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Interdisciplinary higher education: Implications for teaching and learning

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The term 'interdisciplinary' is used increasingly in the rapidly changing context of higher education. It is often used loosely, and is frequently confused with 'multidisciplinary' and 'cross-disciplinary'. Collectively, however, terms such as these have become catchcry. But what do these terms mean and what are the implications for higher education curricula?

This paper explores the ideas of disciplinarity, multidisciplinary, cross-disciplinarity and interdisciplinarity in higher education with a particular focus on the challenges for teaching and learning. Definitions of the various types of disciplinarity are proposed and the differences between these terms highlighted. But, more importantly, some of the pedagogical and epistemological implications of moving towards more interdisciplinary higher education are discussed.

The purpose of this paper is to assist academic staff to understand and respond to the pedagogical challenges associated with supporting student learning in the contexts of various types of disciplinarity. The paper is written principally for the University of Melbourne, in which the Melbourne Model has important multidisciplinary and interdisciplinary components incorporated in its 'breadth' requirements. We hope the paper will also be of value to a wider audience. For readers outside of the University of Melbourne, the structure and goals of the Melbourne Model and the New Generation degrees are sketched in the appendix.

What do we mean by 'academic disciplines'?

To begin with, it is helpful to briefly examine the notion of academic disciplines, on which there is a growing body of literature (Aboelela *et al.*, 2007). In doing so, we wish to develop a typology to understand the various disciplinary options available in higher education.

The traditional view of an academic discipline is an area of study "with its own theories, methods and content ... [with its] distinctiveness being recognised institutionally by the existence of distinct departments, chairs, courses and so on" (Squires, 1992, p. 202). The academic disciplines as we know them today are widely considered to be largely discrete and autonomous, although not homogeneous (Becher, 1981).

A discipline has also been described as providing the 'structure of knowledge' that trains and socializes members of a faculty (Beyer & Lodahl, 1976). This training and socialization includes the ability to carry out the appropriate tasks of teaching, research, and administration that are germane to the discipline. It also includes the production of relevant research, the process of peer-review, and a system of rewards related to these (Beyer & Lodahl, 1976; Reich & Reich, 2006). Becher (1981) defines disciplines as 'cultural phenomena': "they are embodied in collections of like-minded people, each with their own codes of conduct, sets of values, and distinctive intellectual tasks" (p. 109).

There have been various attempts to make an anthropological study of academic disciplines, and to describe these unique cultures, but with limited success (Becher, 1981, 1989). While there is general agreement about what an academic discipline is, it is also clear that many disciplines have permeable borders.

The following features are among those normally used to determine the nature of an academic 'discipline':

- the presence of a community of scholars;
- a tradition or history of inquiry;
- a mode of inquiry that defines how data is collected and interpreted;
- defining the requirements for what constitutes new knowledge;
- the existence of a communications network.

Art historians, geologists and economists, for example, all differ markedly in terms of how they substantiate their knowledge and their methodologies used (Hofer, 1997, 2000, 2001). Academic disciplines can have substantial differences in regard to standards of justification and evidence, degrees of certitude in what constitutes knowledge, and in their understanding of the structure of knowledge itself.

Under the traditional notion of academic disciplines as discrete and autonomous, there is a standard educational pathway for students. With few exceptions, a student begins their studies in one of the broad faculty divisions (the sciences, arts, commerce, and so on). The student surveys the landscape of the disciplines and, by the end of their second year, specialises in one of them. This discipline influences students' views about what is known, what is valued, and what is capable of investigation. By the end of their studies, a student of accounting need not know a great deal about finance; a biology student need not know much about physics; a psychology student may not be very familiar with neurology, and so on, though they may have passing familiarity with cognate disciplines.

Following from the discussion above, 'disciplinarity' describes a somewhat traditional view of the academic terrain. It is a term used to describe academic disciplines as autonomous and discrete areas of study within which independent academic communities rarely cooperate or coordinate their academic efforts. Academic disciplines, from this perspective, are discrete 'boxes', albeit with boundaries that may be permeable.

Problems with the traditional notion of 'academic disciplines'

The traditional notion of academic disciplines, as outlined above, fails to reflect the changing context of higher education. As noted by Squires (1992), the problem with the traditional notion of the academic discipline is that it does not acknowledge that disciplines are not historically fixed; they evolve and change over time. Academic disciplines are culturally and historically situated. Disciplines are also not defined by one attribute but many, and the relative emphasis on these different attributes can differ from discipline to discipline, and even within each discipline.

