

*Cross-disciplinary courses are becoming more common in many tertiary institutions. This issue of CDTL Brief on **Cross-disciplinary Teaching and Learning** discusses issues that concern cross-disciplinary studies.*

Religion as a Heuristic Anchor: Studying the Various Interdisciplinary Approaches

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XD2101 “Approaches to the Study of Religion” is a module that aims to introduce students to the history of religious studies through a review of the different ways religion has been understood and defined. Students are introduced to important writers associated with various disciplines in different weeks, and students must reflect on why different disciplines work in different ways.

My experience shows that most students enrolled in this module have fairly well-formulated opinions about religiosity, ranging from vehement faith to strong skepticism. Many students know that they are already ‘part of’ a religion, but few will have thought about religion as an academic enterprise. The first objective of XD2101, therefore, is to interrogate the very conditions by which ‘religion’ itself has been produced as a linguistic and discursive category in the academe. This involves, for example, examining the Judeo-Christian lineage of the term, and discussing whether or not a faith such as Buddhism or Hinduism can be situated within its discursive parameters.

The second main objective is to give students a straightforward introduction to the main features of social sciences disciplines through the lens of religion. The module is structured around a discussion of five or six individual theorists of religion, whose approaches to religion exemplify the wider disciplinary methodologies they employ. For

example, we discuss Emile Durkheim and Max Weber according to their works on society and religion, as well as Sigmund Freud and James Frazer for psychology and anthropology respectively. Normally, the theorists studied in the module are ‘founding fathers’ of the discipline. It is an interesting part of the module to demonstrate that many disciplines in the social sciences, such as anthropology, philosophy and sociology, were founded by theorists who were very much concerned with religious topics.

The module, therefore, is by nature an interdisciplinary one. In addition to this, it is important to see the topic of religion as a common ‘anchor’ by which various social science methodologies can be compared with one another. The functionalist approach to religion by anthropologist Edward Tylor, for example, is contrasted with a view of religion as a case of universal neurosis, as exemplified by Sigmund Freud, or the focus on religion as societal cohesion exemplified by the work of sociologist Emile Durkheim. The fundamental basis by which the module is conceptualised is that ‘religion’ is an effective heuristic by which students can learn various disciplinary approaches and compare them with one another.

The module is a cross-disciplinary (XD) course that offers a foundation for the study of the world’s religions. In this respect, it complements

GEK1045 “Introduction to World Religions”, a general knowledge (GEK) module taught in the first semester. The general aim of both the GEK and the XD modules (both foundational modules for a minor in religious studies) is to foster an academic environment in which students can learn and exchange ideas about religion in a spirit that

is tolerant, open and lively. While the lectures and tutorials provide a basic, straightforward outline of each of the world’s major faiths, the minor is designed so that students’ personal ideas about religion can be brought to bear on current scholarship and research on religion. ■

Teaching “Simplicity”

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In this article I discuss my experience in teaching UQR2206 “Simplicity”, a module in the University Scholars Programme. UQR2206 is a science/technology-based module without prerequisites and open to USP students from all faculties. A typical class would consist of students from their first semester at NUS to those in their third year of study.

The objectives of the module are to introduce students to (i) the scientific method as used by practitioners, and (ii) the various qualitative concepts and quantitative tools researchers use to understand and model observed phenomena. Some of the challenges of teaching such a module are likely to be common to other cross-disciplinary modules. I shall discuss these challenges below and the various approaches I have experimented with.

The first problem is that students come from diverse disciplines, with very different science and mathematics backgrounds. Thus the subject matter chosen for weekly discussions must be neither too easy nor too advanced. In other words, the discussion subject should ideally sustain the interest of all students over long periods and encourage them to participate enthusiastically.

However, by choosing interesting, and sometimes unconventional, material to solve the first problem, one may face a second problem—the highly pragmatic nature of some students who want to know how what they are learning is useful to them.

The third problem with “Simplicity” as a module in quantitative reasoning is the aversion many humanities students have to mathematics. Many of these students have terrifying memories of how they spent their pre-university days mindlessly memorising countless formulae that were then used with little understanding to solve highly artificial examination problems. Surprisingly, many science

and engineering students also think that memorising and using formulae is what mathematics, physics and engineering are all about. However, science and engineering students differ in that they are slightly more accepting of mathematics than the humanities students.

I solve the first problem by choosing readings from various disciplines and try to use non-standard examples to illustrate the concepts. In this way, even students from physics or mathematics, who may have covered similar basic material elsewhere, would learn something new. Furthermore, I constantly relate the abstract concepts to real life examples and point out connections between similar ideas in different disciplines. In this way, students are reminded that science is ultimately about understanding the real world and how understanding something at the conceptual level in one discipline can help solve similar problems in another. Hence, the second problem mentioned above is also resolved.

To address the third problem, I introduce the mathematics gradually, with a liberal use of simple examples, computer simulations, judicious analogies and fun activities (e.g. mathematical modelling of the love between Romeo and Juliet)—all meant to lull students into a relaxed frame of mind and help them forget their preconceptions of quantitative reasoning. At the end of the day, I hope to have taught students something new and useful that they could remember for a longer period than some meaningless formulae.

