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A TRANSDISCIPLINARY JOURNEY: COURSE CREATION AT A SOUTH AFRICAN UNIVERSITY

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Abstract

The paper reviews the process involved in developing a transdisciplinary Master's degree in Global Change. It first considers the meaning of the various disciplinarities before reviewing the team selection and development process. It provides an overview of the research behind and development of the curriculum, and discusses dealing with academic administration. It finally provides an overview of the teaching experience. Lessons learned cover teams, their selection and development; structures and the work required to address administrative challenges; course design and the issue of transdisciplinarity; and teaching, including the use of various alternative teaching and learning methods are presented. This is followed by a postscript - an overview of a course module and students' responses.

Keywords: Transdisciplinary, curriculum, climate change, global change

Introduction

This is the story of a journey, an on-going journey, to develop and teach a transdisciplinary Masters' degree. It tells of the creation of the team, the development of the curriculum, our experiences teaching and some responses from students. The lessons learned can be used by academics and businesspeople alike as all try to find polydisciplinary solutions to the numerous sustainability and social problems facing us.

A number of challenges confront us in our quest for sustainability given global change, the growing energy 'situation' internationally, implications of 'green economic development' pathways for the country and the wider region, various basic service delivery concerns and calls for a pro-poor, environmental agenda. These compel us to reflect critically on how we are equipping the next generation to manage such environmental changes in sustainable ways.

This future generation of resilient thinkers will not only require a set of skills to navigate these complex changes (Beddoe et al., 2009) but will also require a new repertoire of 'critical thinking' on the environment, or what others have called 'transformative thinking', that is deliberative in purpose and includes transdisciplinary reflections and inputs. Future actors on this stage will have to develop a 360-degree view informed by the PESTLE perspective (Political, Economic, Social, Technological, Legal and Environmental dimensions).

Academics at the University of the Witwatersrand have spent the past four years developing and teaching a curriculum for a polydisciplinary MSc in Global Change. This paper reflects on their journey and the learning achieved in trying to create and develop a transdisciplinary approach to dealing with a changing environment. The concepts of multi-disciplinary, interdisciplinary, transdisciplinary and intradisciplinary are briefly considered before the development journey is described and the learning shared.

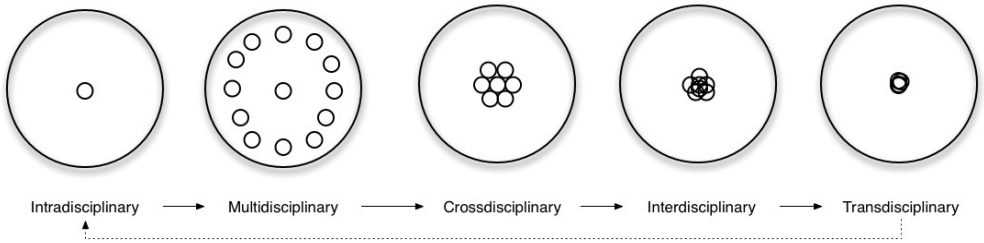
I.

The original assignment was to create a curriculum for a Masters' degree in Climate Change. As noted by Brundiers and Wiek, (2011) "Climate change exemplifies the characteristics of a sustainability problem: its social, economic, and environmental causes and effects are interrelated (across societal sectors); it is a global phenomenon with specific regional and local causes and impacts (across spatial scales); its consequences will affect future generations (inter-generational); its impact is harmful to a large number of people; and the need for solutions is urgent (risk of irreversibility)". (p109). In significant engagement with key stakeholders in business, government and civil society, to understand what they expect of today's graduates in global/climate change it became apparent that, regardless of sector, employers were looking for graduates who have specialised in a discipline such as sociology, biology, geology etc., but who are able to work closely with team members and stakeholders of different backgrounds; are able to work comfortably across disciplines and have a basic understanding of the concerns raised by these discipline areas. This firstly meant the focus moved from 'climate change' to the wider 'global

change' and secondly gave rise to the need to establish a multidisciplinary team to research and develop the curriculum.

