



Curriculum in the context of transformation: Reframing traditional understanding and practices



RHODES UNIVERSITY
Where leaders learn



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CONTENTS

INTRODUCTION	4
What is curriculum?	4
Why a focus on curriculum transformation?	4
Student alienation and the quest for epistemological access	5
Selection of curriculum content	5
Some pedagogic considerations	6
Conclusion	6
References	7
CASE STUDIES	8
1 A critical pedagogy of place in Journalism and Media Studies	8
2 Living in a university residence: what is the curriculum?	10
3 Engaged and critical pedagogies to incite learning – like inciting a riot	12
4 Enabling epistemological access in science: access to what?	14
5 Scaffolding student learning of complex content in Pharmaceutical Chemistry	16
6 Using languages for transformative teaching: small steps that can lead to big moves	19
7 History of Africana intellectual thought: decolonising the curriculum in a colonial institution	21
8 Contextualising multi-faceted problems in Chemistry	23
9 A pedagogy of mutual vulnerability to enable epistemological access for students	25
10 Teaching for reflexivity in a third year Information Systems course	27
11 Making statistical ideas accessible to students in a Statistics service course for first years	29
12 African languages and curriculum transformation at Rhodes University	31
13 Teaching Africa differently: the question of alternatives and the problem of pedagogy	33
14 Teaching economy and freedom in the era of the EFF	35
15 Developing meta-thinking: a creative approach to teaching Mathematics	37
16 Finding solutions to complex social problems using trans-disciplinary research approaches	39
17 Between the student protests and the imploding journalism industry: thoughts on curriculum and pedagogy	41
18 Getting students thinking and talking about leading a good life	43
19 Group work, diversity and learning in Environmental Science: issues and challenges	45
20 Exploring the possibilities for an African science curriculum	47

Introduction

Curriculum is central to the pedagogic project of the university, and like all aspects of education, it is underpinned by values, beliefs and ideologies. Curriculum choices are made based on what disciplines and professions value and what academic departments and / or individual academics find interesting and believe to be useful for students to learn and know. Decisions about how to teach and assess curriculum knowledge is very often made on the basis of lecturers' preferences and beliefs about good teaching and learning. At the current conjuncture, academics in South African higher education are also called upon to take into account a number of transformation imperatives when making curriculum choices. The case studies in this collection present examples of how some lecturers at Rhodes University are thinking about curriculum in the context of current educational concerns and show some of the ways in which they attempt to ensure that greater epistemological access becomes a reality for more students.

By Jo-Anne Vorster

What is curriculum?

A narrow understanding of curriculum is that it is simply a list of topics to be taught. However, a more nuanced conceptualisation is that curriculum includes what is taught, how it is taught and assessed, as well as who the teachers and the students are. Of course, the nature of disciplinary knowledge and knowledge generation processes are integral when making decisions about the selection, sequencing, pacing and assessment of knowledge in the curriculum. In other words, the curriculum is not (necessarily) a given and it is possible and necessary to take account of contextual factors in developing the curriculum. It is self-evident that curriculum is value-based and that teachers' beliefs about the discipline, the nature of knowledge, the nature of teaching and learning and their understandings of the purposes of assessment will all play a part in curriculum decision-making. The kind of learning that teachers want students to engage in will frame many of the curriculum choices they make.

At Rhodes University, where the majority of students are black, but the majority of academics, and particularly senior academics, are still white, it is important to recognise the effect of this demographic pattern on students' perceptions of themselves as knowers.

A large proportion of students drop out or fail and many do not complete their degrees in regulation time. In part this is because many find it difficult to make sense of what is required of them. Paying attention to how one engages students, both in the discipline and in relation to their learning, is a key aspect of curriculum development.

Another issue to consider when selecting curriculum content and pedagogic processes is what kind of person or knower one wants the student to become through engagement with

the curriculum. Barnett and Coate (2005) argue that in a supercomplex and fast changing world, curricula should pay attention to the kind of knowing, acting and being the student / graduate is being prepared for. If teaching and learning processes are to contribute to the cultivation of students and ultimately graduates who understand and can operate in both local and global contexts, then curriculum content and processes need to reflect this.

Why a focus on curriculum transformation?

The Rhodes University Equity and Institutional Culture Office convened a conference on (Re)Making the South African University: Curriculum development and the problem of place which was held in April 2015. The purpose of this conference was to explore the relationship between the curriculum and the "geographical and psycho-social place" from which it emerges. This conference brought to light the deep-seated dissatisfaction experienced by some Rhodes students with what they are taught and how it is taught. Students who attended the conference were critical of the mainly western / northern content of their curricula. These students argued that it was time to decolonise the University, including the curricula.

The call for the decolonisation of universities and curricula in particular was also a feature of the 2015 Fees Must Fall protests. As most academics have been schooled in and work from western knowledge traditions, it is important to examine whether it is necessary to reconsider what is taught and how, and what it might mean to decolonise the curriculum. To facilitate such deliberations, CHERTL initiated a series of Curriculum Conversations and invited academics who had been thinking about curriculum transformation to discuss their thoughts on

the matter and to share what they had been doing to change their curricula, including their pedagogic and assessment practices. This collection of case studies emerged from lecturers' presentations at these Curriculum Conversations.

Over the two decades that followed the new democratic dispensation in South Africa, there has been a major focus on the transformation of the higher education context in policy documents and in higher education discourse. Prior to 1994, the higher education sector was divided along the intersecting lines of race, language and ethnicity. After 1994 the task was to create an integrated higher education system to serve all the people of the country. On the one hand we can claim that universities have indeed transformed. The majority of students at all public universities are now black, and there is some progress in changing the demographic pattern of the academic staff complement of universities. On the other hand, student access and success still leave much to be desired.

Approximately 19% of 18 – 24-year-old South Africans now attend university. This is low in comparison to most other countries. The relatively high numbers of black students in our universities hide the fact that only approximately 16% of 18 – 24-year-old black youth are enrolled in universities (CHE 2016: 6). The South African higher education system is not only characterised by low participation; failure and drop-out rates remain high. Currently only about 27% of students entering university for the first time complete a first degree or diploma in regulation time, with one in four students in contact institutions failing or dropping out before their second year of study (CHE 2016: 145). Success and failure in South African higher education remain racially skewed, with black and coloured students accounting for significantly higher dropout and failure rates than white and Indian students.

There are a number of explanations for this state of affairs. It is very clear that schools do not prepare students for university study. One can, however, question whether it is the role of schools to focus their efforts on preparing students for university study when the majority of pupils enter other sectors of post-school education. Another very important reason for widespread student drop-out and failure is that many students feel alienated from the culture of academia.

Student alienation and the quest for epistemological access

In part students feel alienated because the nature of academic knowledge and learning are foreign to them. As argued by Bourdieu & Passeron (1994), academic discourse is nobody's first language and the majority of students have to be systematically introduced to the literacies of the various fields they study. This entails, learning new ways of engaging with knowledge, as well as new ways of learning, including reading, writing and relating in university spaces.

The alienation of so many students from the university and its culture also stems from what is taught and how it is taught and assessed. South African universities have emerged from the British university tradition, and our institutional structures and ways of being still reflect this. The knowledge traditions from which most disciplines and lecturers draw their curriculum

content are western / northern knowledge traditions. This is understandable, as those are the traditions from which much of the powerful knowledge in the world has emerged and those are the traditions in which the majority of academics have been schooled. These traditions, for the most part, do not take account of other world views and even where specific knowledge has its origins in African or other non-hegemonic traditions, this is not foregrounded. For many black students this creates a sense of "a hierarchy of superior and inferior knowledge and, thus, of superior and inferior people" (Grosfoguel 2007:214). How students experience the curriculum is important, as education is both an epistemological and an ontological project. In other words, as students engage with knowledge, they become different kinds of people. However, if they are alienated from the knowledge and from teaching and learning processes they may struggle to learn.

The task of university lecturers is to enable students to gain what Wally Morrow (1993) termed epistemological access to the disciplines. This means that curricula, teaching and assessment should be designed in ways that induct students into the knowledge of the field, including the ways of knowing that will contribute to academic success. As noted above, succeeding at university has up to now remained a distant dream for the majority of university students. It is perhaps time that, as a university community, we think seriously about the role we can play in engaging students in learning the disciplines in ways that meet the legitimate learning needs of our students (Scott 2009).

As noted above, students and some academics have recently been calling for the decolonisation of universities. This includes making institutional environments more welcoming to black students who feel especially alienated from the culture. In the teaching and learning context this means paying attention to the content of curricula and asking some searching questions about our choices. Questions such as:

- What knowledge traditions are the content of courses drawn from?
- Why those particular knowledge traditions and not others?
- Is it possible, given the particular field, to draw knowledge from other traditions?
- Can examples of how the knowledge relates to African contexts be included?
- Is it possible to show how the knowledge is linked to the histories / experiences of different students in the class?
- In what ways does the knowledge validate / challenge students' experiences / lives?
- Are there aspects of the curriculum, pedagogy and assessment practices that some students may find alienating?

Selection of curriculum content

During the course of 2015 students from historically white universities have made it clear that they feel alienated from institutional contexts, from the knowledge they are taught and from some of the ways in which they are taught. They are calling for the decolonisation of the university. What might it mean to decolonise the University and the curriculum?

In a presentation at the 2015 Academic Orientation Programme the DVC: Academic and Student Affairs at Rhodes,

Dr Chrissie Boughey, introduced lecturers to a theoretical framework, *Decolonizing The Mind*, developed by scholars from the International Institute for Scientific Research. They have identified five dimensions in which the effects of colonisation are evident in previously colonised spaces (<http://www.iisr.nl/en/over-dtm/>). Boughey suggested that a starting point for adopting a decolonising gaze in relation to curricula might be to question the extent to which the curriculum serves or challenges the fact and the effects of each of the five dimensions of the *Decolonizing The Mind* framework. Boughey posed a question (in italics below) related to curriculum or pedagogy in relation to each of the five dimensions.

- The geographic dimension: the rise of a global system in which people, nations and states have been destroyed, relocated, or redesigned and world wide (forced) migration of people has been set in motion. The global world was divided in one subservient geographical part that served the enrichment of another geographical part.

How does the curriculum serve or challenge this?

- The economic dimension: the rise of a capitalist world economy with new international industries based on a combination of “free” wage labor and forced labor in different forms, the creation of new economic systems and the integration of existing economic systems in one global colonial and capitalist world system.

How does the curriculum serve or challenge this?

- The social dimension: the organisation of social relations in different societies based on race, skin color and ethnicity in which the white European culture socially dominated and still dominates the other cultures. An essential part of these relations is the development and maintenance of a social layer of collaborators among the colonised people with the white colonial power.

How does what we teach serve or challenge this?

- The political dimension: the creation and maintenance of political, military and judicial structures and institutions to control, repress and break any resistance against colonial domination and maintain its domination.

How does what we teach serve or challenge this?

- The cultural dimension: the creation of mechanisms of colonizing the mind (mental colonialism) and structures and institutions that provide legitimacy to colonial relations. Important institutions are the institutions of knowledge production (universities, research institutes) and knowledge distribution (educational systems, media, cultural institutions).

How does what we teach serve or challenge this?

Some pedagogic considerations

Boughey challenged academics to consider how the ways they view students either serve or challenge the five dimensions of colonisation outlined above. For example, it is important to interrogate the extent to which the ‘best practices’ attributed to teaching and learning discourses from the north are influenced by these five dimensions. These best practices include learner-

centred pedagogies and the privileging of engagement with written texts. Bernstein (2000) argues that learner-centred teaching hides what is required in the teaching and learning process and as such may further entrench the privilege of students from good schools while undermining the prospects of students from poorer social backgrounds. Furthermore, one could consider whether other forms of demonstration of learning can be successfully employed in some contexts. If written texts are privileged, it is necessary to make the processes of engagement with such texts explicit. It is also imperative to make explicit to students the processes of producing written texts for assessment purposes (Quinn & Vorster 2015).

The University’s location in one of the poorest provinces in the country at the southern tip of Africa offers opportunities to develop curricula that will enable all the students at Rhodes University to gain an education that they value and that makes it possible for them to thrive (Boughey 2015).

Conclusion

The case studies in this collection, although not specifically focused on decolonising the curriculum, all address some of the challenges faced by higher education teachers who wish to create the conditions for the majority of students to achieve academic success and to thrive in the process.

The case studies are by lecturers from a wide range of disciplines and contexts, including African Languages, Botany, Chemistry, Education, Environmental Science, Extended Studies, History, Journalism and Media Studies, Information Systems, Pharmaceutical Chemistry, Political Studies, Psychology, Mathematics and Statistics as well as from the Institute of Water Research, Extended Studies and the residence system.

Some of the case studies provide examples of how lecturers include curriculum content from Africa and about Africans and examine contemporary socio-political issues and contexts using (new) theoretical approaches more congruent with those issues and contexts. Others show how lecturers teach disciplinary content and then encourage students to consider the technological, social and ethical implications of the application of such knowledge. A number of case studies challenge students’ beliefs and values about issues related to race, gender, ethnicity, language, identity, and so on. Yet others consider ways in which pedagogy can be used to promote epistemological access to disciplinary knowledge. A few case studies provide suggestions for how students can be encouraged to develop the dispositions to be successful scholars of their disciplines. The case studies therefore point to the importance of paying attention to knowledge as well as to knowers in shaping the curriculum.

