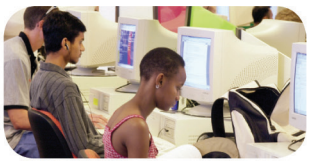
Queensland University of Technology

AUSTRALIAN LEARNING & TEACHING COUNCIL



FYE

KIFT ALTC SENIOR FELLOWSHIP: ARTICULATING A TRANSITION PEDAGOGY

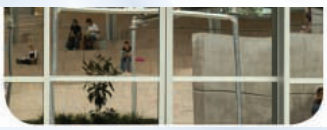
Commentary on first year curriculum case studies: Double degrees perspective

Bruce Moulton

Author:

Dr Bruce Moulton heads a double degrees program in the Faculty of Engineering, University of Technology Sydney. The program is responsible for 448 students enrolled in the following double degrees: *BE-BBus, BE-BA, BE-BSci, BE-BMedSci and BE-BBiotech.*






December 2008

Author

01. Dr Bruce Moulton heads a double degrees program in the Faculty of Engineering, University of Technology Sydney. The program is responsible for 448 students enrolled in the following double degrees: *BE-BBus, BE-BA, BE-BSci, BE-BMedSci and BE-BBiotech.*

The First year curriculum perspective

Introduction and disambiguation

02. The following comments summarise my attempt to consider the seven case studies 'from a double degrees perspective'. To help explain where I'm coming from, I begin by stating that I think a distinguishing and key feature of a double degree is that it involves (or gives the impression of involving) multi-, inter-, trans-, or cross- disciplinarity. Very briefly, I differentiate each of these from the others as follows:[1]

03. *Multidisciplinarity* is taken here to mean studying something in several disciplines at the same time. An example of a multidisciplinary approach is when practitioners work side by side to solve a problem. For example, a multidisciplinary team that designs a control system might include engineers, psychologists and mathematicians.

> ... a distinguishing and key feature of a double degree is that it involves (or gives the impression of involving) multi-, inter-, trans-, or cross-disciplinarity.

04. *Interdisciplinarity* here refers to transfer of methods from one discipline to another. An interdisciplinary approach might be taken, for example, by a team that transfers principles of evolutionary biology to software engineering.

05. *Transdisciplinarity* is not used again here. The word causes problems! I understand it as some sort of *extension* of knowledge arising from *one* or more disciplines. Think 'transcendent'.

06. *Cross disciplinarity* is used here as a catch all term to encompass any of the above, or loosely refer to the study of things which belong to more than one discipline.

07. I think of a double degree as a particular type of *cross disciplinary* educational program model. *Double degree* is taken here as referring to the first model in **Table 1**, that is, two undergraduate degrees studied simultaneously through two faculties or disciplines of one institution.

Table 1: Summary of some commonly known cross disciplinary educational models

Model	Label
Two undergraduate degrees studied simultaneously through two faculties of one institution	Combined Degree (Aus), Concurrent Education (Aus), Conjoint Degree (NZ), Double Degree (Aus), Dual Degree (Aus, USA), Joint Degree (UK, USA)
Two degrees studied simultaneously at two different institutions	3:2 Program (USA), Coordinated Degree (USA), Double Degree (Aus), Dual Degree (UK), Joint Degree (Aus)
Two degrees studied consecutively at one institution (e.g. UMelb 3+2 model)	Articulated Degree (Aus) Integrated Degree (Aus)
Two degrees studied consecutively at two institutions in two different countries	Consecutive Degree (Coimbra Group), Dual Degree (UK), Joint Degree (Aus)
One degree offered by two faculties of one institution	Joint Degree (Aus)

1 *Multi-* and *inter-* disciplinarity are treated similarly in Nicolescu, 2002.

The case studies

Arts and Social Sciences (Explorations) Case Study (Marchbank and Fee, Simon Fraser University)

08. This case study indicates that the *Explorations in Arts and Social Sciences* program explores issues using knowledge from more than one discipline:

> *The program, which opened in 2005, explores a wide range of ideas and issues through interdisciplinary [programs] … Interdisciplinarity, within* Explorations*, means that knowledge and research from more than one discipline is used to understand a particular issue or topic. For example,* EXPL130 *combines approaches from geography, sociology, and economics.* EXPL120 *combines approaches from literature, the creative arts, and cultural studies.*

09. An emphasis on a variety of disciplinary approaches is also apparent in the stated objectives of the program, which aim to 'create a truly interdisciplinary program covering both arts and social sciences'.

