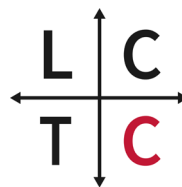


LCT3 Third International Legitimation Code Theory Conference – 2019

1 – 5 July
Johannesburg, South Africa



UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



The LCT Centre
For Knowledge-Building



LCT3

Third International
Legitimation Code Theory
Conference – 2019

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WELCOME TO LCT3!

The University of the Witwatersrand and the LCT Centre for Knowledge-Building (the University of Sydney) are delighted to welcome you to the Third International Legitimation Code Theory Conference. After the amazing success of the LCT1 in 2015 in Cape Town and LCT2 in 2017 in Sydney, we are extremely happy you are visiting us here in Johannesburg for what will be a fabulous event.

As a community LCT has grown rapidly and spread fast. Over the past five years, there has been on average a conference paper every four days, a publication every week, and a PhD awarded every month. Given that the name 'Legitimation Code Theory' appeared in print for the first time in only February 2009, these conferences reflect the dynamism, enthusiasm and energy generated by the field. As you will hear at this conference,

We come together here from a very wide range of disciplines and many countries. We are also a young, dynamic community. We all share the same theoretical language, enabling us to speak across a dazzling variety of topics and issues, methods and data. We all share the belief that we can achieve more together than through individual grandstanding or negativity. So we hope you are ready to engage deeply and positively with an amazing programme of papers.

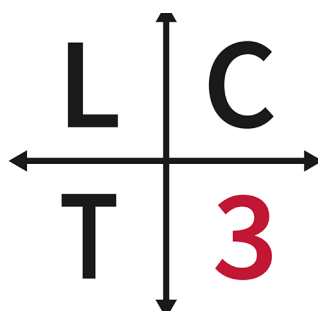
Following feedback after LCT2, we have retained interactive workshops, having more time for talks and more time for discussion, making sure there are always gaps between papers and never more than two papers between breaks, and we have chosen a venue that keeps us together. The conference is designed for creative and constructive knowledge-building among this warm and friendly group of knowers.

LCT3 is free of registration fees and able to offer workshops and keynotes by international scholars thanks to the generous support at the University of the Witwatersrand of:

- National Research Foundation: Knowledge, Interchange and Collaboration Grant
- Faculty of Humanities, University of the Witwatersrand
- Wits School of Education
- University of the Witwatersrand Research Office
- LCT Centre for Knowledge-Building, University of Sydney

Welcome!

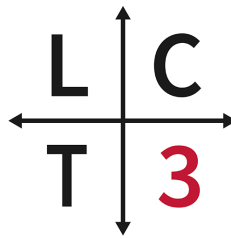
Lee Rusznyak and Karl Maton



LCT3 Organising Committee and Reviewers

A/Professor Lee Rusznyak – Chair
Professor Karl Maton – co-Chair

Dr Yaegan Doran
Mr Philip Hlatswayo
Mr Patrick Locke
Professor Sioux McKenna
Dr Shirra Moch
Mr Mauricio Quilpatay Belmar
Associate Professor Elizabeth Walton
Dr Kirstin Wilmot
Professor Chris Winberg
Dr Karin Wolff



We wish to profusely thank:

Our sponsors at the **National Research Foundation**: Knowledge Interchange and Collaboration Grant for their grant that enabled this conference.

The **University of the Witwatersrand** for its generous sponsorship: **Faculty of Humanities, School of Education**, and the **Research Office**. In particular, we thank **Prof Felix Maringe, Prof Garth Stevens, Prof Elizabeth Mavhunga, Prof Nazir Carrim, Dr Robin Drennan** and **Prof Hamsa Venkat** for their support towards this conference.

Dr Tessa Lunney at the LCT Centre for all the administrative support. **Dorah Moloto and the staff** at **Highfield Dining Hall** for the excellent catering services. **Thapelo Baadjies, Siphon Nkosi** for assisting with planning, parking, security and other operational matters. **Sandile Mthembu** for AV and IT support. **Misheck Ndoro, Thandy Molapo** and **Jabu Nkosi** who assisted with procurement. **Wits ICT** for providing wifi access to conference delegates.

Wits School of Education student teachers – **Mbalenhle Sithole, Teboho Lengane, Sekelwa Gumenke, Thembinkosi Mbatha** and **Tshepo Mokoena** – whose assistance in preparing for and managing the conference has been invaluable.

Menzi Gumbi, Simphiwe Msomi and **Hilda Mohlatlole** for sharing their musical talents with us. **Ferna Clarke** from the Wits Marketing Department for assisting with the campus maps and conference packs.

Our families who indulged many middle-of-the-night calls across 7 time zones.

And finally, **you**, the wonderful people of the LCT community, for your enthusiasm about this event.

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



The School of Education, University of the Witwatersrand

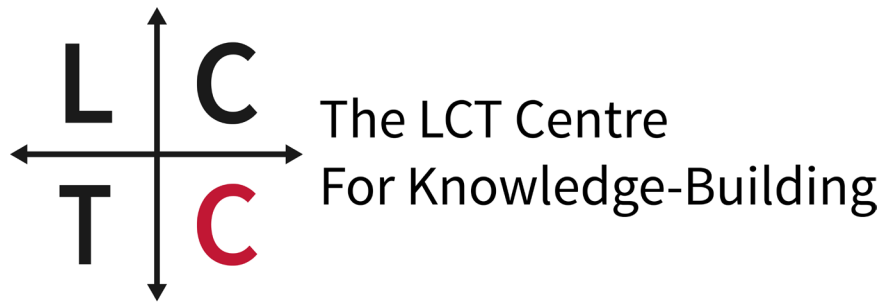
The University of the Witwatersrand is a research intensive university, located on clusters of campuses in Braamfontein and Parktown, Johannesburg. The university has nearly 40 000 enrolled students, of which 40% are doing post graduate studies. The Wits School of Education, headed by Prof Felix Maringe, is one of five Schools within the Faculty of Humanities, alongside the Schools of the Arts, Social Sciences, Human and Community Development, and Literature, Language and Media. The Wits School of Education is located on the Parktown Campus of the University.

The Wits School of Education is deeply committed to producing quality teachers for the South African

context. Currently the School teaches 2500 students studying to become teachers, and has 1000 students registered in its vibrant post graduate programmes. It is a research-led professional School of Education, that provides quality pre-service teacher education programmes, research teaching and contributes significantly to debates about schooling, policy teaching and learning. The research at the Wits School of Education is focused around a number of thrusts, including Teacher knowledge; ICT in education; decolonisation; Pedagogy and assessment; Literacy; Numeracy and work based learning.

The School fosters public debate and community engagement with all sectors of the educational community, regionally and internationally.

Although South Africa has been a democracy for 25 years, there are still vast inequalities that constrain prosperity in our society. Social justice, quality teacher education and a functional schooling system are crucial for building a more equitable society. The School is committed to contributing to vigorous debates on issues of teaching, learning, knowledge-building to take the transformation project forward. It is for these reasons that the University is delighted to be hosting the Third International LCT Conference, and trust that all delegates benefit from the debates, papers, networking opportunities. We especially look forward to the dissemination of the ideas and research in publications that contribute to these important matters in the near future.



The LCT Centre for Knowledge-Building

This conference is co-organised by the LCT Centre for Knowledge-Building, which was created by the University of Sydney in April 2016, under its founding director Professor Karl Maton.

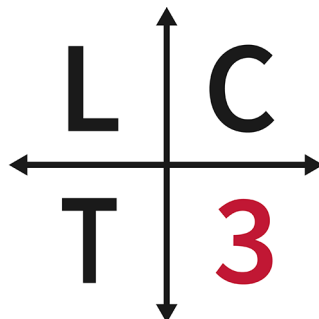
We encourage all delegates to become Associate Members or Associate Postgraduate Members of the Centre.

The LCT Centre runs the 'Sydney Roundtable' seminar series (now accessible online to members), intensive courses in LCT in Sydney and overseas, and many other activities.

The LCT Centre is also the host for a new dedicated book series to be published by Routledge on 'Legitimation Code Theory: Knowledge-Building in Research and Practice', and the Occasional Paper series for cutting-edge new developments in the framework.

Members have access to a growing range of resources as the Centre develops, including: online access to Roundtable seminars (both livestream and recordings); first-look access to Occasional Papers; LCT course recordings and materials; and more.

http://sydney.edu.au/arts/research/lct/people/joining_the_centre.shtml

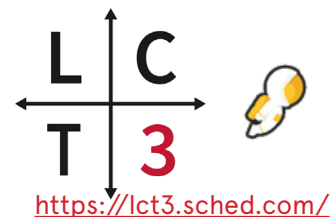


Conference details

Online programme and mobile app

We have an awesome app for the programme!

It features announcements and updates, abstracts, and information on speakers and venues. You can view abstracts, create your own schedule, and connect your social media for networking. You can use it on your laptop or smartphone!



How do I add the app to my phone?

Two ways:

- (1) In Safari browser, go to <https://lct3.sched.com/> and press the Share button (bottom of screen) and choose 'Add to home screen'.
- (2) Download the Sched app from the App store. Search for 'LCT3'.

Wi-fi

The University of the Witwatersrand will provide free wireless internet access in conference venues for all delegates.

Network:	Wits-wifi-Guest
Username:	933839
Password:	O3=i97ozg
First name:	LCT

Social media

Twitter:	#LCT3
Twitter:	@LCT_conf
Web:	http://lctconferences.com/
Email:	lctconferences@gmail.com

Water

LCT conferences aim to reduce plastic waste, so we recommend delegates bring a reusable water bottle to stay hydrated during the conference. Drinking fountains can be found:

- ground floor of Bohlaleng Block
- the Staff Lounge
- top of stairs between Bohlaleng Block and Staff Lounge

Tap water in Johannesburg is also safe to drink.

Meals and refreshments

Morning tea and afternoon tea will be served in the Staff Lounge, Wits School of Education. Everyday, a sit down lunch will be served in the Girton Dining Hall (see map, page 8). Each main course is served with a juice, a choice of starch, and two side helpings of the salads and vegetables prepared.

Fast food, snacks and a wide variety of coffees are available at the canteen on the Wits Education Campus, located next to the Linder Auditorium (see map, p. 8). The canteen opens at 7:30 am each morning.

Evening, July 3rd: Join us!

On Wednesday July 3rd, after 5pm, you are invited to join us at the nearby and very popular Jozi restaurant, Mike's Kitchen Parktown. The restaurant is located in one of Johannesburg's heritage houses. The menu offers a variety of delicious food at very reasonable prices, from light snacks to meals with a more South African tradition. See <https://mikeskitchen.co.za> for more details.

The Wits Shuttle will transport delegates from the campus bus stop (underneath Staff Lounge) to the restaurant at 5:10 pm.

Note: To keep registration free for LCT3, this is self-financing – you pay your own bill (add 10% for service),

Keeping safe in Johannesburg: Being vigilant

South Africa is a country struggling to overcome its vast inequalities, and there are still high levels of unemployment and poverty. In general, the people of Johannesburg are friendly and willing to assist. There are, however, criminal elements who seek opportunities to engage in petty theft. So take the following simple precautions to ensure personal safety:

- Have a lock on your check-in luggage.
- Keep valuables out of sight, and avoid carrying large sums of money.
- Do not leave bags, mobile devices and laptop unattended.
- Lock vehicle doors when travelling and keep bags out of sight (e.g. on floor or in boot of car).
- Avoid walking in the streets at night time, and if you need to, walk in a group.
- Shopping malls are safe spaces, but make sure to keep bags zipped closed, avoid storing a phone in a back pocket, and do not leave a bag in a trolley while browsing.