For example, a social science such as psychology has undergone great changes from its inception as an introspective discipline with the work of William James, Sigmund Freud, Carl Jung and others, to its current empirical emphasis, though there remain different 'branches' where, for example, psychoanalytic research is still discussed.

There have been attempts to redefine the notion of 'academic discipline' to recognise these points (Becher, 1989; Biglan, 1973; Donald, 1986; Kolb, 1981; Squires, 1992). Squires (1992), for example, has defined academic disciplines in terms of three 'dimensions': their *object* (what they are concerned with, their current problems and issues); their *stance* (their current epistemic concerns, that is, what they consider to be their framework of knowing and how they do things – their methodology); and their *mode* (that is, how they reflexively consider themselves as a discipline, for example, the extent of being 'normal', 'mature', or 'revolutionary' in the Kuhnian sense). Many disciplines go through periods of 'normal' science (that is, business-as-usual using an unchallenged, commonly agreed-upon theoretical framework), to 'revolutionary' periods where these frameworks are questioned, thrown into doubt and/or replaced – for example, Einsteinian physics replacing Newtonian physics (Kuhn, 1962).

Squires (1992) claims that all disciplines are "multidimensional spaces in which define, protect and enlarge themselves along any of those dimensions, and in so doing, come into conflict or cooperation with other disciplines" (p. 202). Friction and permeation can occur at the border of disciplines, and influences can be widespread among them. An example of the latter is the empirical methodology of the hard sciences. This has had a dramatic and lasting effect on other disciplines, which are traditionally quite remote from the concerns of the sciences – for example, linguistics.

‘Multidisciplinarity’: multiple, discrete disciplines

Given the understanding of disciplinarity above, we can look now at an important variation, multidisciplinarity. Rather than being conceptually different from disciplinarity, multidisciplinarity is a term that describes a set of circumstances. More specifically, multidisciplinarity recognises the fact that there are many discrete and autonomous disciplines. While students normally specialise in one discipline, they can study several over the course of a typical degree program. For example, in addition to accounting subjects, an accounting student also studies some subjects in finance, and may also study some economics, and/or disciplines such as history or music.

Multidisciplinarity has been described more simply as the view that: “everyone [does] his or her thing with little or no necessity for any one participant to be aware of any other participant’s work” (Petrie, 1976, p. 9). Multidisciplinarity is the co-existence of a number of disciplines. It is no more intellectually, or academically, illuminating than what typically exists in higher education degrees.

‘Cross-Disciplinarity’: One discipline ‘peering’ into another

Cross-disciplinarity is another variation of disciplinarity. In cross-disciplinarity (often terminologically confused with ‘interdisciplinarity’), a topic *normally outside* a field of study is investigated with no cooperation from others in the area of study concerned. Two examples might be the physics of music and the politics of literature. While sometimes informative and interesting, this type of inquiry involves the use of essentially foreign techniques and tools from those normally used to study the phenomenon under consideration. There is rarely any transfer of methodologies in cross-disciplinary work. Taking one of the examples above, musicians don’t necessarily learn any physics and physicists do not necessarily learn much about music.

‘Interdisciplinarity’: More subtle and nuanced approaches

A third variation of disciplinarity is interdisciplinarity. While the traditional view regards disciplines as discrete and autonomous, interdisciplinarity recognises the subtleties of the nature of academic disciplines. There are a number of possible forms that interdisciplinarity might take, but there are points of common agreement. These will be outlined below.

There are a number of variants of interdisciplinarity that can be understood as located on a continuum from benign to radical variants. At the benign end of that continuum, interdisciplinarity is regarded simply as elective subjects taken from a variety of disciplines that in some way relate to [a] general topic – an example might be women’s studies (Garkovich, 1982). Here there are “two or more disciplines ... contributing their particular disciplinary knowledge on a common subject” (Garkovich, 1982, p.154).

Moving along this continuum of variants of interdisciplinarity, another view involves “entrench[ing] discipline boundaries” and “leaving open mutually radical dialectic-critique of opponent territories” (Davidson, 2004, p. 308; Rowland, 2001, p. 3). This view might merely imply critique and the critical exchange of views, while maintaining robust disciplinary integrity.

