'Making a life': Academics and their roles in teaching, researching and community involvement

This is the third brief in the Centre for Teaching and Learning (or CTL's) 'Making a life' series, where we explore the attitudes and experiences of academics at SU, with regard to their roles in teaching, research and what is generally called 'community involvement'. The series was approached as a set of interviews with individual academics, which took the form of reflective conversations between a CTL researcher and the individual academic. Academics approached for the interviews were not sampled, but drawn from different departments and different disciplines, and tended to be those who had had some involvement with CTL. At times we have incorporated other texts into the brief, to enrich the sense of the activities academics engage in, in 'making a life'.

In this brief **Dr Nokwanda Makunda of the Department of Botany and Zoology** is interviewed by Dr Catherine Kell, a researcher commissioned by the CTL.

"All the research projects that I have ever been involved with have always been applied. It's always been important to me to be able to do projects that are linked to industry or society because if I thought about changing careers I needed to be able to fit in into another environment – that's the only way I could see myself being relevant. But I also wanted to do something that would be good, to give something back."

Dr Nokwanda Makunga is a Senior Lecturer in the Department of Botany and Zoology, having moved to Stellenbosch University in 2005. In 2010/2011 she was awarded the TW Kambule Award for a distinguished young black female researcher for her work on the sustainable use of biodiversity resources. She was also President of the South African Association for Botanists during 2011/2012. The starting point for the discussion was how academics see the relation between the roles they can play in teaching, research and community engagement. As a way into this, Nokwanda explained how she came into her role as an academic:

NK: I think it's interesting if I trace a path. My Dad was a botany lecturer at the University of Fort Hare so I grew up in and was always exposed to an academic environment. That makes it much easier for someone to assimilate themselves into that environment. If you came from a rural setting in the Eastern Cape it probably would have been very different. You might not understand the value of education, for instance. So my situation is quite unique if you look at it in terms of the greater population of black people in South Africa. When I went to university, I studied biology and initially I thought I would do this to somehow fit into industry. I always thought it would be important to use science or biology as a way of building the economy.

I did microbiology but didn't enjoy it so much because the lecturer was not very good. That was a very good example for me of how not to be as a teacher! I compared this lecturer to an amazing teacher that I had at school who was one of the people that was instrumental in channeling me to taking biology as a career. So those two were polar extremes!

CK: So how did you actually become an academic?

NM: Well, I eventually ended up in botany and my professor suggested that maybe it would be a good idea for me to be an academic. He got me into a program where they identified young people and then employed them as junior lecturers. So I was actually lecturing to my peers who were also in the Honours and Masters program. That was quite unique in terms of learning to teach! I really enjoyed teaching, the interaction with other people and so it was almost automatic

for me to carry on. But I also enjoyed doing the research and so when I finished my Ph.D. I made a conscious decision to actually move away from the institution where I had done all my studies and from where I had been mentored into building a life in academia. I felt that if I didn't move I wouldn't be able to establish my own program and be able to stand on my own, so that was very important to me. That's how I ended up in Stellenbosch.

> CK: So you already knew that as a young academic you needed to establish your own research program, at the same time you were involved with and reflecting on teaching. Did you learn about the importance of having a research program through your Ph.D. largely?

NM: I learned that through my Ph.D. If I had stayed in my previous position I would always have been the understudy. The department always gave the junior lecturers all these public functions to do, which pulled you away from the research. But then at the end of the day they would say: 'what happened to your publications?' 'Well, sorry - I organised Open Day; I organised the Royal Show; I organised the open gardens.' All of these types of activities are important in highlighting the department but in the end they don't really count for your academic career. So that was one aspect that made me realise I needed to get out of there! Also I was quite interested in trying out my own- I've got ideas I would like to test and I needed to be able to apply for grants to test my own ideas. Then I came to Stellenbosch and started a new research area within the department.

> CK: So which of the roles was dominant at that point in your mind? Did you see yourself as a researcher wanting to discover new knowledge? Or did you see yourself as a teacher or did you see yourself as focused on engaging with the community?

NM: That's actually quite a difficult question to answer. In many ways when I started in the career my main focus was 'I've got to get this teaching done etc. but at the same time I really need to be able to get my Ph.D.' Those were my key goals. However I was not interested in doing a Ph.D. project that did not have a direct link to the broader society. Each the projects that I have been involved with haven't been simply basic science. They've always been applied and for me it's important to be able to do projects that are linked to industry or linked to our society because if I thought about changing careers I needed to be able to fit in into another environment, and that's the only way that I could see myself being relevant. But I wanted to do something that would be good, that would give something back.

> CK: Do you think you're disadvantaged at all in research terms by not going for more basic science?