Emergency contact numbers

- Campus Protection Services (for assistance on Wits Education Campus): 011 717 3340
- Ambulance: 082911 or 10177
- Fire brigade: 10177
- Police: 10111
- 24 helpline for international calls: 10903

Need help?

The wonderful LCT Conference Assistants are pre-service teachers studying at the Wits School of Education. Their names are Mbalenhle, Teboho, Sekelwa and Thembinkosi and Tshepo. They will be clearly visible in colourful red T-shirts– ask any one of them for help and they will be happy to assist.

Maps to the conference venue

The conference will be held at the School of Education, Wits Education Campus, Parktown, Johannesburg. Address: 27 St Andrews Road Parktown. The main campus entrance is on the corner of Queens and St Andrews Road, Parktown.

A well known landmark on the campus is the Linder Auditorium.

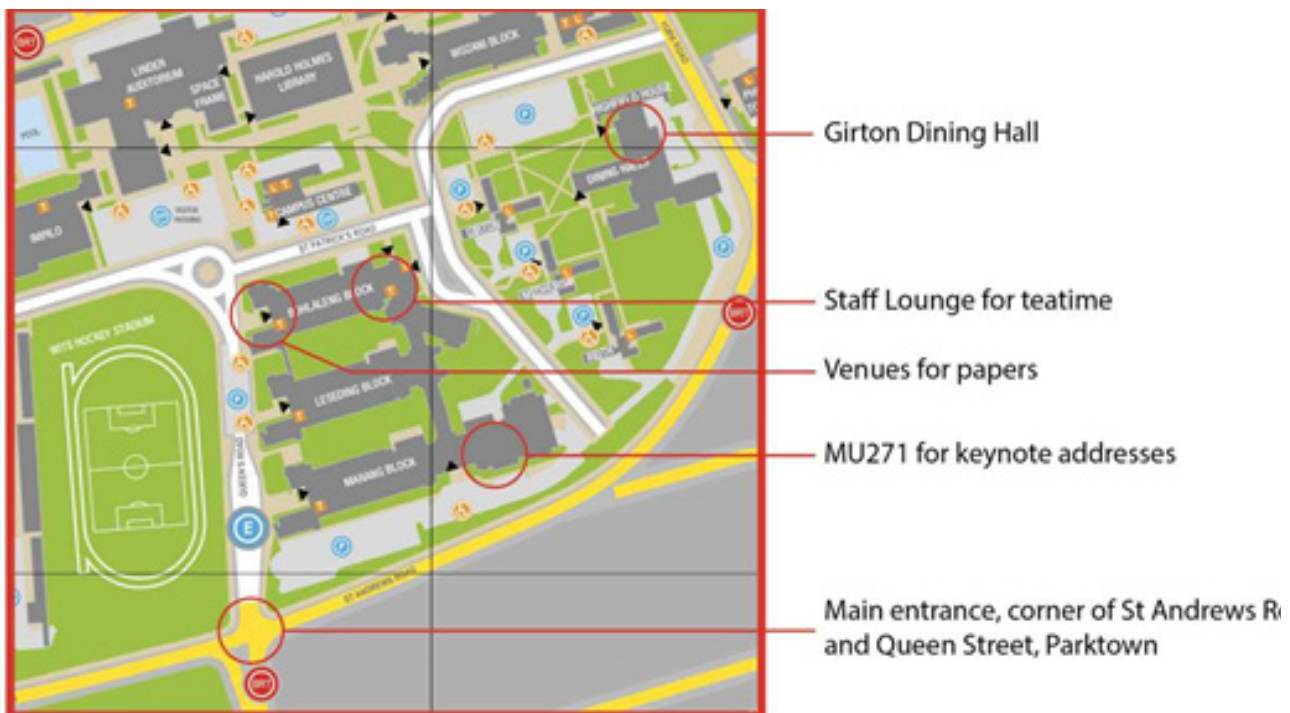


Map of Wits Education Campus

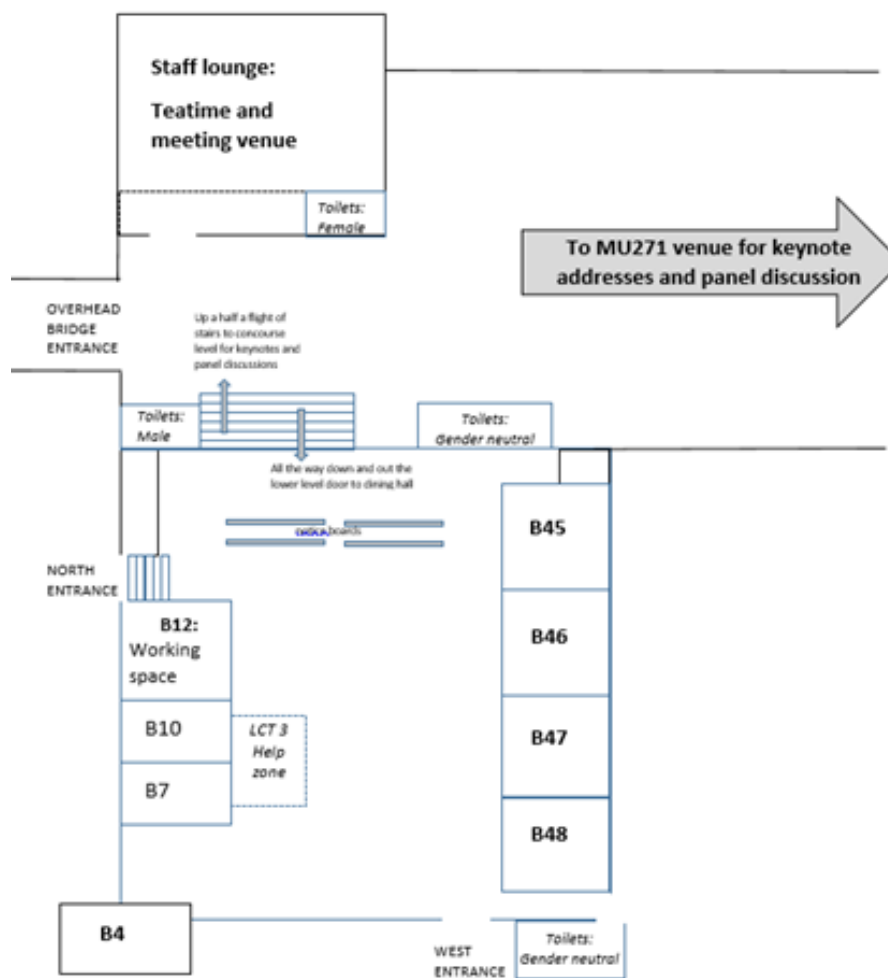
The Conference Presentations will take place on the ground floor of Bohlaleng Block. As you enter the Wits Education Campus, Bohlaleng Block is the third building you pass on your right-hand side before you reach the large traffic circle.

There are several entrances to Bohlaleng Block:

1. Use the door to the west side of Bohlaleng Block if you come from the main gate, and disembark before the traffic circle.
2. If you have gone around the traffic circle, and turned right, you will find yourself in a parking area, located between the Education Campus Centre and Bohlaleng Block. There is a small side door on the northern side of Bohlaleng Block, which leads to the ground floor venues.
3. There is a overhead walkway linking the Campus Centre and the Bohlaleng Block. The walkway will lead you to an entrance with the Staff Lounge on your left and Bohlaleng Block on your right.



Map of conference venues: Bohlaleng Block



Featured Speakers

Professor Karl Maton



Karl Maton is Director of the LCT Centre for Knowledge-Building at the University of Sydney and Honorary Professor at Rhodes University and the University of the Witwatersrand, South Africa. Karl's book, *Knowledge and Knowers: Towards a realist sociology of education*, was published by Routledge in 2014. A primer for enacting LCT in research and practice, *Knowledge-building: Educational studies in Legitimation Code Theory* (eds with Hood and Shay), was published in 2016. Two co-edited collections will be published shortly: *Accessing Academic Discourse and Studying Science* (both with J.R. Martin and Y. J. Doran). Karl is Series Editor of a new book series by Routledge: 'Legitimation Code Theory: Knowledge-Building in Research and Practice'.

Professor Aslam Fataar



Aslam Fataar is a Professor in the Department of Education Policy Studies at Stellenbosch University in Cape Town. He specialises in the areas of sociology of education and education policy. He has published three books: *Education Policy Development in South Africa's Democratic Transition, 1994-1997* (2011) *Engaging Schooling Subjectivities across the Post-Apartheid City* (2015), and *The Education Practices and Pathways of South African Students across Power-Marginalised Regions* (2018). He is the outgoing President of the South African Education Research Association and the former Editor-in-Chief of the journal *Southern African Education Review*. Prof Fataar has won three research awards and three prizes for his published articles.

Dr Mlamuli Hlatshwayo



Mlamuli Nkosingphile Hlatshwayo, is a Curriculum and Education Studies Lecturer at the University of KwaZulu-Natal. He holds a PhD in Higher Education Studies and a Masters Degree (Cum Laude) in Political and International Studies from Rhodes University. He has taught undergraduate and postgraduate courses in Designing and Evaluating Curricular in Higher Education, Philosophy of Education, and Professional Studies. His research interests include theorising South African higher education transformation, epistemological access and curricula, higher education student movements, and the philosophy of education. He is currently a visiting scholar at the University of Connecticut's Neag School of Education for 2018-19.

Dr Yaegan J. Doran



Y. J. Doran is Lecturer in Linguistics and a member of the LCT Centre for Knowledge-Building at the University of Sydney. His research focuses on language, semiosis, knowledge and education, spanning the interdisciplinary fields of educational linguistics, multimodality, and language and identity, and focusing primarily on English and Sundanese. His research has developed grammatical, discourse semantic, register and genre-based descriptions of mathematics, language, images and academic formalisms, as well as fine-grained analytical tools for understanding variations in knowledge practices from the perspectives of Systemic Functional Linguistics and Legitimation Code Theory. In addition, he considers the organisation of values systems that position communities of practice, how these are invoked through highly evaluative language and the theoretical issues that arise from these for our understanding of language, semiosis, knowledge and pedagogy.

Dr. Karin Wolff

Dr. Karin Wolff has worked in Higher Education teaching, curriculum, learning support, staff development and research at four South African universities. Her doctoral research (University of Cape Town) looked at the relationship between engineering disciplinary theory and practice in complex industrial problem solving. She draws on Legitimation Code Theory, notably epistemic relations, to enable improved theory-practice bridging in professional engineering education. She has published several papers internationally, and has been a collaborator on a number of education capacity development projects. She is currently leading the establishment of the STADIO Multiversity engineering faculty, and is senior education advisor and researcher to the Stellenbosch University engineering faculty.