The first debate was around the concept of disciplinarity itself. What did all the terms mean and what did we want to be? As Dyer (2003) observes, "The terms multidisciplinary, interdisciplinary and transdisciplinary are often used interchangeably. This causes confusion" (p 186). Choi & Pak (2006), Marinova & McGrath (2004), Nicolescu (1998), and the seminal work by Stember (1991) capture the essence of the disciplinarity issue, and this is probably best explained by a. graphic found on a blog site belonging to a Norwegian musician and academic, Alexander Refsum Jensenius:

Figure 1. DISCIPLINARITY Source: Jensenius, A.R. (2012)



In terms of these collective views:

- Intradisciplary is a single view of the problem;
- Multidisciplinary is multiple views of the problem;
- Crossdisciplinary is the view of the problem from a different discipline;
- Interdisciplinary is a synthesis of different disciplines to provide a new perspective or discipline;
- Transdisciplinary is a holistic view, without the blinkers of any particular discipline.

Certainly, on the back of those definitions, it would be pretentious to think that we were 'transdisciplinary', and we agree with Augsburg (2014) that "To this day, transdisciplinarity remains a rather elusive concept that continues to evolve" (p.236). However, the course is a good mix of Multi- and Inter- disciplinarity and hence the term 'Polydisciplinary' is used to indicate that a number of disciplines are involved in this process and operate at various levels.

The Team

The initial selection of the team was carried out more with intuition than any real planning, other than needing to find academics within the university across faculties and disciplines. Departments or Faculties represented at the inaugural meeting were: Animal Plant and Environmental

Sciences (the course 'founders'), Sociology, Sustainable Mining, Civil & Mining Engineering, Health, Education, Law, and Commerce. Dyer (2003) refers to the concept of a gatekeeper determining who should be invited to participate. In our case, it was more of a "floodgate" keeper, who was so enthusiastic about the project that she would have welcomed anyone who showed an interest. This was in fact an advantage. Pharo, Davison, McGregor, Warr, & Brown (2014), Bossio, Loch, Schier, & Mazzolini, (2014), Sorensen & Wittmer, (1996) and Stember (1991) all discuss the need to select from a wide range of disciplines and to include people with passion.

Initial team meetings involved much discussion and even more "turf" protection while vested interests and personalities vied with content as the various members sought to establish themselves and their departments in the group, in many cases with an often not so hidden agenda of "what's in it for me?" As Bossio, et al. (2014) observed in their work on interdisciplinary research groups, they "usually begin collaborating in a flush of excitement about a project, but with limited understanding of the complexities involved in negotiating traditional disciplinary frameworks" (p.200).

It was soon recognised that there was a need for expertise beyond the existing team, leading to utilisation of external support. Through a series of externally facilitated workshops and other interventions, the group built a platform for the eventual development of collective and shared understanding of what may be required to put together a successful and sustainable post-graduate curriculum offering. This understanding included a closer look into internal change processes, both individually and collectively as a group, developing reference points for the meaning of effective change and transformation, as well as experiential insight into the skills and tools required. The challenges posed by a multi-layered and multi-cultural national and global society with diverging needs and values, with highly complex and "wicked" problems, required the project team members to first have their own experiential understanding of the nature and force of motivators and internal drivers of human behaviour before setting out a curriculum for change and true transformation for students. This process, involving substantial group work was intensely personal, introspective and extremely cathartic. For some it created deep personal bonds with other team members, ensuring on-going cooperation and willing support for each other. However, there were team members who found the experience difficult and slowly withdrew from the process. Stember (1991) describes it so well noting that: "The right combination of commitment to the common interest, disciplinary competence, broad interests, and personal attributes may be difficult to determine, but no one of these is sufficient Without a sufficient inclination for adventure, a competent disciplinarian may retreat from the group project" (p.6).

This interpersonal team development was not a single event but part of an on-going process, building disparate personalities, strengths, weaknesses and skills into a synchronized and dedicated team, essential for the final preparation of the programme. Failure here would have resulted in an intradisciplinary course within the department of Animal Plant and Environmental Sciences.

Lessons from Other Institutions

Once the team had been established, the next task was to determine the curriculum. Our Master's degrees are expected to have a two year curriculum, including the completion of the research report, an obligatory adjunct to all Master' by Coursework degrees. In order to learn from other universities and to understand best practice, two of the team visited a number of international universities. One member visited the United States, Canada and Europe while the other saw some seventeen British and Irish universities at the beginning of 2013. The team attempted to visit most universities offering transdisciplinary Masters' degrees in climate change, sustainability or similar areas. There was no intention to consider curricula – those were often accessible from the internet – but the intention was to learn from these universities how they had managed this polydisciplinary approach. In summary, the experience was that there was little real transdisciplinary or even limited interdisciplinary teaching happening. More often than not the courses resided in a single department, often Geography, and coordinators tried, where possible, to involve other departments. Where there was an interdisciplinary course it was usually because all the lecturers were housed in a single department; as a result there was no need to involve staff from other departments or faculties in the universities. Matters may have changed by now, some thirty months later, but that was the situation at the time. That insight also helped understanding of the problems likely to be encountered.