NM: I don't think so. I think I enjoy my work too much to feel disadvantaged. If it wasn't applied and didn't require lots of lateral thinking and interfacing different roles and aspects I would probably find it a little bit boring. I really do like the fact that there are different roles and aspects and layers to what I do. I think my personality just lends itself to that.

> CK: Can you tell me more about your role as a researcher, as a person trying to discover new knowledge? What exactly you are doing and how you feel about that?

NM: I consider myself a medicinal plant biotechnologist. A lot of the plants we work on are from the Cape region are very important to indigenous communities. They have been used for millennia for healing and still play a significant role in terms of cultural and economic aspects. So I interface with herbalists and with traditional healers and other people that are within the medicinal plant sector in South Africa. The species that I work on are commercially significant. They are amongst the top commercial herbal species in South Africa.

The work I do is three-pronged. We try to understand the chemistry of those plants and to understand how to grow these plants so that they are domesticated. We also try to find alternative ways of accessing the metabolites, which are the key agents for health. We do a lot of plant-tissue culture which involves growing plants in little bottles. This could facilitate providing alternative sources of these plants and is very important for conservation strategy. Many are harvested from the wild and if this harvesting continues unregulated and uncontrolled it's going to end up threatening that biodiversity. So we use the tissue culture system as a way of conserving some of these important species. Then we also alter conditions either through changing biotic and

abiotic factors or we actually alter the genetic pathways and regulation of those pathways. This allows us to do two things. Firstly, it allows us to maybe increase the amount of key compounds that are there, and secondly, it allows us to have a tool whereby we can actually study metabolism. That's where the basic research comes in.

Then the other work that we do is really based on testing. This is phytochemistry or pharmacology, which involves testing the plants we would have produced by tissue culture or genetically altered. The plants that we've genetically altered through metabolism are sometimes more productive than the non-altered material. So we use three different sets of tools: plant tissue; biotechnology and phytochemistry as a way of understanding at the plant metabolism level.

So this work really brings what might seem as two very separate worlds together. We are informed by traditional practices that are based on folklore but we use technologies which are current and in some ways under-utilised to study medicinal plants in an African context. These biotechnology tools are developed in Europe and North America, there's a lot of emphasis on biotechnology in westernised developed countries. But the developing countries hold not only the biodiversity in terms of medicinal plants but they also hold the knowledge about plant use. Developed countries in the West - their biodiversity is low and their knowledge of plants in the developing world from a cultural point might have been lost through westernisation. So that's what our work does. It really brings together these two systems.

In South Africa you have a system where there is an informal medicinal plant sector which is key to millions of people. They estimate that 70 -80% of our population is reliant on medicinal plants either for health or livelihood security. People will either be selling these plants, collecting these plants and selling them to other people or else they'll be collecting them in order to use them for providing a health resource. Sangomas are actually are pharmacists and doctors who are able to generate money through using medicinal plants and indigenous knowledge. On the other hand you have a formal sector where natural products are becoming more and more important as a health resources, especially ones in South African markets that are based on South African plants. You get "sutherlandia" different types of "pelargoniums". You've got "devil's claw". "Rooibos" is probably our biggest commercially important species worldwide but there are four thousand species people are using on a daily basis that remain underexploited from a commercial point of view. So there are these two worlds that run parallel but there are points of interaction.

> CK: This sounds really inspiring and exciting! It seems to enable you to connect your research with teaching and inspire your students. It suggests that these distinctions between the three roles are not distinct.

NM: Yes, and it's also fun! What we're doing seems sometimes very high-tech but I think in the end what we are trying to do is really to destigmatize medicinal plant cures and indigenous knowledge, and bring what some people regard as a low or simple technology to the 21st century.

> CK: What I'm finding fascinating is that you're bringing these cutting edge high technologies to a system which is very unregulated and on the whole quite mysticized, so there is a real sense of engagement. It's not a kind of short feedback loop to 'community involvement' but a much deeper connection at the level of epistemologies.

NM: People tend to regard this system as something that's very simple - but it's not. I think traditional healers actually have a lot of information and oral histories have kept this alive for generations. What is fascinating is that this is ancient knowledge but it's taking place in a realm that is very modern. So the healers and herbalists and the bush-doctors have to deal with current contemporary medical diseases which weren't there in previous centuries. There are cancers, increased levels of TB, diabetes - all of these diseases that have come with westernisation and they have to use their knowledge which has come from generations back. It might seem simple but they need to be able to alter that knowledge to fit the problems they are facing today. That makes indigenous knowledge very dynamic. It can't remain static otherwise it's going to become

unimportant. It's amazing how they are able to alter their combinations in order to be able to suit today's problems. Actually when they consult with patients they treat each one as an individual so they make a mix that is specific for you. This is not what you get from a westernised health system.