Disciplinary knowledge and systems of thinking provide students with powerful frameworks and tools for thinking about and explaining the world. Expanding the canon where possible, opens up the possibility for some of the hitherto hidden aspects of the world to be examined and explained.

This set of case studies is not presented as examples of best practice. The case studies are offered as prompts for rethinking the curriculum choices we make so that higher education

can offer more students access to the goods of a successful university education.

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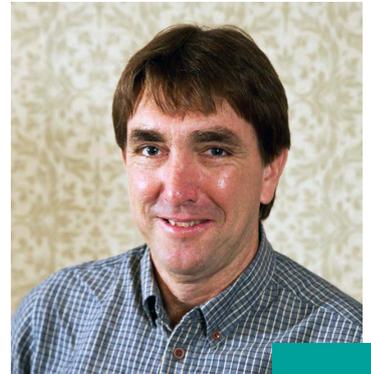
A critical pedagogy of place in Journalism and Media Studies

In South Africa only about 0.7% of the cohort who start out in grade one complete a first degree. It is thus fair to say that university students make up a very small elite component of the South African population and as such many of them do not have knowledge of the conditions under which the majority of South Africans live. This is of particular concern for the Department of Journalism and Media Studies where students are educated and trained to gather news from and write about many different topics emerging from many different contexts, places and people.

To prepare them to do this Rod Amner devised a course to introduce first year students to the diversity of places that students come from and that make up the small town of Grahamstown in which Rhodes University is located. Rod structured his course around what is termed a critical pedagogy of place (CCP). In his course Rod created pedagogical opportunities for students to experience and make sense of different localities and the people who inhabit, work and play in them. This place based education (PBE) makes it possible for students to understand 'the unique strengths, histories and characteristics of local places' (Graham 2007).

The CCP offers an alternative to curricula (including teaching and learning) that are often decontextualised and divorced from community life. In addition, many traditional curricula focus on individual learning that prepares students to take their place in the competitive global economy. A critical pedagogy of place, on the other hand, offers students opportunities to understand their privilege in relation to others. They get to understand people and places and develop empathy with and compassion for others. This kind of engagement with people and places opens up the possibility for students to contribute to achieving the goals of societal transformation.

Rod and his colleagues aim to cultivate journalists who have the awareness, knowledge, skills and values to contribute to a more just and sustainable future. To this end Rod structures pedagogical opportunities for students to get to know various localities and the people who live, work and play in them, so that students could learn to recognise societal inequalities, disruption and injury, and to consider what actions may make it possible to create more just conditions. In addition, they can learn to pursue social action that can improve the lives of others and lead to just and sustainable ways of life (Smith & Katz 1993).



Rod Amner
Journalism &
Media Studies

Goals of teaching a critical pedagogy of place

- To encourage students to reflect critically about themselves and the places they inhabit
- To enable students to develop a nuanced conception of place
- To encourage students to get to know a diverse range of people and places
- To develop an understanding of how people make meaning of their place in the world
- To examine how different groups of people experience and make sense of the same phenomenon.

HOW THE COURSE WORKS

The course starts with a focus on the classroom itself as a place worth paying attention to. Students who pack their suitcases in anticipation of coming to Rhodes, do so in very diverse places. They bring that profound diversity into the classroom, but this diversity is often opaque to many who work in the pedagogical space. Students are asked to write anonymous Postsecrets (to provide insight into their personal struggles) and to write a place-based narrative about where they packed their suitcases. Students then read each other's secrets and narrative, so that they might develop a deeper appreciation for the diversity in the place called the lecture theatre.

Next they engage with places on the Rhodes campus. This is followed by immersion in other parts of Grahamstown. Students are given tasks that require them to make links between the local social, ecological, cultural and historical contexts of Rhodes and those of the town. They write profile articles on fellow students and have to take note of the diversity of Rhodes staff and students.

The journalistic tool of 'civic mapping' used by journalists to understand the complex strata of civic life and the interplay between these various layers in different communities is employed in this course to help students develop a sense of what it means to be located in a particular place such as Rhodes. To achieve this they observe and understand the norms at play in various spaces through becoming part of conversations between groups; they take note of how different groups describe their personal concerns and to get a sense of what people regard as the 'big issues' in their lives. While they conduct this fieldwork, they explore the history, politics and sociology of Rhodes in class.

In the next phase of the course students are taught to produce journalism that attempts to integrate the concerns and viewpoints of citizens into their stories.

In 2015 the *mapping phase* of the course took place during the height of the Rhodes Must Fall campaign, while in 2016 it happened during to #RURreferencelist protests. This provided an ideal opportunity for students to enquire about citizens' thinking in terms that were meaningful to them. Students discovered that debates about transformation of the university dominated discussions in the spaces where people lived, worked and played. In the *second phase* of the course students produced journalistic pieces that went beyond reporting; they were able to construct stories that educated the public and that stimulated debate and public deliberations that included the search for solutions. Thus the critical pedagogy of place employed in this course, provoked confrontations with dominant ideas and enabled students to recognise instances of disruption and injury and to identify ways to address their causes.

A critical pedagogy of place can create profound discomfort, but in the process it can create deep knowledge of places and people.

Further reading

Graham, A. 2007. Art, Ecology in Art Education: Locating Art Education in a Critical Place-based Pedagogy. *A Journal of Issues and Research*. 48 (4): 375 – 391.

Mpofu, N. & Amner R. (paper under review). 'Doing things that make you feel valuable': Students' experiences with a critical pedagogy of place Journalism curriculum at a South African University. *Journal of Education Studies*.

Smith, N, & Katz, C. 1993. Grounding Metaphor: Towards a Spacialized Politics. In M. Keith and S. Pile. (Eds). *Place and Politics of Identity* (pp. 67 – 83). London. Routledge.

Points to ponder:

- A critical pedagogy of place can enable students to develop their knowledge and understanding of contexts and it creates opportunities for critical inquiry and reflections on critical real-life issues. It can foster opportunities for students to challenge dominant ways of thinking and to generate socially just ways of being in the world. It can contribute to the development of identity, commitment and community and integrate the interests of the individual and the community.
- Are there areas in your curriculum that could be taught using ideas and strategies of a critical pedagogy of place?

Living in a university residence: what is the curriculum?

Tracey is a warden of a woman's residence as well as a hall warden. The longer she has worked in the residence system, the more convinced she has become of the need for a sustained programme in the residences to assist students to learn how to manage the demands of the academy so that they can thrive and achieve academic success. To thrive in the Rhodes context all students should feel included and respected in the residence environment. This is especially important for first generation students from different cultural, language, social and economic backgrounds.

Tracey has come to realise that most students entering university do not understand that university is different from school. It comes as a shock to many when they are confronted with the unfamiliar ways of teaching and learning. Students are not always made aware of what is expected of them by lecturers and many are left to "figure it out" for themselves. Even students who did very well at school need to understand that they have to develop a different approach to learning and writing if they are to be successful.

Many students struggle with the workload - even those that seem to cope adequately and who seem determined to succeed. Informal discussions with students have revealed that most struggling students are reluctant to accept that they need assistance while some think that accepting assistance will require them to invest time they feel they simply do not have.

Exploring student responses to the *Unzip your Knowledge* theatre production

Having read the literature on the challenges facing students as they make the transition from high school to university, Tracey decided to conduct research in her residence on how students were coping with the transition from school to university.

The university worked closely with the Drama Department to produce a play titled "*Unzip your Knowledge*", a humorous depiction of students' experiences of university life. She was interested to find out how students related to this play and whether they had experienced some of the challenges depicted in the production.

Many commented that the production had given them a better understanding of the purpose of the university. The production made students realise that studying



Tracey Chambers
Warden: Hobson House
and Hobson Hall

Goals for considering a "curriculum" for the residences

- To create study and living environments in which congruent messages about student learning are communicated and reinforced in class and in the residences
- To encourage students to develop productive scholarly ways of being
- To create opportunities for academic programmes and residence programmes to collaborate in developing students as learners / scholars
- To provide learning opportunities that supplement classroom-based learning.

at university is not only about getting a degree so that they can get a job, but it is also about knowledge production and preparing students to become critical citizens.

Through this small-scale research project Tracey recognised that there are many structures and cultures that can restrict or enable students' ability to succeed. Furthermore, some students are able to exercise their agency in ways that help them to navigate structural and cultural enablements and constraints successfully.

The need for further research

The small-scale study into students' responses to Unzip your Knowledge has made Tracey wonder about the role of wardens and how the residence system could assist students more effectively with the transition into university life. However she believes that further research is necessary to determine how students can be provided with more assistance to help them to successfully complete their studies, however, she has some ideas for a residence curriculum that can contribute to enhancing student learning.

Strategies for supporting students in the residences

The quality of residence life is an important aspect to consider as it could (both positively and negatively) impact on academic success.

- Tracey would like the Rhodes University residence system to provide an environment that supports all students as they engage with university life, and in particular with their academic learning programmes. This support can take the

form of academic workshops and other activities aimed at student development and support. Although Tracey thinks that wardens may not necessarily be the right people to conduct these workshops and other activities, they can play a crucial role in supporting these events. Moreover it is important that wardens take a more active part in guiding students' transition from school to university, so as to prevent or minimise students feelings of alienation from their new context.

- Tracey would like residence life to offer students opportunities to develop socially and to become involved in various roles that make it possible for them to develop a range of graduate attributes that enhance future employment opportunities.
- Some residences already have an effective mentoring programme in place. Senior students assist first year students with difficult course content. They also use the time when assisting first years to discuss ways in which students can make the most of the learning opportunities available on campus
- Discussions about important social issues such as sexualities and gender-based violence are organised. Tracey believes that these should be compulsory for all students in residence
- Academic talks to familiarise students with assignment writing, referencing and plagiarism, note taking in lectures and effective reading skills are offered to students in some residences
- Students studying the same subjects are encouraged to form study groups.

Points to ponder:

- How can the residence system contribute to an out-of-class curriculum that will reinforce the messages about learning and academic engagement provided by their lecturers and tutors?
- What kinds of activities and programmes can be developed in the residence system to enable students to develop important “soft” skills?
- Is there anything you could do to contribute to the “residence curriculum”?

Engaged and critical pedagogies to incite learning – like inciting a riot

Natalie teaches a second year course entitled, Gender, Race and Sexualities. Her aim with this course is for students to understand how the interplay of gender, race and sexualities contribute to their own privilege and oppression. She does this, by not only examining theories and ideologies of gender, race and sexualities, but also by creating opportunities for students to engage with how these aspects of social life are expressed in the media, in their own lives and in those of fellow students.

The topics dealt with in this course, when explored through the lenses of real experiences, have the potential to create discomfort and to offend. Natalie uses this potential to enable learning. She does not avoid making her students uncomfortable. She challenges students not to shy away from their own discomfort but rather to use it to examine, in an academic way, how the ideologies of gender, race and sexualities affect people's lives, including their own.

As an activist teacher, who is interested in transforming society, she believes that she cannot be neutral about societal (including institutional) injustices. She is honest and upfront about her own position in relation to the topics under discussion and she confronts it head-on when students demonstrate positions that are oppressive.

Even though it is part of her aim to create discomfort, she recognises that it is also her responsibility as a teacher to establish conditions in which students can engage with their discomfort. This she does by making explicit her aims with the course as well as setting up rules of engagement right at the outset (see textbox). She is interested in her students' intellectual growth, but also in their growth as people who care about the world and the well-being of others.

Natalie creates a supportive environment in her class by affirming students' experiences and feelings. This is achieved by giving them opportunities voice their ideas, beliefs, values and feelings by engaging in dialogue in the classroom. Dialogue is a means of breaking down and transcending barriers created by race, gender, class, and so on. Through their engagement in critical dialogue Natalie and her students construct



Natalie Donaldson
Psychology

Goals of the course:

- To use critical conversation and debate in the classroom to develop students' understanding of the (effects of the) interplay between race, gender and sexualities
- To challenge students' conceptions and experiences of the intersectionality of race, gender and sexualities
- To provide students with opportunities to examine how they can contribute to making society more just
- To enable students to reflect on the implications of their privilege in relation to race, gender and sexuality for how they are able to make their way in the world.

knowledge together. Natalie does not relinquish control of the teaching and learning process; she facilitates the process of critical conversation and debate that transforms students' understanding and makes it possible for them to build new knowledge about gender, race and sexualities.

Natalie's pedagogy is an inherently critical one. This means that her work with students is political and aimed at creating a society that is more just through her curriculum and pedagogy. Through the Gender, Race and Sexualities course she wants students to become more aware of injustice and inequality so that they are able to challenge and stand up against inequities in the world.

In one of the practical sessions of the course, students are asked to examine their own position of privilege and to consider what their lives would have been like had they been born a different gender, race, sexuality and / or physical or mental ability. Natalie then demonstrates what privilege means and how it manifests in an individual's or group's experiences and how it differs based on different identities. Following each practical session, students write a reflective piece in which they explore their experience of the practical class. They use various readings and theories to examine their own experiences and understandings of the topic covered in the practical. Through interrogating their own experiences students are able to view their privilege as a condition of the ways in which the society and culture are structured.

