Learning and Teaching Investment Fund 2010

Final Project Report

Title: Customisation of Associate Degree Programs

Strategic Objective: Dual sector advantage

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1 Acronyms

AD – Associate Degree
AD002 – Associate Degree in Engineering Technology (Mechanical)
AD005 – Associate Degree in Engineering Technology (Electrical/Electronics)
AD008 – Associate Degree in Engineering Technology (Network)
AD009 – Associate Degree in Engineering Technology (Civil)
CAD – Computer Aided Design
CATIA - Computer Aided Three-dimensional Interactive Application
EA – Engineers Australia
HE – Higher Education
IAC – Industry Advisory Committee
SAMME – School of Aerospace, Mechanical and Manufacturing Engineering
SECE – School of Electrical and Computer Engineering
SCECE – School of Civil, Environmental and Chemical Engineering
SOET – School of Engineering (TAFE)
2 Executive Summary

This report has been commissioned by the Head of School and Divisional Manager - Higher Level Programs of the School of Engineering (TAFE), College of Science, Engineering & Health at RMIT University to explore and document articulation issues arising from discussions held whilst developing a series of Engineering Projects to be embedded into Associate Degree programs run by the School in Semester 2, 2010.

Bachelor students articulating from Associate Degree were interviewed and articulation issues were identified. This final report outlines the challenges and any potential solutions identified from all perspectives to encourage a more seamless transition for RMIT Engineering students and improve articulation to Higher Education. Skill sets for each discipline was also identified in consultation with Higher Education Colleagues and external stakeholders (Industry Advisory Committee) in order to meet Higher Education requirements for articulation and also to meet the requirements of Engineers Australia.

All Associate degree Programs now include Engineering Project based on recommendation of Engineers Australia. The Engineering Project provides final year Associate Degree students with the opportunity to demonstrate and apply their learning whilst developing managerial skills relevant to industry and future employment, such as communication and project management skills – as well as preparing them for the challenges and experiences of Higher Education. This latter point particularly illustrates the reason for preparing this report.
3 Project Outcomes

Bachelor Degree students articulating from Associate Degree were interviewed and articulation issues were identified and action plan proposed as listed below:

- After having discussions with Mechanical Students in Bachelor program it was analysed that CATIA (Design Software) should be taught to Associate Degree students as CATIA knowledge is required in Bachelor Degree in Mechanical Engineering program. Academics from higher education also verified that CATIA should be taught to the students of Associate Degree in Engineering Technology - Mechanical (AD002) program and SOET has started teaching CATIA in the AD002 Program.

- It was identified that students of Associate Degree in Engineering Technology - Civil (AD009) need Auto CAD knowledge for the second semester courses. It was agreed by Academics of HE & TAFE schools and Industry Advisory Committee members that Auto CAD is the package which is used in the Civil Industry most commonly. Hence Computer Application course will include Auto CAD to provide adequate Auto CAD knowledge to students that will certainly assist them in further study and employment. Similar need was identified for Associate Degree in Engineering Technology - Electrical Students (AD005) and AutoCAD is taught to them from Semester 1, 2011.

- While implementing Engineering Project for Associate Degree Electrical (AD005) Students the need for them to have knowledge of Automation concept was identified. Based on this demand this semester Automation concept is shifted to first semester for the second year students. Hence they will be equipped with the knowledge of Automation concept before they can move on to Engineering Project.

- MATLAB is now taught to all Associate Degree in Engineering Technology students studying MATHS 2. Need for MATLAB was strongly felt by the Bachelor Degree students who articulated from the Associated Degree. Academics from School of Mathematical and Geospatial Sciences fully agreed with delivery of MATLAB to the Associate Degree programs to enhance success of students in the further Mathematics related studies in the Bachelor Degree programs.

- As a vocational outcome of Associate Degree in Engineering Technology programs, it was also required by Engineers Australia, all Associate Degree programs now include the course “Engineering Project” which provides an integrative engineering experience in the form of a capstone student project. The structure and assessment of the course is common across all of the Associate Degrees, however the subject matter of the student projects varies according to the discipline area of the Associate Degree. To facilitate articulation Engineering Project is designed and developed in collaboration with Higher Education Schools. Guest speakers from relevant industry were invited to give insight to current Industrial Scenario. Student mentors were provided to students. In addition to industry speakers, in recognition of the large numbers of articulating students, academics from the HE Schools have been invited to present lectures to the various streams.
All these initiatives are expected to improve student satisfaction and smoother transition of Associate Degree students into the relevant Bachelor Degree programs.