Moving further yet along the continuum, another variant of interdisciplinarity suggests that, unlike multidisciplinarity, where disciplinarians need not discuss things with each other, this variant requires “more or less *integration and even modification of the disciplinary sub-contributions* while [an] inquiry is proceeding. Different participants need to take into account the contributions of their colleagues to make their own contribution” (Petrie, 1976, p. 9, italics added). Within this view, the latter point is crucial, for one of the criticisms and concerns of some interdisciplinarity work is that it is ‘interdisciplinary’ in name only.

More specifically, this variant of interdisciplinarity – sometimes known as ‘pluridisciplinarity’ (Max-Neef, 2005) – requires two or more disciplines *which combine their expertise* to jointly address an area of common concern. This usually arises in areas of study where the topic under investigation is too complex for a single discipline to address. Examples include, the AIDS pandemic, the water crisis in Australia, global warming and climate change. Topics such as these require coordinated efforts of many specialists. An issue such as ‘land use’, for example, is seen differently from economic, geological and environmental perspectives. In the health sciences, a pressing social concern such as obesity requires the *integrated* views of behavioural scientists, molecular biologists, and mathematicians (Aboelela *et al.*, 2007).

This variant of interdisciplinarity is explicitly presupposed under the Melbourne Model. There is a plausible case to be made for interdisciplinary relationships between the disciplines, which may not be as discrete and autonomous as the traditional view claims. Some issues and topics appropriate for undergraduate university level study are simply too complex to be properly investigated within a single traditional discipline. If interdisciplinary relationships are fostered in the Melbourne Model, then traditional disciplinary structures should also naturally be retained, and interdisciplinary relationships formed for the purposes of teaching and learning. These relationships might go some way to promote critical dialogue between the disciplines on complex topics that are beyond the resources of individual disciplines alone.

Petrie (1976) notes that the history of the disciplines suggests that disciplinary specialists themselves seek interdisciplinary relationships when the demands of their subject warrant it, and not before. Certain conceptual issues demand new perspectives to provide breakthroughs. These insights can certainly come from different disciplines. The history of thought provides many examples where disciplinarians have themselves welcomed interdisciplinary relationships. Biology needed physics at a certain stage of its development. Ecologists use mathematics when it is needed. Philosophers of mind began to seek relationships with neuroscientists and computer scientists when their *a priori* speculations about internal 'representations' led to a need to understand what an internal 'representation' might be. There are numerous cases in which the nature of a problem has necessitated the insights of another discipline (Petrie, 1976), and here, interdisciplinarity occurs naturally among disciplinary specialists.

Interdisciplinary exchanges occur normally and need not be mandated by universities, although under the Melbourne Model, these exchanges are likely to intensify and become more critical. It is thus wise for the University of Melbourne to embrace interdisciplinary education, with appropriate checks and balances, while simultaneously maintaining and preserving a robust disciplinary focus. The evaluation and quality assurance processes already in place should allow interdisciplinary exchanges to flourish while ensuring that learning in academic disciplines is not compromised.

Moving further along the continuum of variants of interdisciplinarity, at one extreme is a view of interdisciplinarity as involving the "collapse of academic borders and the emergence of a new discipline" (Davidson, 2004, p. 308). This is sometimes known as 'transdisciplinarity' (Max-Neef, 2005). However, dissolving academic boundaries would seem to go against the gains won in terms of the basic research productivity of individual disciplines. There are questions about how, in a practical sense, disciplines would continue work done in dedicated disciplinary areas of concern if boundaries were 'dissolved' and about how disciplinary integrity would be maintained. If boundaries between disciplines are dissolved it becomes unclear to what extent traditional disciplines would survive, although some temporary boundary dissolution may lead to new disciplines (Marginson, 2007).

Pedagogical and epistemological considerations

What implications does interdisciplinarity have for teaching and learning? There is a commonsense case for suggesting that the best education that can be provided to students is a sound discipline-based education, with opportunities for interdisciplinary discussion when it is warranted. The mix between the local, disciplinary content and interdisciplinary content is critical. Sufficient local content will ensure that *students themselves* see the need for the interdisciplinary understanding when their lecturers have incorporated it into their subjects, just as disciplinarians, as described above, seek interdisciplinary relationships when they see a need to do so. An education that is too broad might not allow for sufficient expertise in the home discipline to allow an adequate appreciation of when interdisciplinary work is needed and when it is not. But given that some interdisciplinarity will be desirable, the questions of how best to incorporate it into students' experiences are key.