Paul Maluleka

Paul Maluleka holds a Master's degree (by dissertation) in History Education with Distinction from the School of Education – University of the Witwatersrand. He was invited to be a member of the prestigious WITS Golden Key International Honour Society for this achievement. He is currently reading for his PhD in history education. He is exploring how 'best' South Africa can decolonise and Africanise its school history curriculum. This research interest was particularly sparked by student movements (2015) in higher institutions of learning, as well as the report of the History Ministerial Task Team (2018) that pronounced on the 'need' to have a 'compulsory Africa centeredness' school history curriculum. Previously, he worked as a senior history educator at Holy Family College, Parktown – Johannesburg. He also served on the board of the school as a staff representative, and a member of the Skills and Employment Equity Committee. He resigned from Holy Family College to join Rand Preparatory and College, Bezuidenhout Valley – Johannesburg as a senior Social Sciences and history educator. He also served as a subject coordinator for Humanities. He is currently a teaching assistant in the Division of Social and Economic Sciences at the WITS School of Education. His duties include lecturing and tutoring undergraduate students in history education, as well as co-supervision at Honours level.



Dr Hanelie Adendorff

Hanelie Adendorff is a senior advisor in the Centre for Teaching and Learning at Stellenbosch University. She has a Ph.D in Chemistry, but has been working in Professional Development since 2002. Her career in Professional Development started with an interest in blended learning, but has since included work in the areas of assessment, facilitation of collaborative learning, natural scientists' struggle with access to SoTL-type work, and more recently the decolonisation of science. As a member of the Science Faculty's teaching and learning hub, she works with the Vice-Dean (Teaching and Learning) on finding strategic approaches to enhance the stature of teaching in the Faculty.



Keynote Abstracts

Professor Karl Maton

LCT Centre for Knowledge-Building, University of Sydney

The rules of the game: Why what we do matters

'Legitimation Code Theory' – it's a scary name: multisyllabic, rather technical sounding, with more than a hint of the abstract. Yet 'LCT' is fast growing as the basis of a multidisciplinary and international community of scholars and educators who are enacting LCT to not only interpret and explain the world but also to change it ... and for the better. In opening our third biennial conference, I take the opportunity of us coming together as a community to consider what we do and why it matters. First, I begin by discussing what I've previously called the 'Big Dichotomy' that has long shaped the way academic practices are viewed. I argue that LCT defies this universalizing, either/or mode of thinking and that its combination of theoretical rigour and empirical application, conceptual clarity and practical impact is both what makes LCT unusual and what can make it difficult for others to understand. LCT does not sit easily within the conventional binaries that shape how ideas are conceived. It is what Mary Douglas called 'a scaly monster, cutting across the tidy categories'. I argue that one of the ways that LCT scholars and educators cut across those categories is by empowering people with the tools to make what Bourdieu called the 'rules of the game' explicit.

Second, I illustrate why making explicit the rules of the game can be crucial. I focus in depth on analysing pedagogic practices using the relatively new concepts of 'autonomy codes'. I explore how two teachers who are teaching the same subject, the same unit, and in the same year of schooling, do so in different ways. Specifically, I focus on the critical moment that is the beginning of a unit and analyse step by step how the teachers engage with their students to orient them towards and elicit from those students the kinds of knowledge they wish them to learn. Apart from illustrating another unusual characteristic of LCT – its detailed engagement with real-world data – these analyses show the difference it can make when a teacher's target content and target purpose are clear. One teacher takes her students into the heart of her target, with a clear understanding of where their journey will take them; with the other teacher, things threaten to fall apart as students are left in the dark.

Finally, I reflect on the implications of these analyses for what LCT enables us to do and why that might matter. I return to the 'Big Dichotomy' to emphasise that LCT stands in contrast to the either/or thinking that leads to intellectual trench warfare and to the universalising mode that believes there is one answer to everything, but does so without descending into helpless relativism and radical posturing. I also argue that by making explicit the 'rules of the game' and helping others to see how they shape their lives and life chances, LCT can help empower people. The rules of the game are not easy or obvious. They do not lie on the empirical surface. These underlying principles require diamond-edged precision tools to excavate and bring to the surface. These conceptual tools can make LCT appear scary, difficult, exclusionary, but, I argue, the ways that scholars and educators enact those tools are empowering others to not only see the rules of the game but to be able to change the game in ways that can benefit us all.

Dr Yaegan J. Doran

LCT Centre for Knowledge-Building and Department of Linguistics, University of Sydney

Knower-building: Building axiological constellations in the humanities

Recent years have seen a rapid growth in studies of knowledge-building. Amongst other things, these studies have revealed the principles underpinning cumulative knowledge-building and the discourse that is used to organise it across a range of fields. Moreover, this focus has driven developments in practice where tools such as semantic waves have been put to work in the classroom. Much of this work has centred on explicit knowledge-building such as we tend to find in knowledge codes. It has looked in detail at how fine-grained technical knowledge is pieced together in classrooms, textbooks and across a range of semiotic resources. And it has given a sense as to how vast networks of meaning are pulled together to form an integrated whole. In contrast, less focus has been directed toward knower-building – how dispositions, values, and moral and aesthetic stances are developed – such as often found in the knower codes. For fields underpinned by stronger social relations, such knower-building is essential. For students to be successful in such fields, they must be progressively cultivated into nuanced ways of seeing the world that offer subtle stances and interpretations of an expanding range of phenomena. This regularly leads to elaborated networks of meaning known as ‘axiological constellations’ to form. For those already well integrated into the field, these meanings will be clear. But for those new to a field or who have not had such cultivation, they may be obscured. As such meanings are essential to the uncommon-sense ways of seeing the world across a wide range of fields, if we are to develop a pedagogical approach to teach more effectively these meanings, we first need to be able to see these axiological constellations and understand how they develop in discourse.

As such, in this paper I will explore knower-building in the field of poetics and compare it to explicit knowledge-building as it often occurs in physics. As part of this, I will show how axiological constellations can be pieced together step-by-step in a cumulative way. This is important for our understanding of knower-building as axiological constellations offer unique insights into the intricate configurations of meaning that underpin conceptual development oriented to values, stances and dispositions but also offer means for understanding the different readings of these meanings that are tied to alternate perspectives. To see how these develop in discourse, we will step through a selection of rhetorical strategies used to build axiological constellations. These include where texts position certain meanings as being from a particular perspective; where particular meanings or perspectives are opposed to each other; where meanings, positions or oppositions are likened to other meanings, positions or oppositions; and when all of these are charged with value. Through these rhetorical strategies we will see the highly nuanced, yet consistent building of meaning that occurs in many fields, and develop a way of seeing how knowers are cultivated to view the world in particular ways.

Dr Karin Wolff

Stellenbosch University, Stadio Multiversity

INSIGHTS TO INCITE – An LCT journey through dysfunctional social systems

'The unexamined life is not worth living' – Socrates (BCE 469–399)

25 years into democracy in South Africa, we are constantly inundated with evidence of systemic failure. As academics, practitioners and researchers, we can only hope to address our numerous challenges if we can 'see' what they are. Having had the privilege of relatively early access to Karl Maton's thinking while Knowledge and Knowers was in the throes of birth, this paper offers a personal, reflective journey showcasing the power of a practical theory which not only enables 'seeing', but also potentially transforms knowledge practices. Drawing primarily on Legitimation Code Theory (LCT) instruments from the Semantics and Specialization dimensions, the account starts out in the context-dependent domain of the engineering classroom over a decade ago and ascends – slowly and painfully – into the hallowed halls of formal academia where I was inducted into the context-independent realm of the sociology of knowledge.

Detailing both the affordances and challenges across a decade of applied research into the theory-practice divide in engineering Higher Education and the profession, the paper focuses on key turning points where LCT instruments provided invaluable insights, and subsequently guided context-dependent practices in the 'real world'. The journey is peopled with Virgilian knowers in the LCT field, whose gazes enabled me to experience a strengthening of the epistemic relations through the social relations as a result of their generosity of time, opportunity and intellect.

The paper is structured as an overarching semantic wave, and culminates in a reflective analysis of the effect of such a research journey on the individual. The paper hopes to illuminate the gap between theory and practice for both emerging and established researchers.

Workshop Abstracts

FIRST SESSION

Introduction to the dimension of Semantics: Understanding cumulative learning

Professor Lee Rusznyak (University of the Witwatersrand)

The LCT dimension of Semantics is useful for teachers and researchers who are interested in cumulative learning and knowledge-building. This workshop demonstrates how teaching can build knowledge in segmental and in cumulative ways. Participants will analyse a selection of teaching materials. The strengthening and weakening of semantic gravity and semantic density will help them evaluate the extent to which cumulative knowledge-building is evident in the materials.

The workshop will:

- introduce the concepts of semantic gravity and semantic density
- show how semantic profiles reveal segmental and cumulative learning patterns
- provide participants with opportunities to analyse a sample of teaching materials and interpret their potential for knowledge-building
- enable participants to use Semantics to think about segmental and cumulative learning in their own courses and teaching practices

This workshop will be useful for lecturers/teachers who want to improve aspects of their teaching and assessing practices. It will also be invaluable for researchers who are interested in understanding teaching practices. No prior knowledge of Semantics is assumed.

Using Semantics in teaching and assessing student writing

Dr Sherran Clarence (Rhodes University)

This workshop will focus on how we create assessment tasks, guide students' responses to the tasks, and offer developmental feedback during assessment. Using semantic gravity and semantic density, brought together in both the profile and the semantic plane, we will use a range of examples from teaching and assessment practice to grapple with how we convey meaning to students in the tasks we design, and related teaching. We will also look at how we can use Semantics to guide written and verbal feedback, to enable students to more ably improve their writing and learning in appropriate ways. Specifically, the workshop will aim towards these outcomes:

- A more practical understanding of Semantics, and adapting it to your context
- New approaches to conceptualising, writing and teaching academic tasks (especially written)
- New ways of conceptualising and offering feedback on student writing

Examples of assessment tasks, tutor/lecturer feedback, and teaching guidance will be provided by the facilitator. The workshop will be facilitated through small group tasks, and discussion, with small inputs to set up and consolidate the tasks.

From data to description and back again: Creating a translation device

A/Professor Sarah Howard (University of Wollongong)

Developing a good translation device is not easy. It requires working closely with data and the theory, theory and data, back and forth. However, a high-quality translation device is a necessary component in your research. It supports knowledge-building in LCT, makes your research replicable and allows others to apply your tool in their context. Learning a few key strategies can dramatically simplify the process of creating your translation device and improving the quality of your research.

To do so, this workshop will walk you through some of the important components of creating, questioning and refining a LCT translation device for any dimension. This will include:

- covering key concepts
- developing appropriate indicators, targets and relations
- selecting effective examples
- testing and refining your device

Participants will be working in pairs and small groups. If possible, they should bring their own data and a laptop. Materials will be provided online before the workshop.

SECOND SESSION

Introduction to Specialization

Dr Ian Sieborger (Rhodes University)

Most people have an intuition that knowledge is built differently in different fields of study, or that in each field, there are some people who are widely accepted and others who aren't. This workshop will explain, in accessible terms, how Specialization can help us to differentiate between types of knowledge and understand some aspects of the 'rules of the game' in many different fields of knowledge, both inside and outside formal education. The workshop will give you the tools to answer the following questions about any knowledge field:

- what makes this field special? (the specialization plane)
- how does this field build knowledge, and knowers? (knowledge-knower structures)
- who's in charge where? (the epistemic-pedagogic device)

This workshop will be useful for anyone interested in using Specialization in their research or educational practice, or those who are simply curious about the dynamics of knowledge in different contexts. No prior knowledge of Specialization is assumed, and there will be plenty of opportunities to ask questions in a non-threatening environment.

