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Bridging the Industry/Education Nexus; A flexible and efficient approach to providing key research and development skills in industry growth areas

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Bridging the Industry/Education Nexus: A Flexible and Efficient Approach to Providing Key Research and Development Skills in Industry Growth Areas

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Abstract: How can universities continually produce graduates that have current and relevant skills? Is the answer to keep writing new units and courses that keep up with rapidly changing industry requirements? Or, is it possible to collaborate with other universities and industry to provide targeted skills (both research and development) that satisfy industry growth areas? New approaches are needed to help cope with the effects of globalisation, cultural diversity and innovative technology. This paper outlines a flexible Masters degree course developed with a view of helping industry gain required skills, while at the same provide students with opportunities for employment in new growth areas.

Introduction
Universities all around the world are struggling to keep up with rapid changes in technology and demands from both Government and industry, at a time that funding and resources for higher education are continually diminishing. Within this setting, students are paying more for education and demanding better service, as well as an expectation of employment. So, how can these competing expectations be satisfied? Keep producing new and innovation online and face-to-face courses? Maybe? Though, unless student numbers are available to fill new courses, this becomes a financial risk, and much effort can be wasted in trying to start new courses.

However, is it necessary to keep producing new units and courses to satisfy perceived industry growth areas? Why not try and collaborate with other universities and promote student mobility? This paper outlines a strategy for the development of the “Master of Innovative Technology” that leverages from key skills and expertise sourced from other collaborating universities with a view of promoting student mobility and inter-cultural awareness. Key discipline skills will be combined with research skills to help provide teams of students that will develop project/thesis solutions in industry growth areas. The new course rationale is to develop a Master degree program that promotes national and international mobility, inter-cultural awareness, and innovative research solutions that meet the needs of globally oriented industry and research areas.

The Need for New Skills
European Union /Australia Cooperation in Higher Education aims to promote understanding between the peoples of the European Union and Australia by improving knowledge of languages, cultures and institutions. Since the Joint Declaration of 1997, EU/Australian relations have developed steadily and continue to grow closer, resulting in the establishment of mutual links across the whole spectrum of relations. These include information exchange and collaboration across communication studies, culture, staff/student exchanges, recognition of academic qualifications, and new educational technologies. The European Union and Australia initiated a pilot phase of projects on cooperation in higher education starting in 2002, and continuing in 2003 and 2004 (Directorate-General for Education and Culture, 2005). The EU and Australia have launched a fourth joint call (2005) for proposals, for multi-lateral projects with the potential to serve as a model for future substantive and long-lasting structural EU/Australian cooperation in higher education.

Globalization helps provide unique solutions for this project, as our ability to share information and collaborate with new communication protocols helps break down national barriers, and differences between cultures. This has been promoted through the uptake of broadband connectivity around the world, and the use of cheap and effective communication tools such as video conferencing, email, bulletin boards, listservs, streaming video and voice over IP. At the same time, there has been global growth in new hardware and software technology, with new industries requiring new skills that are often difficult to find.
This trend has been recognized and documented by Career Space (http://www.career-space.com). With the support of the European Commission, a consortium of nine major ICT companies, (BT, Cisco Systems, IBM Europe, Intel, Microsoft Europe, Nokia, Philips Semiconductors, Sie mens AG, Thales), and EICTA, the European Information, Communications and Consumer Electronics Industry Technology Association, has been exploring new ways of addressing this skills shortage. A project was set up, co-ordinated by International Co-operation Europe Ltd., to put in place a clear framework for students, education institutions and governments that describes the roles, skills and competencies required by the ICT industry in Europe. Their promotional logo is: “ICT is all around us and ?the future prosperity of the EU depends on ICT.? Some of the best jobs can be found in this sector ?and the European industry relies on ICT due to the increasing integration of Software, Services, Devices and Infrastructure.”

Career Space stresses the importance of ICT expertise in Europe, which include skills in the technical area (telecommunications, software development and product design/development), artistic and design, marketing, communications and business. They promote that these people need to also have generic skills attributes such as good communications skills and teamwork skills.

As well as providing new opportunities for students and industry, higher education institutions also are compelled to collaborate with international partners to help gain advantage in a highly competitive market! Joining forces through collaborative ventures can be an effective way for universities to gain market share. Many joint ventures, including Universitas 21, (16 international universities) have been successful in attracting international students and promoting their courses in an global area. The new course will allow industry to negotiate requirements in high demand developing areas, that are then negotiated with students through a learning agreement, with a view to develop relevant skills as well as innovative solutions for industry. With this backdrop, program promotion will include:

- Industry contacts and employment opportunities in new innovative areas
- Innovation and entrepreneurship by mixing multidisciplinary skills
- International and multi-cultural skills, with a focus on teamwork to promote creativity and innovation
- Providing solutions for industry needs through structured research, development and evaluation methodologies