Learning the cognitive maps

Clearly, disciplines have their own way of viewing the world. Sometimes these are known as mental models, cognitive maps or frameworks, or 'paradigms' (Kuhn, 1962). Practitioners understand the world in terms of the cognitive models they possess; they 'see' things differently. Disciplinary-based concepts are necessary for viewing the world in a certain way. In the normal course of events, of course, students learn these cognitive maps when they are inducted into a discipline. This is part of what it means to become 'educated'. Once this has occurred, it becomes difficult for those inducted to see things any other way. This being the case, what challenges does a focus on interdisciplinarity raise for higher education students and providers?

Interdisciplinarity will, by necessity, result in fewer topics being taught in traditional ways. However, disciplinary depth is important to ensure that students develop the required cognitive maps in both disciplinary and interdisciplinary studies. Undergraduate higher education should provide education that both prepares students for the changing world of employment and that provides a pathway into graduate programs. Such depth is critical for intending graduate students who have to eventually make research contributions (Golde & Gallagher, 1999) as well as for those leaving university after undergraduate studies to take up a profession.

Learning the disciplinary language

A related point concerns language. In addition to providing the requisite cognitive maps for students, a discipline must also teach a distinct, discipline-specific vocabulary. This raises a number of pedagogical issues. It is as important to teach the language and technical terms of the disciplines, as it is to teach the methodologies, procedures and concepts (indeed, they cannot be taught *without* the language). But even within disciplines that are naturally grouped together, there are significant differences in language. For example, the language of accounting is very different from the language of management, finance or law. In disciplines not usually grouped together, these differences are even more pronounced. The language of accounting, for example, is very different from the language of chemistry or history.

This raises significant epistemological, as well as practical, challenges for students and, therefore, academic staff teaching these students. Some of the disciplinary 'vocabularies', and the assumptions behind them, are incommensurable with vocabularies from other disciplines. 'Mass' to a physicist does not mean the same thing as 'mass' to an engineer or architect. The notion of a 'fact' and 'evidence' are largely matters of disciplinary definition. If there are differences in the use of single words, it can be expected that differences in the understanding of theoretical concepts will be vast (Feyerabend, 1993).

In the interdisciplinary university, where students are striving to achieve breadth as well as depth, the language of disparate disciplines may need to be explicitly taught. While this is not an inconsistent aim, it is challenging to achieve without risking the strengths of a well-grounded education in the language of single disciplines independently. Mixing the unique languages of commerce and engineering may be possible, but may also result in an inadequate training for both employment and graduate study if not done with care. Graduating students will need to emerge from university with the required discipline-specific vocabulary in each of the disciplines in which they have studied.

The importance of idea dominance

It has been claimed that a central feature needed for interdisciplinary success in research, but also—albeit to a lesser extent—teaching, is *idea dominance* (Petrie, 1976). Viable projects require a key 'idea' without which, failure or abandonment of the project is almost certain. It has been noted that over 50 percent of interdisciplinary collaborations fail (Doz, 1996; Kezar, 2005). The key idea needs to be mutually agreed upon as being important by all concerned. Different, even inconsistent, ways of viewing the idea are, of course, welcomed in the process of intellectual discussion, but that there are agreed-upon *problems* is not in dispute.

In independent, 'traditional' disciplines, idea dominance is not a critical issue. The ideas that economists, engineers or psychologists regard as being important are filtered out from weaker ideas in routine intellectual discussions and weak ideas are abandoned. The dominant ideas become viable and become the focus of investigation and learning, that is, of research and teaching. Dominant ideas are closely aligned with eventual success and achievement in results that all parties to the project regard as being illuminating, and offering some degree of intellectual progress.

However, interdisciplinarity does not work this way. By necessity, different cognitive maps and vocabularies are involved. In cases such as 'global warming' the idea is mutually agreed upon as being important by all participants from various disciplines. However, these cases are rare, and sometimes interdisciplinary research runs the danger of being done, not for any legitimate academic reason, but simply: "for the sake of being interdisciplinary" (Petrie, 1976, p. 10).

The pedagogical issues that the concept of idea dominance raises are critical for the success of interdisciplinarity. It is critical that students emerge from interdisciplinary undergraduate studies with a clear idea of the dominant ideas of their discipline(s). Graduates must be able to recognise a dominant idea from a weaker idea and to distinguish ideas that belong to certain disciplines from those that are interdisciplinary in nature. They must also be able to raise appropriate questions (that is, 'legitimate' questions from the perspective of their discipline) to critique ideas from both a disciplinary and, if necessary, an interdisciplinary perspective.