Using LCT in planning and pedagogy

Dr Steve Kirk (University of Durham)

This workshop explores how LCT can be used both 'frontstage' and 'backstage' to guide pedagogical planning, design and delivery. The workshop focuses on Semantics but will also draw on the Specialization concepts of knowledge-building and knower-building. Participants will engage with the following ideas:

- The value of considering educational goals (of a session / module / programme) in knowledge-oriented terms (Specialization);
- How Semantics can be used to conceive, plan and enact those goals in pedagogy;
- How together, Semantics and Specialization offer practicable ways to think about notions of 'quality' in teaching

Participants are encouraged to spend a little time before the session thinking about classes they have taught recently, particularly (if possible) across very different subject areas or student groups. We will draw on the experience in the room and use LCT concepts as lenses through which to explore participants' own pedagogical thinking and practices. By the end of the session, participants will (hopefully!) take away a renewed sense of how to enact LCT concepts for their own classrooms and educational focuses.

Analysing constellations: Seeing axiological and epistemological meanings

Dr Yaegan Doran (University of Sydney)

This hands-on workshop will focus on how we can 'see' constellations of meaning and analyse them in text. It will:

- first introduce the concepts of constellations, charging and cosmology, in terms of how they organise knowledge,
- second, hone in on two types of constellations: axiological constellations that organise meanings associated with political, moral, aesthetic, or affective stances; and epistemological constellations that organise meanings associated with specialised empirical, technical or procedural knowledge.
- third, introduce a small set of analytical tools for teasing out the relations between meanings in text and show how this can help us build a 'map' of a constellation.
- fourth, give you an opportunity to dive in, have a go and get your 'hands dirty' at building constellations from texts from across a range of fields.

THIRD SESSION

Introduction to Autonomy

Professor Karl Maton (University of Sydney)

Every dimension of LCT has its own characteristics; how we enact concepts from Specialization is not the same as analysing data with Semantics. The same is true of Autonomy: analysing with 'autonomy codes' is a different ball game. In this workshop we shall work through real-world empirical data to get a 'feel' for how to analyse with autonomy codes. In joining me on this pathway you shall:

- learn the meanings of key terms
- figure out how to read 'signals' in data that can help announce autonomy code shifts
- experience how 'rules of thumb' can be developed
- learn why not everything is 'turned to purpose' and you cannot code backwards in time

No knowledge of Autonomy is assumed, but it will give us a lot more time for work if you have read 'Taking autonomy tours', which is available on the LCT website (in 'Occasional Papers' page and in Publications database).

Using the epistemic plane to address the what and how of your research and classroom problems

Dr Karin Wolff (STADIO, Stellenbosch University)

This hands-on, collaborative workshop is designed for academics wishing to solve a particular problem, whether in classroom practice or formal research. If you would like to develop a research project, refine a research question, plan your research design, or tackle your data, this workshop will introduce you to a useful LCT conceptual tool from the Specialization dimension. The epistemic plane offers a lens through which to get clarity on the what and how of your problem-solving research journey.

Participants will be introduced to the epistemic plane, given supporting existing examples of its application, and will be able to experiment with:

- Unpacking the key features of a research question
- Planning the research journey
- Developing the research design
- Analysing existing data

Participants are encouraged to bring along notes for a particular problem or material related to a challenging element of their current research.

Using LCT to enhance postgraduate supervision

Dr Kirstin Wilmot & Prof Sioux McKenna (Rhodes University)

Postgraduate education is assessed through a written thesis but supervisors often battle to make the disciplinary norms explicit. In this workshop, we demonstrate the ways in which Specialization and Semantics can be used to make the tacit rules of disciplinary knowledge creation more explicit in the supervision space. LCT provides key tools that can be used explicitly or more metaphorically to reveal key knowledge-building strategies to support students at all stages and across all fields.

In this workshop, you will learn how to use LCT concepts:

- in a broad brush-strokes way to help scholars to become more aware of the expectations of the discipline
- in a more explicit, fine-grained manner to scaffold the writing of the thesis
- to reflect on critical issues in the formation of a scholarly identity

The activities and strategies that we introduce in the workshop emerge from our own practices as a supervisor and doctoral student. As such, we hope the workshop will be useful to postgraduate supervisors, those academics who plan to supervise in the future, and to those students busy with their own PhD studies.

MONDAY 1 JULY 2019: WORKSHOP DAY

REGISTRATION			
9.00 – 9.30	Room B45 INTRODUCTIONS TO LCT	Room B46 PUTTING LCT INTO PRACTICE	Room B47 RESEARCHING WITH LCT
9.30 – 11.00	Introduction to Semantics: Understanding cumulative learning Lee Rusznyak	Using Semantics in teaching and assessing student writing Sherran Clarence	Creating a translation device Sarah K Howard
11.00 – 11.30	TEA: Staff lounge		
11.30 – 1.00	Introduction to Specialization Ian Siebörger	Using LCT in planning and pedagogy Steve Kirk	Analysing constellations: Seeing axiological and epistemological meanings Yaegan Doran
1.00 – 2.00	LUNCH: Girtton Dining Hall		
2.00 – 3.30	How to do Autonomy analysis Karl Maton	Using the epistemic plane to solve research and classroom problems Karin Wolff	Using LCT to enhance postgraduate supervision Kirstin Wilmot & Sioux McKenna
3.30 – 4.00	TEA: Staff lounge		

TUESDAY 2 JULY 2019: CONFERENCE DAY

8.30 – 9.00	REGISTRATION Between Staffroom and Bohlaleng Block			
9.00 – 9.20	WELCOME & ANNOUNCEMENTS Venue: MU271			
9.20 – 10.30	OPENING ADDRESS: Professor Karl Maton <i>The rules of the game: Why what we do matters</i> Venue: MU271			
10.30 – 11.00	TEA: Staff lounge			
Room:	B4	B45	B46	B47
SESSION 1 11:00 – 11:40	Pride and prejudice: The one-sided nature of the feedback dialogue Martina van Heerden	Blended learning and knower building: Reconcilable or not? Ilse Rootman-le Grange & Hanelie Adendorff	A conceptual framework for understanding the complexities of mathematical proficiency Ingrid Rewitzky	Preparing language teachers for assessment practice: Finding the ‘missing’ curriculum in teacher training Maryna De Lange & Hanlie Dippenaar
SESSION 2 11:45 – 12:25	Evaluative language for knower construction in promotional blurbs of English literary study books Bin Tang	Practice or personal? Pre- service teachers giving peer- feedback Dale Langsford	Supporting the transition from first to second year mathematics using LCT Honjiswa Conana, Deon Solomons & Delia Marshall	The specialization codes of law and order Patricia Preciado & Louise Greathouse
12:30 – 1:30	LUNCH: Girton Dining Hall			
	Knowledge and rhetoric: A Specialization analysis of courtroom argumentation Mathew Toll & Shi Chunxu			

TUESDAY 2 JULY 2019: AFTERNOON

Room:	B4	B45	B46	B47	B48
SESSION 3 1.30 – 2:10	Autonomy journeys and pedagogic moves: A lesson cycle in a first year university classroom Billy Meyer	Understanding specialization in specialized music programs through multimodal discourse analysis Jonathan Lilliedahl	Autonomy analysis of the Mathematics Comprehension Test of Academic Potential Naomi Msusa	Reflection as knowledge building in teacher education? Peder Holm-Pederson	Inter-weaving legitimate codes of professional legal education and global citizenship education Robert Tam
SESSION 4 2:15 – 2:55	Understanding first-year students' participation in the curriculum: A Specialization gaze Emmanuel Ekale Esambe	Sound waves and semantic waves: LCT in African music curricula Mandy Carver	Using Lego and Semantics to mediate conceptual grasp of Thermodynamics Karin Wolff & Tobias Louw	The case of the academy and compulsory education & training sector Mark Herrett	
3.00 – 3.30	TEA: Staff lounge				
SESSION 5 3:30 – 4:10	Variations on a theme: Understanding student learning with semantic codes Nicholas West & Francine Masson	Mind matters: An on-line resource for actuarial science students Billy Enderstein	How educative is educative? Examining mathematics curriculum materials Steve Thornton	Cultivated knowing, constrained knowledge: Jazz educators' espoused and enacted curricula Saul Richardson	Semantic density in legal studies examination responses Jennifer Kompara-Tosio
SESSION 6 4:15 – 4:55		From frustration to exhilaration: A tour with LCT Shoba Rathilal & Nalini Chitanand	Emerging constellations of Earth's movement in space: A case study of children in South Africa Ngonidzashe Mushaikwa, Mpunko Nakedi & Lee Rusznyak	Using Specialization to conceptualize musical performance assessment in higher education Jack Walton	Practice of police crisis negotiation: A multimodal discourse analysis Lin Xinming & Yuan Chuanyou

WEDNESDAY 3 JULY 2019: CONFERENCE DAY

9.00 – 10:15	PANEL: Paul Maluleka (Chair); Professor Aslam Fataar; Dr. Mlamuli Hlatwayo; Dr Hanelie Adendorff <i>Researching knowledge, decolonisation and the quest for inclusivity and social justice</i> Venue: MU271			
10.15 – 10:45	TEA: Staff lounge			
Room:	B45	B46	B47	B48
SESSION 7 10:45 – 11:25	Exploring project-based learning to navigate the articulation gap Marnel Mouton	Semantic analysis of key media studies course readings: Implications for improving student reading competencies Fiona Jackson	The use of wording related to semantic density shift in chemistry teaching Bruno Santos, Ademir Silva & Eduardo Mortimer	What matters in the workplace: Generic skills or specialised knowledge? Nicky Wolmarans, Corinne Shaw & Azqa Singh
SESSION 8 11:30 – 12:30	Extended Paper Making meaningful waves: Using Semantics to teach research writing Sherran Clarence	Extended Paper Cumulative learning in professional programmes: The role of judgment and reasoning Lee Rusznyak	Extended Paper The constrained autonomy of the postgraduate supervisor Sioux McKenna	Extended Paper A translation device for axiological-semantic density in Daily Sun articles Ian Siebörger
12.30 – 1.30	LUNCH: Girtton Dining Hall			

WEDNESDAY 3 JULY 2019: AFTERNOON

Room:	B45	B46	B47	B48
SESSION 9 1:30 – 2:10	Educational leadership cosmologies: Autonomy of a Hybrid Mode conceptualisation JP Bosman	Stretching LCT a bit: Towards the racial contract code theory Siya Sabata	Touring the epistemic plane: Student question-posing in chemical engineering education Robbie Pott & Sunel Nortje	Tracing the moving target in Didaktik of vocational education and training Martina Wyszynska Johansson
SESSION 10 2:15 – 2:55	Influence of feedback on assessment when using semantic waves Ekaterina Rzyankina	Semantic density in Zimbabwean judgements: Implications for social justice Dylan Nemaramba	Making semantics waves in biochemistry Lucas Passos Barreto, Eduardo Mortimer, Andrea Mara Macedo, L.T.G. de Almeida	The diminishing autonomy of vocational education: Teachers' perspectives Patrick Locke
3.00 – 3.30	TEA: Staff lounge			
SESSION 11 3:30 – 4:10	Pedagogic functions of synonyms in assessment contexts: A perspective from Semantics Talatu Banu Banu	Learning to teach in a situated learnership model of teacher education Loredana Borello	Lonergan and Semantics: A hope for chemistry education? Margaret Blackie	Academics' conceptualisations of innovation in engineering education in Zimbabwean universities Barbara Nhemachena Nhemachena
SESSION 12 4:15 – 4:55	Feedback as knowledge practice: Code clashes in teacher practice and student expectations Gina Roach & Vinita Gaikwad	Learning to learn: Autonomy tours for autonomous science learners Karen Ellery	Learning potentials of term variation in high school life sciences textbooks: Perspectives from Semantics Moses Adokonye, Richard Kamai & Baba Danjuma	How Zimbabwean Deputy Heads receive their technical training: A Semantic analysis Philip Chuma
5:00	SOCIAL GATHERING: Mike's Kitchen 15 St Andrews Road, Parktown			