4 Project Description and Rationale

Divisional Manager/Project Leader (Arvind Sharma) had established a working team comprising an external consultant and key TAFE and Higher Education stakeholders, such as Roy Ferguson, (Deputy Head, Learning and Teaching, SECE), Tom Steiner (Deputy Head, Learning and Teaching, SAMME) and Nira Jayasuriya (Senior Lecturer, SCECE), for the purpose of working cooperatively with Higher Education to identify challenges and skill set gaps with students articulated from Associate Degree programs in order to design more seamless transition with future programs.

This report has involved a series of meetings and discussions with Head of Schools and key nominated representative stakeholders from both TAFE and Higher Education (some in parallel with another project involving the design and delivery of Engineering Projects into Associate Degree programs for Semester 2, 2010) as below:

- Initial Meeting held in April with Professor Mark Shortis (Associate Dean, Program Quality in the Academic Development Group of the College of Science, Engineering and Health) and Roy Ferguson to discuss the project and gain advice on content issues as well as relevant stakeholders for liaison. They provided (and continue to provide) information, contacts and ongoing review and support from their own and other sources,

- During May, a number of meetings and discussions held regarding preparation of the Associate Degree Engineering Projects for Semester 2 enabled articulation issues to be discussed with Higher Education academics such as Dr. Dean Cvetkovic, Lecturer in SECE, who provided invaluable insights and advice on his experience with the Higher Education student cohort in terms of learning and reaching practice for teachers as well as interpersonal challenges for students required when completing the more open-ended independent learning projects.

- Other meetings and discussions held to date have also been very informative with regards to the technical challenges involved. For example, a meeting with Mohammad Nawaz, Senior Lecturer in Aerospace, Mechanical and Manufacturing Eng, and Selection Officer for Bachelor Degree (Mechanical) outlined technical issues concerning subject matter and materials that were very useful for the Articulation Issue report from that perspective.

- During final signoff meetings and discussions for the Associate Degree Engineering Projects with Higher Education Heads of Schools in June, issues around technical as well as learning aspects of the transition process were able to be tabled, for example the relevant use of PebblePad across both sectors was raised by Professor Ian Burnett, Head of School, SECE and Peter Ryan, Head of School, Engineering TAFE.

- A joint committee of academics of SAMME and SOET has been established to discuss articulation issues and propose actions to facilitate smooth articulation from TAFE to HE.
Customisation of Associate Degree Programs

- Students in the Bachelor program that articulated from the Associate Degree program were consulted about Articulation issues as listed below:

  o Mechanical and Automotive students were interviewed and the following articulation issues were raised by the students:
    
    In general students wanted the MATLAB knowledge to be increased. The need to have more assignment in Associate Degree was felt by the students. There is too much emphasis on Exam. Students felt that Assignments should be given throughout the semester. Students are kept busy throughout in HE whereas in Associate Degree students study only during Exam. Students wanted more CATIA knowledge. On brighter side students were happy with Engineering Management course which is offered in Associate Degree first year. In HE students are doing Professional Practice instead of Engineering Management. Students felt that Engineering Management is much better compared to Professional Practice and it puts them in an advantageous position.

  o Aerospace students were interviewed and the following articulation issues were raised by the students:
    
    Students of Aerospace Stream of Associate Degree in Engineering Technology - Mechanical (AD002) were interviewed in Bundoora. Aero students also felt that More CATIA exposure is needed in Associate Degree to make them ready for HE. At present students are using Solid works which is not used in HE. CATIA is the current industry trend for Aero students. MATLAB was another issue with Aero students. Like Mechanical students they also wanted to have more exposure to MATLAB.

  o Electrical and Electronics students were interviewed and the following articulation issues were raised by the students:
    
    Electrical/ Electronics students were called for discussion in city campus. During discussion about articulation issues the points which came up was MATLAB. MATLAB is the most common program used in HE. In Associate Degree Programs MATLAB is not used instead MAPLE was used, which again is not used in Higher Education.

