball Shooting Robot”, etc. Besides, CFSS students also educated about 2000 citizens by distributing the booklets “Golden Rules for Facing Climate Change” to promote Global Awareness to Environmental Conservation.

(3) E: Equity – Popularity and Gifted Education;

Every student can be a citizen scientist, regardless of his/her age and academic background, thereby citizen science activities should be promoted in a whole-school approach. Every student can then get involved in Citizen Science with their input of initiatives. Students with particular areas of interest and talent can then be pulled out for leadership training for projects. This serves both purposes: popularity and gathering of talent pool. “CFSS.INNOVATION.STREAM” programme included eight Citizen Science thematic events to attract public participation of 10000 citizens throughout the 2-year period.

(4) C: Community service from Home-School Collaboration;

Joyce Epstein's proposed six levels of parental involvement in schools in her School-Family-Community Partnership Model: parenting, communicating, volunteering, learning at home, decision making and collaborating with community. Parental involvement in citizen science projects not only facilitates children's learning progress, but also levers a wide-spread of citizen science to other family members and community stakeholders. In “Fun Science Carnival” with the theme of “Correct Planting, Mosquito No Way!”, CFSS parents advocated suitable growth of plants to the public to combat against mosquito breeding and related infections of Dengue Fever and Zika in the stall. In addition to elucidating the causes of mosquito breeding, 1000 citizens had been taught to download “Mosquito Alert” app to locate mosquitoes breeding sites to combat disease transmission.

(5) E: External liaison for big data collection

It is crucial for schools to synergize with government, non-government educational bodies and even industry so that more data collection and resources can be optimally utilized to conduct citizen science projects. External liaison can help widen the scope of research to outreach larger groups in the community. CFSS started “Community Roadside Tree Project” to evaluate if roadside trees in Siu Sai Wan District were properly chosen for plantation. CFSS also joined “The Hong Kong Inter-School City Nature Challenge(HKISCNC)” and “Biodiversity Survey Project” by iNaturalist App to establish global e-map.

From 2017 to 2019, 19 workshops had been organized by CFSS using the PIECE approach, involving 8550 student-teacher-parent participation frequency and outreaching 40000 citizens in total. Besides Education Bureau and HK Direct Subsidy Scheme Schools Council, collaborations had also been sought through non-government organizations: HK Science Museum, HK Ocean Park, HK New Generation Cultural Association, CitizenScience.Asia, UNESCO(HK), and etc. CFSS had packaged some related highlighted citizen science events as “CFSS.INNOVATION.STREAM” programme. Out of them, “3D-Printing and Robotics Fair”, “360° Virtual Reality Experience” and “Science Carnival” were the three accredited activities of CFSS in celebrating the 20th anniversary of establishment of the HKSAR. The theme covered urban biodiversity conservation, health education, sustainable development and innovation in STREAM development.

Community services to elderly, children and hearing impaired individuals had been incorporated into some citizen science workshops with love and care. Besides the aforementioned 19 workshops, CFSS also refined the school-based curriculum and launched in-house popular STREAM programmes to help well-equip students with experience to work out Citizen Science.

With outstanding performance in promoting Citizen Science, CFSS Green Gurus Project “it’s All From Nature” attained the First Place Grand Award of Outstanding Organized STEM Activity in the 34th China Adolescent Science & Technology Innovation Contest(CASTIC) 2019. Science teachers had also received the honour of Chief Executive’s Award for Teaching Excellence(CEATE) in Science Education in 2017, to recognize teachers’ devotion to advocate sustainability concept to the community through the topic of biodiversity.

Effectiveness of promoting Citizen Science in PIECE approach had been regularly evaluated with performance indicators, for instance, participation frequency, areas outreached as well as practicality and sustainability of the programmes. The article also includes the deliverable and the way forward of how Citizen Science education should be fostered by CFSS in the upcoming years. The PIECE approach scaffolds a solid framework to potentiate other schools to contribute to Citizen Science altogether. The approach has reiterated the importance of schools to lever student-centred learning through Citizen Science Education.

Keywords: Citizen Science, Sustainable Development, interdisciplinary collaboration, STREAM, Global Awareness, Home-School Collaboration, The Chinese Foundation Secondary School