There is no need to name universities visited. Many of the universities have proven highly successful and the relevant courses offered by all universities visited lie on a continuum from intradisciplinary to transdisciplinary. The purpose of the research was not to judge, but to learn.

In the interviews during this visit the issues raised by the course coordinators largely centred on the key themes of workload, money and interest. Most coordinators found it difficult to bring academics from other departments into the course due to workload commitments in their departments and the lack of no recognition for lecturing in another department. One university tried employing other academics as sessional lecturers, but that created resentment, administrative problems and an inability to be too demanding. The second issue, probably allied to the first, was that departments felt that if their staff were lecturing they should receive

a share of the course fee. Most course coordinators were not averse to this but it seemed that university bureaucracy, coupled with turf protection, was problematic. The last of the most common problems was that of interest. A number of academics, who might have been available, expressed little interest in becoming involved. In most cases, it seems, they saw minimum incentive and were too focused on their own research and teaching. There were obviously some exceptions, especially one US State University where, it seems, the commitment to transdisciplinarity has infused the entire university, but in general, amongst the universities surveyed, transdisciplinarity was honoured more in the breach than in the observance. This experience resonates with the findings of, Dyer (2003) who noted that "Competition for organizational human and fiscal resources, differences in practice and educational pedagogy, discipline-specific turf issues, differences in faculty workloads, and departmental perceptions of power and control are cited as reasons why the team concept remains rhetoric instead of reality in most educational institutions" (p.187). Pharo & Bridle (2012) would agree, as participants in their research "viewed the traditional discipline-based structure as a major obstacle to collaboration, mostly because of competition between disciplines for student income. Other barriers included the strong rewards of disciplinary specialization, the difficulty of sustaining teaching teams, and other university structures, such as inflexible timetables" (p.67).

The value in this exercise was the learning gained from discussions and shared experiences with course heads as far as dealings with the administration and students were concerned and that provided invaluable feedback into our process.

The Course

The curriculum development team now comprised a group of like-minded and interested academics at the University. The task was to participate in an internal, reflective and reflexive curriculum process informed by a review of existing activities, including a deep discussion as to what knowledge 'is' being created and 'could' be created for effective global environmental change, and the types of skills to be transferred in such course offerings for improved transformative education for global change. The initial developmental workshops now proved their worth as the team had not only bonded but had created a common language and a desire for the successful outcome of the course, irrespective of any personal benefit. Early in the process, the team had realised that if it was to be effective it would have to resolve and address many of the issues that would be faced by their students. It recognised the need for this experiential process for the team members first, so that, as they teach the program, they go beyond teaching about external content to also modelling an inter- or trans-disciplinary

process that has integrity with the intended outcomes of the program. As McClelland & Kleinke (2012) note, "Interdisciplinary teams generally speak the same language, understand the same written codes, and work with similar objectives" (p.1).

The focus of the course was, to quote from the course brochure, "to develop creative and flexible thinkers, decision makers who can effectively navigate complex, rapidly changing, non-linear social situations and systems". The structure of the course was laid down by university administration – a minimum number of contact hours, specific assessment criteria, the requirement for a research component and a series of specific and measurable outcomes. This provided the backdrop to the discussions. The team leader had worked hard to win over one of the deputy vice chancellors (one of the lessons learned from our overseas colleagues) and he helped facilitate much of the cooperation between the group and the various faculties and departments.

A key component of the course design was that content and process would have similar weight. The course design team, had learned to work together and adopt new thought and behaviour patterns and all graduates will need to take the same paradigm into the workplace, if the numerous global and environmental challenges facing society and the planet are to be in any way addressed.