By employing critical and engaged pedagogy and by promoting students' active, reflexive and critical academic engagement with her course, Natalie is able to incite learning - like a riot - about the meanings and implications of privilege and oppression as it manifests through the intersection of gender, race and sexualities in contemporary South Africa.

RULES OF ENGAGEMENT FOR THE GENDER, RACE AND SEXUALITIES COURSE

Natalie acknowledges that the kind of critical pedagogy she espouses and practices is relatively easy to accomplish given the subject matter she teaches. The fact that she is an activist also influences the curricular and pedagogical choices she makes. However, one of the purposes of higher education is to prepare students for critical citizenship.

How can you create opportunities for students to critically reflect on the implications of what they learn in your course for promoting social justice?

In what ways can you enable students to develop an ethical approach to using the knowledge they gain through taking the courses you design and teach?

Points to ponder:

- Natalie acknowledges that the kind of critical pedagogy she espouses and practices is relatively easy to accomplish given the subject matter she teaches. The fact that she is an activist also influences the curricular and pedagogical choices she makes. However, one of the purposes of higher education is to prepare students for critical citizenship.
- How can you create opportunities for students to critically reflect on the implications of what they learn in your course for promoting social justice?
- In what ways can you enable students to develop an ethical approach to using the knowledge they gain through taking the courses you design and teach?

Enabling epistemological access in science: access to what?¹

Academic success and failure at South African universities, including at Rhodes University, is still racially skewed in favour of white and Indian students and those from educated middle-class families. Too many Black students still drop out and fail, particularly in science disciplines. This is because there remains a significant articulation gap between school learning and university learning that can potentially be addressed through appropriate scaffolding that prepares students to meet the curricular outcomes for the different disciplines. If lecturers are to design appropriate curricula they need to be able to articulate what is required of students in different disciplines and courses.

As part of her work as a lecturer on the Science Extended Studies programme Karen has been interested in exploring what is needed for students to be successful in a range of science disciplines. As an academic developer, it is Karen's mission to design curricula that will contribute to her students' gaining what Wally Morrow, a South African educationist, termed epistemological access. She was interested in understanding exactly what gaining epistemological access in the sciences meant. To this end, she examined what science disciplines tend to value in students' work, or put differently, she set out to answer the question, What do disciplines in the sciences legitimate?

First, science curricula legitimate a range of aspects related to the disciplinary context. It is self-evident that disciplinary knowledge is highly valued in science curricula. Students also need a set of skills for fieldwork and experimental work in the laboratory – they need to be able to collect and store samples in particular ways, do experiments proficiently, measure accurately, and so on. However, this is not the whole story. Even though the sciences privilege knowledge, they also value particular kinds of scientific knowers.

Second, the sciences legitimate scientific literacies. These knowledges and skills are not necessarily as explicitly taught as the disciplinary knowledge and skills; however, they are also highly valued. To be scientifically literate, students need to understand how scientific knowledge is constructed and how knowledge claims are made and validated. Science scholars also need to exhibit dispositions such as objectivity and curiosity and they need to be analytical and tentative in their making of knowledge claims. In addition, scientists value empirical data, rigour and precision.



Karen Ellery
Extended Studies

Goals of Karen's exploration of epistemological access in the sciences:

- To examine the implications of the articulation gap between school learning and university learning in the sciences
- To understand what epistemological access means in the sciences
- To explore the relationship between science knowledge and what it means to be a science learner
- To examine what ways of knowing and being are likely to lead to successful science learning.

¹ This case study is based on Karen Ellery's PhD study, *Epistemological access in a science foundation course: A social realist perspective*. <http://tinyurl.com/zyq5skh>

So, both in the areas of disciplinary knowledge and in the area of scientific literacies, specific knowledge and specific dispositions or ways of being are legitimated. However, there is a third aspect that is legitimated in science curricula. The successful science student has to be a particular kind of learner: one who is self-regulated, independent, engaged, critical, reflective, autonomous, and who can develop his/her own understanding and who takes responsibility for his /her own learning. This aspect of the curriculum is often hidden and students do not recognise this aspect as part of what they have to learn.

Karen's work into what epistemological access to science disciplines means, shows that some students experience clashes between the expectations they have become accustomed to over twelve years of schooling and the new expectations they face in university science curricula. For Karen, the articulation gap between the school and university science courses point to a clash of expectations across all three of the domains to which students need to gain access: disciplinary knowledge, scientific literacies and the nature of the successful science learner. The table below shows the nature of the clashes in expectations and why some students need extensive support to meet the expectations of science curricula:

Clashes in expectations between university and school science experienced by some students

	University expectations	School expectations
Disciplinary knowledge	Volume, level, pace – high	Volume, level, pace – low
	Judgement and application	Little judgment or application
Science literacies	Valuing of empirical data	Little valuing of empirical data
	Precision, accuracy, rigour	Lack of rigour
Being a science learner	Understanding required	Rote learning
	Knowledge-making students' responsibility	Knowledge is the teacher's responsibility

Karen argues that students need support to become the kinds of knowers they need to be to achieve success in science curricula at university. Some students need to be taught explicitly, not only the disciplinary knowledge and the scientific literacies they need, but also the kind of science learners they need to become.

To make it possible for more students to gain epistemological access to the sciences it is imperative that lecturers create spaces in the curriculum to make explicit to students what being scientific knowers and learners mean and how to become those kinds of knowers and learners.

Points to ponder:

- How can you make more explicit to students what knowledge and skills they need to acquire in your course and what kind of knowers the discipline values?
- How can you create opportunities in the curriculum to enable students to cultivate not only the disciplinary knowledge, but also the disciplinary literacies and ways of being that lead to academic success?
- Given the nature of your discipline or field, is it possible to expand the disciplinary knowledge and knowledge-making processes so that a wider range of knowledge and epistemologies are included in the curriculum?

Scaffolding student learning of complex content in Pharmaceutical Chemistry

Leonie was unhappy with the curriculum and the pedagogy of a course in Spectroscopy (structural elucidation) for Pharmaceutical Chemistry. Her unease with the course was also reflected in the less than optimal performance of students in both formative and summative assessment tasks.

The problem

Leonie taught the course by first presenting students with the declarative knowledge of spectroscopy. They then had to use that knowledge to solve integrated problems that enabled them to acquire *functioning* knowledge. The main drawback of this teaching methodology was that students could learn the declarative knowledge off by heart, thus taking a surface approach to the task. When they finally had to apply the knowledge in an integrated manner right at the end of the module, many were not able to do so successfully.

Taking steps to address the problem – teaching to enable student learning

In considering how to change the course Leonie used her own reflections as well as student feedback on the course and on her teaching. She also consulted with colleagues and relevant chemical education literature. Following is an outline of the steps she took as a result of all these investigations.

Leonie decided to take a problem-based, student-centred approach to the course.

This meant starting the module with a problem statement, or an activity aimed at showing the class how to use knowledge that they had acquired in previous chemistry courses. For example, students would be asked to calculate the empirical formula of an unknown pharmaceutical ingredient from elemental analysis. Leonie would then work with the class to determine the molecular formula of the unknown by comparing the mass of the empirical formula with the mass of the molecular ion on the mass spectrum and then move on to using other spectral data to complete the process.



Leonie Goosen
Pharmacy

Goals of Leonie's pedagogic approach to this course:

- To use a problem-centred approach to teaching
- To use a range of strategies to scaffold student learning of complex knowledge and problem-solving processes
- To use assessment to shed light on students' problem-solving processes to inform teaching
- To develop students' metacognitive knowledge
- To encourage students to take responsibility for developing their own learning during the course.

Starting the course in this way immediately exposed students to the type of problems they would have to solve with the knowledge gained on the course and it also linked the content to an active pharmaceutical ingredient rather than a random chemical compound as was the case in previous iterations of the course. Students also gained experience in following the necessary steps to elucidate a structure. *This process contributes to the automation of functioning knowledge.*

The course thus started with problems that needed relatively easy declarative knowledge; and with each consecutive problem new concepts were introduced that built on what they had encountered previously. In the process, some concepts were repeated, aiding in the transfer of that knowledge to long term memory. *In this way concepts are also internalised and easier to understand.*

Leonie also made the links between the different topics more explicit by pointing them out in lectures and in workshops.

Students were also encouraged to create their own “text books” as the course progressed by collating all the different snippets on a certain technique (declarative knowledge) in one place and adding information from printed and virtual text books as well as web pages with interactive activities. The idea was that they would end up with a good set of self-written notes containing the declarative knowledge on each technique. Students who did not follow this advice tended to find the course very confusing and frustrating. However, those who did, could successfully attempt and complete activities with confidence after three weeks that previous groups could only do after four weeks.

Using problem-solving narratives in assessment

Leonie was interested in how her students used the data they were provided with in the process of determining the structure of a chemical compound. She thus started using student narratives during workshops and assessments. In the past, she expected students to fill in a table, e.g. to identify molecular substructures from different types of spectra and to then use those to provide a chemical structure for the unknown compound. She decided, instead, to let them write down their stories about how they used the provided data to determine the structure of the unknown compound.

Initially students found this rather strange, and many of them continued to give the facts in table form and then proposed

a structure. This could be because they had been looking at older activities and tests or because they were just too scared to show or tell the lecturer what they were thinking, because in science subjects, “It’s either right or wrong, and I don’t want to get it wrong, especially not in front of the lecturer”. Examples, such as the ones below, taken from exam scripts, gave Leonie a good sense of how students were attempting structural elucidation problems:

“When I saw this question, I freaked out, but then I remembered that you told us to stay calm and try to solve the problem from another angle.” (This student managed to solve the problem in a very elegant way).

“I need to find more proof that my compound has an aromatic ring e.g. from the IR and ^{13}C NMR spectrum.”

“So far I have accounted for all atoms except 1 x C, 2 x H and 1 x Br, this could be CH_2Br , but I will have to confirm this by inspecting the data in ... spectra.”

“All this data suggests that the compound has an aromatic ring. I now need to look at the ^1H NMR data to determine the number of substituents and the substitution pattern.”

“I’m stuck, so I’m going to try X...”

“This data does not fit what I have been thinking so far, so I might have made a mistake somewhere.”

Leonie’s students were beginning to understand the relevance of the theory they were learning as well as how to apply it - they were able to link theory and practice. Students were beginning to enjoy solving puzzles instead of just answering exam questions. After all, solving puzzles by using current knowledge forms a big part of practising science.

Additional strategies

Leonie believes that it is important for students to develop metacognitive understanding, i.e. to understand their own learning processes as well as the kind of knowledge they need to acquire. In order to give students insight into the different kinds of knowledge they were expected to develop, she explained terms such as “declarative” and “functioning” knowledge during lectures.

She developed a *study guide* but then used it to guide the students in developing their own personalised guides by

Points to ponder:

- How can you develop students’ metacognitive knowledge so that they can understand better how they learn or how they could learn more effectively?
- How can you scaffold student learning of difficult content in the courses you teach?
- Is it possible to develop assessment strategies to give you insights into how students reason as they attempt to solve problems?

collating and organising information from text books, lectures and provided web sources. This encouraged students to spend time with and arrange knowledge in different ways which then enhances declarative knowledge, long term memory and life-long learning skills. In addition, students were given *integrated activities* throughout the course in which they had to use sets of spectral and analytical data of unknown compounds

to elucidate their structures, leading to the construction of functioning knowledge.

She also started to post a series of “what we did in class today” notes on RUconnected after each lecture.

Further Reading

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Coppola, B. 1995. Progress in Practice: Using Concepts from Motivational and Self-Regulated Learning Research to Improve Chemistry Instruction. *New Directions for Teaching and Learning*. 63: 87 – 96.

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Using languages for transformative teaching: small steps that can lead to big moves

Nobody can deny that the relationship between access to language and access to education and other opportunities in South Africa requires much more attention than it is given. The fact that the language of instruction in most educational contexts is English, means that the majority of South Africans have to learn in a language that is not their home language. There is thus a mismatch between the language usage, or language repertoires of students and the language of instruction. Language repertoire includes not only the languages that students speak and understand, but also their levels of proficiency and literacy in those languages. This has consequences for the ways in which and the extent to which students can achieve epistemic access to the disciplines. It also has implications for how students negotiate the social and cultural spaces of the university.

The use of two or more languages in the classroom is stated as an ideal in various education policies. However, this educational aim is easy to ignore when one operates in a context where English is the dominant language. It is also very easy not to dwell on how students are disadvantaged by not being able to understand and speak the indigenous language(s) used by the majority in the region. In 2015, through the Fees Must Fall movement, students brought the deleterious effects of educational inequality to everyone's attention.

It is in this context that Monica and her colleagues teach a BEd honours programme called Bilingual Education for Diversity and Access to school teachers. In the course students examine and debate key issues in bilingual and multilingual education. The course interrogates, amongst other issues, the relationship between language, identity and power, language policy and language planning in South Africa as well as the challenges of literacy, diversity and access to education. One of the ironies of the need to transform the way languages are marginalised or privileged in our country is that without access to English, which is the home language of less than 10% of South Africans, learners have no chance of gaining access to higher education and the economic and social power that it bestows.