This new course will give students the opportunity to access experts at a time where employment requirements/skills are constantly changing. Specialist themes will include areas such as mobile learning, game design, 3D and E-broadcasting. These, and many others are rapidly evolving and changing areas with high demand and growth. Being able to access industry requirements for research and development in growth areas, as well international experts from around the world will help make this a valuable course to graduates. Also, students will be encouraged to form teams. In summary, demand for this course would be driven by: providing students with the ability to:

- Develop customized skills through a learning agreement (negotiated with the course coordinator) that suits the student aspirations as well as industry growth areas
- Access key areas of academic specialty from different faculties and universities from around the world
- Access cheaper tuition fees in some countries
- Develop inter-cultural skills through a program that promotes graduate mobility

Success Criteria
The European University Association (EUA) is a representative organization of universities and national rectors’ conferences in 45 countries across Europe. They produced a report (European University Association, 2004) on the experiences of over 100 of their member universities of the practical experiences and lessons learnt from running joint Master degree programs. Encouragement, mixed with cautious advice if offered as follows:

1. Know why you are setting up the programme
2. Choose your partners carefully
3. Develop well-defined programme goals and student-learning outcomes with your network partners
4. Make sure that all the institutions (and not just academic colleagues) fully support the goals and objectives of the programme
5. Ensure that sufficient academic and administrative staff resources are involved in the programme
6. Ensure that a sustainable funding strategy for the programme is in place
7. Take care that information about the programme is easily accessible to students
8. Organise and plan sufficient meetings in advance
9. Develop language policy and encourage local language learning
10. Decide who is responsible for what
Another list of success criteria was compiled by Chan (2004), based on suggestions by Prichard (1996), van Ginkel (1998), and de Wit (1998):

1. **Mission and objectives.** Goals should be realisable and appropriate to the level of development of the partner institutions, and formulation of clear objectives for the short to long term is essential. There should also be a clear sense of partnership, a commitment to the same goals, and advantageous returns to all members;

2. **Partners.** Partners should be selected in accordance with the mission and objectives of the network. Cultural and other differences between partners should be acknowledged. Competence is also as important as commonality because cooperation makes sense only when in addition to similarities, differences in expertise are used. Last but not least, the number of partners should be kept at a manageable level. Networks sometimes are too large to be able to represent the interests of all members;

3. **People.** Many networks fail because of the lack of commitment and continuity of support. Therefore, it is important to identify “project champions” who have the relevant expertise and who support the project. Picking winners is also important as many projects are created by brainstorming and are adopted at leadership meetings before they are well thought out;

4. **Projects.** As it is unrealistic that a network involves the entire institution, networks trying to satisfy too many customers may end up in failure and disillusionment. Leaders should recognise potential discrepancies between partnership needs and those at the decentralised level and accept the fact that departments, centres, and schools will have their own networks. However, an institutional network will also fail if it does not have sufficient interest at the decentralised level;

5. **Time and resources.** Investments in both time and money are necessary to realise a project. For instance, time and energy are needed before the network objectives and goals can be made known, accepted, and worked out within and among partner institutions. On the other hand, many networks are formed to take advantage of short-term opportunities and run out of steam as soon as the resources disappear. It is also important to control the cost of the network organisation, which should not become the main drive for maintaining the network; and

6. **Communication.** Networks are advised to involve key players and set up a listserver to keep as many participants in frequent contact as possible. Given that most institutional networks are leadership driven, this is a crucial factor for the success or failure of the network.

These lists emphasise many similar points, and have been developed from the experience (both success and failure) of many institutions over the past few years. Based on this information, the following list (Table 1) has been developed to assist with the planning of this new course.

### Table 1: Global and Local Issues

<table>
<thead>
<tr>
<th>Global Project Commitments</th>
<th>Partner Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission and Objectives</td>
<td>Why is the course appropriate for this institution? What value does it add to the institution/faculty/school?</td>
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<tr>
<td>Course Structure &amp; Principles</td>
<td>Institutional support for the program? MOU signed?</td>
</tr>
<tr>
<td>Course Delivery methods &amp; QA</td>
<td>Sustainable funding and resources available?</td>
</tr>
<tr>
<td>Professional and Strategic</td>
<td>Responsibilities defined and commitment given for?</td>
</tr>
<tr>
<td>Alignment</td>
<td>Learning outcomes</td>
</tr>
<tr>
<td>Overall Marketing strategy</td>
<td>Delivery methods &amp; QA</td>
</tr>
<tr>
<td>Communication mechanism for collaborating universities</td>
<td>Communication mechanism for collaboration between universities</td>
</tr>
<tr>
<td></td>
<td>Marketing strategy</td>
</tr>
<tr>
<td>Program information availability (course information, accommodation, type of award, delivery systems etc)</td>
<td></td>
</tr>
</tbody>
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<table>
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<tr>
<th>Academics developing new research networks</th>
<th>Collaboration with international universities and industry growth areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhancing teaching, learning and research opportunities</td>
<td>Up-to-date research into the conception and application of delivery strategies using a customised LMS and online teaching strategy</td>
</tr>
<tr>
<td>Engaging with the professions and</td>
<td>Focus on team building and collaborative learning</td>
</tr>
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<td></td>
<td>Industry attachments</td>
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<td></td>
<td>Use of adjunct staff from the in</td>
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</table>