10. Regarding the program design, the case study indicates:

> *Interdisciplinarity is the key to the content of each subject and also to its delivery. There is also diversity in teaching practices, including team teaching.*

11. Thus, it seems the program employs members of staff from a number of different disciplines (though I may have misunderstood this), and that the program emphasises multidisciplinarity (that is, a process where an issue is considered by a team of people where each person specialises in a different discipline). For example:

> *The program is designed to be coordinated across subjects delivered in the same semester and to be complementary in terms of knowledge and issues considered (*EXPL110 *explores family, society, governance through social science approaches and material, while* EXPL120 *takes the same and related themes and shows how these have been expressed and explored in the Arts).*

12. I think arrangements such as this may be very interesting from a double degrees perspective. Double degrees sometimes lack synthesis (of the two degrees). To illustrate, a recent Australian Council of Engineering Deans Review observed (in relation to double degrees (King, 2008, p. 81) 'the undergraduate programs in the two disciplines have tended to remain completely separate'. Students and employers might understandably assume double degrees curricula would include coverage at the interface of the two degrees. For example, it might be expected that a program such as *BE-BMedSci* would enable graduate attributes in the area of biomedical engineering. However, in reality, the program may simply include 'standard' engineering *alongside* 'standard' medical science. If so, the double degree may be ineffective in achieving the desired level of cross disciplinarity.

13. This case study provides an example of a program where an issue is considered first in light of one discipline, and then later in light of another discipline. I think this approach may be an important step in developing students' cross disciplinary understandings. If so, I think the approach might be well suited for the first year(s) of a double degree.

Applied Sciences (TechOne) Case Study (Fee and McCracken, Simon Fraser University)

14. *TechOne* is described as a program for students ranging from engineering science to creative arts. The core subjects of *TechOne* are stated to be 'interdisciplinary':

> *The core subjects are interdisciplinary and represent critical concepts in applied science theory and practice: design, technology, spatial thinking and collaboration.*

15. According to the case study, the *TechOne* program includes 'team projects', where:

> *… working in interdisciplinary teams, students build real world skills while learning to communicate, think critically and collaborate.*

16. *Design* seems to be a key feature of the program:

> *The final project for this subject (*Spatial Thinking and Communicating*) is the team development of an automated toy. After designing their toy on paper, students use 3D modeling software to visualise how gears, cams and cogs might fit together to animate their design. Then they build the toy, creatively assembling wood, plastic and metal in a working prototype. Students are allowed to use any materials they can find. By making an actual toy, students can physically turn the crank and see where their model breaks down. Usually devices don't behave as expected at first. The hands-on experience teaches countless valuable lessons in mechanics and the industrial design process.*

17. It occurs to me that this may be an example of good practice from a double degrees perspective. Firstly, the learning activity seems to involve students from different disciplines working together in multidisciplinary teams. Secondly, I think that '*good design*' is ordinarily a cross disciplinary activity. For example, the design of something will impact not only on the thing's cost and functionality, but may also impact on areas such as health, education, ecology, government or law. Thus, it could be argued that good design requires knowledge across, not only the disciplines of engineering and management, but also the disciplines of health, education, economics, psychology, and law.

18. I imagine that such learning activities would be quite expensive to run, but the learning activity nevertheless seems to me potentially applicable for the needs of double degrees that place an emphasis on design.

Education Case Study (Healy, Queensland University of Technology)

19. Looking at this example of first year curriculum design from a double degrees perspective, the following thoughts occur to me.

20. Firstly, the program emphasises a curriculum design that *accommodates diversity*. This issue is relevant to double degrees, in the basic sense that students of double degrees come from diverse disciplines.

21. Secondly, the program seeks to introduce students to 'multiple lenses on learning, teaching and diversity'. I interpret this as indicating cross disciplinarity.

22. Thirdly, the program seeks to provide 'a relevant curriculum that links to vocational aspirations'. From a double degrees perspective, this again touches on the issue of 'overlap' of the two degrees. Let us return to the earlier example of the *BE-BMedSci* that is thought to enable graduate attributes in the area of biomedical engineering. It is possible that many students of such a program hope to pursue careers as biomedical engineers. But if the program is basically two programs, one being 'standard' engineering, and the other being 'standard' medical science, there may be a problem — the double degree may be poorly suited to students' vocational aspirations. If so, the problem may perhaps be overcome by attempting to better link the program to students' vocational aspirations — the case study describes an approach by which such linking may be achieved.

23. Finally, the program seeks to assist students' transition from their previous educational experience to the 'nature of learning' in their discipline. Ordinarily this is understood in a context such as a transition from high school to university. But it occurs to me that double degree students make some sort of transition (be it cultural or 'nature of learning' or whatever) each time they undertake a learning activity from one degree to the other.

Writing and Communication (Bilby) Case Study (Radbourne and LeRossignol, Deakin University)

24. The Bilby case study relates to the online environment of a subject intended to develop professional writing skills. The

subject is described as 'multidisciplinary responding to student enrolment across faculties and campuses'.

25. I would imagine that professional writing skills are similarly essential for students of both double and single degrees. However, certain aspects of the case study are perhaps particularly relevant for students of double degrees. Three that occur to me are:

- critical reading
- writing in a style that is appropriate to audience and purpose
- working collaboratively.