An important question for lecturers to ask is how one continues to give access to English in the curriculum without, at the same time, contributing to the marginalisation of African languages. Monica and her colleagues attempt to find ways to respond in their curriculum to the vexing question of how to provide epistemic access in ways that are ethical and



Monica Henricks
Institute for the Study
of English in Africa

Goals of using multiple languages as a pedagogic tool:

- To expand the language repertoire used in educational settings
- To provide speakers of African languages opportunities to develop their understanding of disciplinary knowledge using their home languages
- To contribute to the recognition of African languages as languages of learning and teaching
- To interrogate the relationship between language, power, identity and access to knowledge.

educationally sound and that create opportunities for students to grapple with the questions about what it means to engage critically and creatively, in English, with being an African.

While the scholarship of (South) African academics in English language education and indeed in many other fields is not yet such that it can challenge or supersede the western / northern domination of research and knowledge production, it is in the area of curriculum that lecturers can begin to transform / decolonise / Africanise the content, pedagogy and assessment practices. To this end, Monica and her team have been using a number of pedagogic and assessment strategies. Three of them are explained below:

Multilingual classroom talk

Students are encouraged to use their first language (if it is not English) to ask questions and test out ideas in groups in what is known as *exploratory talk*. A fellow student or an isiXhosa speaking lecturer then translates the questions or ideas into English. The purpose of exploratory talk is to clarify ideas and understanding in pairs or groups. In this relaxed context accurate language use is not important.

In contrast to exploratory talk, *presentational talk* is more formal talk, meant to display the speaker's knowledge. Presentational talk is directed to the whole class or happens in response to questions asked by the lecturer. Here it is important to pay attention to accurate, grammatical language usage. Switching between languages in exploratory talk and using English in presentational talk is useful for facilitating epistemic access in what students are likely to experience as a safe classroom space. It also facilitates social cohesion in the classroom.

Mono-lingual teachers may experience discomfort when they do not understand what their students are saying about the topic at hand.

Translanguaging

Translanguaging means using a concept in one language, in this instance isiXhosa, to explain a concept presented in English. So, for example, to explain the concept of patriarchy the isiXhosa metaphor of ukulawula ngegqudu which literally means to control with a stick or knobkierie (knopkierie in Afrikaans) is used. It is thus more than translation as it requires students to use higher order thinking and inter-cultural negotiation to draw on nuanced meanings of concepts in the multilingual classroom.

Cornell or split-page summary¹

This is a process that creates opportunities for students to develop or gain epistemic access in multilingual classes. Students are asked to draw a line down the page, about a third from the left side of the page. On the wider, right side of the page they write notes and main ideas as they read. The left side is used to write key words, diagrams and questions that emerge from the reading. Students are encouraged to condense or summarise information in a few short sentences in a horizontal space below the two columns at the top of the page. Students can also use the space to translate concepts and write down questions in their first language. The writing of summaries and paraphrasing across languages create opportunities for students to use their language repertoires to build their understanding of disciplinary knowledge. An added advantage of creating meaning across languages is that it is likely to minimise plagiarism.

Finally, Monica and her colleagues are keen to explore making greater use of oral assessment to create space for what they call 'more performative multimodal forms of expression' to reduce the heavy reliance on writing in academia.

¹ See: <https://sites.google.com/site/notetakingandstudyskills/note-taking-methods/cornell-method>

Points to ponder:

- Consider providing opportunities for non-mother tongue speakers of English to use their home languages in class to test and build their understanding of disciplinary knowledge.
- Could asking students to respond to assessment tasks in multiple modalities create more equitable opportunities for students to represent their knowledge?

History of Africana intellectual thought: decolonising the curriculum in a colonial institution

A few years ago Vashna and her colleagues in the Department of History were concerned about the low numbers of black students electing to do postgraduate studies in history while disciplines such as politics did not seem to have the same problem. In a bid to address this problem, as well as to contribute to the decolonisation of the history curriculum, Vashna developed an honours course entitled, *The History of Africana Intellectuals*.

In his book, *Existential Africana*, Lewis Gordon defines the term Africana thought as “an area of thought that focuses on theoretical questions raised by struggles over ideas in African cultures and their hybrid and creolized forms in Europe, North America, Central and South America, and the Caribbean. Africana thought also refers to the set of questions raised by the historical project of conquest and colonization that has emerged since 1492 and the subsequent struggles for emancipation that continue to this day” (2000: 1).

For Vashna the course is part of a conscious political project to decolonise the history curriculum and to erase the silence around African history and African thought from the history curriculum at Rhodes University.

Vashna focuses on African intellectual history because the continent has for a long time been understood as existing outside of history and its people are written about as if frozen in imperial time. In the Western epistemology, developed to support the imperial project, Africans were constructed as unreasonable and theory thus had to be imported from the global North. Following Lewis Gordon, Vashna believes that it is imperative to shift the “geography of reason” from the global North to the global South. This she does in her course through exploring the work of African intellectuals and to assert Africa as a continent with a history, including a history of ideas. Through the course, Vashna also aims to show the presumed universality of the enlightenment project as false since the enlightenment was a Eurocentric and not a universal project.



Vashna Jagarnath
History

Goals of this aspect of evaluation:

- To contribute to the decolonisation of the History curriculum at Rhodes University by making African history and African thought an integral part of the curriculum
- To introduce students to Africa and Africans as integral to the making of the modern world
- To show students that ideas are universal and that they are used to explore the particular
- To introduce students to African intellectuals from a range of times and localities
- To make explicit the political agenda of the course.

At the start of the course, Vashna communicates to her students the political agenda that underpins it. One of her aims is to demonstrate that Africa is an integral part of the making of the modern world; that African labour was used to secure the rise of the most powerful countries in the modern world. Another aim of the course is to show that ideas are universal and that they are used to explore the particular.

In the thirteen-seminar semester-long course students explore the ideas of a range of Africana intellectuals from Africa, the Caribbean and the United States. This is done through a variety of texts including videos, poetry, music, speeches, interviews and academic articles and books. Before the first seminar, students are required to watch a lecture by Professor Lewis Gordon, entitled “Shifting the Geography of Reason”. In the first seminar they debate some big questions related to Africa including its history, what is considered intellectual and what not, and how Africa has come to be positioned in the way that it is. The course then shifts to the precolonial history of Africa. Students read an epic poem from Mali about king Sunjiata and engage with it as part of the intellectual tradition of Africa rather than as an anthropological text. They listen to the music of Salif Keita, a descendant of Sunjiata, who was ostracised from his family because of albinism and became a musician, a profession normally adopted by *griots*¹.

The focus then shifts to Timbuktu and the writing and influence of Islam in Africa. This is in contrast to past histories where the attention was predominantly on the influence of Christianity and missionaries in Africa. Medieval Islam is examined as a

¹ A griot is a West African historian, storyteller, praise singer, poet and/or musician (<https://en.wikipedia.org/wiki/Griot>)

cosmopolitan, intellectual and liberatory religion of the time. Students learn that Islam was part of the history of Africa long before the introduction of Christianity on the continent. Furthermore, it is shown that Christianity was also part of the history of Africa before it was introduced to Europe.

Next the history of the American slaves such as Sojourner Truth is examined. The work of Frederick Douglas, an African American social reformer and abolitionist, writer and statesmen is studied. This part of the course focuses on how people think and come to have ideas, in spite of conditions of great oppression. The course then moves on to the intellectuals from the Caribbean and the Haitian Revolution followed by thinkers from the United States such as W.E.B Du Bois, Booker T. Washington, and Sol Plaatje from South Africa. Students are introduced to them not as political figures, but as intellectuals. South African thinkers are seen as part of an international intellectual tradition. The works of Franz Fanon and African nationalists such as Nelson Mandela, Winnie Madikizela Mandela, Jomo Kenyatta, Kwame Nkuru as well as African American thinkers such as Malcolm X, Martin Luther King and Angela Davis are examined. The course ends with an exploration of the work of Thabo Mbeki, whom Vashna regards as the embodiment of the modern African intellectual, in whose work the ideas of the many Africana intellectuals discussed earlier in the course converge.

Vashna has recognised that the main focus of the course is on male intellectuals and this is something she is currently addressing. She believes that any content can offer the basis of a decolonising curriculum. What is important is that the appropriate political questions are explored through the content.

Points to ponder:

- Are there silences in your discipline and your curricula that, when addressed, can contribute to students’ understanding of Africa as integral to the development of the world?
- What work do you have to do to broaden / enrich your scholarship with theories and ideas from the global South?

Contextualising multi-faceted problems in Chemistry

David Khanye believes that lecturers can stimulate an interest to learn Chemistry in the many students who feel alienated from the discipline. This can be done by taking a more contextual approach to the teaching of the discipline, to enable students to make sense of what is otherwise often presented in a very abstract and decontextualized way. This approach is underscored by research into teaching and learning in Chemistry published by the Centre for Occupational Research and Development and published in a volume entitled, *Teaching Science Contextually*.

Students tend to learn best when they are able to make the connections between new knowledge and what they already know and understand. Many lecturers expect students to make these links themselves; it is not seen as part of what needs to happen in the classroom. However, there is evidence that suggests that students' learning improves dramatically in maths and science if they are explicitly helped to make those connections.

The traditional approach to teaching Chemistry is content-focused and there is a strong emphasis on students' development of disciplinary concepts, ideas and methods and processes with limited attention to the impact of Chemistry knowledge and practices on society. David thinks that it is important to show students how Chemistry knowledge is used in the world – in the fields of health, various industries, the military and so on. This is not only to generate more interest in the field but also to foreground the social and ethical implications of the work that chemists do. By exploring the relationship between what happens in the laboratory and on the page where signs, symbols and figures are manipulated, David aims in his teaching to connect the abstract scientific knowledge to things that are part of students' frames of reference. This approach also takes cognisance of the multi-faceted nature of the kinds of problems that Chemistry helps to address and puts a human face to the abstract knowledge of the field.

David is in agreement with Chemistry educators Jesper Sjöström and Vicente Talanguer who propose a humanistic approach to the teaching of the discipline. This multi-layered approach includes a focus on basic chemistry as well as applied chemistry, socio-chemistry, and what they term critical-reflexive chemistry. *Applied chemistry* focuses on different applications of chemistry while *socio-chemistry* includes examining the development of chemistry as well as how chemistry knowledge, practices and products are used. There is also a focus on how science is embedded in socio-cultural activities. *A critically reflexive approach to chemistry* includes analysis of the historical, philosophical, sociological and cultural dimensions of chemical knowledge and its applications as well as issues related to the social justice dimensions of chemistry.



David Khanye
Chemistry

Goals of a contextual approach to teaching Chemistry:

- To stimulate students' interest in Chemistry by exploring the links between prior knowledge and disciplinary knowledge
- To promote critical reflexivity in relation to Chemistry knowledge and its applications in the world.

AN EXAMPLE FROM GABRIEL PINTO AND AMALIO GARRIDO-ESCUADERO

When teaching the Chemistry of explosives, that is the highly exothermic reaction between Nitroglycerin (L) and Trinitrotoluene (R) that produces TNT, Pinto and Garrido-Escudero suggest that teachers can, in addition to teaching the chemical properties of the various elements and the nature of the reaction, also relate that knowledge to the history of sciences, technology and industrial chemistry; the history of chemistry manufacturing and the properties of explosives; the reactions of synthesis of nitrates esters, the chemistry of fireworks, the ethics of chemistry and environmental chemistry.

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Pinto, G. & Garrido-Escudero, A. 2016. Chemistry and Explosives: An Approach to the Topic through an Artistic and Historical Contribution Made by a Spanish Global Explosives Supplier. *Journal of Chemistry Education*. 93: 103 – 110.

Sjöström, J. & Talanquer, V. 2014. Humanizing Chemistry Education: From Simple Contextualisation to Multifaceted Problematization. *Journal of Chemical Education*. 91: 1125 – 1131.

Points to ponder:

- Students who have the potential to succeed in natural science disciplines sometimes feel alienated from disciplines such as Chemistry because of their highly abstract nature. These students are likely to persevere in these fields if they are able to see the more human aspects of these fields. How can the abstract science disciplines be given a more human face, especially as students are inducted into basic knowledge and practices of a field early in their degree studies?

A pedagogy of mutual vulnerability to enable epistemological access for students

Corinne teaches the augmented curriculum for the Humanities Extended Studies programme for the disciplines of politics and sociology. She believes that a teacher's positionality is integral to curriculum and pedagogy and that it is important to expose the privileges and prejudices that her position as a white, older, feminist woman academic affords her in the university context.

Her approach to curriculum and pedagogy emerges from her students' experiences of being and feeling excluded from various conversations in the classroom and from a range of academic practices. These students have experienced several forms of violence as a result of their education and socio-economic histories, viz, political violence, economic violence and epistemic violence. Epistemic violence is, according to author Suren Pillay¹, the most difficult one of these forms of violence to confront since it is invisible. Epistemic practices are context-specific and are a natural and everyday part of how the inhabitants of that context think and act and what they believe and value. Those who are new to a context are excluded from the naturalised ways of thinking and being in the context and could therefore experience these epistemic practices as violence.

