Addressing the Gap

Between VET and University Qualifications in the Australian Mining Industry

Outline

• CQU had a plan to develop Associate Degrees in Mining and Geoscience
• From conversation to closing the loop
• Developing assessments TO BRIDGE THE GAP between competency based learning and academic based learning
History of CQU University and VET

- Originally Queensland Institute of Technology (Capricornia) 1967
- University of Central Queensland 1992
- Successful history of delivering external programs to mature age students.
- Intend to become Queensland’s first dual sector university by merging with Central Queensland Institute of TAFE (CQIT)

The Plan: Develop an Associate Degree in Mining Engineering

1. Have a conversation with the mining industry.
2. Develop a position description for the role to be filled.
3. Learning outcomes from the position description.
4. Designing assessments to achieve the desired learning outcomes.
5. Assemble resources and course content that the students can use to complete the assessments.
6. Close the feedback loop with industry.
1. Mining Industry Conversation

- They want them NOW!
- They don’t want specialists.
  - They want coal and metalliferous.
  - They want open cut and underground.
- They want support for their professionals.
  - Scheduling.
  - Project work.
  - Detailed mine design options.
- Experienced, Senior Mining Engineer, in half the time, less time if possible.

2. Position Description

- Review of Seek.com
  - Senior Mining Engineer
    - Technical Excellence, technical mentor, open pit drill and blast experience, design, scheduling and planning, setting up drill and blast systems
    - 7 years + Mining Engineering, 5-10 years operational experience
    - Degree Qualified Mining Engineer
    - UG Mine planning (short to long term), strong short – midterm planning
    - Hard rock
    - Operational and consulting experience
    - Vulcan
  - Senior Geotechnical Engineer
3. Learning Outcomes

• Examples:
  – Describe processes and methods used in mineral exploration and mining.
  – Apply the principles of resource estimation and mine planning.
  – Discuss the social, environmental and economic impacts of mining operations.
  – Describe processes used to extract, separate and concentrate minerals and their application to particular industries and situations.
  – Demonstrate an effective, professional level of teamwork and communication and support collaborative peer group learning.

4. Assessments

• On Line Learning
• Assignments rather than exams
• 12 week term
  – 3 assignments (20%, 35%, 45%)
    • Due Week 3, Week 7, Week 12
  – Compulsory Residential School (Pass/Fail)
    • Week 5 or 6 – Mine site visit
    • Complete assessment before leaving site
  – Compulsory Learning Journal (Pass/Fail)
    • Updated with each assignment
5. Resources

- Course material
- Textbook
- Google
- Library

6. Close the Loop?

- Students come to external study having completed their first qualification (2 – 4 years)
  - Surveyor, Assistant Surveyor
  - Tradesman
  - Operator/Supervisor
  - Other (Teacher, etc.)
- It takes 4 to 6 years to complete a Minerals Industry Associate Degree externally.
- 8 + years on a mine site = senior role.
- Degree graduates spend 1 - 2 years in a graduate program before they can touch anything.
Using Assessment to Close the Gap

• Students from a VET learning framework are familiar with
  – Learning Outcomes
  – Evidence
• External mature age students in the mining industry are familiar with the VET learning framework
• Propose an assessment model that will help to move students from a VET learning framework to an Academic learning framework

Marking

• Compulsory – Have to hand something in.
• Fail – <50%
  – Fails to satisfy some of the basic requirements of the course.
• Pass – 50% to <65%,
  – Satisfies all of the basic learning requirements of the course, such as knowledge of fundamental concepts and performance of basic skills; demonstrates sufficient quality of performance to be considered satisfactory or adequate or competent or capable in relation to the learning outcomes of the course.
• Credit – 65% to <75%
  – Demonstrates ability to use and apply fundamental concepts and skills of the course, going beyond mere replication of content knowledge or skill to show understanding of key ideas, awareness of their relevance, some use of analytical skills, and some originality or insight.
• Distinction – 75% to <85%
  – Demonstrates awareness and understanding of deeper and less obvious aspects of the course, such as the ability to identify and debate critical issues or problems, ability to solve non-routine problems, ability to adapt and apply ideas to new situations, and ability to invent and evaluate new ideas.
• High Distinction – 85% to 100%
  – Demonstrates imagination, originality or flair, based on proficiency in all the learning outcomes of the course; work is interesting or surprisingly exciting, challenging, well read or scholarly.
Assignment Questions

• Marks = Effort
  – Questions should be consistently worth the same amount of effort across the 3 assignments.
  – Assignment 1, 2 questions worth 10 marks each
  – Assignment 2, 2 questions worth 10 marks each, 1 question worth 15 marks
  – Assignment 3, 3 questions worth 10 marks each, 1 question worth 15 marks
  – All questions have to be mapped against the learning outcomes.

Assignment Questions

• Calculation Questions
  – Demonstrate
    • Attention to detail
    • Mathematical ability
    • Understanding of variables
    • Heavily penalise wrong answers
    • Give part marks for correct formulae selection and application of variables
  – Usually get 10/10 or less than 5/10
Assignment Questions

• Essay Questions (Words)
  – 10 marks, 1000 words minimum.
  – Harvard Referencing Style.
  – Regurgitating course notes, 7/10.
  – Well written, concise, new information, properly referenced from a reliable source, correctly addressing the question, 8/10 to 10/10.
  – Lose marks for poor grammar, incorrect spelling, lack of proof reading.

Assignment Questions

• Research Questions
  – Real life examples, EIS, price of gold, coal, other commodities, familiarity with company reports.
  – Different answers can both be right.
  – Very important to identify sources of information and make methods transparent to assessor.
Residential School

- Week 5 or 6 – Mine site visit
- Requirement of the university and professional bodies for external students
- Complete assessment before leaving site
- Opportunity for face to face contact
- Exposure to a different workplace (Surface or Underground)
- Lecturer can direct learning

Learning Journal

- Three components
  - Study Diary
  - Reflection and Evidence of Learning Outcomes
  - Workbook
    - Anything of interest off the internet, links, URL’s, sources of information
    - Communication with peers, supervisors and facilitators, mind-mapping
    - References
- Gives the lecturer/assessor an additional insight into how much work the student has put into the course. Has to be pass/fail to get an honest insight into the students effort.
- Gives the student a framework for undertaking external study and research.
- Focus the student's learning through the learning outcomes.
- This is the most useful assessment tool because it enhances all of the other types of assessment.
Conclusion

• Learning journals are an excellent tool for enhancing other forms of assessment.
• When students understand the purpose of the assessment is to demonstrate their ability in terms of the learning outcomes they will do better.
• Assessment can be used to help students transition from a VET learning framework to an Academic learning framework.