



Education Special Interest Group Newsletter

IChemE
Education Special Interest Group

ISSUE 109

NOVEMBER 2022

Words from the EdSIG's Newsletter Editorial Team...

If anyone would like to write an article for the newsletter about good practice, previous EdSIG events or school outreach, or anything else that you think our community would find it interesting - please do not hesitate to get in touch at specialinterestgroups@icheme.org.

From the editors:
Chika Nweke, Sze Pheng Ong

Good Practice Exchange

Process Safety Workshops for Chemical Engineering Undergraduates

Peter Marsh, Dr Paul Balcombe and Dr Peter Hewitson
XBP Refining Consultants Ltd., Queen Mary University of London, Brunel University London

The IChemE Safety & Loss Prevention Special Interest Group (S&LP SIG) has been running process safety workshops at UK universities since 2007. Panos Topalis is a long-serving member of the S&LP SIG committee and has been the lead organiser of the workshops since then. He has mobilised an army of volunteers from the S&LP SIG and from industry as well as liaising with academics at the host universities. The workshops have proved very popular with undergraduate students. Recent student feedback surveys yielded an average score of 4.6 out of 5 where 1 is poor and 5 is excellent from a return of 86 survey forms. Consequently, IChemE would like to expand this offering to UK and overseas universities where there is demand and (crucially) local volunteers are available. The volunteers have all said they find it rewarding sharing their experience and working with the students, so please make contact if you'd like to offer your help.

The workshops typically comprise a morning plenary session with presentations comparing process vs. personal safety, introducing the concept of inherently safer design and describing some high profile major process safety accidents along with some context on the chemical industry risk profile and accident landscape. The session also includes interactive presentations involving quizzes on process safety as well as career snapshots presented by early career chemical engineers giving insights into their working life and demonstrating that a career in process safety can be very fulfilling.

The afternoon plenary session kicks off with a refresher on the HAZOP review process and an introduction to the HAZOP exercise the students will undertake in breakout groups coached and supervised by the volunteers. Each breakout group reviews a different part of a process and instrumentation diagram (P&ID) describing a simple process over a 90 minute period. The groups then return to the plenary session and a spokesperson from each group presents their findings for a chosen parameter (e.g. pressure), describing a particular deviation (e.g. low suction pressure), a cause (e.g. closed valve), the consequence (e.g. pump cavitation and damage), existing or recommended safeguards (e.g. low level alarm on suction vessel or trip of pump). The workshops are best conducted in-person but can also be run on-line.

Past experience with Brunel University London, Queen Mary University of London and London South Bank University and have shown that the HAZOP exercise works best if the students are already familiar with a few key topics such as P&IDs and their associated equipment symbols and nomenclature, equipment design pressure and temperature, overpressure protection, plant layout considerations, materials of construction, material safety data sheets, hazard identification processes (e.g. HAZID, HAZOP), overview of safety case documentation, etc. Hence the workshop is normally targeted at Year 3 students and scheduled in parallel with the final year design project. Feedback from the afore-mentioned university lecturers suggests the optimal approach is to integrate some of these topics into other modules in Years 1 and 2 and revisit/refresh those learnings in the Year 3 process safety module while ensuring those topics relevant to the externally-facilitated process safety workshop are revisited in the last 2 weeks before the workshop takes place.

For more information or assistance, please contact Panos Topalis, Paul Balcombe or Peter Hewitson via slpsgecm@ichememember.org.

resources accessed online) and do not necessarily reflect the views of the Education Special Interest Group Committee or the Institution of Chemical Engineers.

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Post-Chemeca Workshop on Final Year Design Project

Andrew Hoadley

Department of Chemical and Biological Engineering
Faculty of Engineering Monash University

EdSIG held a one-day workshop following the Chemeca conference in Melbourne focussing on teaching the final year capstone Design Project. We were hosted by Monash University and this was a hybrid event attended by the majority of IChemE accredited universities in Australasia.

The workshop kicked off with a plenary seminar presented by Prof. Patrick Spicer (pictured below) on the UNSW capstone Product Design project. In this module of the UNSW Product Design Degree (*not presently accredited by the IChemE*), students produce new products, which they physically make as part of the unit.



Figure 1. Speaker of the workshop

Each of the participating universities presented how they were currently teaching the capstone Design Project. There have been quite a few changes from previous times the Project Coordinators have gathered. Some universities are offering more than one project to specifically fit different specialisations (e.g. pharmaceuticals, renewable energy etc). One unique approach in order to allow for different report formats was to allow the students to nominate the weighting for each chapter within a certain bound, with maximum word counts changing accordingly. Some universities previously running across 2 semesters, have switched to one semester, whilst others have gone the other way. UNSW run the Design Project over term 1 of their final year, so as not to conflict with their research project in terms 2 & 3.

Prof. Nicoleta Maynard from Monash presented her experience with the use of the free software ITP metrics for both team formation and peer assessment. We also ran a small panel of 5 graduate students from different universities to capture their largely positive experiences. The final part of the day was to look at the IChemE design prize marking rubric. It was acknowledged that the current rubric does not mention sustainability at all.

EdSIG have invited Prof. Patrick Spicer to also give a webinar "Product Design - A Capstone Design Project for New Products" on the 8 December. Please register using the link <https://communities.icheme.org/73VF-AYSV-SEL1J-6EUCG-1/c.aspx>

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Hands-on Workshop on Process Simulation

Dominic C. Y. Foo

University of Nottingham Malaysia

EdSIG Malaysia Chair Professor Dominic C. Y. Foo has published the 2nd edition of [Chemical Engineering Process Simulation](#) with Elsevier/IChemE. Following the publication of the book, Professor Foo conducted a hands-on process simulation workshop on the 19 Oct 2022 at the University of Surrey, Guildford UK. A total of 24 participants from various universities in UK attended the workshop, which include academics, early career

researchers and postgraduate students.

Professor Foo started the 5 hours workshop by introducing the concept of sequential-modular, which is the most popular algorithm adopted by modern commercial simulation software. He then guided the workshop participants on the modelling of a literature example on n-octane production using Aspen HYSYS that is available in University of Surrey. To facilitate convergence, Professor Foo led the participants to simulate the integrated flowsheet following the individual layer of Onion model sequentially, i.e. reactor, separation and recycle, heat recovery, etc.

Host of the workshop Dr Michael Short said “Process simulation requires a diverse set of skills, from understanding how computers work, numerical methods, to chemical thermodynamics and process flow sheeting. Dominic’s workshop and material provided an accessible and engaging day for a wide audience. We had fantastic responses from the participants and a great turn-out with both internal and external participants from various backgrounds and experience levels. Even some of those that teach process simulation came away with new ideas. Apart from thanking Dominic for his excellent workshop and research collaboration, we would also like to extend our thanks to the British Council Japan for funding Prof Foo’s travels as part of the [COP26 Trilateral Research Initiative](#).”

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Figure 1. Participants of the workshop

EdSIG Activities

Education Special Interest Group (EdSIG) Annual Meeting 2022

8 December 2022, 08:30 - 10:00 GMT.

Education Special Interest Group (EdSIG) will be holding its Annual Meeting on the 8th of December 2022 (Thursday). This year the meeting will begin with a presentation from **Associate Professor Patrick Spicer** from the **University of New South Wales** on the topic of Product Design Capstone project in Chemical Engineering.

The meeting will be held as a virtual meeting via Teams. All members are welcomed to attend the presentation and join the election of office bearers.

Presentation: 08:30–09:15 GMT

Annual Meeting: 09:15–10:00 GMT

Please click [HERE](#) for registration.