Corinne thinks that in order to confront and transcend the violence that epistemic practices in the university and in our classrooms can do to students, it is necessary to examine the social, cultural and emotional realities and norms that exist in this context and that are perpetually being reproduced and that tend to include some students while excluding others.



Corinne Knowles
Humanities Extended
Studies

¹ <http://africasacountry.com/2015/06/decolonizing-the-university/>

Goals of Corinne's approach to pedagogy:

- To use a range of teaching and learning practices to enable students to make explicit and to overcome their struggles with knowledge, pedagogy and learning in the university
- To use strategies related to the humanising pedagogy of “mutual vulnerability” to make it possible for teacher and student to recognise and transcend conditions of privilege and symbolic violence in the teaching and learning context
- To be aware of her positionality and her power as a teacher in relation to the positionalities of her students
- To be reflexive of how her position as a knower in this context can impact on her students' understanding of themselves as knowers
- To be intentional in the way she relates to her students and to the knowledge she enables them to learn
- To enable her students to see her as a co-learner whose aim is to enable them to learn how to learn from her.

She believes that at this time in South Africa's history and with the student protests having placed students at the centre of debates about higher education, it is important for academics to examine the principles and values that shape their interactions with students.

She has explored the notion of *mutual vulnerability* as a pedagogic tool to counteract the potential social, economic and epistemic violence that some students experience when confronted with knowledge and knowledge practices that are different to their own social, cultural and emotional norms. Mutual vulnerability is about recognising students' vulnerability as they are confronted with counter-normative or conceptually difficult / challenging knowledge while risking making oneself, as the teacher, vulnerable as well.

Mutual vulnerability can be used in pedagogic contexts by making curriculum norms visible and being prepared to surrender, expand or adjust our norms in order to be part of a collective (learning) process. *Making the familiar strange* and the strange familiar is central to this way of engaging with students. This means making explicit the workings of academic practices and ensuring that students get the opportunities to learn and to engage in those practices in safe spaces. Teachers can make themselves vulnerable in the classroom by *transcending their power teachers* to provide students with opportunities to use their own agency in shaping their learning. One way of doing this is to create opportunities for students to relate concepts and theories to contexts familiar to them (and often not to the teacher) and to explore similarities and differences between the new knowledge and what they already know. Another way of enabling this process is to encourage students to use their home languages to explore new concepts

and theories and in the process to imbue the concepts with additional meaning. These strategies provide opportunities for marginalised students to become central in the learning process.

Corinne also engages with her students in a process that Keet, Zinn and Porteus (2009) call *co-intentional pedagogy*. For Corinne this means creating regular opportunities where she and her students reflect on how the teaching and learning processes they engage in work or don't work for them. As the teacher, she offers her own reflections (this is also a modeling of reflection) and then asks her students to offer their reflections and suggestions for how teaching and learning can take place more effectively.

Furthermore, she makes spaces for herself and her students to *tell stories about their vulnerabilities* in the teaching and learning context and in relation to the disciplinary content. Admitting to not knowing the answers is relatively easy for Corinne since, like her students, she did not study politics and sociology at the undergraduate level, even though she is now a much more experienced scholar than they are.

Another feature of mutual vulnerability is to *share the burden of self-consciousness* with students. Corinne endeavours to be self-conscious about and share with her students her own biases, her passions and her struggles in relation to knowledge and learning. The politics of Corinne's pedagogy enables her to make visible for her students the frames that shape the knowledge practices they engage with together. She believes that her vulnerability does not make her weak, but that it makes it possible for her students to deal with their own vulnerabilities in the strange context of the university.

Reference

Keet, A., Zinn, D., & Porteus, K. 2009. Mutual vulnerability: a key principle in humanizing pedagogy in post-conflict societies. *Perspectives in Education* 27 (2): 109 – 119.

Points to ponder:

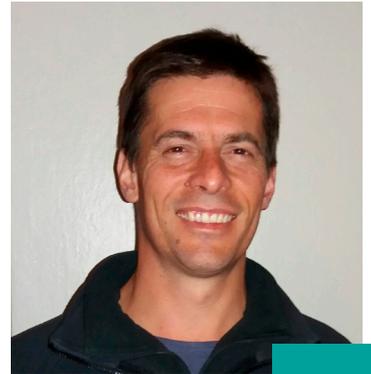
- Are there occasions where it may be appropriate for you to practice a pedagogy of mutual vulnerability in order to enable your students to learn the often hidden norms and values underpinning academic practices in your discipline?

Teaching for reflexivity in a third year Information Systems course

Kirstin teaches a third year course called Information Systems (IS) Theory to a group of about one hundred students in the last term of the final semester of the IS major. His aim with the course is to teach students about IS Theory, but also to create opportunities for students to reflect on the value and purpose of theory and on how theory relates to their own beliefs, values, and backgrounds. In addition, he wants students to be aware of how they learn by making explicit the criteria for success in the course. Part of the purpose of the course is to prepare students either for postgraduate studies or for entry into the IS industry.

Kirstin decided to teach the course in this way when he was made aware of the effects of clashing ways of valuing when different people interpret and experience situations. As part of his PhD research, he taught computer literacy to a group of school teachers in deep rural KwaZulu-Natal. Here he learned, after much critical reflection together with various community members, that the reason his students were not able to tell him when they did not understand what he was trying to teach them, was because they did not want to disappoint him. For these students, disappointing Kirstin as their teacher was contrary to their ways of valuing; it thus impeded their learning. From this insight, Kirstin realised that it was important for IS professionals to be aware of the existence of diverse and contradictory value systems and importantly, how different worldviews can impact on the way people relate to each other and to the way this can influence how typical IS projects are approached.

A range of teaching and learning methods are used in the course. Primarily, students work in groups to produce video presentations which are posted on a dedicated Facebook page. In the video presentations the groups reflect on course readings and case studies assigned to them. In preparation for making the videos, students are given a reading (or in one or two cases a YouTube video to watch) that they then have to apply to a case study. In the group presentation video they have to respond to three reflexive questions that relate to the reading and the case study. The purpose of the reflexive questions is to nurture criticality in students, to enable them to engage with the historical development of IS and to challenge the status quo, including technological determinism.



Kirstin Krauss
Information Systems

Goals of this aspect of evaluation:

- To explore the influence of multiple and conflicting value systems which impact on how people relate to each other
- To explore how to manage information systems projects in the context of diverse value systems
- To develop students' abilities to be reflexive and critical about knowledge and knowledge practices
- To use a range of media to engage students actively and generatively in the teaching and learning process, including student-produced videos, YouTube videos, case studies, academic texts, Facebook discussion groups, etc.

Student groups are also provided with assessment criteria to guide their video presentations. The video presentations are then posted on the IS Theory Facebook page, where fellow students then engage with the video presentations online before and during the lecture. Kirstin responds online to the video presentations and to students' comments on each other's videos. For the course to be successful, students have to do the preparatory readings, produce the reflexive videos and participate in discussions on the course Facebook page.

In the lectures, Kirstin creates the space for the class to reflect on the presentation videos and related topics. The Facebook page is thus a tool to support in-class teaching. Furthermore, Kirstin makes overt that the purpose and values of the IS Theory course is to challenge the different discourses and practices (i.e. worldviews) typically associated with IS. They are made aware that no theory or discourse is neutral and that they should thus be challenged. As such, students are given permission to challenge IS knowledge by bringing their

own perspectives, worldviews and theories from other contexts to bear on the readings they encounter in the course. The readings, reflexive questions, video presentations, online and in-class discussions are all opportunities for students to reflect on and challenge dominant interpretations in the field of IS and to learn about the value of reflexivity.

To nurture students into the ways in which assessment takes place, they are also expected to collectively develop examination questions. In addition to producing a question, they have to present an argument for why the question is a valid way for assessing the course. They also have to provide assessment guidelines or model answers for their questions. To do this task, students need to know and understand the course outcomes, have a good knowledge of the course content, understand the kinds of reflexive thinking that the course requires, and ultimately master the discourse of IS theory.

ASSESSMENT CRITERIA FOR VIDEO PRESENTATIONS

A: Distinction 75 – 100%

Reflection and application

- Evidence of comprehension and deep understanding of the topic area
- Evidence of deep reflective engagement with the topic readings
- Evidence of engaging in reflective analysis of the case studies, where the students show application of conceptual frameworks and / or theory

Presentation

- Creative and entertaining video / presentation, with a personal (or group) touch
- A message that engenders reflection in its viewers / listeners, i.e. you succeeded in making others think and reflect.

Further reading

Krauss, K. 2015. Discourse and Discourse collisions: understanding the experiences of Information Systems students at a South African university. *Proceedings of the 13th International Conference on Social Implications of Computers in Developing Countries. Negombo, Sri Lanka. May 2015.*

Points to ponder:

- What strategies can you use to make explicit to students the learning requirements of your discipline / sub-discipline / course?
- How can you use social media as a pedagogical tool?
- In what ways do the teaching, learning and assessment strategies you employ reflect your teaching philosophy?

Making statistical ideas accessible to students in a Statistics service course for first years

Thina's aim is to ensure that her students are statistically literate. She believes that it is possible to interest more students into making statistics a career choice through paying attention to pedagogy and assessment. Thina thinks that Statistics teachers should not leave to chance that students will develop a deep interest in their field; instead they should take some active steps to entice students into taking more than a passing or pragmatic interest in the field.

Thina's own biography as a student of statistics at UCT and as a postgraduate student at an American university serves as starting point for thinking about transformative curriculum and pedagogy in her field.

Thina grew up in the Port Elizabeth township of Motherwell. She went to school in New Brighton where she had excellent mathematics teachers and planned to study Biotechnology at university even though she had no idea what it was. Once at UCT, Thina was advised to enrol for Statistics because of her good mathematics results. At the time she did not know what Statistics was and thus had no idea what she was letting herself in for. She initially struggled with the abstract nature of the field, but once she was able to connect the concepts she was introduced to in lectures to her experiences of playing the card game Unjiqua as a child, she realised that the principles of probability, distribution and variance were not alien to her and that she had in fact, applied these ideas to her strategising while playing the game.

This is why, in her own teaching, she stimulates her students' interest in the field through showing how they engage in statistical thinking in their everyday lives even if they are not aware of it. Furthermore, it is in the kinds of assessment tasks that she sets that she stimulates their thinking about the real-world relevance of statistics and where she can provoke higher levels of engagement in statistical thinking. Many lecturers do, however, not have the requisite knowledge of a large proportion of their students' lives to enable them to draw on appropriate examples to link theory to the more everyday.

Thina believes that there is more than one route into the field of statistics. In some universities the focus of the curriculum is more applied, while in others statistics is taught in a very mathematical or theoretical way. For her there is a middle-way that will make it possible to draw more students from different backgrounds into the field. This middle-way is about finding the bridge between the contextual applications and qualitative interpretations and explanations and the more theoretical or conceptual mathematical disciplinary basis of the field. She thinks that a predominant focus on



Thina Maqubela
Statistics

Goals of Thina's approach to teaching introductory Statistics:

- To make statistical thinking accessible to more students
- To demonstrate to students that statistical thinking is part of their everyday experiences
- To bridge the gap between statistical theory and the application of statistics so as to actively engage more students to develop an interest in pursuing Statistics beyond first year.

the theoretical nature of the field alienates many students who could potentially be captured by the field that enables one to ask and answer interesting questions about the world. However, this does not mean that she denudes statistical problems of their mathematical basis. Making the field accessible, does not mean making it easy.

Thina also believes that students respond positively to teachers who connect to them on a human level. That is why she alerts students when they are about to encounter difficult concepts and problems and tells them about her own struggles in

coming to terms with similar challenges when she was in their shoes as a student. For Thina, the UCT student, one of the hardest things was not feeling that she could approach her lecturers to help her solve the problems she experienced with Statistics. She also hesitated to ask her lecturers for help because she feared not being able to articulate what she did not understand. In retrospect, she thinks that she could have saved herself much anguish had she felt assured that her lecturers would be able to relate to her struggles. Thina thus makes a point of being accessible to her students.

Points to ponder:

- In what ways can you make highly abstract ideas more accessible to a broader range of students? How can you develop your knowledge of the contextual realities of students' lives so that you can draw on appropriate examples in class?
- To what extent is it possible to contextualise theoretical knowledge without losing the conceptual integrity of a knowledge field?
- Thina teaches Introductory Statistics to first year students who intend to major in other science disciplines. In some cases, students do this course up to two years before they will use the ideas and procedures in research projects in their major disciplines. Do you need to re-think at what point students should do courses like statistics to ensure that they are able to see the relevance of these courses?

African languages and curriculum transformation at Rhodes University

As relatively new fields of study, African languages have had an interesting and complex historical trajectory. African languages have been devalued since the time of the British and Dutch occupations in the seventeenth century and during the apartheid era.