THURSDAY 4 JULY 2019: CONFERENCE DAY

9.00 – 10.15	KEYNOTE ADDRESS: Dr Yaegan Doran <i>Knower-building: Developing axiological constellations in the humanities</i> Venue: MU271			
10.15 – 10.45	TEA: Staff lounge			
Room:	B45	B46	B47	B48
SESSION 13 10:45 – 11:25	Tracing a supervisor-student developmental journey through tracking feedback 'conversations' Sherran Clarence & Martina van Heerden	Developing scientific discourse through project-based learning Marnel Mouton & Ilse Rootman-le Grange	From cornfield to forest: becoming scholars of teaching in science Hanelie Adendorff	Semantic weaving to develop inclusive teaching practices Elizabeth Walton & Lee Rusznyak
SESSION 14 11:30 – 12:30	Extended Paper The sum of its parts: An autonomy analysis of combined app use in primary schools Sarah K Howard	Extended Paper Seeing condensation: A way of graphically showing growing complexity of knowledge over time Kirstin Wilmot	Extended Paper Seeing knowledge and knowers in the field of political studies Mlamuli Hlatshwayo & Sioux McKenna	Extended Paper Diving for pearls: Exploring EAP curriculum enactment with Semantics Steve Kirk
12.30 – 1.30	LUNCH: Girtton Dining Hall			

THURSDAY 4 JULY 2019: AFTERNOON

Room:	B45	B46	B47	B48
SESSION 15 1:30 – 2:10	Namibian Educational Leadership and Management Masters curricula Loide Vaino	The grand tour: LCT informing pedagogy and instructional design Dorian Love	Building chemistry knowledge through images Zhigang Yu & Yaegan Doran	Semantic waves in novice and experienced teacher-talk Sunday Dauda Malgwi
SESSION 16 2:15 – 2:55	Code match: Semantic-autonomy waves in junior secondary literary analysis A.J. Jackson	Specialization: An alternative language of description for threshold concepts Lizel Hudson, Penelope Engel-Hills & Chris Winberg	Semantic profiles in chemistry texts: How Reading To Learn pedagogy enables literacy development Pernilla Andersson Varga, Anna Maria Hipkiss & Susanne Staf	Legitimizing research in English teacher education: A semantic profile of MA writing Vicky Ariza Pinzon
3.00 – 3.30	TEA: Staff lounge			
SESSION 17 3:30 – 4:10	Knowledge and knower structures in self-directed learning Verner Larsen	Negotiating semantic waves: Integrating LCT into EAP Daniel O'Sullivan	Semantic profiling as means for assessing teacher students' practicum lessons Anna Maria Hipkiss & Sally Windsor	Semantic profiling in South African medical rescue education Mark Marais, Navindhra Naidoo, JP Bosman, LD Christopher
SESSION 18 4.15 – 4.55	Facilitating epistemological access by developing students, and experiences of undergraduate research Anisa Vahed	Eradicating knowledge blindness on a generic EAP course for postgraduates Susie Cowley-Haselden	'Unpacking' and 'repacking' during the tutorial journey: Surfing semantic waves in multi-lingualism Salochana Lorraine Hassan	Building knowledge and knowers in a longitudinal professional learning programme in the health sciences Shirra Moch & Patricia McInerney

FRIDAY 5 JULY 2019: CONFERENCE DAY

9:00 – 10:15	KEYNOTE ADDRESS: Dr Karin Wolff <i>Insights to incite: An LCT journey through dysfunctional social systems</i> Venue: MU271			
10:15 – 10:45	TEA: Staff lounge			
Room:	B45	B46	B47	B48
SESSION 19 10:45– 11:25	Challenging paradigms: Literacy interventions in tertiary environments Daniel O’Sullivan	Interdisciplinarity requires stewardship of powerful knowledge Gabi de Bie & Sioux McKenna	Semantic analysis of introductory physics assessments: Towards cumulative learning Christine Steenkamp, Ilse Rootman-le Grange & Kristian Mueller-Nedebock	Planning and scaffolding academic writing with Semantics in teacher education Anna-Vera Meidell Sigsgaard & Susanne Karen Jacobsen
SESSION 20 11:35 – 12:15	Using Semantics with Reading to Learn to develop an integrated literacy pedagogy for first level university Billy Meyer	Autonomy pathways to compare active teaching methods in undergraduate physiology classes Faadiel Essop & Hanelle Adendorff	Understanding knowledge practices in a transformative citizen science context Louine Boothway & Ingrid Schudel	Analysis of semantic waves in college English teaching classrooms Sha Xie
12:30 – 1:00	Fun, frolics and the future! Venue: MU271			
1:00 – 2:00	LUNCH - Girtton Dining Hall			
2:00 – 5:00	Guided Tour of Soweto: South Africa’s road to Democracy			

From cornfield to forest: becoming scholars of teaching in science

There have been increased calls for a more scholarly approach to curriculum design and pedagogy in Higher Education. The importance of developing pedagogical competence in fields with poor retention and success rates, such as science, has been highlighted in a recent review paper (Winberg et. al., 2018). Stellenbosch University's teaching and learning policy and strategy also links the professional development of teachers with scholarship and scholarly approaches, suggesting that quality teaching and learning should be informed by scholarship (SU, 2018) and urging academics to engage in the scholarship of teaching and learning (SU, 2017), one of the chosen vehicles for foregrounding a more critical approach to teaching and learning (Tight, 2018). Yet, academics from natural science fields often report struggling to cross the divide into the scholarship of teaching and learning (SoTL). This paper follows on an earlier paper (Adendorff, 2011) that looked at the experience of nine academics from science and related fields trying to make sense of the SoTL space.

In this earlier study, those who were interviewed, reported finding the new field of study and its methods of enquiry inaccessible. The findings of that study highlighted three obstacles: making sense of the Discourse, becoming legitimate participants in the SoTL Community of Practice and negotiating troublesome identity concerns. Whilst the study managed to shed some light on these struggles, it failed to explain the underlying reasons for the findings: why the new Discourse caused such difficulty, what the barriers to entering the Community of Practice were as well as why this led to identity concerns. It also failed to offer suggestions for overcoming these barriers.

This paper will report on a study that used Legitimation Code Theory (LCT) to explore the nature of the issues highlighted in the previous work. The data sources comprised of interviews with academics from science who (1) had completed or were completing teaching portfolios or (2) were attempting to do SoTL type research as well as (3) selected examples from teaching and learning literature. The focus of this study was on unpacking what counts as legitimate knowledge and how meaning is made in science and teaching and learning literature, respectively. Two dimensions of LCT were employed to explore these questions: Semantics and Specialization. Semantics offered a means of looking at how meaning is made in the two different Discourse practices whilst Specialization was utilised to explore the organising principles underpinning access to the SoTL community of practice, given its focus on membership, authority and achievement (Maton, 2013).

During the first stage of interpretation, the interview data was compared with the previous findings. During the second stage, the interviews and literature were analysed with translation devices designed for the purpose of this study. Whilst the findings of the earlier study were confirmed by the new data, the two dimensions of LCT helped to explain how and why the knowledge practices in the Discourses and Communities of Practices differ, not just that they differ. Findings indicate that moving from the knowledge code practices of science to the knower code practices of SoTL constitutes a code clash. Unfamiliar with what is valued, and trained to value different things, scientists fail to see the rules of the game in SoTL practice, with some even equating it to a relativist code. The different foci in the two communities can be seen, amongst others, in different referencing practices and different meaning making practices. The technical language of science is strewn with epistemically condensed terms, such as lipopolysaccharide, but terms such as these can be understood through grasping the meaning of the terms that they are condensed from, i.e. lipid and saccharide. Teaching and learning literature, on the other hand, employs terms that are axiologically condensed. These terms, some which might remind us of everyday language, are packed with axiological meaning. However, grasping the meaning of these terms, i.e. knowledge transfer or hegemony or epistemic violence, and understanding the axiological constellations they form part of, is a very different process to that employed in Science, a process that requires lengthy immersion into the ways of being, doing and acting of that community.

Finally, identity is impacted by the fact that science and SoTL value different things and set up different hierarchies, with the knower code practices related to SoTL placing far greater value on the attributes of the knower.

Understanding the differences between the fields, and the barriers this set up, can help academic developers identify how to better help scientists make sense of the SoTL terrain.

Moses Adokonye Africa
Baba Danjuma Danjuma
Federal Polytechnic IDA, Nigeria

Richard Awoshiri Kamai
Federal College of Education Yola, Nigeria

Learning potentials of term variation in high school Life Sciences textbooks: perspectives from legitimation code theory semantics

Term variation, which manifests as synonymy, hypernymy and hyponymy, is vital for cumulative knowledge building (Maton, 2013; Maton & Martin, 2013). However, some studies suggest that variant terms in science textbooks should be expunged or that their frequency be limited because they increase the level of text difficulty (Evans, 1976) and impede learning (Groves, 1995). This paper argues on the contrary that term variation is a textual resource that can be leveraged to optimize learning. To support this claim, three topics were identified from six Life Sciences textbooks used in Nigeria and South Africa. The clauses in the related topics were mapped on to a transitivity table in order to identify variant terms in the various clause constituents specified in the table. Each term variant was then described using constructs from the semantic dimension of legitimation code theory. The cognitive effect of the use of variant terminology was then examined in an achievement test on how to identify and respond to term variation. Results show that both Nigerian and South African textbooks blend specialized and non-specialized terms when describing scientific concepts. A qualitative analysis of learners' Think Aloud Protocols further shows that substituting an abstract term with a simplified one can foster the choice of correct answers to test questions. The study concludes that the practice of weaving meaning of different semantic nuances while explaining scientific concepts and phenomena in text or speech can provide learners with epistemological access to the specialized knowledge encoded in science textbooks

Semantic profiles in primary school chemistry texts: How Reading to Learn pedagogy enables literacy development

In comparison to other school subjects, the subject(s) of science and the language of science is particularly abstract (Edling, 2006). There is also a presupposition that teachers and students “mean” the same thing when they talk about concepts (Blackie, 2014). Science text book texts are characterized by few shifts in levels of abstraction and “in a society where specialized knowledge is necessary, the access to specialized texts is important. A democratic view of education and school mandates that children and adolescents have the opportunity to encounter and learn to encounter specialized language in school” (Edling, 2006 p.4). The subject(s) of science is to a large extent based on oracy, and normally the function, form and user of science texts are not discussed in the classroom (af Geijerstam, 2006). Students’ science texts produced in the classroom are often characterized by copying, legitimized by the teacher (af Geijerstam, 2006).