Even in mental health traditional healers play many roles. They are often psychologists. You might walk in there and say "Ooh - I have a heaviness in my stomach" and it might not be something physical. Although it might feel like that, the case may be that you've actually got depression. So I think we often see these practitioners as very simple people that have very simple knowledge whereas it's very complex and actually very deep knowledge.

CK: Is it very valuable that you are a first language isiXhosa speaker then?

NM: I speak isiXhosa but funnily enough I don't work with too many isiXhosa speakers because a lot of the plants that I work on are plants that grow in the Western Cape. They have been used by the Khoi-San people and so I have a lot of interaction with Rastafarian herbalists and Khoi-San herbal practitioners. These are Afrikaans speakers but everybody is eloquent in English actually.

CK: Thank you for that very eloquent overview of your work. I can start to see how the concept of community engagement is something that is completely integral to your research, to your whole academic project. Can we come back to the teaching a bit? Can you talk about what you think characterizes you as a good teacher?

NM: My biggest trump card is that I have the ability to explain what are really difficult concepts in the simplest ways. I always use different techniques and tools because I realise that people are different and so you've got to be able to reach them in different ways. I try and make my classes interactive because learners today come from a very visual, highly stimulated, socio-cultural background. Everything is interpreted for them. If you listen to a song, there's a music video that goes with it. Playing games - it's video games so it's very visual. We live in a world that is sometimes over-stimulated so if you don't try and stimulate all these different senses then you become very static and you can't actually reach them. I try and use lots of visual imagery when I explain things in class. As scientists we interpret things in different ways. Sometimes they might have to physically interpret what they see in their heads onto some kind of platform or format.

We also have practical sessions and do excursions. So for instance all my prac-work is well aligned with my lecture material. There are no practicals that don't fit into what I teach in class. I give them lots of opportunities to test themselves. I have a system where we have a set of questions which are placed on webCT and then they have the opportunity to formulate answers to this then they can bring it over to me and I look through it to give them a feeling of what they would get in an exam situation, for instance. I'm also pretty approachable and students really like that. They want to be able to come to your office and talk about a problem.

CK: What in the university facilitates your actual teaching practice? And what is it that would help you become an improved teacher?

NM: There are different things that really assist. Technical support. Sometimes if I have a really strange or crazy or weird idea there'll be people that'll buy into that idea and then they will be able to assist me to develop and interpret that idea. The Center for Teaching and Learning also plays a key role because there are lots of programs that are available as resources and sometimes I bounce ideas with people from CTL: 'Do you think this is going to work if I do it or how can I change this idea to fit a class of 250 students?'

For instance, I have a problem now with trying to set up some kind of electronic system to reach Honours students that might be out in the field. So it's really good to have CTL people, because they have been working with those kinds of systems for a long time. And we've got great technical support in our department. A lot of the technical assistants that are linked to the courses are excellent and they assist with administrative duties. If you've got to put marks in for 350 students it can take you lots of time!

I'm always trying to think of new ways of presenting information. I reflect on what I did in previous years and whether it worked or not and then I'll either alter it or I'll try and think of a new way of doing it. I really try to be creative about the way that I teach. The main thing that the PRONTAC

made very clear to me was that if you want to teach and all you do is stand in front of the class and deliver information, students will learn it in a very superficial way. It ends up on the surface whereas if you engage them in different ways it actually sort of staples that information.

PRONTAC provided a very good stimulus because I think that as people in science we come from a very ... 'the teacher stands in front of the class - you give the information - you discuss pathways'. That's very traditional teaching! PRONTAC opened up different ways of teaching. That was pretty important for me. But it's time consuming. I don't think everybody can use the different practices and approaches. And that time you're investing in thinking up these weird and funky ways of doing things could also be the time you could be thinking about your experiments and doing research!

> CK: So does the time needed to develop new ways of teaching provide an obstacle to innovation especially in a department that's heavily weighted in terms of promotion on the research aspects?

NM: I think that culture is changing. There are other professors in the department that interact with other dimensions of the university or academic life who have been promoted. I think that culture is changing.

> CK: So you don't feel a tremendous kind of split in terms of the pressure on you to publish internationally?

NM: Oh no, there is pressure! You have to be able to be the teacher and the researcher. You've got to be good at least at those two roles. In our environment your community service can sometimes be within your area of specialisation so if you serve on editorial boards; if you are involved in organising conferences; so more within in-field community outreach work - that's also considered important. There are a few people in the department who really do work out in the greater community.

> CK: But it seems that your work, in a very integrated way, facilitates 'community outreach'?

NM: Yes, it interfaces with different communities so that in many ways it lends itself to that absolutely, without having to make a specific effort. I've also had projects, for example, an international student who wanted to do a project in Phillippi on home gardening and school gardening and influences in terms of plant conservation and medicinal plant use. This facilitated direct interaction with school learners. I also get learners coming to the department for school visits and past students bring their learners. One came with her grade 11's and we spent a whole day doing experiments learning about biotechnology, medicinal plants. So that's a great platform for that type of community work. And that's also directly linked to good teaching - if I had been a really terrible teacher I don't think she would have approached me. I think also good teaching sits at the centre of being a good researcher. You need to be on top of your area of specialisation so you can excite students about your research and then that pulls them into your postgraduate school.