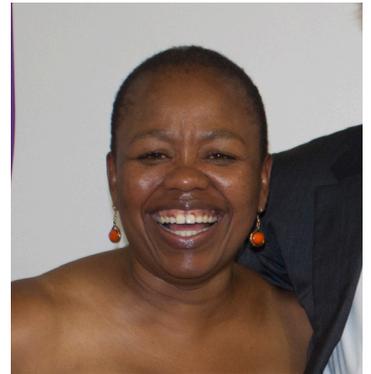
Transformation issues related to African languages, particularly in the context of a traditional, historically white university, are equally complex and in some ways surprising. With the advent of democracy in South Africa in 1994, there was a surge of interest from students who wanted to study African languages. However, soon afterwards student numbers dropped sharply and it is not clear why this was the case. Increasing the number of students studying African languages is crucial if we wish to encourage South Africans to value African languages both as domestic and academic discourses. First and additional language speakers of African languages should be encouraged to study them.

Even though the legislative context in South Africa is enabling for the further development of African languages in the academic domain, it seems difficult for academics and students to disconnect from the legacy of the past. This legacy continues to privilege the use of English as sole or primary medium of teaching and learning across higher education institutions, including Rhodes.

Barriers to communication in isiXhosa

Lecturers teaching isiXhosa at Rhodes are challenged to help students overcome their reluctance and embarrassment to speak isiXhosa in class. This barrier is addressed by reassuring students that they may speak any dialect with which they are familiar. Once students understand that multiple varieties of the language are embraced in the classroom, they engage enthusiastically. The next challenge is to enable students to use the more formal academic register when they write isiXhosa assignments.

Students initially shy away from discussing African culture in isiXhosa classes. What they at first perceive as taboo topics for discussion in a multicultural context, are soon recognised as practices and values that are in reality shared by most cultures, albeit



Pamela Maseko,
Dion Nkomo and
Bulelwa Nosilela
School of Languages

Goals of this aspect of evaluation:

- To develop students' understanding of the relationship between language, identity and power
- To explore African languages as a vehicle of communication in both everyday social contexts and in professional arenas
- To promote interest in the study of African languages as academic disciplines
- To encourage multilingualism in a predominantly monolingual academic context.

in different guises. Student discomfort in speaking isiXhosa in class is a feature of these classes. Much of this discomfort stems from the dominant white, English culture at Rhodes which does not encourage the valuing of African languages and cultures. For Pamela and her colleagues the challenge is to get mother-tongue speakers to value the knowledge embedded in their own languages.

isiXhosa for teaching and learning in professional programmes

The Division of African Languages in the School of Languages teaches isiXhosa to students in a number of professional programmes including Education, Law, Pharmacy and Journalism. Even though it should be patently obvious to future professionals that it is an advantage to communicate with clients in their primary languages, many are still unwilling to acquire a level of proficiency so that they can engage in a rudimentary conversation with isiXhosa speakers. It is thus clear that much work still needs to be done at Rhodes to change attitudes and actively embrace multilingualism and multiculturalism.

The intellectualisation of African languages

Since the early 2000s, lecturers from African Languages have been working on an isiXhosa intellectualisation project. Missionaries were the first to record isiXhosa in writing and analysed its structure as well as its ability to generate words for new ideas and inventions. Despite this linguistic capacity, isiXhosa has not developed as a language for academic communication. Researchers across the country as well as staff members in African Languages at Rhodes are involved in ongoing research and development work in this regard.

The first academics to teach African languages in universities were not native speakers of the languages; nor were they necessarily language specialists. In fact, African languages were first taught as part of Anthropology and through the medium of English. The dominant mode of language teaching has been structural, following the way Latin was taught and learned. This means that students are often expected to learn, inter alia, lists of noun classes, verb forms and formal grammar. Most students find this alienating and thus give up before they are able to master simple conversations.

At Rhodes, however, storytelling, poetry and relating language usage to personal histories are used as language teaching methods with encouraging results. These methods are a far cry from the traditional structural approach to language teaching. A safe space is created where students are encouraged to work through their own sense of discomfort when speaking isiXhosa.

It is necessary to devise a way of teaching that forms a bridge between the standard or received form of the language and the more colloquial conversational forms of isiXhosa. Much work still needs to be done to transform the Rhodes culture and to develop an enhanced and broader understanding of the social, cultural and political value of learning to speak and write African languages. In essence, language should not be used to exclude and alienate in a context that truly values transformation. Alienating students from their own languages and from who they are potentially has devastating effects.

Points to ponder:

- How might all lecturers at Rhodes contribute to the valuing of African languages at the university?
- Are there ways in which African languages could be used in classrooms across disciplines so that all students recognise the value of understanding and using these languages as a means of both everyday and academic communication?

Teaching Africa differently: the question of alternatives and the problem of pedagogy

Sally Matthews has been teaching a course on African Studies to third year politics students at Rhodes University for more than a decade now. It is a course she enjoys teaching and that is important to her as it offers her the opportunity to develop students' knowledge about Africa and to stimulate them to question common misconceptions and misrepresentations about the continent. The course allows both black and white students to revise their ideas about Africa, to reflect on how their own backgrounds have shaped their conceptions of Africa and to take a more critical stance on the way the continent is represented in the media and in the academy.

Sally has some concerns about the course, though. She is critical about what counts as knowledge in African Studies and who the mainstream authorities are in the field. She problematises the context in which she teaches, i.e. a historically white university in South Africa where the majority of students are now black but about 70% of the lecturers are white. The fact that she is a white person teaching a class of mostly black students from South Africa and further afield in Africa is central to how she conceptualises the curriculum and pedagogy of the course.

African Studies courses around the world predominantly use texts written by Western scholars who offer Western perspectives on Africa. For Sally it is important to offer alternative viewpoints on the continent. However, arriving at alternative explanations on Africa is not a straightforward matter. African scholars such as Achille Mbembe, VY Mudimbe and Ato Quayson point out that even when scholars attempt to present counter views on Africa, they typically do so using Western epistemologies, concepts and theories. Mudimbe argues that even the idea of Africa is a Western construct.

One of Sally's aims with the course is to present students with sets of alternative viewpoints on Africa, by including texts evincing mainstream approaches as well as those exploring critical perspectives on the field, often written by African scholars. She wants her students to engage with multiple perspectives on the topic and to understand that many of these perspectives are indeed contestable. However, she does not want students to emerge from the course with a view that everything that is said about Africa is relative. Sally uses a pedagogic approach inspired by the 'Taking Sides' book series from publishers McGraw-Hill. The series brings together texts offering different perspectives in the format of debates where key thinkers take opposing sides on issues. The debates are followed by outlines of the key differences between the ideas and approaches followed by each author.



Sally Matthews
Politics

Goals of Sally's course on African politics:

- To provide students with alternative ideas about Africa, including non-African and critical perspectives on Africa
- To enable students to understand that knowledge and perspectives are contested
- To find ways of sharing power with students – even in large classes.

Ideally, Sally would like to experiment with critical pedagogy where she shares the power in the classroom with her students. She recognises, though, that this is more difficult in large classes that physically position the teacher as expert in the front with the students in rows ready to receive knowledge from the teacher. It is important for her to find ways to reduce the power differential between herself and her students.

As noted above, Sally is keenly aware of being a white person in an authoritative position on African Studies teaching mostly

black students. She actively endeavours to compensate for her whiteness by contrasting ideas from mainstream scholars with those of African authorities rather than offering her own critiques of these hegemonic ideas. Furthermore, in the absence of African guest lectures she makes use of YouTube videos that feature prominent black academics on the subject. Although these strategies do not compensate for the limited representation of black academics at Rhodes University, they do go some way towards exposing students to important scholars in the field of African Studies.

Further reading

Matthews, S. 2015. Reflections on Teaching Africa in South Africa. *Politics*: 2015. Doi:10.1111/1467-9256.12107

Mbembe, A. 2001. *On the postcolony*. Berkeley, CA: University of California Press.

Mudimbe, V.-Y. 1994. *The idea of Africa*. London. James Currey.

Quayson, A. 2002. Observe denomination. *Public culture* 14 (3): 585 – 588.

Points to ponder:

- How can you ensure that students are offered alternative representations of Africa and African realities in the courses you teach?
- Do you include texts from scholars who may not necessarily be regarded as mainstream in your field yet offer interesting ideas on your subject?
- How might you reduce the power differences between you and your students to enable them to develop their scholarly voice?
- Have you considered the impact that the ratio of white to black academics might have on students' sense of what it means to be an authority in a field?

Teaching economy and freedom in the era of the EFF

Nomalanga Mkhize from the Department of History believes that many of the historical theories of the past are no longer adequate to deal with the questions and interests that contemporary students have. Nor are these ideas adequate for enabling graduates to respond to the challenges they will face when they enter the world of work. In her courses she aims to engage students with the kinds of theories, ideas and languages that are necessary to address current social issues.

Nomalanga felt that the traditional lens of historical scholarship was not able to explain the emergence and the effects of social, political and economic conditions currently prevailing in South African. She therefore designed a third year course, The history of the corporatisation of South Africa, in which she used new lenses to interrogate the complex socio-political, historical and economic causes and manifestations of the current conjuncture in South African social life.

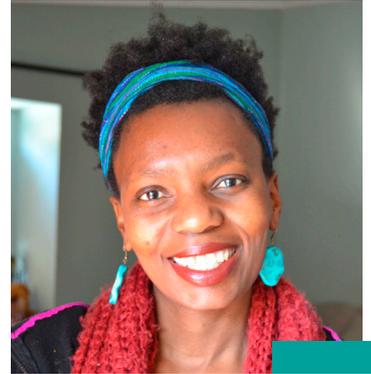
South Africa is at a point in its history where the older generation of political and university leaders seems to reproduce ideas and power structures from the colonial past, while the new generation of leaders waiting in the wings wants to create a new social contract.

The interregnum caused by this generation gap is epitomised by two moments of disruption in the social spheres of parliament and university campuses. Members of the Economic Freedom Front (EFF) have disrupted parliament demanding that the president pays back the money spent on upgrades to his Nkandla homestead, while students have disrupted university campuses with campaigns such as #RhodesMustFall, #FeesMustFall and #RhodesSoWhite. Nomalanga believes that these disruptions are a direct result of the end of what she terms “the Mandela experiment”.

The young parliamentarians and the students are asking important questions about the ownership and purposes of the economy and of social institutions.

The EFF is asking whom the economy is for and who the legitimate owners of the land and its riches are, while the students are asking who the university is for, what kinds of graduates it is aiming to produce and why university education is so expensive.

In this course a series of case studies is used to demonstrate the impact of corporations on South African history starting with the Dutch East India Company. This is followed by an examination of the influence of De Beers, after which the role of Afrikaner finance capital through corporations such as Sanlam, Iscor, SAB, PEP, and so on is explored. The course ends with an analysis of the role of Naspers in the South African economy.



Nomalanga Mkhize
History

Goals of the course:

- To offer alternative historical (and inter-disciplinary) theories that are more congruent with contemporary socio-political and economic issues
- To combine the best of traditional historical scholarship and theory with contemporary scholarship that attempts to respond to questions that interest today's students.

The course departs from the political economy debates of “old white scholarship” of the 1970s and 1980s that focused on the resolution of the agrarian question and the lives of the working class. These issues, though based on excellent scholarship, are no longer interesting to students. Nomalanga wants her students to learn the best of traditional political economy while also engaging with the language of contemporary economics of finance capital and its impact on society. She wants Rhodes University to develop graduates who understand, for example, the economic, social and political effects of black people living with systemic debt.

To this end, Nomalanga believes that it is time for academics and students in the humanities to ask different and bigger questions about our society, such as: What do we do in a world where employment opportunities are shrinking? What do we do in a world where the middle class is shrinking and where the working class is no longer a social fact? What do we do in a world where capital is part of an abstract global financial system of interlinked currencies, funds, stocks and futures?

For Nomalanga it is important that students develop the language and the analytical capability to engage with their peers in parliament whose conception of the economy still seems stuck in a Marxist understanding of economic power as rooted in the ownership of the means of production - even in this era of financialised capital.

Nomalanga believes that graduates need a social understanding of the South African economy and how it relates to the contemporary world of politics and of work. She argues that it is necessary to build theories that emerge from local contexts instead of continuing to use theories from the North. It is time for (South) African scholars to generate the theories that explain local questions and to engage in conversation with theories from the North. Creating courses that examine complex contemporary issues is one way of stimulating such new theorising.

Points to ponder:

- Are there contemporary issues or questions that can no longer be adequately explained by traditional theories in your discipline?
- What new lenses can you offer students through which to examine some of these vexing issues and questions?
- Nomalanga argues that it is necessary for South African academics to develop their own theories and to engage in conversation with theories from the North. What are the questions in your field arising from the South African context that require the development of local theories to answer them?

Developing meta-thinking: a creative approach to teaching Mathematics

Viroshan is a mathematician who experiences joy (and frustration!) from studying and creating mathematics. As a teacher of mathematics he understands that some of his students experience mathematics as beautiful and elegant. For the majority, however, boring multiplications drills and exercises in arithmetic have forever tainted their relationship with the subject.

This aversion to mathematics persists even into the university mathematics classroom. And, for Viroshan, it is no good saying to disaffected students that they need to learn mathematics because it is important. He also does not see his task as teaching mathematics to produce a scientific and technical elite capable of using mathematics as a tool.