We argue that students need to learn to master the specialized language of science to build knowledge cumulatively, enabling movement between stronger and weaker semantic gravity and density (e.g. Maton, 2014a, b). The pedagogy of Reading to Learn (R2L) focus the form and function of texts. Its overarching purpose is to decrease the gap between high and low achievers by developing teaching to more effectively meet the literacy requirements of all subjects (Rose & Martin, 2012). Language two learners in Swedish schools particularly lag behind. Due to increasing school segregation R2L has been introduced in some schools to decrease inequalities through teaching literacy across the curriculum. R2L pedagogy consists of curriculum genres in which teachers and students are engaged during classroom work and knowledge genres, which relate to the characteristics of texts used in the classroom for reading and writing (Rose 2015a; Rose 2015b). Curriculum genres are designed to emphasise learning as a social activity in the classroom, guided by expert teachers (Martin & Rose 2013, p. 24). One curriculum genre is detailed reading, when teachers provide strong reading support through different strategies, focusing on for example sentence structure; i.e. participants, circumstances and processes.

This study aims at exploring how curriculum goals in primary school chemistry are enacted when teachers apply R2L pedagogy and how R2L provides affordances for cumulative knowledge building through “semantic waving”? Focusing on the R2L curriculum genre of detailed reading, our research questions are:

- What does a semantic profile look like in a model text?
- What does a semantic profile look like in a teacher detailed reading text?
- What does a semantic profile look like in student texts?
- How do these texts relate to the knowledge code of primary school chemistry (expressed in the national curriculum/syllabus)?

We use the dimension of Semantics and Specialization (Maton, 2014 a, b). Semantic density is the foremost used analytical tool in our study, as it illuminates the sometimes-dense concepts of chemistry (Blackie, 2014), abstractions (Edling, 2006) and how these are, or are not, used, unpacked and repacked, in texts. The semantic density of a model text, the teacher text for detailed reading and students independently constructed texts are analysed using semantic profiling, in order to explore what aspects of model and teacher texts appear in the student text. Specialization is used as a backdrop to understand how the teacher recontextualizes the chemistry syllabus.

We analyse student example texts about atoms, teacher planning of detailed reading and the model text (from secondary school science), which the detailed reading is based on, along with syllabus writing on models in chemistry, and the particle model in particular.

Preliminary results

Using the model text, unpacking it through detailed reading we will see how and if R2L and detailed reading provide a good opportunity to students to learn the knowledge code of primary school science and whether it affords cumulative knowledge building.

This paper adds to the research body of genre pedagogy, in particular Reading to Learn, by illustrating how the strategy of detailed reading creates waves between the model text, the preparation for reading and the execution of detailed reading.

Legitimizing research in English Teacher Education: A semantic profile of MA writing

Broadly defined, disciplinarity refers to the organization of knowledge as well as the organization of intellectual and educational practices (Christie & Maton, 2011). In this sense, writing a dissertation is a means to organize and create knowledge. However, the specificities in any given discipline are not always made explicit for academic writers to succeed. The challenge for novice writers in English Teacher Education is to recognize how to open a space for legitimate research in a context where academic literacy studies is a developing field. The challenge grows larger because of the wide variety of theoretical trends, influences, and emerging epistemologies and ideologies in Latin America (Avila, 2017). In practice, this creates a tension because while some educators see literacy as entailing complex social interactions influenced by cultural, social, political and economic factors, some others still see it as an orderly skill set; as unvarying and transferrable across contexts.

Legitimation Code Theory (LCT) provides a means for revealing the nature of the knowledge practices being expressed in discourse (Maton, 2014). Semantic gravity will be particularly useful to make visible not only the characteristics of the introductory chapter of MA thesis but also the challenges thesis writers face to legitimize research. The purpose of this study then is to explore the forms knowledge take in the endeavour of providing a context and justification for research and in doing so creating a research warrant. This study addresses questions: (1) how do MA writers create a legitimate space for research in thesis writing in English Language Teaching?; and (2) what does semantic gravity analysis reveal about writing and knowledge practices in the discipline of English Language?

The corpus of this study consists of seven introductory chapters of Master thesis in English Teacher Education. It is analysed with semantic gravity (context-dependence of meaning), where stronger semantic gravity are experience and weaker semantic gravity are theory. First, units of meaning are defined resulting in a translation device that ranges from theory to experience. Then, the units of meaning are coded and plotted. Results suggests particular semantic waves in introductory chapters of MA thesis that shed light on the basis for providing a context and justification for research. Introductory chapters of MA thesis in English teacher education are represented by low waves almost flat lines. Weaker semantic gravity involves bare definitions and collection of studies; stronger semantic gravity relies on thesis writers' legitimacy 'being an insider' in the field of research (Hood, 2012). The semantic analysis yields a powerful tool that unveils the rules of the game of thesis writing in the humanities. Opening up the possibility for teaching more students to succeed.

Pedagogic functions of synonyms in assessment context: a perspective from Legitimation Code Theory Semantics

Significant progress has been made on the knowledge building potentials of synonyms in teaching and learning contexts (Maton, 2013; Matruggio et al, 2013; Kamai, 2018). Regrettably, little is known of their pedagogic functions in assessment contexts. Against this background, this study examines the pedagogic functions of synonyms in an assessment context and to determine whether the use of synonyms (e.g. Nitrogen fixing bacteria in test question and Azotobacter in reference text) would foster or impede learner achievement. Thirty Grade 12 learners from Nigeria and South Africa were grouped into ten groups across the two study sites. A ten-item comprehension test and reference texts on Life Sciences were given to the learners to consult. The tests were administered to learners during prep classes to avoid interfering with teaching and learning. The participants were expected to work collaboratively and to provide answers to the test questions and a rationale for each answer given. The test questions and the reference texts deal with the same subject matter but the wordings were substituted. This entailed using synonyms in the questions that were at times more (SD+) or less (SD-) concentrated in meaning. The dialogue Think Aloud Protocols or the verbalisations of the learners were recorded and later transcribed. A qualitative analysis of the cognitive processes of the learners or their verbalisations revealed that the practice of weakening the semantic density (SD-) of a term (e.g. solvent) by the use of a variant (e.g. water or liquid) by participants facilitated the choice of correct answer by other learners. This finding is consistent with a theoretical prediction in LCT that shifts in the strengths of semantic density and gravity are "crucial to cumulative knowledge building and key to academic literacy" (Maton, 2014:1). The results further indicated that the use of abstract, meaning-concentrated terms (SD+ or SG-) in the test question and the reference text impeded learning. The study concluded that the use of synonyms in assessment context is beneficial to tuition and that the meta-linguistic awareness that knowledge is not static but is structured as waves of information can be leveraged to foster learner achievement.

Lonergan and LCT (Semantics) – hope for chemistry education?

In the context of major curriculum reform and calls for decolonization of curricula in South Africa, at our institution we have been asking the purpose of a Bachelor of Science degree. For the graduate who obtains a pass of 51%, there is no entry into honours, and no access to the world of professional science. Within months of graduation they will have forgotten the majority of the content they have learnt. What is value of their degree?

Having a good model against which to critique curriculum reform efforts and a practical set of analytical tools through which to understand the model could provide valuable insights for chemistry education. This paper integrates LCT(Semantics) with the Lonerganian model of human understanding. Lonergan's major project was understanding 'understanding', ultimately to achieve what he termed self-appropriation. This can be translated into the idea of critical citizenship. Lonergan's model gives a four-part iterative cycle comprising experience, understanding, judgement and decision making.

Experience includes sensory experience and cognitive experience and is informed by one's past. Understanding is the grasping of the principle which underlies the related experiences – the aha moment. Judgement is then required to ascertain whether the understanding is indeed reliable. And finally, decision making is the action which is appropriate given the judgement.

The chemistry education literature is dominated by discussions on the presentation of different topics (experience) and teaching different concepts (understanding). Both of these aspects are vitally important, but if our educative effort ends at the correct articulation of chemical concepts, we may be teaching chemistry but we are failing to educate in any broader sense. At the very least we would like our graduates to know the extent and limits of their knowledge. If they can exercise that judgement, and make appropriate decisions, they will be capable to engage constructively with new knowledge areas. In education-speak, they would be life-long learners. But there is little evidence of this higher order thinking in our graduates.

For self-appropriation to be possible, the understanding gained must be robust. The knowledge gain must be real. Lonergan's framework clearly indicates that in order for this to happen we need to teach fewer concepts at greater depth. It is only with depth of knowledge that we can really learn the skill of interrogating our level of understanding.

It is here that the link to LCT (Semantics) becomes clear. Semantic gravity in particular gives us a way of consciously scaffolding the learning process such that there is iterative movement from very specific context dependent examples, to the high order, less contextualised concept.

Currently chemistry education is relatively good at measuring and assessing variation in semantic density. But the variation in semantic gravity is relatively poor. The conversation between Lonergan and LCT(Semantics) can provide an easier entry for chemistry educators into consideration of variation of semantic gravity. Lonergan provides an easily described framework that science educators are happy to adopt but gives little detail as to how to implement a better system. The desire to implement the Lonerganian framework provides the activation energy required to get science educators to engage with variation in semantic gravity in a much more intentional and conscious manner.

Understanding knowledge practices in a transformative citizen science context

The Mpophomeni Sanitation Education Project (MSEP) is a citizen science project that foregrounds the transformation of social-ecological practices and the solving of real-world problems in context. It is a community-engaged citizen science project that aims to address the problem of sewage pollution in the Mpophomeni settlement (Kwa-Zulu Natal, South Africa) through citizen involvement in monitoring and reporting of sewage pollution events. In this paper specifically, we focus on understanding the nature and role of knowledge in this particular type of citizen science practice.

Working with Tabara and Chabay's (2013) description of two ideal-type worldviews that focus on the role of social-ecological systems in human information knowledge systems, the paper develops a set of indicators for understanding knowledge in these types of citizen science practices. Tabara and Chabay (ibid.) argue that an open, but socio-ecologically embodied worldview is necessary for actively addressing context-specific sustainability issues. We work with Maton's (2014) 4-K model that describes knowledge practices as epistemic and social in nature, in order to strengthen the theoretical grounding of the indicators developed for this study.

In keeping with the social realist perspective on education, our research methodology is underlaboured by critical realism and an interest in Bhaskar's (2016) 'holy trinity' which embraces ontological realism, epistemological relativism and judgemental rationality. The data for the study is generated from semi-structured and focus group interviews, project documents and observations with and of the MSEP coordinating team as well as members of the three components of the MSEP. These are; the 'Enviro Champs' who monitor and report sewage spillages, a school eco-club that focuses on environmental issues in the settlement, and the Mpophomeni Youth Productions Environmental Street Theatre group who engage the local community through plays that deal with the pressing issues of water and sanitation in the settlement.

The findings show that knowledge practices in the MSEP are both social and epistemic, produced by a wide range of knowledge actors in open knowledge systems as defined by Tabara and Chabay (2013). They also show that social-ecological transformation is associated with meaning making processes and learning experiences in context. The MSEP knowledge products exemplify concrete universal knowledge in that it is both contextualised - that is context-rich - whilst at the same time being relevant outside the scope of the local context. The mini-SASS water quality test is a good example of a contextualised knowledge tool that is both scientifically rigorous and allows for local meaning-making and potential social-ecological transformation.