8. **Academics.** The methods and approaches of the network should be developed to provide an opportunity for academics to develop and apply new teaching and research techniques.
Mission, Objectives and Course Principles

The mission of the new master degree program will be to: “Provide a program that promotes new skills, mobility, inter-cultural awareness, teamwork, and innovative solutions in industry growth areas.” The specific objectives will be to develop:

• Key skills in a disciplinary area/theme of their choice (Media, Information Technology, Engineering or Business)
• Key skills in research design, teamwork with multi-cultural collaboration, creative thinking and project management and evaluation,
• An understanding of new opportunities that are now being afforded through globalisation
• Skills in communicating and collaborating with students from other cultures, as a result of travelling to other countries, discussing issues online, and where possible working collaboratively together on international projects.

The program will be driven by industry/commercial projects that require innovative solutions. These will be developed using a structured research methodology and, where possible, multidisciplinary student teams. The course will not only benefit students, but also academics and contributing institutions as shown in Table 2.

Table 2: Institutional Advantages

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Distinguishing features and underlying philosophy of this course include:

• Allowing students to negotiate a customised course targeting industry growth areas, as well as supporting their strengths and interests
• Tied to research and development and focused on industry growth areas
• Key skills negotiated with students through a learning contract (elective stream)
• Collaboration and cooperation with other universities promoted by using experts and existing courses from other suitable local, national or international universities
• Student and staff mobility promoted with collaborating universities
• Multi-disciplinary approach to research and development promoted through the thesis project
• Globalisation and multi-cultural issues promoted in core units

Course Structure & Themes

The program aims to integrate four themes with the view of producing graduates that will benefit from multidisciplinary research projects to produce new innovative products for industry (Figure 1). Attempts will be made to source projects that provide tangible, commercial benefits in the following areas:

1 New Media, Communications and E-learning
2 Software Development
3 Hardware Development
4 Business Solutions & Entrepreneurship

Half of the course will be based on electives, and the other half will comprise of core units and thesis/project work (Tables 3 & 4). Part of the course requirements will require all students actively participate on a bulletin board to discuss collaboration opportunities for projects of interest posted by the supervisors. A consortium of international universities will provide expertise and source innovative projects that are current in their country.
The Globalisation, Cultural Diversity and Innovation unit will consider how communication technologies have had a profound effect on global communications, business, technology, innovation, and leisure choices. It will explore the resultant change in global communications and cultural convergence with a view of raising awareness of how these can be used to help promote innovation in society and industry. Evolving media, technological, political and economic factors will be discussed that impact on globalisation, as well as the social, cultural and historical factors that mediate the interpretation of emergent international trends.

This unit, along with two research method units and the Masters Project makes the core of the course. The rest of the course (50%) is negotiated through with a learning agreement used to help the student decide on suitable electives and project combinations (Figure 2). Students will be required to select electives that provide expertise to their chosen discipline. Electives can be chosen from their own School, other local, interstate, or international collaborating universities.

Figure 1: Themes

Research, Innovation, Employability

Table 3: Course Structure

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Table 4: Credits Figure

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Learning Agreement
Conclusion

At a time when higher education institutions are experiencing diminishing resources, along with the effects of globalisation and innovative technologies, which are creating new opportunities that require new models of course delivery, we need to consider new models of course delivery. The course outlined above attempts to bridge the industry/education nexus by identifying industry growth areas, and customising each course by allowing students to negotiate 50% of the units from any university with a view of promoting mobility, inter-cultural awareness and globalisation. This concept of course delivery not only helps service industry requirements quickly, but also provides levels of cost saving within participating universities, as they don’t have to build new units for perceived growth areas, but rather encourage students to take required units at “expert” universities at other locations.

Current participating universities will have a web site ready to promote this course by end of semester 1, 2006 showing industry projects, employers, participating universities with available elective streams and a bulletin board to allow students, academics and industry to discuss requirements. In semester 2, 2006 data will be collected from both potential students and employers to survey their perceptions and views of this new concept as compared to traditional education.

One thing this paper does not discuss, are the differences in legislation and regulations between the participating countries, including problems related to accreditation. This will be the subject for further investigations and papers.

Bibliography