It is never too late to learn

Viroshan believes that there are similarities between learning to draw and learning mathematics. Some argue that if one does not develop the ability to draw while young, then one is forever doomed to drawing stick figures. But many adults do, and can, learn to draw, and there are many successful courses for artists who blossom later in life. Usually, these programmes start by encouraging students to silence their inner critic, and to change the way that they “see”. Viroshan uses a similar principle in enabling students to learn mathematics.

He teaches mathematics as a service course to first year students, many of whom do not trust themselves to think mathematically or to do basic calculations. He wants students to trust that they do indeed have the ability to do mathematics. This he does through getting them to think about how their perceptions about learning mathematics have developed and the effects of such perceptions on their mathematical abilities.

Viroshan wants to create cracks in the perceptions that students have about themselves that do not serve them well. To this end he introduces them to a model for thinking about perceptions about their abilities to do mathematics based on the work of financier, Nassim Taleb.

Fragile, anti-fragile and robust systems and people

Nassim Taleb developed the idea of fragile, robust and anti-fragile systems or people. Fragile systems break when the environment is volatile. A fragile person avoids situations that potentially disrupt or destabilise their equilibrium for fear of feeling vulnerable, for example. A system or a person is robust when it / s/he can withstand shocks and challenges. However, robust people do not allow themselves to be changed in the process of dealing with challenges. When a person or a system is anti-fragile, however, they are able to apply creative means to overcome new challenges and they learn from disruptions.



Viroshan Naicker
Mathematics

Viroshan's goals:

- To build students' confidence and sense of themselves as learners who can do mathematics
- To integrate play into the teaching and learning of mathematics

Students may be afraid of trying when they confront new problems for fear of failing. They need to learn strategies to become anti-fragile even as the environment they are in becomes progressively more volatile and messy.

Thus, if students memorise proofs or only use a calculator, they won't learn to change the way they think and in the process they become more fragile. However, if they learn and practise problem-solving strategies, they become anti-fragile and better able to solve novel problems.

If a lecturer provides an environment where students solve problems, they become good problem solvers. Arguably, one could understand progression through a university curriculum as a process of moving from fragile ways of knowing and being towards anti-fragile ways of knowing and being. An anti-fragile education can thus become a cornerstone for responding creatively to the complex and ever-changing world that we inhabit.

Viroshan helps students to understand that they have the power to shape the way they relate to mathematical problems and that the problems do not have agency over them. His aim is to influence their limiting beliefs about their mathematical abilities. By explicitly addressing students' belief systems in his courses, and establishing a playful problem-oriented lecture environment, students are supported to improve their skills and approach mathematics creatively.

The routine and abstract way mathematics is often taught hides the aesthetic beauty of the subject, as well as the mathematician's creative process. It is this creative process of finding hidden clues and patterns, and uncovering "mathematical reality" that makes mathematics enjoyable. Viroshan wants to *show* his students why mathematics is interesting rather than telling them that it is.

Letting go of the notion of "perfect" mathematics

One way of changing mathematics teaching is to let go of the notion of "perfect" mathematics: the type found in textbook solutions and statements of proofs. Instead, a healthier approach would be to focus on the imperfect process by which mathematics is created. For example, instead of making an absolute statement such as "the circumference of a circle is two pi times the radius", lecturers could challenge their students to find circles and make measurements. This teaches everything from mathematical and scientific curiosity to problem-solving and investigative skills. It also leads naturally towards developing mathematical skills such as abstraction, generalisation and pattern recognition through concrete examples.

Taking a creative approach to teaching and learning mathematics

Viroshan believes that it is worth taking a more creative approach to the teaching and learning of mathematics. Empowered, creative teaching requires high levels of empathy in which teachers put aside their own "knowing" and play the role of supporting students to develop the quality of their thinking and self-trust.

The creative arts are often associated with play, so why not practise play in the art of mathematics teaching? This approach may, at the very least, reduce the apprehensiveness that most students carry with them into their mathematics classes.

Viroshan thinks that, as educators, it is worth being mindful of the fact that our role is to support our students in their own human development and to show them a few landmarks in their disciplines while modelling and nurturing the skill of navigation.

Further Reading

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Feynmann, R.P. 2005. *The Pleasure of Finding Things Out*. New York. Basic Books.

Liedloff, J. 1989. *The continuum concept*. New York. Arkana.

Polya, G. 1957. *How to solve it*. New York. Doubleday.

Taleb, N. 2014. *Anti-Fragile. Things that gain from disorder*. New York. Random House.

Points to ponder:

- It is arguably the case that many students in many different fields fail, not because they are not capable of learning, but because they do not believe themselves to be capable. How can you help students to develop more self-serving beliefs about their ability to learn at university?
- What forms of meta-thinking can enable students to improve their learning in your discipline?

Finding solutions to complex social problems using trans-disciplinary research approaches

Tally is driven by her passion for fairness and for working towards a world that is sustainable, that offers us all a future on this inter-connected planet. For her, transformation means the possibility to create conditions in which people experience the freedoms to think and act in ways that transcend the many great injustices that currently exist.

Tally's research and postgraduate teaching and supervision are centred on what she terms the intractable problems related to water in South Africa. She focuses on the challenges of balancing the protection of water resource systems such as rivers and wetlands with the use of water for economic and domestic purposes. Water supply to areas that experience poor water infrastructure and service delivery are particularly important.

In attempting to make progress with such difficult issues, the variety of people involved, including scientists, water resource managers and communities, exercise power and privilege, utilise knowledge, often work in silos and strive to work efficiently. Each of these strategies works to a limited degree, however it hardly ever happens that these approaches to solving intractable problems lead to a state where large numbers of people can agree that they experience a state of well-being. The reason that it is so difficult to find workable solutions to big problems is that they exist in complex systems.

Complex systems are multi-layered and the parts that make up a complex system are characterised by a high degree of diversity. The parts form a system because they are connected to each other through non-linear webs of relationships and processes, each with a broad range of characteristics. Parts and processes often work differently at different scales in space and time – as one aspect of the web changes, this results in shifts in other parts of the system. It is often difficult to predict the effects of a change or changes in a complex system on other parts of the system. It could thus happen that there are large-scale expensive interventions in a system that only result in very small changes. On the other hand small interventions sometimes create unexpectedly large effects. Surprises and disappointments are both characteristic of complex systems! For these reasons, adaptive processes and principles are more useful than rules and prescriptive procedures.



Tally Palmer
Institute for Water Research

Goals of engaging postgraduate students in trans-disciplinary research:

- To understand the complexity of problems in the social world
- To promote and understanding of the research problems as situated in a complex web of systems and contexts
- To develop students' knowledge of doing transdisciplinary research to address complex research questions.

Tally has therefore come to realise that context is vitally important. The behaviour of elements in relationship is profoundly influenced by context. Any context is, furthermore, the result of its history. It is therefore important for researchers to understand where the current context has emerged from if they are to understand the context and its complexities.

Tally acknowledges that there are challenges to post graduate student research within complex systems. She suggests that there is substantive evidence that transdisciplinary approaches offer a hopeful and transformative practice. These approaches require clear articulation of theory, careful selection of conceptual framing, and appropriate methodologies and methods. Transdisciplinary research practice offers both rigour and encompassing flexibility.

Further reading

Palmer, C. G., R. Biggs, and G. S. Cumming. 2015. Applied research for enhancing human well-being and environmental stewardship: using complexity thinking in Southern Africa. *Ecology and Society* 20(1): 53. <http://dx.doi.org/10.5751/ES-07087-200153>

Points to ponder:

- Have you identified challenges related to research projects of postgraduate students that could be the result of their research questions aiming to address what could be termed intractable problems existing in complex systems?
- How could transdisciplinary research enable researchers to find solutions to some of the intractable problems identified in your field?

Between the student protests and the imploding journalism industry: thoughts on curriculum and pedagogy

There was a time when Gillian and Anthea were certain about the nature of their work and its purpose. They had a very good sense of the journalism industry they were preparing students for and of the kind of journalists they needed to educate and train. They knew what to teach and how to teach. They both, after all, had many years' experience as journalists before becoming teachers of journalism at Rhodes University. In the early years they spent much time trying to equip students to fit the journalism industry that they understood so well.

Now, however, they no longer have a clear sense of their task as their certainties about their field, their students and higher education have been unsettled.

The journalism industry has changed irrevocably over the past five to ten years and it continues to do so as digital media develop and newsrooms contract. The work of journalists is no longer centred on print newsrooms where junior journalists play particular kinds of roles. As such, there is no longer an ideal journalism graduate. Besides, graduates from the School of Journalism and Media Studies enter many different kinds of careers.

Not only has the practice of journalism evolved, higher education in South Africa has also undergone significant changes over the last few years, as has the student body. Through the various student protests of 2015 and 2016, students have catapulted the conditions in universities and the challenges they experience in their efforts to gain a higher education firmly onto the national and institutional agendas.

Throughout this tumultuous period Gillian and Anthea have engaged deeply with their students and their struggles for justice and change. They felt that it was no longer possible to operate in the classroom as if there were a separation between students' heads and their lives outside of the classroom. They recognised that they had to take a more overt political stance in their teaching and keenly felt that this was a moment in which one could not be neutral – one was either on the right side or on the wrong side of history.



Gillian Rennie and
Anthea Garman
Journalism &
Media Studies

Goals of Gillian's and Anthea's reflections on their curricula:

- To make sense of the deep contextual shifts in the journalism industry, the student body and the higher education context in general
- To explore how to change or adapt curricula and pedagogy so that both are congruent with developments in their beliefs about teaching and learning Journalism and Media Studies in a changing context
- To examine how the contextual shifts influence their identities as teachers.

Gillian and Anthea have themselves changed over the years – as human beings and as teachers. They have been working together as teachers of writing and editing over the past few years and have spent a good deal of time thinking about who they are as teachers, who they teach, what they teach and how they teach.

What they have learned about their students, their plight and their experiences of the university during the student protests has made them rethink radically how and what they teach. At the start of 2016 they asked their third and fourth year students to meet with them for three days before the official start of the first term. They used this opportunity to tell students that, as a result of the way journalism, the higher education context, the student body as well as they themselves as teachers have changed, they no longer had a set curriculum for the work they needed to do together. They asked their students to work with them to navigate what they understood to be a new teaching and learning space.

Gillian and Anthea have long realised that students have an array of experiences with digital and social media and that these can contribute to shaping the projects students are able to fashion. In fact, teachers are very often not in a position to keep up with what students learn, know and can do. For example, student journalists have been responsible for changing the nature of the independent student media, Activate and Oppidan Press. The Oppidan Press started out as a newspaper and then moved online and created a television arm. Oppidan Press was working in a multimedia space and with multimedia tools long before some lecturers learned to work with these technologies.

Gillian and Anthea recognise that not all students are equally experienced with and proficient in using various media. They also know, though, that students have many capabilities that they need to take seriously and that they can harness in their teaching.

Research into student learning has shown that collaborative social activity is vital in shaping learning. As teachers they

were therefore keen to find ways for students to contribute to each other's learning and to find ways for them as teachers to work with their students to develop knowledge and storytelling practices. That is why they have found ways to bridge the third and fourth year cohorts. Students work collaboratively on some projects across year groups and help each other shape their projects while muddling through various trouble spots and learning in the process.

As a result of the eroding financial base of journalism and contracting newsrooms, Anthea thinks there is no longer a particular body of knowledge that can be taught. In fact, she has for a while now been sceptical about the value of teaching vast chunks of knowledge. (The first-year course she devised in 2007 still only has one 29-page article as the core reading. Reducing the volume of material for the course did not lead to a recognisably different educational output. None of her colleagues complained that this had made a difference to how well students coped with their second year.)

Gillian and Anthea have a great deal of freedom to decide what bodies of knowledge are worth teaching. One way of choosing a knowledge base is to consider student experiences. For example, Gillian realised, through interactions and conversations with students, that many of them feel a great deal of fear as they set about their lives. She therefore devised a project for students on fear and courage. This was Gillian's attempt to enable her students to intellectualise a visceral human response. She collated a series of readings about fear and encouraged students to apply what they learned from the texts to the practice of writing.

Anthea still believes in the value of storytelling for enhancing human lives and for promoting justice and equity. However, she is no longer sure how to teach this kind of storytelling in a classroom in which multiple external factors coalesce in extremely volatile ways. Gillian sees her task as teaching students a way of living and being as journalists. As such she aims to develop media workers who are responsive, reflexive and adaptable persons.

Points to ponder:

- In what ways have the student protests influenced how you approach teaching and learning?
- How do the kinds of graduates or knowers that you aim to develop shape the nature of the curriculum and pedagogy for the courses you teach?
- Can you think of ways in which you can encourage students to use each other as resources for learning?
- Gillian and Anthea meet regularly to reflect on their teaching and their students' learning. These reflections have enabled them to make significant changes to writing and editing curricula, including teaching and learning processes. Do you have a colleague or colleagues with whom you could deliberate questions about curriculum and pedagogy in the context of a changing higher education context?

Getting students thinking and talking about leading a good life

Since 2012 The Allan Gray Centre for Leadership Ethics (AGCLE), has been offering a new course, (described as ‘pioneering’ by an anonymous reviewer), called liNtetho zoBomi¹ (formerly called Existential Conversations). In this course students are challenged to think about what it means to live ethically in the world today. Students can take the course for six months, after which they receive a 15-credit Rhodes University short course certificate, or they can elect to take the course for a whole year in which case they obtain 30 credits towards their degree.