In describing the knowledge practices in the MSEP, through a combination of Tabara and Chabay and Maton's work, we achieve two things. From an education practice-based perspective, we develop an argument for the importance of developing learning processes that support knowledge practices with both epistemic and social relations in citizen science projects with a transformative social-ecological agenda. Secondly, from a methodological perspective, we outline a synergistic relationship between the 4-K model (which strengthens the theoretical grounding of our analytic tool), and the indicators in our tool (which are illustrative of how the 4-K model might look when applied to contexts concerned with social-ecological transformation).

Learning to teach in a situated learnership model of teacher education

A learnership (apprenticeship-based) model of pre-service teacher education is being adopted more frequently by well-resourced schools as a response to the growing need to address the shortage of well qualified practicing teachers in South African schools. Student teachers are paired with experienced teachers in affluent schools. These teachers are expected to supervise and mentor the students in situ, whilst they undertake studies through a distance learning programme. The success of such programmes depends of the extent to which mentor teachers are able to open the possibilities for professional development and whether it allows for pedagogical reasoning or access to the inner logic of the more experienced mentor. In other words, the study examined the nature of the Zone of Proximal Development (ZPD) that mentor teachers create for the professional development of the students they mentor. If mentor teachers focus primarily on the technical aspects of teaching, it is unlikely that students will develop the pedagogical reasoning needed for successful practice when they obtain employment in different contexts.

This research aims to understand how student teachers are supported, by exploring mentors' conception of what students need to learn as well as the mentors' own constructs of what and how they need to mentor.

The research question for this paper is:

What is the nature of the feedback that is provided by mentors to the student teachers after observing lessons they teach? From this data analysis, I offer an interpretation of the extent to which the feedback provides access to the inner logic of teaching as a practice. I also evaluate the extent to which these feedback sessions engage in developing students' capacity of pedagogical reasoning.

The data for this paper comes from a case study of four mentor teachers who work with students in a learnership programme. The data comes from an analysis of the feedback that each mentor provided after observing two lessons taught by the student under his/her supervision. The feedback was recorded and analysed with regards to its form and content.

The Semantic Dimension of Legitimation Code Theory (Maton, 2014) provides useful conceptual tools for the data analysis. The analysis first considers the extent to which units of feedback provided is regulative, dispositional or instructional. The regulative and instructional units of feedback are analysed in terms of their semantic gravity (SG) and semantic density (SD). The strength of the semantic gravity considers the extent to which the feedback is transferable across classroom contexts. The strength of its semantic density considers the extent to which the feedback provides an elaborated account of practice. A translation device has been designed for identifying different strengths of SG or SD, and for analysing how these strengths change through the discourse. This analysis enables the study of the ZPD created through the interactions between mentor teacher and student.

At present, the data has been collected and is in the initial stage of coding analysis. Preliminary findings show that mentors who do not have a conceptual understanding and language of teaching as a practice tend to provide feedback which focuses more on the dispositional and regulative (characterised by SG-, SD-). Mentors who are better-versed in the conceptual underpinnings of teaching pedagogy and who had access to a language of practice provided more instructional support, with variable strengths of SG and SD. The analysis of the data and its interpretation will be further developed by the time of the LCT conference and will thus be available to be presented.

Educational Leadership cosmologies – Autonomy of a Hybrid Mode conceptualisation

Similar to the 'range of stances' that have been constellated around the term 'student-centred' learning and contrasted with another group labelled 'teacher-centred' (Maton 2014:155) this paper will develop the clusters and constellations around the emerging concept 'Educational Leadership' as contrasted with a term like 'Traditional leadership'. Both concepts hold in themselves a cosmology of meaning that is critical to understand in the current higher education landscape that tries to escape (or not!) the neo-liberal drive towards the massification and consumerisation of higher education (Smyth 2017). The intellectual and even material conflict flowing from this dichotomy is fierce and asks for an urgent scholarly response.

To describe the cosmologies, but more importantly the power-dynamics present in the world of Educational Leadership in Higher Education, Autonomy will be used to analyse the organizing principles underlying the relations among leadership practices (Maton & Howard 2018) prevalent in an institutional initiative at a South African university around the conceptualisation of a new hybrid mode academic offering. 15 Interviews were done with leaders from three distinguishable power-perspectives in the university, namely the (a) institutional/ management, (b) the faculty leadership, and (c) the support services. The transcribed interviews were qualitatively thematically analysed with autonomy codes as lens.

Relational Autonomy indicates whether the idea comes from the inside of the university (stronger relational autonomy, RA+) or from the outside (weaker relational autonomy, RA-). Positional autonomy shows where the control of the idea resides. Again, if outside the university then it indicates weakened Positional autonomy (PA-) but when inside it shows stronger positional autonomy (PA+). The analysis uncovers differing autonomy profiles across the data, including different autonomy pathways across the autonomy plane (Maton & Howard 2018:8). It also shows differing autonomy pathways for the different groupings (management, faculty, support) but not consistently.

Looking at where the idea comes from and how a description of the leadership around the idea is crafted (i.e. the clusters and constellations), and who controls it (i.e. management, faculties or support) will contribute to a practice-based cosmological analysis of 'Educational Leadership' from the context of a research-led university in an 'emerging market'.

This LCT analysis will contribute to our understanding of (technological) innovation and how it happens in universities in our current global climate through the lens of (and struggle for) (legitimate) Educational Leadership. It will also contribute to the field of Educational Leadership by theoretically analysing some of its core concepts in a cumulative knowledge building approach and showing how and why there is so much potential for conflict between the different constellations.

Sound waves and semantic waves: LCT in African music curricula

This paper discusses the curricularisation of African music. It examines one South African tertiary African music programme and asks what knowledge is outlined, how it is validated and how connections are made between different knowledge types, experiential, conceptual, epistemic and axiological. The recontextualisation of 'oral' or 'traditional' knowledge is a thorny problem in the field of music education, where what counts is hotly contested. Lamont and Maton attributed the unpopularity of school music to changing specialisation codes through different levels of schooling (2010). Philosophical debate in the wider field considers the extent to which music education should be based on disciplinary knowledge about music, or procedural knowledge embedded in the act of 'musicing' (Elliott & Silverman, 2014). The influence of competence modes in education is reflected in a focus on creativity and self-actualisation (Sarath, Myers, & Campbell, 2017), while recent scholarship draws on critical theory to highlight democracy (Woodford, 2005), anti-racism (Gould, 2008), or anti-colonial approaches that give voice to previously silenced epistemologies (Bradley, 2012). The question of indigenous knowledge is included in this latter theme. Despite their emancipatory intension, African music curricula, for the most part, retain the conservative curricular model established for Western art music, and simply replace Western with 'indigenous' content.

Considering curricularised African musical knowledge in terms of semantic gravity allows us to explore several important questions. First, where content is drawn from sites of oral acquisition, what is the potential for context independence? Second, what is the nature of such abstract, context-independent meanings? Third, as conceptualisation is most often tacit in oral learning, how should these meanings be articulated in formal curriculum? Finally, and importantly, how are connections made across different knowledge types, and semantic shifts enacted to allow cumulative knowledge-building?

The research examines course outlines and teaching and learning, focussing on the articulation of conceptual and experiential knowledge and the nature of the boundary between these. In this tertiary programme different knowledge types jostle for curricular space; it includes skill-based performance, epistemic knowledge of musical structures, and contextual information encompassing physical and metaphysical aspects. Because the grammaticality (Muller, 2007) of these varies greatly, acquisition depends upon how students negotiate boundaries within and between knowledge areas and knowledge types.

The study shows the importance of making visible these boundaries, but more importantly, it shows the need for mechanisms to negotiate them. Where boundaries are weak, for instance where abstract concepts are subsumed into procedural enactment, or everyday language is construed with disciplinary language, students have difficulty recognising what must be acquired. Consequently, they are more likely to rely on axiological meanings embedded in their own experience. This seems to downplay knowledge, but Green (2005) argues that axiological meanings play an important role in musical knowledge-building and in the acquisition of epistemic meanings. Thus, in the case of music, enacting semantic shifts within and across experiential, axiological, and epistemic knowledge content calls for specific translation mechanisms. The study demonstrates the need for deeper theorisation of African music curricula, to better understand how knowledge should be conceptualised, and the intricate relationship between 'getting into the groove' and conceptual mastery.

The theoretical findings of the study have implications both for African music curriculum development and the wider field of music education where diversity, agency, identity, anti-colonialism, etc., are all very much a part of current discourse. For LCT, the research extends our understanding of how semantic waves might work where understanding draws on both axiological and epistemic meanings.

How Zimbabwean Deputy Heads receive their technical training: A semantic analysis

Research suggests that the outward migration of the experienced teachers from Zimbabwean schools between 2000 and 2012 has created a pedagogical leadership gap within the education system. As a result, many newly qualified teachers begin their teaching careers in Zimbabwean schools with relatively few experienced teachers available to induct them into the working of the school and to mentor them as they develop their classroom practices. Increasingly, Deputy Heads are taking more responsibility for fulfilling the role of the induction and mentoring of the new teachers. A Doctoral study on the role of Deputy Heads in the provision of pedagogical support to newly qualified teachers provides the context of this paper. The study uses LCT's Semantics to analyse the epistemological constellations of ideas about how the training and/ or induction provided to Deputy Heads is viewed by the Deputy Heads as social actors as they engage in their practice, and the degree to which the training is context bound or independent. The study draws on policy documentation and interview data from selected participants in two Zimbabwean districts.

The five identified modes of learning were coded using Semantic Gravity (SG) by use of the following key:

Learning modes	SG codes
University course in management/administration	SG--
School/District workshops	SG-
Handbook	SG-
Mentorship by Head	SG+
Learning by experience	SG++

The findings revealed that there seems to exist a code clash between the nature of the training and the work that the Deputy Heads are required to perform. The interviews revealed that none of the 10 Deputy Heads interviewed received official training into the post of the Deputy Head. They all confirmed that there is no formal training but they only learnt to the post through any of the five modes, that is, university course in management/administration, school/district workshops, mentorship by the school Head, learning by experience and also using the policy handbook. The highest number of Deputy Heads indicated that they learnt through experience and mentorship by the school Heads. Both learning modes have got strong Semantic Gravity (SG+). This shows that the Deputy Heads' training or rather learning mode is highly contextually bound, meaning that their learning is done in the context of their schools. Their own experience or of their school Heads seems to have a paramount bearing on how they perform their duties. Only 3 Deputy Heads indicated that they learnt to their posts through the Handbook (SG-) which, in the eyes of the Ministry of Education is the ultimate policy document. A policy document is nationally bound, but, in the foregoing, its absence in schools might be a recipe for disaster.

The absence of induction programs and also formal training for Deputy Heads might influence negatively the discharge of professional duties of the Deputy Heads especially in the rural districts. This is so because, all the 5 Deputy Heads in the rural Beitbridge district indicated that they are on acting posts. Surprisingly, it is at these schools where most of the newly qualified teachers in the province are deployed. This, however, reveals a mismatch between the experience available and the support demand on the side of the newly qualified teachers. The other important question to be asked therefore is the nature of support provided to the newly qualified teachers by the Deputy Heads if themselves have not been properly inducted or trained into their posts. The assumption is that, as per policy document, the Deputy Heads are mandated to provide pedagogical and professional support to newly qualified teachers as they come to their schools.