An example of a computer simulation used in teaching the module is the *Game of Life*¹ that illustrates how remarkably simple rules can give rise to both diversity (as a result of different initial

1. The *Game of Life* is available online: <http://www.math.com/students/wonders/life/life.html> and students can play it before or after class discussions.

conditions) and emergent complexity, but how difficult it would be to guess those rules just by looking at the end result. This simulation illustrates with minimal fuss why there is merit in the scientific method used by explorers in seeking simple universal rules underlying natural phenomena.

Another example is *Boids*²—a computer simulated program that produces very realistic flocking behaviour of digital birds, illustrating the concept of self-organisation. When students learn that the techniques used in *Boids* are also used in many blockbuster movies and animations, students realise that science can be both serious *and* fun.

There is, of course, no substitute for the real thing—the group project (the most challenging part of the module). This is where students are asked to select a recently published paper that uses quantitative reasoning and the scientific method and do a critical review of that paper. Thus, students have to first understand what the paper is about, master the mathematical tools the authors used, surface the various underlying theoretical assumptions in the mathematical models, critique those assumptions and conclusions, and finally, suggest improvements for a potential future study.

2. *Boids* (<http://www.red3d.com/cwr/boids/>) was a computer program originally developed by Craig Reynolds in 1986 to simulate the flocking behaviour of birds.

For many students, the critical reading of a technical journal article is often their first experience in taking the indispensable preliminary step in academic research. To make the experience even more realistic and memorable, students are to give an oral presentation of their project to the whole class, after which presenters will be ‘grilled’ just as in any science workshop for professionals.

Anecdotal evidence indicates that the group project comes in handy for students whose future project work involves mathematical modelling. Even for those who do not intend to further their studies in science, the project arguably brings students as close as possible to the way actual science is done and perhaps, dispels their naïve thoughts that scientists can easily make breakthroughs by day-dreaming.

In addition to the group project, each student has to make another 3-minute oral presentation on ‘scientific method or quantitative reasoning in the news’. Students search for a recent news item and then give a concise but intelligible talk to the whole class. This teaches students how to digest everyday scientific news, distil its essence and communicate it to their peers. ■

Some of the resources used in “Simplicity” are available at the course website: <http://staff.science.nus.edu.sg/~parwani/sim/simindex.html>.

Cross-disciplinary Theories for Cross-disciplinary Teaching

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Cross-disciplinary teaching is one of the most important and complicated issues in pedagogy characterised mainly by specialisation and the appearance of new disciplines today. In this new reality, there is a big need for courses that provide students with a wider view of lateral connections between disciplines.

When dealing with cross-disciplinary teaching, it is first necessary to clarify the distinction between disciplinary courses and cross-disciplinary courses. Disciplinary courses usually deal with a specific field of knowledge, delving relatively deep into details

and micro aspects. It is more focused on a specific field of knowledge and less with the ‘big picture’. On the contrary, cross-disciplinary courses deal with connections, interrelations and interactions between different fields of knowledge. These courses are more general in character and they can be called macro-courses.

These two kinds of courses are important, interdependent and interrelated. Both give students a high level of understanding. However, it is much harder to teach cross-disciplinary courses successfully because:

- a. Cross-disciplinary courses require teachers with a broad interdisciplinary knowledge. In this era of specialisation, it is relatively rare to find people who have studied laterally and are able to think in a cross-disciplinary manner.
- b. Academic institutions traditionally encourage disciplinary research. The low number of cross-disciplinary researches compared to disciplinary researches is an important indicator of the situation despite the growing tendency towards more cross-disciplinary research.
- c. Cross-disciplinary theories are rare and existing ones are not well-assimilated into the area of teaching.
- d. Objectively, it is much complicated to teach cross-disciplinary courses.

In an era characterised by rapid accumulation of new information, cross-disciplinary theories can help teachers and students control, manage and understand large amount of information better. Such theories can also contribute to the creation of new systems and processes with cross-disciplinary characteristics.

Few cross-disciplinary theories have been developed throughout history. Amongst these theories, it seems that the system theory by Bertalanfy (1968) (and others who later developed this theory) is the most fundamental one that can be turned into a basic tool for developing cross-disciplinary understanding. I shall discuss how the potential of the system theory and its developments can help in teaching and understanding cross-disciplinary thinking.

The system theory is an interdisciplinary theory that analyses the theoretical and practical properties of systems from a cross-disciplinary point of view. The theory integrates principles and concepts from many fields of research such as biology, chemistry, thermodynamics, engineering, social sciences, ecology among others. It deals with the definition and analysis of systems, typology of different systems and behaviour of systems in different conditions and environments. The theory also stresses the relations between the parts and offers a holistic perspective.

Terminologies of interdisciplinary properties (e.g. complexity, stability, entropy, energy, time, feedback, dynamics of systems) are introduced and analysed. It is important to note that the applications of system theory can be found today in many fields and activities (e.g. Beer, 2004; Mosseri, 2005).

