2017 Faculty Teaching Excellence Awards

Nominee Portfolio for Dr. David Rohindra

Faculty of Science, Technology and Environment

University of the South Pacific
1. Approaches to teaching that influence, motivate and inspire students to learn

The ultimate goal of students coming to a university is to secure good employment or move into research. Employers nowadays require “Work Ready Plus (+)” graduates i.e., students with good academic qualifications (graduate attribute) combined with work related experience and possess a high level of “critical thinking” skills. This concept is the basis on which I inspire my students to learn. A presentation was delivered at the Vice-Chancellor’s Learning and Teaching Forum-2015

_FSTE’s Efforts in the Pathway to Producing “Work-Ready Plus (+)” Graduates._

_Vice-Chancellor’s Forum on Learning and Teaching, USP, Suva Fiji. 9th Sept. 2015._

In all my courses, before starting my class or giving out an assessment, I articulate a reality problem happening either locally, in the region or globally and show them how the theory of that course can help to solve the problem.

- “Whenever he was explaining a concept, he would use real life/ local example which made it easier for us to understand.”

This approach helps to stimulate curiosity in students and it motivates students to learn and understand the subject better. Consequently, students are better skilled to solve real life problems. This also encourages the students to realize their career path and what is expected from them throughout their education.

- “He really prepares me for the outside world than only getting knowledge from the courses I learn.”
- “By advising them on what to do and how to develop new ideas that will help them in their study and even in their working areas when finish studying or when they are graduate.”
- “Before most of his class, he would motivate students to achieve more and he usually encourage students to help develop Fiji or to contribute to their home country.”
• “Inspire me through his motivations on the hard courses such as CH203. The only lecturer who always gives encouraging words during lectures that causes me to think more positively on my future career.”

Furthermore To motivate and inspire students in their studies, I have adopted several approaches that generate interest to learn.

a. Mental stimulation

The importance of developing “graduate attributes” is explained to the students with reference to some job advertisements which specifically highlights these attributes as essential criteria. Frequently, in my class I show profiles of young scientists from our own university and across the globe and their contribution to science and challenge the students “If they can do it, so can you.” I also enlighten about the detrimental effect of inferior qualified graduates becoming part of the workforce which hinders the excellent quality of education for the younger generation. These messages inspire students to become good scholars.

b. Innovations in teaching introduced

The use of innovative methods in teaching has the potential to improve learning, empower people and produce quality graduates that will help to achieve the human development goal for the country.

The innovative techniques introduced in my teaching have been based on Confucius’s
teaching;

“I hear and I forget.
I see and I believe.
I do and I understand.”

Several approaches have been undertaken in my teaching;

c. **Mind maps**

I include “mind maps” as a summary for each topic. Mind Maps are a very quick way to review and link information in the mind just by glancing it. This is achieved by using connecting blocks to the different aspect of the theory. This has been found to be very effective for recalling or remembering facts and connecting facts than conventional notes.

d. **Use of ICT**

The Moodle platform is used to deliver teaching materials both in the face to face and online modes. By incorporating different ICT digital media elements in my teaching, the students are able to learn better since multiple sensory modalities are used, which makes them understand better. Powerpoint with embedded videos are used to deliver the lecture. Use of smart phones in capturing moments during the laboratory class has been observed to encourage learning.

Students using smart phones in one of the laboratory class to capture images from a microscope.
Dr David used all types of resources, from real life explanations to the power of a video in order to educate his students.

e. Teaching with sense of humour
My teaching occasionally includes humour to reduce stress in students and make them feel comfortable. This type of teaching helps to create an atmosphere conducive for learning.

f. Problem based learning
Problem-based learning is seen as an innovative measure to encourage students to learn via real-life problems. Consequently, students will be creative and are able to think critically and analytically. This is achieved in my class through thought-provoking type of questions. In addition, at least one laboratory experiment in the course I teach, I use the “inquiry and confirmatory type experiment” to develop critical thinking skills.

-“He gives real life situations into labs and practice students thinking in different types of learning.”

Z to A approach
In this approach I attempt to explain the application part of a particular concept first and then explain the theory. This concept is opposite to the traditional A to Z approach where the theory is explained first and then the application. What I noticed in the traditional A to Z method was students were more interested to know about the applications. So I reversed the way information was delivered. I have a 90% lecture turnout and all students are eager to learn.