The effects of breadth on specialisation

Students usually seek to study a discipline in which they believe they have some natural talent. Students who have skills in mathematics gravitate to mathematics, physics, engineering or allied subjects. Students with talents in language-rich subjects tend to study in the humanities, law, social sciences, and so on. If cross-disciplinary or interdisciplinary studies are encouraged or mandated, this may benefit students who have broader interests (and who perhaps are weaker in areas of narrow specialisation).

There is some evidence that individuals who are outstanding in a particular discipline—as opposed to being very good—tend to be very narrowly focussed in their skill area. Petrie (1976) asserts that: "one tends to see good disciplinarians uninterested in interdisciplinary efforts, and many who are interested seem to have marginal disciplinary competence" (Petrie, 1976, p. 10). Becoming an excellent disciplinarian demands undivided focus. Expertise is also the result of substantial amounts of training, and the empirical evidence suggests that this training is not transferable (Chi, Glaser, & Farr, 1988; Johnston, 2003).

Johnston (2003) claims that experts perceive meaningful patterns in their own domains better than non-experts. This is hardly surprising. According to Johnston, they also use more higher order principles to solve problems, work faster and with more accuracy, are better at self-monitoring, comprehend the meaning of data more readily, recognise the relative weighting of variables and have better domain-specific short and long term memory. It may be that expertise is a necessary requirement in disciplinary studies in order for excellence to occur. This degree of specialisation, single-mindedness and focus required for expertise to occur brings challenges in a university that has the stated aim of pursuing interdisciplinary education. However, 'expertise' among mature scholars and 'expertise' among undergraduate students are very different (Marginson, 2007).

In a practical sense, the balance between disciplinary focus and interdisciplinary relationships is difficult to navigate and demands careful judgement for both staff and students. Neither a disciplinary focus nor interdisciplinary relationships can predominate for interdisciplinary work to occur and be successful:

If one is not ... extremely adventurous and extremely interested in the project, the rewards which accrue simply due to disciplinary competence are likely to pull an [extremely competent] individual away from the interdisciplinary effort. Likewise, the person of extremely broad interests but lesser disciplinary talent may feel the project is going well, when it, in fact, never gets beyond the superficial (Petrie, 1976, p. 11).

While it is true that cutting-edge work goes on in the margins of disciplines, basic and foundational work remains within individual disciplines. Universities must ensure that ideas are allowed to dominate in each discipline and reach successful outcomes. Graduates need enough exposure to key disciplines to learn these ideas, although they must be able to move outside their discipline to obtain interdisciplinary assistance when necessary or appropriate.

Valuing interdisciplinarity in the institutional setting

Another important pedagogical consideration is the institutional setting in which interdisciplinary work goes on (Petrie, 1976). Transplanting interdisciplinary exchanges in an institution not set up for this purpose is likely to create problems. Purposeful and directed interdisciplinary work requires an appropriate system of rewards and institutional support, promotion, seed funding, release time, teaching and innovation grants and recognition, and so on. These rewards need to be directed to *interdisciplinary* work. At present, the principal rewards for academic staff at most universities are by means of disciplinary channels (publication in top-tier disciplinary journals, evidence of having advanced their discipline, teaching awards for teaching undertaken in a discipline, and so on) although this may be beginning to change with, for example, the emergence of a growing number of interdisciplinary journals.

Staff will naturally put their efforts where rewards are available. Under the typical reward circumstances for staff outlined above, interdisciplinary work may not flourish. Students, too, may recognise that the important work is being done in the disciplines (not inter-disciplines). Interdisciplinary projects, courses and 'breadth' requirements may be seen as token parts of the educational experience and may not be taken seriously.

Preparing for and managing variations of disciplinarity

There are a number of considerations in preparing for and managing changes in the focus of disciplinarity in universities. For example, at a broad level, if students take subjects outside the broad discipline area in which they have chosen to focus their efforts, attention must be given to the preparation of students for such interdisciplinary and multidisciplinary experiences. The inclusion of interdisciplinary and particular multidisciplinary expectations in a degree program means that students may take subjects for which they are neither adequately prepared nor naturally inclined. Students must therefore be explicitly inducted into the academic discourse of all disciplines in which they study. This is particularly important if students are taking subjects in disciplines that are very different from their discipline(s) of 'first preference'.