In this course students are invited to reflect deeply on who they are vis-à-vis the social pressures that help form them; they examine issues of justice and morality and ask questions about the duties and responsibilities of individuals and groups in modern society. However, this is always done in ways that relate these issues back to the self. Big questions such as: what does it mean to live with integrity, what is psychological freedom and what are the implications of exercising such freedom, are some of the topics that come under scrutiny in liNtetho zoBomi.

liNtetho zoBomi is essentially a course about exercising ethical leadership, understood as effective ethical agency. If a significant impact is to be made on students’ modes of being and perceiving, then ethics has to be taught as much more than a merely intellectual discipline.

The course is also a vehicle to address concerns Pedro has about the knowledge project embodied in the contemporary university. He is concerned about how the global university is a caretaker of the status quo rather than a promoter of genuine creative engagement with the world of ideas in ways that bring ideas to life. Through creative engagement students get to see that attentive thinking about relevant issues is essential for finding ways to attain the kind of lives they would want to live. Pedro believes that universities should be places aimed fundamentally at cultivating wisdom and humanity rather than places aimed at equipping people to learn things that can be sold in the marketplace.

He also feels that many in the university misunderstand what it means to know. The implicit conception of knowledge at work in universities is fundamentally disembodied. The academic project should not be limited to the cultivation of the intellectual aspect of



Pedro Tabensky
The Allan Gray Centre
for Leadership Ethics

¹ Conversations about life

Goals of this aspect of evaluation:

- To provide students with structured opportunities to critically reflect on issues of justice and morality
- To examine how students can use their agency to contribute to a socially just society
- To consider the responsibilities of individuals and groups in shaping a more socially just society
- To challenge students to examine social, political and ethical issues.

human living. This approach to learning is impoverished even from the intellectual point of view. Pedro's aim is that students should develop the maturity and wisdom that will lead them to become agents of change where change is necessary within their own domains of influence.

Pedro's views about the role of knowledge in a post-colonial society are influenced by the work of Steve Biko and Frantz Fanon. Biko and Fanon argued that the way one views the world is profoundly affected by the place one is in, in the complex network of power relations that define societies. Pedro argues that our outlook on the world is underpinned by prejudices that are often, indeed typically, not challenged or even recognised. He believes that students should be invited to challenge the ideas they have come to hold, often without even realising that they hold them, and in order to do this they need to understand that much is happening beneath the veils of consciousness.

liNtetho zoBomi has few prescribed readings and the format is conversational, using videos, often from social psychology, to trigger focused conversations. Each week students watch a movie or a documentary that deals with deeply human and often disturbing and controversial topics. The viewings are followed by facilitated conversations about the films, documentaries and video resources.

Initially, professional philosophers facilitated the conversations, but now the facilitators are alumni from the course. Students are required to keep a journal and engage in a service-learning project that enables them to reflect on their involvement in the project. The course offers students resources for thinking about the world and their place in it. They use these resources to make sense of challenging contexts they encounter in their service-learning work. In the process it is hoped that they will gain in self-understanding, an essential element in living a good life. Students or groups of students devise their own assessment tasks such that the tasks will demonstrate that they have met the outcomes of the course.

liNtetho zoBomi offers Rhodes students opportunities to think deeply about what it means to live at our best, ethically speaking, particularly in post-apartheid South Africa with its high levels of racial, economic and gender-based violence. The course offers students structured occasions to think about their place in the world and how they can lead and live their lives ethically.

Points to ponder:

- Are there opportunities in any of the courses you teach to offer students structured opportunities to consider the implications of what they learn for living ethically?
- How can conversations amongst students be used to consider the implications of the theories they engage with in your course for understanding the social, economic and gender-related challenges in contemporary South Africa?
- liNtetho zoBomi can potentially form the basis of a so-called common course. The purpose of such a common course would be to offer all students structured opportunities to think about ways in which to contribute to making South Africa (and the world) a fairer place to live in. What do you think of the idea of a common course that all Rhodes University students have to do before they can graduate?

Group work, diversity and learning in Environmental Science: issues and challenges

Group work is integral to teaching and learning in Environmental Science. At Rhodes, Environmental Science is offered at second and third year levels. It is a relatively new field that integrates knowledge and research methodologies from both the social and natural sciences to solve challenging environmental problems. Learning to solve the complex, non-linear kinds of environmental challenges that confront the world requires students, as aspiring environmental scientists, to develop the capacity for critical analysis and engagement with different interest groups. More often than not, these interest groups hold contrary viewpoints about a particular problem that environmental scientists have to negotiate carefully.

There is ample evidence in the research literature on group work as a pedagogic strategy that points to its value in enabling learning through interaction, collaboration and the sharing of ideas and experiences. Through group work, students not only learn disciplinary knowledge, but also how to work with diverse people. The *how* of the learning, including the difficulties that emerge in the process of doing a group task or research project, is as important a part of the Environmental Science curriculum as the disciplinary knowledge. Group work is, however, not without problems and if these are not addressed appropriately, they can impact negatively on student learning as well as on students as people.

University classrooms are diverse in terms of, amongst other things, their racial, ethnic, language, personality and gender make-up. Group members are therefore likely to hold a multiplicity of ideological positions that can be sources of great tension. At a university such as Rhodes, students also have a range of disciplinary majors and are thus learning different ways of thinking and engaging with knowledge. The different contexts from which students come have an impact on how they view others and on how they approach group projects.

As university classrooms become more diverse and the socio-political environment on university campuses becomes more dynamic and even volatile, lecturers need to think more carefully about how they structure and manage group work (including group and



Gladman Thondhlana
Environmental Science

Goals of group work in Environmental Science:

- To prepare students to understand the nature and challenges of working in diverse groups
- To enable students to solve problems emerging from difficult group dynamics
- To enhance students' ability to work with and learn from others
- To use student experiences of group work in a diverse class to reflect on how to deal with complex problems in groups where members have different interests
- To explore more effective ways of structuring group work for learning disciplinary knowledge and for learning about problem-solving processes in groups.

peer assessment) to ensure that all students benefit and achieve the envisaged learning outcomes. To enable him to create effective group tasks, Gladman devised a questionnaire in which he probed students' experiences of group work.

While his findings were generally unsurprising (see text boxes), Gladman was concerned about some comments that pointed to problems that had their basis in racial differences. Although students recognised the rich potential of learning from diverse groups, some black students felt that their opinions were not valued in the same way as the opinions of others. Some felt that they were judged even before they could present their ideas. Others felt that their fellow students were biased and that their peers' assessments of their work were influenced by factors unrelated to their performance on tasks.

Gladman was particularly concerned about the long-term effects that experiences of discrimination, whether real or imagined, may have on some students. He recognised that culture, including language, had a big impact on student interactions in groups. He resolved to address these issues further by creating spaces to have "courageous" conversations with students about issues that enable and constrain their ability to work and learn effectively in groups.

Further Reading

Thondhlana, G. and Bellugi, D. Z. (2014). Group-work as 'terrains of learning' for students in South African higher education. *Perspectives in Education*. 32 (4): 40-55. http://reference.sabinet.co.za/webx/access/electronic_journals/persed/persed_v32_n4_a3.pdf

SOME POSITIVE STUDENT EXPERIENCES

- Groups are generally democratic in their decision making processes
- The different student backgrounds result in "well rounded perspectives" being incorporated into projects
- When groups did not function well, students gained "insights into how to deal with problematic personalities in the future".

EXPERIENCES THAT CAN IMPACT NEGATIVELY ON STUDENTS' LEARNING EXPERIENCES

- In some groups dominant voices take over and some students find it difficult to make their voices heard
- Some students felt that their contributions were not taken seriously
- Personality clashes sometimes constrain productive engagement in groups
- Students have different approaches to learning and completing tasks
- Different students find different standards of work acceptable
- Students set themselves different targets in respect of acceptable grades for tasks.

Points to ponder:

- Group work (including peer assessment of group members' contribution of group-based tasks) is a good strategy for enabling students to learn to solve complex problems while also learning how to work with diverse people. However, group tasks need to be structured carefully to ensure that all students contribute to the task.
- In what ways can group work/departments create spaces that are conducive to learning instead of alienating to some student groups?
- What are some of the ways in which lecturers can prepare students to deal with issues of diversity, in particular in relation to race and language?
- How can peer assessment be structured to make it less likely that individual biases of peer assessors influence marks awarded for an assignment?

Exploring the possibilities for an African science curriculum

Susi specialises in researching and teaching Ecology in the Department of Botany. She is passionate about drawing more black and women academics into the field. However, she recognises that there are many factors that prevent this from happening, including people not acknowledging that there is a problem and not questioning and changing familiar patterns of thinking and acting. Further factors include how students are seen or not seen, the learning environment that is created as well as the constraints of institutional and departmental structures.

For Susi it is important that black and women academics and students have access to the field of Botany and that they flourish and “feel in their element” (Vice 2015) as they engage in research, teaching and learning. Drawing students to the field is also influenced by who teaches, what they teach, how they teach and assess as well as the social environment, including the culture of the institution.

Given that the focus in the Science Faculty is on research and research-based teaching, she thinks that it is important that students are initiated into research practices so that they can see themselves as legitimate producers of knowledge from early on in their undergraduate programmes. This involves creating many opportunities to “do” science such as practicals, field trips, seminars and doing their own research project, in order to ensure that teaching, learning and assessment activities foster the growth of students as independent researchers. Such activities also allow for formal and informal interactions between undergraduate students, postgraduate students (who are researchers-in-training) and academic staff. Through such interactions the process of progression from undergraduate student to researcher is made visible and explicit.

Furthermore, it is necessary to give serious consideration to what could be distinctive about African science graduates and the potential contributions they can make to scientific knowledge production. She thinks African graduates should be:

- enquiring and curious about the world around them, including in relation to the experiences and worldviews of others
- informed and aware of important environmental and other issues science can contribute to addressing
- aware of their own role in society and the contribution science can make, but also have humility about the limitations of science
- seeking new ways of solving problems rather than always replicating the ways of others.



Susi Vetter
Botany

Goals of Susi’s re-thinking of the curriculum:

- To consider strategies for getting students from diverse backgrounds to take an interest in studying Botany, particularly at postgraduate level
- To consider pedagogical strategies that will contribute to students feeling in their element when doing science
- To explore how science curricula can be organised differently to create more opportunities for students to develop a deep interest in the sciences.

During interactions with scientists from the United States and Europe, Susi has often been struck by what she calls the “boer-maak-‘n-plan” approach of South African scientists and the novelty of the results they produce. This is particularly so because they have to work with limited resources. She feels that this aspect of South African science needs to be showcased, encouraged and modelled.

When considering how the Botany curriculum can be changed to enable access to a greater diversity of students, Susi and her colleagues in the department regularly examine their curricula and ask themselves the following questions:

- What core values and content should be kept?
- Is everything that is currently taught relevant and necessary?
- Are the links between theory and practice adequately and explicitly drawn?
- Are important transferable skills taught alongside content?
- Are there any unnecessary duplications in the curriculum?
- How can space be created for courses that focus on important content and skills that span the disciplines?

Susi has been thinking about some of these issues in relation to the Ecology courses she teaches. The Ecology curriculum is explicit about the research process in the generation of new knowledge. In her course students consider how ecological knowledge is created. She foregrounds the role of context in research decisions and processes. For example, she talks to students about who the researchers are, why they were motivated to do the specific research; she explores whether and how the social context influenced the research and what theory emerged from it. With her students, she asks questions about whether theory is relevant or applicable to the South African context. Susi ensures that knowledge from both the northern and the southern hemispheres, including from South Africa, is included in the curriculum. One of her explicit aims with the course is to show students that they too can and should be producers of knowledge.

Susi also thinks that South African scientists should eschew being arrogant about their disciplines. She thinks that science curricula currently have a narrow disciplinary focus and that there are ways in which this could be changed so that science students are afforded educational experiences that broaden their understanding of the field, and also of the social and ethical implications of their work (see text box). Susi would like to see science academics becoming comfortable with engaging across disciplines and interested in and open to what other disciplines have to offer.

IDEAS FOR RETHINKING SCIENCE CURRICULA

- The first semester in the first year could include a semester course on the history and philosophy of science in which questions related to science in society are introduced and ways of “knowing” in the sciences are explicitly explored and taught. This course could place scientific endeavours in their historical and geographical contexts. It could also include African scholarship – past, present and future.
- In the second year students should take three science subjects that provide them the opportunities to learn key disciplinary content.
- In the third year it should be possible to transcend disciplinary divides so that courses could be rationalised and duplication prevented. This will free up space for students to do common courses such as statistics and experimental design. Courses that explicitly offer inter- or trans-disciplinary knowledge could be made available.

Points to ponder:

- What ideas do you have for the kinds of African graduates that should be prepared by your discipline or the university more generally?
- In what ways could the curriculum be structured to make space for students to learn about the social aspects of science?
- How does the curriculum need to be adapted to ensure epistemic access to students from a greater diversity of home and educational backgrounds?
- In what ways can institutional and departmental structures and cultures be changed to make it more possible for black and women students and academics to thrive?