The strengths underlying this type of teaching helps:

-Students generate interest to learn the concept.
-Creates long lasting memory/correlation of a concept. (from CH101 to CH203 to CH306)
h. Teaching based on Research

The courses I teach that involve high degree of research component are SC356 and CH414. In lower level courses I teach based on research findings or limitations of research which have limited our understanding of certain concepts. This generates curiosity in students.
2. Development of Curricula and resources that reflect a command of the field.

   a. Designing of course content

   Over the last two years I had developed the following courses in the on-line mode; CH105, CH101, CH203 and CH306 and partially finished with CH414. Designed assessment rubrics in-line with the Research Skills Development (RSD) framework.


   Periodically new laboratory experiments are introduced using local materials. This helps the course to become economically sustainable whilst not compromising the quality. The link of the theory to real life situations becomes self-explanatory.

   • “By applying his own knowledge and be able to create new things in life or to be able to develop other skills and ideas in relation to everyday living.”

   Topics such as polymer and pharmaceutical chemistry, climate change and renewable energy are introduced in courses which are hot topics and in demand globally. Research is also being extended at postgraduate level in areas which are “hot topics” globally.

   • “As mentioned before, he made us realise that knowing the notes word by word from the textbook won’t last long, but if we understand what it means and we apply it so real life situations with our own words”.

   b. Curriculum Mapping, learning outcomes and alignment of assessments to learning out comes.
Being the STAR trainer for FSTE, I had helped in writing; programme outcomes, learning outcomes and development of rubrics of individual courses in different programmes offered in FSTE including the courses in chemistry.

After the international accreditation of 4 programmes in FSTE, the experience I gained on aligning assessments to learning outcomes, the following programmes were revisited and the alignment exercise have been completed with the help of FSTE Dean.

1. B.Sc in Physics
2. B.Sc in Biology
3. BSE
4. BNC
5. BGS


c. Accreditation of Programmes by Fiji Higher Education Commission (FHEC) to the Fiji Qualifications Framework.

BGS programme from FSTE has already achieved the FHEC accreditation. B.Sc Physics major will be submitted.

I am also the member of the FHEC. As a chair of one of the group, I was involved in reviewing one of the programmes from another university in Fiji.
3. Approaches to assessment and feedback that foster independent learning

Assessments are ways of ensuring that the learning outcomes are being achieved. I continuously design new assessments to achieve graduate attributes but at the same time expose students to new experiences.

   a. Self-assessment

The on-line version of the courses have lots of weekly based self-assessments and students receive instant feedbacks after submission of their answers.

   - “By providing activity as in self tests and also lab test as in individual so that students would learn on how to work on their own.”

   - “By giving exercise and activities for the students to attempt and to see whether they understand the concept or not.”

   - "The online assessment that Dr David put up on moodle is so encouraging but at the end it is up to the students whether they want to learn or not.”

Feedbacks on topic tests are done by placing the detailed answers on Moodle and students to check where mistakes were made. In addition, I also have a one to one session with every student in the middle of the semester when returning their test papers and discuss about their views on the course and any difficulties they are facing.

   b. Written assessments - Use of Rubrics

Rubrics have now been introduced in all the chemistry courses I teach for different assessments. Students find it convenient to conduct their assessments and do self-judgment of the expected marks.

All lab reports are returned to the students in the following class (normally a week’s time) with comments. I personally deliver the reports and discuss the shortcomings and encourage improvements to be made in the next write-up.
“Real life question” related to the learnt theory are given as “Thinking Questions” to develop cognitive thinking ability in students.

- “In the lab assessments, there were lab tests where we do it individually and this helps build our confidence in lab rooms and make us study harder as we are not going to depend on them to help all the time”.

- “Asks real life scenario based questions and we to analyze, critical thinking skills to answer the question given, which makes students to think more outside the box. In the lab we read the procedure and begin our experiments, this helps us to work independently and apply whatever we learned in class into practical.”

In addition, when I design assessments, I ensure the students’ efforts are also recognized outside of the course. For example in CH105 (2017 class) course, a 5 min documentary assessment was designed related to climate change in the Pacific complementing a topic in the course. The students were told that the best documenty will be given to the Fiji Government to be considered for the COP23 meeting in Germany in November 2017. Received 3 documentaries that met the criteria.

Similarly, in a 300 level course, students were asked to present the laboratory result in a format so that year 5 and 6 students in elementary school could understand the message. This invoked students to be creative in their thinking. One interesting video was received and has been forwarded to the FBC TV to be edited and aired on the children’s programme. In both cases, teamwork was enforced (graduate attribute).