The resultant course, which remains a work in progress, now comprises a foundation module made up of five to six block release weeks (usually four to five days in duration) starting with an introductory block focusing on climate and global change science and the issues around the topic and introducing the students to analytical tools and theories as well as to softer skills such a journaling, reflection and introspection. The second block focuses deeply on self-analysis and students are introduced to integral theory, understanding values and beliefs, spirited leadership and a number of theories around personal development and interaction. This is a lighter version of what the team had undergone at the beginning of the process, and serves to build strong relationships in the class, without pressurising students beyond their comfort zones. The remaining blocks in this foundation module focus on specific issues such as the economics or business of climate change, resilient cities, food security, adaption and development and similar topics. The actual topics, while broadly similar from year to year will depend on availability lecturing staff for specific content. The lecturer in charge of each block will usually provide some theoretical input at the commencement of the course to create the structure, but will include field trips, guest lecturers, case studies, knowledge cafes, and so forth and a fair degree of internalisation. These modules are where there is substantial

interdisciplinarity, as the lecturer and speakers from various disciplines consider a specific issue from a variety of viewpoints.

Students are also expected to complete four elective courses and these courses are available from masters' courses in almost any faculty in the university. In some instances, this involved the need for prior learning. This is an obstacle to interdisciplinarity, and underlines why so many interdisciplinary degrees are housed in a single unit. It means that, with some exceptions, students select their electives in areas where they have the credentials to participate and register.

Where real transdisciplinarity occurs is with the research component, which comprises fifty percent of the total mark and is therefore an extremely important element of the degree. Students select their topics and supervisor from anywhere in the university and are encouraged to take a transdisciplinary approach to their specific problems. While at present for supervisors this activity only forms part of the "academic citizenship" aspect of their workload model, work is being done to obtain recognition from the university that such activities are part of a normal workload.

The degree is now in its second year, having commenced in January 2014, and is going through its own changes and iterations as it develops. Has the original objective been achieved and is this truly transdisciplinary? Not fully, but there are certainly elements in the foundation module where this may be approaching this state, and certainly some research is heading that way. We started by saying that this is the story of a journey and it remains that.

Conclusion

What were the key learning points from this process?

Firstly, ignore the label; build the perspectives. While unsure as to exactly what sort of polydisciplinarity has been achieved, this definition of type is not important, so long as for each Global Change challenge that faces us we have as many perspectives as possible. The only value in being more than multidiscipline is for marketing purposes – everyone wants to be transdisciplinary.

Secondly, create resilient multi-disciplinary teams to address inter or transdisciplinary issues. To achieve this in academia we have to deal with egos and turf issues at an individual level and build teams with a personal openness and willingness to cooperate. As Bossio et al (2014, p.200) note, there is no literature setting out some kind of framework or route-map for understanding the complexities of the various disciplines and their own 'cultures'. Much of the literature recommends finding people with passion, purpose, perseverance and, to that, one might add paragon. As noted above, people start with enthusiasm and that slowly or quickly dies.

Adjunct to this is the need to have a course driver or leader with resilience and passion. Brundiers and Wiek (2011) and Pharo et al., (2014), amongst others, emphasise the need for a good facilitator. The team is fortunate to have a team leader who fully understands the system and who is known and respected by the administration. Without the ability to network and cajole and work the system, the degree would not be running today. The importance of this role cannot be emphasised enough.

In a business environment creating any kind of serious inter or transdisciplinary group will be much more complicated and it is difficult to see this working without committed encouragement from the top, and the employment of people with substantially different skills or backgrounds (and cultures?) to those already employed within the organisation.

Thirdly, one must have the correct structures in place. This means that in academia the stifling bureaucratic recalcitrance at an administrative level must be overcome. Workload issues and the flow of funds must be resolved.

In the corporate arena, perhaps the creation of a high-level specialised group within the organisation is the only way to manage the need for a transdisciplinary approach to the numerous issues facing organisations. It is interesting to see the major audit firms now employing people from a multitude of backgrounds in the sustainability area, including biologists, statisticians, economists, philosophy graduates and the like. One only has to see the level of research coming from the big audit firms to realise that they understand the need for transdisciplinary approaches to business issues, sometimes better than academia.

Fourthly, with regard to course design, produce something that is practical, can be implemented and gets through the administration hoops. The structure comprising a core module controlled and run by the team, complemented by a number of independent electives, proved appropriate. Each university has its own structures as was learned much from the research amongst other universities.