> CK: Are there any particular kind of tensions or issues here, for example, the pressure to publish more?

NM: There is definitely pressure to publish more. If I don't publish I'm going to perish because on an international scale it doesn't matter how great my teaching can be. It's only reaching a certain amount of people. The only aspect that really profiles my career internationally is my papers. That's where you get lots of pressure and in terms of promotion you do need to publish. I've sat on committees before where lecturers were not allowed to be promoted because they hadn't been producing the number of papers that they should have been producing.

But I think that there was a time when people who only had research careers would be promoted. Now I think the avenues are opening up to be promoted for other aspects. Some people are getting more into biological education - publishing in biological education - so this allows them to become promoted.

CK: So what is it in the university that facilitates this?

NM: CTL helps with this. The FINLO programs that CTL offers are also seen as very useful, and the seminars and conferences throughout the year. And there is a lot of support at Stellenbosch for each of these three roles - a lot more than in other institutions. We have a well organised research office at Stellenbosch. And more and more the public intellectual is becoming a well-recognised key factor in linking the university to society. I didn't get the same sense of coherence amongst all of these different departments or units when I was in my previous job. Here when I got my job they told me I have to go and take the PREDAC course. That was a way of highlighting how important teaching and learning really is to the Stellenbosch community.

CK: Can you tell me about a specific curriculum innovation that you've been involved with?

NM: The plant physiology course that I teach is a really unique situation because you've got different age groups, an amazing diversity in the class and different biological streams. It's really challenging to be able to reach all those people. Some of the students are forced to do that course so they really don't have an option. That in itself - they come in there with an attitude of "why do I have to do this plant physiology course?"

I take over from a sub-module which involves lots of maths and physics and often biology students opt for biology because they feel they're not good at maths and physics and chemistry. They are faced with this module which is biological but brings in lots of elements that are related to physics and chemistry and maths. So they see this as a bit of a block and I've got to try and allay their fears. If they feel that the boat is sinking I need to help them feel there is a lifeline here.

Each year that I've taught it the student group and the culture within the class are so different! I have to be able to assess that right at the beginning. It sets a tone for the rest of the term so I can't just cut and paste from what I did last year to the next block of people. I cover the same material but every time I've got to tweak it. In some ways it keeps the module alive for me. It's time consuming because I've got to think about how to tailor it. From the first week that I see them I try to draw from them what it is that they are interested in. I try and understand something about their personalities. That, in itself, facilitates me being able to change and swap it around. It's a very fluid system that we are actually working with.

It's been interesting to see how the evaluations for that course have progressed throughout the years that I've taught it. I went from 85 at the beginning to 92 last year. But some years you have theory strong groups that are highly competitive. The students will run in and say "why did I not get 90 for that essay because I thought I did well". So I have to present the material so that it really tests them. In previous years they've been a bit weak so I've had to try and draw them out to get them to the standard.

CK: Can you mention any specific interesting approaches or techniques you've developed?

NM: I have this self-evaluation system. We usually do it in class in a group environment and it gives them a feeling of how I expect them to evolve their thinking. They write out their answers and then I take them in and correct them. Then I tell them about points that might be weak so I really facilitate their ability to be able to formulate answers. I'll give them principles based on the topic we're discussing and then ask them an experimental question which needs them to apply their knowledge. I'll give them the opportunity to take that home. Then they come back and we discuss different options that they've each presented. That type of system allows them to understand that I might have a very rigid idea of how I think that needs to be answered. But once they start to discuss different ideas they realise there isn't just a right or a wrong, just different options of approaching this particular problem.

I also use a system where there's a lot of self-assessment involving problems that are placed on the web. They are more than welcome to formulate questions and answers to these problems and I say to them "I don't want to take that stuff in but it's your responsibility. I'm giving you the option to hand it in to me but it's your responsibility!" I really want them to take ownership of their own learning. Then if they do hand it in I'll sit with them and give them feedback.

CK: So it's not part of the actual formal assessment?

NM: No it's not. I get lots of little essays - little scribbles. I make time for it but the only little trick to that is that you don't hand it in to me the night before you write the exam because by then it's too late!

CK: I think the way in which you've shown that community involvement can happen within the research process itself and at a much deeper, almost epistemological level than we often think of, is incredibly valuable. So you've helped us reflect on the discourse we use within the university and how that can take on a life of its own. So that even the concept of 'integrating the three roles' does not work so well, when you see how deeply integrated your work actually is. Thanks so much, Nokwanda!