More specifically, the requisite vocabularies would need to be taught within each discipline. Strategies such as the preparation and use of 'checklists' or glossaries of key terms designed for each discipline and appropriate to each level of study might be helpful. These would be useful to both students focusing in the disciplines either as part of their 'home' discipline or outside of that, and to students taking interdisciplinary breadth subjects.

But induction into an academic discourse and way of knowing and of seeing the world will take much more than checklists. As a pre-cursor, it may be necessary for academics from Faculty disciplines to devise minimal levels of disciplinary induction in the cognitive maps required for a graduate from each discipline so that a staged process toward building those maps may be possible. The introduction of 'bridging' or intensive preparatory programs that are integrated into the curriculum may need consideration. And clearly, particular attention will need to be paid to the ways in which assessment practices will ensure and uphold standards and help determine student understanding and readiness to advance in level of study.

It may also be necessary to put in place mechanisms to benchmark standards with students and/or graduates studying elsewhere where an interdisciplinary focus is not in place. One way this might be done is to ensure graduates meet benchmarked standards in the conceptual requirements of the discipline by comparing their learning outcomes with those of with 'single discipline' graduates from other comparable institutions.

In order to encourage interdisciplinarity, it might also be beneficial for the university to put in place mechanisms to recognise when interdisciplinary exchanges occur naturally, that is, when discipline problems demand them. These exchanges might be between students, staff and/or staff and students and processes to detect viable exchanges and to foster them would be helpful.

To create and maintain an environment where such exchanges might occur, processes need to be put in place to allow students to gain enough expertise to recognise the value and need of interdisciplinary study and work. Formal 'fieldwork' programs, on-site experience, mentoring arrangements in real work situations, involvement in undergraduate workshops and conferences, and similar mechanisms will be likely to assist in the creation of such an environment.

In terms of preparing and supporting the on-going development of staff for interdisciplinary and multidisciplinary environments, new academic development programs may be necessary. These might focus on developing a 'de-centering' of the academic self of the participants and allowing an appreciation of different world views. This would, perhaps, promote critical "conversations between disciplines, whilst retaining the integrity of those disciplines" (Davidson, 2004 p. 302). One effect of such a program would hopefully be encouraging teaching and learning across the curriculum in a manner that does not violate disciplinary culture and values.

The evaluation of interdisciplinary teaching and learning also needs careful thought. Appropriate measures need to be discussed and agreed upon within an institutional context and the systems used must feed into both recognition and reward, and quality assurance programs in the University.

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Appendix 1: Disciplinarity and the Melbourne Model

The 'Melbourne Model' at the University of Melbourne is the first attempt within Australia to take higher education in the direction of North American and European higher education systems. The Melbourne Model features the creation of six 'New Generation' degrees to provide a broad education in order to both prepare students for the changing world of employment and to provide a pathway into graduate programs. It also features increased emphasis on postgraduate study and the formation of a 'graduate school' culture and a two-tier degree structure, from the present three-year degree to a '3 + 2 model'. The Melbourne Model emphasises the preparation of graduates with 'depth' as well as 'breadth' of educational experience.

This latter aim is to be achieved in a number of ways. One way is by underpinning a better understanding of the relevance of discipline studies in a wider context. Another is by offering greater opportunities for students and staff to experience interdisciplinary teaching and research collaborations across the university. Subjects that offer students different ways of knowing from their 'home' discipline are an integral part of the Model, as are breadth subjects that are interdisciplinary in character.

At the University of Melbourne, students in both Heritage and New Generation degrees will study several disciplines over the course of their degree. Using the definitions given in this paper, there is no cross-disciplinarity specifically proposed as part of the Melbourne Model, although it is likely to be occurring as part of the normal circumstances in both the Heritage and New Generation degrees.

Breadth subjects within the New Generation degrees that are existing disciplinary subjects outside a students' home discipline can be categorised as one variant of interdisciplinarity discussed in the paper – the variant where discipline boundaries are entrenched but the possibility of mutual critique is possible. Equally, the inclusion of existing subjects from outside the students' home discipline can be accurately described as an example of multidisciplinary, as it has been defined here.

The breadth subjects within the New Generation degrees that are referred to as 'University Breadth Subjects', that is, those new subjects proposed and developed as interdisciplinary offerings, can be accurately categorised as the variant of interdisciplinarity that requires two or more disciplines to combine their expertise to jointly address an area of common concern.