The course content was developed after consultation with industry, students and international research. Due to the university's geo-political position, there are a number of country specific environmental issues such as energy and water, and substantial socio-economic challenges, all allied to, causing, or resulting from climate change and its knock-on effects. That helped shape the content. The simple rule should be: know your environment; know your audience; match their needs.

The fifth learning was in teaching. There was a strong determination not to make lectures into "Death by PowerPoint". The result was the lessons became a learning experience for the students and, in many cases, the lecturer as well. A number of guest lecturers, some from within the

university, but most from outside were used. Each was given a brief as to the broad theme of the day and thereafter had free reign. As with every guest lecture, a large amount of learning also followed the talk as students raised questions and entered into discussion. Something learned from our overseas research was a comment that students do not want to hear the academic, they want to hear the guest. There was time for group discussion, for short exercises (design a resilient city in the next hour), tours into the urban environment. The response from students has been overwhelmingly positive. There were errors. Some bad guest speakers, pitching course content too high or too low, impractical ideas, and so forth, so one adapts.

Where to in the future? We have no idea where this journey will take us. We are not even sure who will be on the journey with us. What we do know is that the ride, right now, is stimulating and fulfilling and we hope to be part of it for a little longer.

Personal Postscript

I teach at a business school and recently offered an elective entitled "The Business of the Environment" for the MBA students, but it was structured so that half the students were from the MSc in Global Change, as this comprised one block in the core module as well. The content was based on Porritt's Five Capitals Model, with four days allocated to Financial, Manufactured, Environmental and Human/Social Capital and the fifth day set aside for a case study. Essentially each day comprised five sessions – an introduction, up to three guest lectures, all from industry, and then a closing session to discuss and reflect on the days learning, along with any clarification required. For the final case study the group was split in two syndicates, an equal mix of MBA's and MSc's, and given the task of using the five capitals to evaluate the case for or against shale gas extraction or fracking, a nice transdisciplinary assignment.

The student's responses reveal their experience, and I want to share some of this with you. These are all direct quotations.

- The first time I was informed that we would be doing a course at business school I was highly intimidated because I heard we would be placed with the MBA students. My experience from previous courses with business and industry executives has been that they have an "unnecessary sense of superiority". However I was pleasantly surprised in this course to meet decent people not only are they just as curious about business and the environment as we are but they actually have similar outlooks on the value of the environment.
- Today I got exposed to concepts I have learned before but in this case presented with a different point of view.

- I personally enjoyed this session as it gave me an opportunity to apply some of the theories I had learned about with the five capitals model. It was very interesting to get a real life case study which we could critically analyse.
- I found this lecturer very insightful especially the perspective on putting financial value on the natural capital. Most "bunny huggers" would burn him at the stake for doing this but he is trying to translate the importance of using our natural capital sustainably in a language that the non-environmentalist would understand
- As for the actual work it was definitely not easy arguing for fracking especially in the natural, human and social capital. It was a good experience to put myself in the shoes of the proponent and to view things differently.
- Truly one of the best group work experiences which is a raving review considering I am always partnered up with the worst of the worst. The group dynamics were good we all focused on the end goal and contributed towards getting there in the least amount of time. We listened to one another and as a result I got exposed to different perspectives which was quite interesting.
- This is one course that will shape the way I think and do things from now onwards.
- As an emerging young leader this course has represented a mindset shift for me; a transformation process of understanding the architecture of my broad responsibility to the place(s) I call home. Home is not just something to be preserved because of the environmental benefits it offers but its encompassing all things that add to and enrich my existence and that of my business operations.
- My learning is enshrined in how all the different topics came together and brought new understanding on building sustainable business.
- We were taught some basic finance - where I finally learn what equity really is (I suppose it's quite embarrassing that at the age of 26 I didn't know what equity is, but at least now I can tick that off the list.) I enjoyed how the finance was boxed up into 'where money goes' and 'where money comes from' it simplified things quite nicely.
- It was great sitting with a class of business-minded people and gauging their responses to environmental topics. I had so much fun and found it to be immensely interesting and meaningful.
- I was able to get a pragmatic experience of how sustainability is integrated in business, not only in South Africa, but globally as well.
- The course was wrapped up by very interesting topics such as carbon trading and human rights in planning for sustainable projects, these are vital topics especially in the South African setting.

- This course has given me an opportunity to engage with these complexities and come to appreciate the inherent tension between short-term value extraction to address immediate needs and long-term imperatives.

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