26. It seems to me likely that students of double degrees (as compared to students of single degrees) would be required to write in a greater number of various styles according to the reader and purpose (at least while those students are at university). In particular, double degree students might need to pay particular attention to issues such as appropriate use of jargon, professional writing styles, and assumed knowledge.

27. Another thought — the case study emphasises a process by which learning activities are mapped to graduate attributes. I think it would be useful to employ such processes to a greater extent in the development and renewal of double degrees curricula.

... the case study emphasises a process by which learning activities are mapped to graduate attributes ... it would be useful to employ such processes to a greater extent in the development and renewal of double degrees curricula.

Information Technology Case Study (Nelson, Queensland University of Technology)

28. The Queensland University of Technology (QUT) *Bachelor of Corporate Systems Management* (*BCSM*) includes subjects delivered by the Faculty of Information Technology (IT) and the Faculty of Business. The program seems to me to fit a cross disciplinary model that might be characterised as a 'joint degree' (the model set out in the last row of Table 1), except that the program core seems predominantly IT (16 subjects offered by the Faculty of IT whereas only three subjects are offered by the Faculty of Business).

29. The case study indicates that double degree pathways were considered in the development of the program as follows:

> *There were no double degree students in the program in 2007. In 2008 double degrees with Business and Justice Studies were offered. The plan is to introduce case studies aligned with the disciplines of the double degree offerings to assist students make the connection between the study of IT and the study of the application domains. The QUT standard double degree structure of 16 subjects from each discipline is utilised. Students progress through both their programs by taking two subjects from the* BCSM *and two subjects from the second degree each semester.*

30. An interesting aspect of the program is that the underlying rationale for its development arises from a perception of employer demand for graduates skilled in this area. (The perception is founded in part on an analysis of positions vacant.) I think there may be scope for a similar analysis with respect to employer demand for, and expectations of, graduates of double degrees.

Science (Biology) Case Study (Gleeson, University of Melbourne)

31. According to the case study, the Melbourne model does not permit double degrees. Cross disciplinarity, however, seems to be encouraged through the 'breadth' component of each program.

32. An element of the case study that is interesting from the perspective of double degrees is the 'Careers Night':

> *Genetics also run 'Careers Nights' once a semester where two speakers who have majored in Genetics talk about their career path. One usually has a PhD and the other a different career path. After the talks drinks and food are offered and the speakers, academic staff, postgraduates and honours students from Genetics are in attendance to speak to students. The most recent event attracted over 200 students.*

33. I would think that something such as this might also be valuable for students of double degrees.

Law Case Study (Westcott, James Cook University)

34. The case study outlines several activities and processes which I think may be particularly interesting from a double degrees perspective.

35. First, the peer mentoring system:

> *Students are also provided with an opportunity to meet with, and engage with peer mentors, a group of continuing law students who have signed up to assist first year students with their transition to tertiary study.*

36. Second, the 'push out of information' emails:

> *The e-mails are designed to be a timely push out of information that students may need for that week or the coming weeks. The e-mails have included, amongst other things, information about upcoming study skills or library workshops, reminders about cut off dates and study tips.*

37. Third, the emphasis on engagement in the university community. These things are all particularly relevant for double degree students, because it can be more difficult for these students to form peer networks and become part of a lifelong learning community.

38. Students undertaking single degrees progress through their programs at a faster rate, so friends of double degree students tend to 'move on'. For example, double degree students in their fifth year are commonly in a situation where their friends from the same school cohort have left the university. It can be difficult for the double degree students to try to form new friendships with the 'new' single degree students, especially when those 'new' students are themselves in their second or third year and have typically already formed attachments within their own cohort.

39. Thus it seems to me that modified versions of the above supports may be especially helpful in enabling double degree students to better engage with the university community.

Final thoughts

40. I have briefly noted here some first year approaches/activities that may be interesting from a double degrees perspective. But it occurs to me that some (if not all) of these are likely to be quite 'expensive'. If we wish to better understand 'best practice', I would imagine it might be helpful to learn more about relative costs, outcomes and experiences.

References

King, R. (2008). *Addressing the supply and quality of engineering graduates for the new century*. Sydney: Carrick Institute for Learning and Teaching in Higher Education. Retrieved November 24, 2008, from http://www.altc.edu.au/resource-addressing-supply-quality-engineering-graduates-uts-2008

Nicolescu, B. (2002). *Manifesto of transdisciplinarity*. New York: State University of New York Press.

Support for this publication has been provided by the Australian Learning and Teaching Council Ltd, an initiative of the Australian Government Department of Education, Employment and Workplace Relations. The views expressed in this publication do not necessarily reflect the views of the Australian Learning and Teaching Council.

Further resources developed under this ALTC Senior Fellowship, *Articulating a Transition Pedagogy*, are available at
http://www.altcexchange.edu.au/first-year-experience-and-curriculum-design