Teaching Portfolio

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1. Formal Pedagogical Training

1997	Lecturer training program, University of Southern Denmark
1980-1984	Bachelor of Science Education (B.Sc.Ed.) Melbourne State College, Victoria, Australia

This was a course specifically for training High School teachers of science. My major was chemistry and I was presented with a broadly-orientated curriculum. In parallel, theoretical pedagogy subjects were taught. Over the four years were four high school placements of several weeks each with supervised teaching. Through this experience I was fortunate to gain insight into a range of Australian secondary schools-two country High Schools, a city technical school for boys and a Catholic girls school.

2. Administrative tasks relating to education

Member of Teaching & Education Committee FKF 2015-present. Organization of inorganic and organic chemistry laboratory classes. Formulating, writing and testing experimental protocols for inorganic and organic chemistry. Organization of student presentations. Organization of oral exams for individuals, groups and classes. Organization of excursions to work places for chemists and researchers (Odense University Hospital, Department of Nuclear Medicine, Haldor Topsøe A/S, MAX Lab in Lund, Novozymes). Start-up and development of a new bachelor and masters education (nanobioscience).

3.Experience with teaching, supervision and examination

Current Teaching:
Inorganic Chemistry (KE525), 5 ECTS (Third year level)
Bioinorganic Chemistry (KE810), 5ECTS (graduate course)
Organic Chemistry (KE535), 5ECTS (First year level)
Green Technology (KE543) (Second year level)
Project course (NAT501)
Former Teaching (1998-2012): Nanobioscience courses, Characterization of inorganic compounds
Supervision of research students:
6 Postdoctoral fellows
9 Ph.D. students
22 Masters students
30 bachelor and 10 Erasmus projects
Formative and summative assessment of students including the formulation of E-tests during the semester (multiple choice and descriptive questions) and final written (electronic) with multiple choice and descriptive questions and oral examinations.
Member of evaluation committees for 16 Ph.D. theses from 6 different countries
Guest Teacher at an international Ph.D. school.
Mentoring young teaching assistants.

4. Methods, materials and tools

Current Teaching:
Inorganic Chemistry (KE525), 5 ECTS (third year level)
Bioinorganic Chemistry (KE810), 5ECTS (graduate course)
Organic Chemistry (KE535), 5ECTS (first year level)
Green Technology (KE543) (second year level)
Project course (NAT501)
Former Teaching:
(1995-2012): Two nanobioscience courses, Characterization of inorganic compounds
Supervision of research students:
6 Postdoctoral fellows

9 Ph.D. students
22 Masters students
30 bachelor and 10 Erasmus projects
Formative/Summative assessment:
The formulation of E-tests (multiple choice and questions which require short paragraphs for answers) throughout the semester and final grading which can take the form of a written exam (multiple choice and descriptive questions) or oral examinations.
Other:
Teaching at international Ph.D. school and guest teacher at an American and Swedish University.
Member of evaluation committees for 16 Ph.D. theses from 6 different countries
Mentoring young teaching assistants in laboratory classes.

5. Educational development and educational research as well as educational awards

I run 2nd/3rd Labs that are primarily guided and open inquiry labs. These require reports with written observations, explanations and conclusions. There are not formal protocols for every step in an experiment and therefore an emphasis on experience-based learning and improvement of broad knowledge of the properties of chemicals and understanding experimental manipulations in synthesis. Students should be able to search literature to find experimental procedures and to be able to repeat the experiment and assess the reliability of the evidence that was presented for structure, spectroscopy and properties for chemical compounds in the literature. Students learn to use their knowledge and resources to develop chemical syntheses from scratch and to make procedural decisions instead of working blindly from a set of instructions.
In effort to encourage effective communication (oral and written) of chemistry topics, I occasionally use the method of getting student to critique their peers' presentations and writing in a non-threatening reciprocal process.
I have developed an interactive web page for visualizing proteins for students taking my course in Bioinorganic Chemistry.

6. Reflections teaching practice and future development

My job is to ensure positive environment for students to learn chemistry and to this end, there is no question that chemical knowledge is best acquired through practice as an essential support for understanding concepts from lectures. Unfortunately, expense means that experimental laboratories have been the first targets of recent budget cuts. No-one would hire a builder with only a theoretical knowledge of building houses or go to a doctor who had never treated a live patient. That this is acceptable by administrators for university chemistry degrees illustrates how little the subject is understood.
Despite the increasing time constraints my 2nd/3rd labs run with strong emphasis on the analysis of the outcome of experiments - especially those that do not proceed as expected. Students typically start out in labs regarding these as “failures”. But just as in other aspects of our lives, I always tell them we learn more from mistakes than success. Once they realize that I celebrate thoughtful interpretation more than successfully carrying out an almost fail-proof experiment, they loosen up and start enjoying lab work. They think more about what to expect and learn to troubleshoot immediately. This work practice better equips them for future creativity in experimental design compared to blindly following well-tested protocols so they can go home by 4pm.
With this work atmosphere in undergraduate labs, sometimes we even discover something that appears to be unreported in literature. On a couple of occasions this has led onto a student’s first publication. These activities, among others, are designed to highlight the forefront of chemistry research and push my students to consider the solutions chemists will provide for important global environmental and energy issues.
I tailor my teaching specifically to the needs of my students at their particular level of study. For example, when I teach students not majoring in chemistry, e.g., biologists, I emphasize chemical education in the broadest sense, exemplified with biological examples, with the aim of achieving enabling skills and knowledge that will give each student (as voting citizens) an informed view of the role of chemistry in modern life and the means to evaluate scientific and ethical issues. For chemistry majors, my courses hopefully serve to catalyze their metamorphosis from dependent learners to independent scholars capable of deductively approaching and creatively solving problems.
Summative assessment by examination is the way university courses run. This apparent necessity often stifles creativity and interest. In Utopia I believe examination would not be necessary once students reach university level. Without this constraint universities could truly foster research-based teaching and creativity from the dedicated students. With small classes and close interactions with professors, at SDU we have a fantastic environment for facilitating this utopian learning philosophy. In some small way this is what I intend for my labs.
In my research laboratory as principle investigator I create an environment that is as scientifically enlightening as possible, provide encouragement and inspiration when difficulties are encountered in the course of tackling challenging research problems. My mentoring is perhaps intensive - my office door is always open. I attempt maximize each graduate student’s individual potential and involve them in an international scientific network so they learn the skills needed to reach a position of leadership in their future careers.
I encourage students to volunteer in public outreach programs like “Kemishow”.