Educating Managers and Leaders for Sustainable and Socially Responsible Mining in Africa

UCT’s new Master of Philosophy specialising in Sustainable Mineral Resource Development

Dr Jenny Broadhurst, SDIMI 2015
So how did it come about?

Education for Sustainable Development in Africa (ESDA) Initiative

Sustainable Rural Development
- University of Ibadan
- University of Ghana
- Kwame Nkrumah University of Science & Technology
- University of Development Studies

Sustainable Urban Development
- Kenyatta University
- University of Nairobi

Mining & Mineral Resources (MMR)
- University of Cape Town
- University of Zambia

United Nations University Institute for Sustainability and Peace
Prof J-P Franzidis
Emeritus Professor: Minerals to Metals, UCT

Prof Sue Harrison
Centre for Bioprocess Engineering Research, UCT

Prof Harro von Blottnitz
Environmental & Process Systems Engineering Group, UCT

Dr Jenny Broadhurst
Acting Director: Minerals to Metals, UCT

Prof Stephen Simukanga
Vice Chancellor: UNZA

Dr Jewette Masinja
Head: Dept of Metallurgy & Mineral Processing, UNZA
Programme rationale

- Mineral wealth has the potential to serve as a vehicle for significant economic growth, but there are challenges.

- A sustained programme of research and human capacity development is essential in meeting sustainability challenges facing the mining industry.

- Of key importance is the need to generate managers and leaders, who have an understanding of the critical & inter-related issues involved and a sensitivity on how to project such in the context of different stakeholders.
Aims & approach

- Integrate critical and inter-related factors for sustainable development in the context of mining and minerals beneficiation.
- Provide opportunity to experiment with real-life case studies.
- Bring together a diverse cohort of students from across a spectrum of disciplines.
- Review and piloting of existing courses by three master’s students: UCT, UNZA and Kyushu University.
The new Master’s degree programme

Master of Philosophy (MPhil)
specialising in
Sustainable Mineral Resource Development
offered at the
University of Cape Town (UCT)
and the
University of Zambia (UNZA)
<table>
<thead>
<tr>
<th>Course Description</th>
<th>Convening Institute</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Introduction to Sustainable Development</td>
<td>Sustainability Institute, US</td>
<td>16</td>
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<tr>
<td>Strategic Social Engagement Practice</td>
<td>GSB, UCT</td>
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<tr>
<td>Environmental Stewardship in Mining &amp; Minerals Beneficiation</td>
<td>School of Mines, UNZA</td>
<td>12</td>
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<tr>
<td>Research Communication &amp; Methodology</td>
<td>EBE Faculty, UCT</td>
<td>16</td>
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<tr>
<td>Practical Training in SD/Internship</td>
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<tr>
<td>Master’s Dissertation</td>
<td>EBE Faculty, UCT</td>
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1 credit is equivalent to 10 hours, with 1/5 hours as contact time
Introduction to Sustainable Development

- Professor Mark Swilling and Eve Annecke, Sustainability Institute at University of Stellenbosch

- How can the extraction, use and disposal of resources be reorganized to ensure greater levels of social equity, and the long-term survival of the ecosystems that sustain all life?

  “Excellent, dynamic, life-changing, emergent”

  “Made you hang out deeply”
Strategic Social Engagement Practice

- Convened by Corporate Learning Department at the UCT Graduate School of Business
  - Elspeth Donovan, A/Prof Chris Breen, Prof Ralph Hamann & A/Prof Mills Soko, guest lecturers

- How to engage with and manage the relationships between an organization and the communities and other social partners that populate its context?
  - Managing relationships and conflicts; the challenge of collaboration; the practice of dialogue; tensions and innovation (dealing with wicked problems); developing inclusive business models
Environmental Stewardship in Mining & Minerals Beneficiation

- **New course at** **UNZA School of Mines**, Lusaka
  - convened by Dr Jewette Masinja, with guest lectures from UCT

- **Principles, criteria and practices for environmentally conscious development of mineral resources**
  - cradle-to-grave mine design; cleaner production, eco-efficiency; industrial ecology; material stewardship, mine waste impacts & management, carbon neutrality, life cycle analysis, legislation.

- **Mine site visit and case study**
Research Communication & Methodology

- Modified course at the Faculty of Engineering & Built Environment, UCT
  - Professor Sue Harrison, Prof J-P Franzidis, Dr Jenny Broadhurst, guest lecturers

- How to execute meaningful research in a structured way, and report the results?
  - Literature review & writing skills
  - Research philosophy, methodologies & planning
  - Hypothesis development & research communication
  - Synthesis & application of programme learnings
The first student cohort (2014/2015)

- 15 students – 8 at UCT, 7 at UNZA
- 4 chemical engineers, 3 foresters, 2 lawyers, 2 mining engineers, 1 geologist, 1 geographer, 1 economist, 1 social anthropologist
- Represent 3 African countries & Australia
- 8 males, 7 females
- Ages 21 to 51
Research topics

- Community involvement in rehabilitation of degraded mine land
- Performance analysis & decision-making frameworks for mineral value chains
- Life cycle based indicators for eco-efficient processing of PGMs
- Entrepreneurship in communities around the mining & minerals beneficiation
- Measuring the sustainability signature of mining assets by integrating models
- A systemic approach to mining accident causality analysis
- Legal frameworks for encouraging sustainable communities post mining
- Broader implication of deforestation by mining companies
- Downstream uses of mine wastes: opportunities, challenges & implications
- Reconciling different stakeholders: A Zambian case study
- Challenges & opportunities for revenue collection from mining companies
- The effectiveness of EIA protocols and legislation in relation to mining
The second student cohort (2015/2016)

- 18 students- 10 at UCT, 8 at UNZA
- 1 mechanical engineer, 4 mining engineers, 1 civil engineer, 2 chemical engineers, 1 mineral processing engineer, 3 geologists, 1 forester, 1 lawyer, 2 social scientists, 1 psychologist, 1 business analyst
- Represent 4 African countries, Australia and Japan
- Middle to senior management: government, mining houses, consultancies, communities
Towards developing integrative knowledge

The Big Questions

- What were the key take-home messages from the courses and how are they related?

- How can this integrative knowledge be used to develop an understanding of challenges and required responses to selected problems?

Selected Outcomes

- Enhanced self-awareness and personal growth
- Speaking a common language
- Respect for other viewpoints and perspectives
So what did the students learn?

- Understanding the **complexity** and **inter-related** nature of sustainability challenges
- The need for **value-based** leadership and governance
- Creating **shared value** as a business model
- Constructive and inclusive **stakeholder engagement**
- Respect for **nature** (deep ecology)
- Effective **planning & monitoring** – Go slowly upfront
- Adopt **systemic** perspectives and principles
Concluding remarks

 Students:
  ✓ integrated learnings from different courses
  ✓ developed a new appreciation of the complexity of sustainable mineral resource development
  ✓ Recognised the need for value-based leadership and governance

 Academic staff: enhanced engagement with academics from other disciplines and external organisations

 University: new trans-disciplinary research activities and partnerships
Thank you for your attention