The system theory can be included in cross-disciplinary courses or cross-disciplinary knowledge. It is important to note that this kind of knowledge is important especially for interdisciplinary professions like medicine, architecture, ecology, town planning and others.

One of the most important questions in using the system theory is: when is the right time in the teaching process to introduce this kind of knowledge? Should it be given at the beginning or the end of the studies? Past experience shows that each alternative has its own advantages. Exposure to such knowledge at the beginning of the studies gives students an overall introduction and cross-disciplinary vision at an early stage without specific knowledge. Introducing system theory into at the end of the studies is also advantageous as students would already have possessed a relatively large amount of knowledge and it is then much easier for them to develop cross-disciplinary thinking. However, the problem here is that the 'big picture' is only achieved at the end of the teaching process. A combination of these alternatives can be a possible solution.

The system theory and its importance in cross-disciplinary teaching need to be further investigated in the future based on the initial ideas introduced in this article.

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Behavioural Studies in Real Estate: An Interdisciplinary Approach to Real Estate Education and Research

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On 13 June 2005, the Board of Directors of a renowned international property company decided to purchase a piece of land in Shanghai to develop a shopping mall. The main motivation for purchasing the land was to increase the company's presence in Shanghai despite the relatively low Net Present Value (NPV) and Internal Rate of Return (IRR) of real estate investment in China.

On the same day, a Singaporean family decided to purchase a condominium unit (The Sail @ Marina) for investment purposes. While one of the family members was signing the sales contract, another family member, who was spending an afternoon at her friend's condominium, was so attracted to its resort-style concept and impressed with the level of asset management that she felt she would not mind working a lifetime to finance the purchase of the dream home she had just seen.

The above scenarios depict varied decision-making processes by stakeholders in the real estate market. Unlike ordinary economic goods, real estate is often regarded as a tangible asset with a bundle of rights attached to it. It is also a more complex product due to its characteristics and operations of the real estate market. Thus, many professionals are involved in delivering goods and services in the real estate market. This also implies that there are complexities involved in the real estate development process. According to Ling and Archer (2005), the property development cycle involves eight main stages, namely:

1. establishing site control
2. feasibility analysis, refinement, and testing
3. obtaining permits
4. design
5. financing
6. construction
7. marketing and leasing
8. operations

The real estate development cycle takes on a systematic approach, involving inputs from various disciplines (e.g. geography, law, finance, management, marketing, economics). Among these, few key areas have been the main focus in real estate research and education. Black, Brown, Diaz, Gibler and Grissom (2003) mentioned that these inputs have somehow formed "artificial boundaries" (p. 85) on real estate research and education. Black *et al.*, (2003) called for a more holistic approach to study real estate by linking the thoughts, theories and tools from other disciplines to real estate research and education. Black *et al.*, (2003) further cited behavioural research as an area which real estate educators and professionals should develop, and claimed that all disciplines within the realms of real estate research and education "derive their existence from human behaviour" (p. 86). However, there has not been much research and understanding on behavioural perspectives in real estate research and education (Black *et al.*, 2003; Levy & Henry, 2003). For example, if the assumptions of financial cash flows are derived from human decisions, then architects need to understand human behaviour and the built environment while real estate owners and managers should understand their stakeholders' attitudes and behaviour to enhance productivity.

In 2004, after attending the American Real Estate Society Conference in Florida, USA, I began examining the real estate courses offered by leading universities. It was then that I realised the apparent lack of coverage in behavioural aspects in real estate studies. The broad-based education system at NUS motivated me to develop the module RE3390 "Behavioural Studies in Real Estate" as one of the electives of the Bachelor of Science (Real Estate) programme for Academic Year (AY) 2004/2005. Essentially, the module advocates that the perceptions, attitudes and behaviour of real estate players are the result of interaction among real estate, people and the environment. Therefore, it is critical that real estate professionals understand

the complexities and dynamics of issues affecting the behaviour of real estate players during different stages of the real estate development cycle. This multi-disciplinary module looks at the different principles, concepts and methodologies of behavioural studies in real estate using real estate as a product and the real estate market as the background. The module adopts an interdisciplinary approach, hinging upon theories and applications from disciplines such as psychology, sociology and economics. The module comprises interactive lectures, on-site learning and workshops. Students will also have the opportunity to grasp first hand perspectives of real issues affecting the behaviour of real estate players.

I have completed the second run of the module in Semester 1 of AY 2005/2006. When the module was first introduced in AY 2004/2005, less than 20 students registered for it, but student numbers increased to 74 during its second run in AY 2005/2006. It was also during the second run that students had opportunities to experience better insights on the behavioural perspectives during property developments launches and asset management stages of property development. Students were also enthusiastic in producing good quality submissions. During the final examinations for the module, multimedia slides were used to enhance students' understanding of examination questions based on behavioural perspectives.

Focusing on behavioural studies will certainly widen the opportunities for real estate research and education. While adding further dimensions to existing theories from other disciplines, behavioural studies will also deepen students' understanding of real estate issues from the behavioural perspectives. This will ultimately enhance the real estate industry. ■

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