    Maths 3 knowledge will be very useful for Electrical students. It is a elective course at present for AD005 students. Students wanted to make it compulsory. Microcontroller should be core course for Electrical/Electronic students. Microcontroller knowledge is needed in Associate Degree.

    In Network fundamentals class Associate Degree students use real routers that students would need to use in real workplace. In HE school real routers are not used instead a software called BOSON netsim which creates virtual routers. It will be good if students are given touching on BOSON netsim within network
fundamental course. Emphasis was also given by students to give more C++ programming training.

A large number of students felt that Higher Education courses have heavier loads and more challenging course content.

• Articulation Issues Identified

The articulation issues have been documented for consideration with the purpose of increasing the opportunities for TAFE to work collaboratively with Higher Education in identifying challenges and skill set gaps for students articulating from Associate Degree programs in order to design more seamless transition with future programs.

Articulation issues are discussed in general, followed by a description of the issues surrounding generic skills and technical issues for consideration.

  o Articulation in general

Most of the students who enter Associate Degree have articulation in their mind. Students decide to articulate due to better job prospects. Few students articulate due to their love and passion for the course. Some students articulate as they believe Bachelors Degree will fetch them well paying jobs. In RMIT Associate Degree students articulate into the relevant Bachelor Degree Programs with advanced standing of equivalent of 2 years as detailed below:

AD002 Associate Degree in Engineering Technology (Mechanical) graduates articulate to:
BP067 Bachelor of Engineering (Automotive)
BP066 Bachelor of Engineering (Mechanical Engineering)
BP069 Bachelor of Engineering (Aerospace)

AD005 Associate Degree in Engineering Technology (Electrical/Electronics) graduates articulate to:
BP261 Bachelor of Engineering (Electrical Engineering)
BP262 Bachelor of Engineering (Electrical/Electronics Engineering)
BP264 Bachelor of Engineering (Electronics and Communication)

AD008 Associate Degree in Engineering Technology (Network) graduates articulate to:
BP263 Bachelor of Engineering (Computer/Network Engineering)

AD009 Associate Degree in Engineering Technology (Civil) graduates articulate to:
BP198 Bachelor of Engineering (Civil and Infrastructure)
During discussions, it was noted that students transitioning from the TAFE to Higher Education programs were often lacking in generic skills related to the workplace and industry environments, such as:

- Time and priority management
- Independent working skills
- Teamwork skills
- Professional behaviour and standards

Whilst it is acknowledged that the development of technical skills is paramount in moving through from the TAFE sector programs to Higher Education, there were a number of areas that were deemed relevant for particular emphasis where possible:

- Mathematics – identified as a gap that is consistently a challenge with TAFE students entering Higher Education
- Use of industry relevant equipment
- Use of workplace safety policies and procedures

5 Project Outcomes and Impacts

Bachelor Degree students articulating from Associate Degree were interviewed and articulation issues were identified and action plan proposed as listed below:

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All these initiatives are expected to improve student satisfaction and smoother transition of Associate Degree students into the relevant Bachelor Degree programs.

6 Dissemination Strategies and Output

There are no planned dissemination strategies at this moment. However we would be willing to discuss and share the inputs and outputs of this project should it be deemed necessary and valuable to stakeholders.

7 Linkages

We are not aware of any direct linkages between this project and other projects within RMIT.
8 Evaluation of Project Outcome

This document has outlined many of the current challenges and potential solutions identified from all perspectives to encourage a more seamless transition for RMIT Engineering students and improve articulation to Higher Education and skill sets for employability, as well as skill sets for each discipline in consultation with external stakeholders (IAC) in order to redefine the capabilities to meet Higher Education requirements for articulation and also to meet the requirements of Engineers Australia.

In order that this practice be maintained for continuous improvement purposes, this report recommends that a continuous consultation and feedback loop process be established that will involve ongoing meetings between key nominated TAFE and Higher Education stakeholders, teachers and also students where relevant in order that all perspectives are taken into account in the future for successful transition.

9 References

N/A