

Metallurgical Education Partnership (MEP) – an industry supported national collaborative initiative

by Dr Dan Churach and Nadine Smith, MEP Program Coordinators, Murdoch University

In 2007, the higher education arm of the Minerals Council of Australia – the Minerals Tertiary Education Council (MTEC) – and three universities formed the Metallurgical Education Partnership (MEP) to create industry-relevant collaborative education projects in metallurgy. The partner universities include Curtin University (through the Western Australian School of Mines), Murdoch University and the University of Queensland.

MEP's first collaborative project, the Process Design Project (PDP), is now in its fourth year. The aim of PDP is to give final year extractive metallurgy and chemical engineering students in-depth experiences working in teams to design a mineral processing plant using real, live industry data.

A key component of the PDP project is a week-long introductory workshop conducted at the beginning of second semester and attended by all student participants. The venue for this 'inter-university gathering' alternates between Brisbane and Perth. Commodities dealt with so far are nickel, zinc and alumina. Gold will be the focus in 2011.

The rigorous, face-to-face induction week sets the tone for the semester long project, and allows participants to develop working relationships with members of their 'design' team. The aims of this intensive, workshop are threefold:

1. To immerse students in a sea of technical information about the commodity being considered and the design process in general. The information sessions are provided by a broad group of technical, business and environmental experts provided by industry.
2. To provide a cross-fertilisation of academic expertise and styles across the three universities,

allowing students access to a composite knowledgebase not available to any one university.

3. To establish peer networks, at both the working and social levels and on which students can call throughout the semester-long project and into their later professional careers.

After students return to their home universities, communication between team members is maintained both formally and informally by video-conferencing and web-based communication/document management tools. Strong mentoring support given by lecturers and a dedicated interactive website, allow students real time access to their projects.

The course is intended to act as the quintessential vehicle for students to integrate all the technical content included in their undergraduate education with the ultimate goal of completing a 'mock' design for a commodity-specific processing plant.

Student groups are formed across university boundaries and the assigned 'contract work' is given using actual industry data. The teams must apply their knowledge of mineral processing within limitations of a 'real' ore body, economic, geographic and social parameters and energy and carbon constraints. All participants are given instruction in the use of SysCAD, a software program used in flow sheet design for mass and energy balances and for the development of dynamic modelling of the designs they create.

This is the first time a collaborative course of this nature has been run for minerals education in Australia. Dr Kevin Tuckwell, Executive Director of MTEC said,

"MTEC is proud to support minerals tertiary education courses that are

innovative, collaborative and industry-focused as they produce superior graduates with desirable attributes for the Australian minerals industry and build sustainability into minerals-related university departments."

Of course, with innovation comes challenge. In the case of PDP many of the challenges stemmed from the interface of bureaucratic structures of the three partner universities.

Another challenge was reaching agreement on outcomes criteria and the weighting of various course components to ensure fair and consistent assessment across the three university partners. The PDP now has a marking framework acceptable to all participants which has acted as the 'glue' that allowed collaboration to continue. The PDP outcomes have now been successfully mapped to the Learning and Teaching Academic Standards Project (Australian Learning & Teaching Council).

The Process Design Project has been well accepted by participants and students alike. Mr Bob Hannah, Senior Lecturer at UQ added:

"This highly inventive and challenging course is truly world-class. The innovative learning and communication technologies being utilised along with the intrinsic nature of the role of industry in the development and delivery of the course, we believe, make it unique amongst final year engineering courses in Australia".

Associate Professor Don Ibana, Head of Minerals Engineering and Extractive Metallurgy, WASM, said:

"The course is a great opportunity for students from the three major extractive metallurgy schools across Australia to work together on their capstone course in the final semester



Student participants, staff and industry representatives meet in Perth for a three-way teleconference of project presentations using the Australian Resource Research Centre's conference room at the Centre for Sustainable Resource Processing (CSRP) offices.



Mr Stevan Green, CEO of the Centre for Sustainable Resource Processing CRC makes a SUSOP (Sustainable Operations) presentation to students during the 2009 workshop held at Murdoch University.

of their degree. The experience students will gain in tackling this project, which enjoys a strong industry backing and involvement, will significantly benefit their transition into the workforce".

Aleks Nikoloski, Senior Lecturer at Murdoch University, points to the strong industry support for the program as key to its success.

"The increasing awareness about this course in the industry and the growing support from year to year, is a testimony of the shared interest in the quality of metallurgy education in Australia and the benefits it generates. Achieving this level of industry involvement would not have been possible if each of the three universities was organising a design course independently, given the relatively low numbers of students enrolling in our courses nationally."

Online student surveys and interviews, collected by both MTEC and industry participants, have provided baseline data related to the student experiences of PDP during the initial three years of the program. It is clear that year on year incremental changes to the program have improved student experiences.

In 2010, students identified that actually working on the design project and attending the industry workshop

were the most enjoyable aspects of the program, while time management and communication posed the greatest challenges. Overall, on a scale of one to five, with one being 'terrible' and five being 'extremely rewarding and enjoyable', students rated the PDP experience as 4.29.

Students also rated participation of industry representatives as the most useful part of the workshop. The value of PDP as perceived by industry members is reflected in the number of representatives who have contributed to the program since 2008.

In 2010 alone, at least 13 alumina industry experts contributed a minimum combined total of 100 hours to PDP

When asked to comment on what he perceived to be the value of PDP to industry, Joe Pease said:

"I have only been on the MEP steering committee for 18 months, but I have long been an enthusiastic supporter of the concept. In 2010, Bev Coulter and I (also from Xstrata Technology) were involved in one of the program workshops, and with individual student groups, to coach in a peer review process. Bev and I were highly impressed by the quality of the program and the enthusiasm and quality of the student work. The

technical content was excellent. More importantly, the program requires people to work in groups to develop complex projects with tough deadlines, including interacting with people in different locations and time zones with only occasional face-to-face meetings. This is an ideal preparation for the modern work environment, and is a stark contrast with the individualistic and competitive work style of my university days. From my observation, the students responded impressively to the challenge."

One of the synergistic side effects of the first three years of the program has been the lasting network of young metallurgists formed during the workshop and the on-going cross-university team work. As a transition from university to industry, the Process Design Project appears to have multiple benefits. It is now the intention of the implementation committee to evaluate the value of the PDP to students in this transition, as well as the prescribed course outcomes.

Having successfully met the challenges presented in the initial stages of this program, through the foundations laid down by Diana Drinkwater (program co-ordinator 2008 – 2010) and continued support of industry, PDP has become an institutional part of 4th year metallurgy programs. ■