I am an engineering education scholar. As such, my professional pursuits are focused on re-imagining engineering through education based on a scholarly understanding of the changing nature of the engineering profession, and how people learn to become practitioners. This mission is partially actualized through my research which seeks to identify, develop and evaluate tools and techniques that can be readily applied in real learning environments to improve student learning, and teaching. Much of my work has been done using design-based research methodology, i.e., a framework that allows researchers to simultaneously pursue the goals of developing effective learning environments and using such environments as naturalistic laboratories to study learning and teaching. I have pursued two main lines of research: The first looks at artifact-inspired discovery–based pedagogy, i.e., learning activities where students’ exploration of STEM knowledge is self-directed and motivated by interactions or manipulations of artifacts. The second looks at the development of faculty expertise in outcomes–based course design through the use of the Instructional Module Development (imod) system, a self-guided web-based training tool.

1. What evaluation method(s) and tools did you use for the solar photovoltaic trainings in the Pacific Islands? And why? Were the evaluation goals attained?

Dr. Dalrymple: To evaluate the solar photovoltaic trainings in the Pacific Islands the evaluation model by Donald Kirkpatrick was used. This model allows us to holistically measure how much and how well students are attaining the desired learning objectives, and the effectiveness of the instruction, and training program. In turn, the information collected helps us to make evidence-based improvements.

Based on the Kirkpatrick’s Model, four levels of evaluation are conducted. These levels are as follows: 1) Reaction, which refers to changes in participants’ perceptions, attitudes, and satisfaction; 2) Learning, which is the extent to which the participants’ acquire knowledge and skills; 3) Behavior, defined in terms of the participants’ ability to perform the newly learned skills on the job; and 4) Impact or results, which looks at the "return on investment" to an organization after a training intervention.

To measure all four levels a collection of twelve instruments was designed and used to attain both quantitative and qualitative data from participants before, during, and after the training. Thus far, the data analysis has indicated very positive outcomes, and identified a few areas where the training can be improved.
2. How did the cultural background of the trainees in the Pacific Islands affect the evaluation method choice and the evaluation process?

**Dr. Dalrymple:** Once the unique needs of the Pacific Islands were determined, along with the identification of resources and constraints, and the characterization (e.g., prior knowledge, skills, attitudes, values, literacy levels, etc.) of target learner groups; the Assessment & Evaluation team collaboratively worked with the technical content experts and instructional designers to tailor the scope of the training, identify a suitable sequencing of courses, and define course specific performance objectives to address the needs of the Pacific Islands. Then, based on the tailored objectives, they produced assessment instruments to measure the extent to which learners achieve course objectives and the effectiveness of the instruction, and training program.

3. How did the trainees (both men and women) react to the evaluations and assessments?

**Dr. Dalrymple:** The importance of the assessment and evaluation process was discussed with trainees. Particular mention was made of the intended use of the collected data for making improvement to the current and future training programs. The trainees were all amenable to completing the assessment instruments; there was a 100% response rate.

4. What were the challenges that you faced and if you were to conduct the same evaluation again what would you do differently?

**Dr. Dalrymple:** The challenges faced were minor, and mainly due to the newness of the experience, i.e., being the first training delivered by the VOCTEC team. These challenges resulted in one instrument not being administered. Since that initial experience, detailed documentation has been developed to outline which instruments need to be administered, and when. This documentation is also accompanied by a newly developed spreadsheet for capturing all collected data on site. In addition, a few tweaks have been made to some of the instruments to make them easier to administer and interpret both by the participants, and the A&E team.

5. What were the results and impact of the training on the trainees and how can the results be used to improve future training programs in developing countries?

**Dr. Dalrymple:** The training led to positive results. The results show that training had a significant effect on the trainees’ learning outcomes, behavior and reaction. A very high percentage of the trainees also reported that they feel ready to start delivering their own technician training. The evaluation objective in general is to examine the effectiveness of
a program and to use the data to enhance future training programs based on collected evidence. The VOCTEC team has already started using the data to enhance future scheduled training by improving on the weak areas while maintaining the strong components. In other words, this data is used to boost the whole program (e.g., training material, virtual learning environment, hands-on activities, and assessments).

6- How does the evaluation help aid agencies and increase awareness on the importance of solar energy?

**Dr. Dalrymple:** The evaluation plays a critical role in shedding light on the importance of solar energy, especially if the evaluation results show that the training led to positive impacts on participants’ performance and attitudes. It shows that developing different training programs in the energy sector is important and leads to effective results. Evaluation enables us to demonstrate the program impact to others, which is critical for not only showing the effectiveness of the program, but also for attracting and retaining support from current and potential funders and agencies in such programs in developing countries.

7- Do you have any other thoughts or advice that you would like to share?

**Dr. Dalrymple:** Evaluation by itself results in many lessons learned from every training program. Those lessons are used to enhance future trainings and make them more effective. Making training programs more effective means increasing learning by the trainees, and enhancing lives in developing countries. Therefore, evaluation is an important process that reveals the strengths and weaknesses of any program. It should be highly considered and very well planned and developed to meet the needs of both the audience and the program objectives.