In order to give students a good experience in the course, student feedback about the course is obtained by way of filling a questionnaire during the mid-semester. This practice will now be extended to all FSTE courses from 2nd Semester 2017.
4. Respect and Support for the development of students as individuals

To instill the respect for individual they are reminded of their self-esteem and their goal of being at USP. Personally I believe students need to be engaged and respected and Educators should be role models so our actions and attitudes can be learnt by our students.

- “He would never criticize any student based on their performance.”

- “He shows good respect to everyone and always support students in any given situation.”

Professionalism is one of the USP graduate outcomes and integrates with the ethics outcome. In order to develop these outcomes, the classroom environment is very crucial. I treat students (young and mature) with respect and they're more likely to do the same to others.

- “He understands what the students are going through especially when you're a first year student. In lectures he does not only focus on the course but also talks to students about importance of health where we should consume healthy food and have good rests before study, like he advises students also”.

- “Always understand students and most times makes students feel open to ask questions. And good thing is he recognise their students and know the names which makes each students feels in place.”

In the classroom, to foster respect for each other, teams are formed with students from the diverse ethnically cultural backgrounds. By doing so, it provides them with a greater sense of self-efficacy and achievement and encourage students to better understand the world in which they live—and their role in improving it.

- "Apart from the concepts, he teaches us to be good citizens, to aim high and not to be merely duplicators but inventors because that is what the world needs right now."

- “Great leader, very influential, always giving speeches on student conduct especially the ethics part of learning, always reminding students to try harder”
5. Scholarly activities that have influenced and enhanced learning and teaching.

Several scholarly activities were undertaken to improve the learning process.

a. **Introduction of an Assessment Audit Template.**

Have developed and used a process to align the assessment(s) to the learning outcomes of the course. This process has been recommended to the faculty and the institution level.

b. **Introduction of rubrics based on the Research Skills as an assessment tool.**

Rubrics based on “Research Skills” was introduced in the laboratory component of the chemistry courses in CH105, CH203, CH414 and SC356. An overall improvement was seen in the students’ ability to do research.

- The finding of this approach was presented in the Vice-Chancellor’s Learning and Teaching Forum-2011.

c. **Introduction of new laboratory experiments in undergraduate courses.**

In chemistry courses I teach new experiments based on locally available materials have been introduced for multifold reasons; (i) to avoid plagiarism from previous year’s reports and (ii) to enhance students’ appreciation of science related to real life.

- An experiment introduced in the course CH306 to enhance students’ performance on critical thinking. The outcome was so overwhelming that a research paper titled “A simple experiment to determine the activation energy of the viscous flow of polymer solutions using a glass capillary viscometer" was published in European Journal of Physics 33 (2012) 1457–1464.

- Similarly, a blended experiment was introduced in a first year chemistry course to foster cross disciplinary critical thinking. Another manuscript titled “Developing critical thinking skills in first year chemistry students through inquiry and confirmatory based laboratory experiment” has been submitted for possible publication.
d. Investigating the performance of first year students in chemistry.
Several teaching strategies had been implemented at first year level to improve the academic performance of first year students.

- One investigation focusing on the difficulties faced by first year chemistry students had been published; “Investigating first year chemistry learning difficulties in the South Pacific; a case study from Fiji” in International Journal of Science and Mathematics Education (2006) 4: 365-390.

- Another study was undertaken to determine what type of teaching environment students preferred to enhance their learning “Student perceptions of a culturally diverse classroom environment” and was published in Research in Science and Technological Education (2008), 149-164”.

I was instrumental in inviting Prof. Akira Suzuki, Nobel Laureate in Chemistry (2010) to The University of the South Pacific in 2012.

e. David Rohindra’s Best Master’s Thesis Prize in Chemistry
To improve the quality of Masters Research Student in Chemistry, I have initiated a monetary prize to those students who publish from their research before graduating. This prize money comes from my personal fund which I have invested with the University in the form of Endowment fund. Two students have received this prize.

f. Community Service through Professional Body (CSSP)
Our future students (high school students) are informed about the latest happenings in the field of chemistry through academic activities such as Chem-quiz, Chem-battle and Titration competition through the CSSP society which I am part of. Also contributed to the “Form 7 Chemistry Study Guide” which is now used as a recommended text for secondary school students.
• “He has great ideas and plans ahead for the science field, and I voted him because he has constructive ideas and one was to repair the old parliament house into a science lab where students across the Fiji nation are able to use it for their experiments, the house will have all the science equipment placed there and students are to go in and do their experiments there. This would be an income for the country as a whole.”