Making meaningful waves: Using semantic waves to teach research writing

Making meaning in academic writing in higher education is often presented in literature and practice as an activity that is applicable across textual and disciplinary contexts. It tends to be reduced to the level of literacy practices that apply to higher education as a whole, rather than to different disciplines, in different ways. This understanding belies its connections with knowledge, and the processes used to create and communicate meanings (the purposes of the writing or research activities). What count as legitimate 'meanings' and how these are made and communicated through writing differ between types of text, and disciplinary contexts. Seeing these differences, and translating them into teaching praxis, is necessary to provide students with clearer understandings of the 'rules' of these different contexts, and how to create and communicate meanings in more relevant and informed ways. This paper seeks to unpack the nature of teaching meaning-making in three different writing, and knowledge-making, contexts: undergraduate, postgraduate and postdoctoral writing work.

The departure point in the teaching was introducing students in these three contexts to the semantic wave, and the basic ways in which meanings can be mapped through tracking shifts in semantic gravity and semantic density. The wave itself was then broken up into parts of the research process, and used to show students where different meanings should sit on the wave (i.e. more or less abstracted, more or less dense, and why), and also used to discuss the ways in which meanings are connected through the additional metaphor of the 'golden thread'. Through using, adapting, and teaching the semantic wave in these teaching and writing contexts, this study aims to demonstrate how meanings are made in different disciplinary, or meaning-making, environments. The paper discusses the uses and adaptations of the semantic waves within these contexts with reference to different stages of the research and writing process.

The first part of the paper will present different waves that have been drawn in these contexts, and connect these with an explanation of the parts of the research and/or writing process they represent. Differences, and well as similarities, between the waves used in these contexts will be drawn, in light of a discussion about the more generalizable, and more contextualised, aspects of meaning making through research. The second part of the paper briefly looks at data from student feedback in these contexts, reflecting of the usefulness of the wave metaphor in helping them to do, and write about, research.

In essence, the initial findings of this study show that there is no one version of the semantic wave that will hold for research writing within one discipline at any level, although there are similarities in the outcomes of the research process. Further to this, both the level a writer is working at, and the field they are working within, will literally work to shape the form of the wave that best represents, and unpacks, a legitimate meaning making process. The findings also point to the distinct differences between using semantic waves to analyse and study teaching and learning, and using it to actually transform teaching and learning in the classroom.

The value of this study lies in its contribution to LCT, in extending an existing body of work that uses semantic waves and profiles in the teaching of academic writing; and in its contribution to the teaching and learning of academic research and research writing.

Tracing a supervisor-student developmental journey through tracking feedback 'conversations'

Feedback between doctoral students and supervisors plays a significant role in the development of both the student's knowledge and 'voice', and the thesis itself. The developmental role of feedback is well documented in research on assessment, although much of it focuses on feedback to undergraduate students (see, for example, Poulos & Mahony, 2008; Orsmond & Merry, 2013). Feedback to postgraduate students, and specifically at doctoral level, is less well-documented. Instead, the focus tends to be on the different styles and approaches to supervision (see Lee 2008). How supervisors' feedback may enable the development of the student's 'voice' remains on the margins.

A starting point for this study is that supervision is a pedagogical practice, in which student and supervisor are peers, the latter guiding the former to become an independent, knowledgeable scholar (Gurr, 2001). This means that supervision has a role beyond helping the student to write a thesis; it has to model different forms of scholarly engagement with knowledge. One of the primary ways in which supervisors can, and do, model scholarly thinking, writing and 'voice' development is through feedback to their students, both written and verbal, and moving from this to enable a feedback dialogue between themselves and their student (Lee, 2008).

Yet, supervisors, similar to undergraduate lecturers and tutors (see van Heerden, 2018), are seldom taught how to give formative feedback. Even those supervisors who understand their pedagogical role may struggle to offer feedback that both informs the student's development adequately and creates incrementally greater spaces for students to make their own decisions and claim autonomy. The temptation to 'write over' the student's work or insert the supervisor's own voice in the student's text is difficult to resist, especially when supervision is narrowly understood as the process that produces a competent thesis.

This paper wishes to argue for an understanding of postgraduate feedback as a formative, developmental and incremental process, in which student and supervisor engage in dialogues about the student's writing and thinking processes that shift over the course of the doctorate towards the student claiming their voice more fully. Analysing 'conversations' constructed, quite literally, in the margins of a doctoral thesis, between a supervisor and her student, we will track the development of the student's voice primarily in two ways: in the evolving argument of the thesis, and in the ability of the student to respond to the supervisor's feedback.

Using Semantics, the paper will analyse a series of feedback conversations across two years of the PhD, within the drafting of one of the thesis chapters. Semantic gravity (SG) is used to discuss the relative connection between the feedback and the specific writing task ahead of the student (i.e. SG- refers to knowledge and understanding related to the thesis, but in the context of wider voice and scholarly development; SG+ refers to comments about specific revisions and issues within the chapter). Semantic density (SD) is used to discuss the relative density of actions implied in the feedback in terms of responding to it (i.e. SD- implies easy to act on or simpler feedback requirements, and SD+ implies feedback that requires several steps in unpacking feedback, identifying steps and acting on these).

It is hard to capture feedback in semantic waves (see van Heerden, 2018); however, semantic gravity and semantic density can be productive in tracing, over time, the evolution of a dialogic feedback relationship between this student and her supervisor. Tracing the development of the student's voice over time can shed light on, firstly, the kind of feedback supervisors can offer students to formatively develop their voice and thinking, and secondly, to illustrate the ways in which doctoral student growth is one side of a two-sided process. The other side, ideally, should be supervisor development and learning.

Supporting the transition from first to second year mathematics using LCT research findings

This paper uses tools from the Semantics dimension of LCT to examine students' experiences of the transition from first year to second year mathematics, and then reports on an educational intervention aimed at addressing students' difficulties with this transition. Internationally, the transition from first year to second year is noted as a challenge for many students in undergraduate programmes around the world (see, for example, Hunter et al, 2010; Yorke, 2015). Despite this, there is a paucity of research on the transition to second year, with most studies focused on students' experiences of the first year, or on their exit-level outcomes. In South Africa, the challenging transition from first year to second year is especially the case for students moving from a foundation or extended degree programme into the so-called mainstream second year. Lubben (2007) in study of an undergraduate extended physics programme noted that students struggled with the discontinuity in teaching approaches between first- and second-year physics courses. Smith, Case & Walbeek (2014:636), question 'the efficacy of a model that focuses largely on first year academic interventions. They show that these models influenced students' performance in the first year but did not improve the overall graduation rate of students. Rollnick (2010) has suggested that changes to the curricula and pedagogies beyond the first year are what are needed. This is also argued in a recent CHE (2013) report which highlights the importance of 'epistemic transitions' throughout the undergraduate curriculum, and notes that curriculum reform needs to address these key transitions. The report argues that foundational provision needed to extend beyond the first year of a programme.

The context of this study is an extended curriculum programme in a Science Faculty, in which the first year Physics and Mathematics courses are spread over two years, allowing more curriculum time for foundational provision (developing conceptual foundations, mathematical understanding, modeling, academic literacy and numeracy skills etc.). Despite this foundational provision, students' transition to second year remains an ongoing challenge. The first part of this paper uses tools from the Semantics dimension of Legitimation Code Theory (LCT) to better understand students' transition challenges. Pedagogical practices in a first-year physics foundation course and second year physics and mathematics courses are analysed as a means to develop insights into the challenges students face in making the transition to second year. The LCT analysis suggests that this transition may be exacerbated by mismatches and discontinuities in pedagogical practices between first year and second year. The findings suggest that attentiveness to particular pedagogical aspects (pacing, semantic range, representational modes and interactive engagement) would be likely support students in navigating the 'epistemic transition' to second year.

The second part of the paper describes how the research findings from this LCT analysis of the transition to second year were used to frame an educational intervention. This intervention was developed through collaboration between an academic development practitioner and disciplinary lecturers in mathematics. Clarence (2015) similarly notes the usefulness of LCT tools to 'assist both academic development practitioners and disciplinary educators, working collaboratively, to analyse and change pedagogical practice in higher education' (p.3). Changes in pedagogical practices introduced at the second-year level included a greater semantic range in the lectures, more semantic waving (including more explicit unpacking and repacking of representational modes used) and more interactive engagement (with students actively engaged in enacting semantic shifts). This paper will report on lecturers' and students' experiences of these interventions and the way in which these interventions led to significant and unprecedented improvement in student learning of mathematics at the second-year level.

Eradicating knowledge blindness on a generic EAP course for postgraduates

In the field of English for Academic Purposes (EAP) catering to subject specificity, in what is often termed English for Specific Academic Purposes (ESAP), is often lauded over a more generic approach. This is in some ways a just argument as English for General Academic Purposes (EGAP) can often fall short of having much *purpose* at all, trying to serve multiple disciplines at once and in turn serving none and ultimately becoming guilty of what Maton (2014) would term 'knowledge blindness'. ESAP is far more tenable when delivered concurrently with students' degree courses (termed in-session provision in the UK) or when student numbers on courses preparing students for their academic study (known in the UK context as pre-session provision) are large enough to warrant discipline specific groups. However, this is not always viable for institutions with relatively small and diverse student cohorts. The research to be presented here is concerned with eradicating knowledge blindness on a 6-week long generic pre-session course delivered to a cohort of postgraduate students preparing to study in a range of disciplines within the Social Sciences.

Monbec (2018) details the 'common core' curriculum of EAP, a curriculum that focuses on language and skills that is prevalent on many pre-sessionals at the expense of exploring the role of knowledge itself. The research being undertaken here holds with the notion that academic language, behaviour, and knowledge enjoy a symbiotic relationship (Coffin and Donohue, 2014) and therefore cannot be amputated within EAP curricula. While Monbec (2018) focuses specifically on knowledge about language (KAL), the knowledge in question here is that of theory. The underpinning ethos of this paper is that 'theoretical knowledgeability' is a threshold concept (Meyer and Land, 2003) for many postgraduates studying on pre-sessionals. The term 'theoretical knowledgeability' refers to the act of not simply knowing that theory exists and that it needs to underpin much of the academic work students are expected to produce in their academic studies (Kiley, 2015), but also enactment of this through the building of knowledge of particular theories themselves.

In order to explore how academic language, behaviour and knowledge develop symbiotically, this research employs the LCT dimensions of Semantics (to analyse knowledge building) and Specialisation (to analyse shifts in academic behaviour) in tandem with Systemic Functional Linguistics' (SFL) (to analyse academic language development).

Data was collected while participants took part in a series of four seminar discussions (with discussions recorded and transcribed for analysis). The first three discussions built the participants' theoretical knowledgeability by first discussing a text exploring what theory is, then analysing a text introducing the participants to the theory of Semiotics (chosen by the researcher as a theory that transcends disciplines), with the third text exploring Semiotics within the participants' particular disciplines. The fourth and final discussion enabled reflection on the knowledge accumulated having engaged with the three texts.

The study took place in the summer of 2017 and was replicated in the summer of 2018. Each study involved two groups of pre-postgraduate students, yielding 16 discussions. This paper will report on the findings from one cohort of participants from the most recent study and will reveal the building of academic language, behaviour and knowledge that emerges across the discussions, arguing that this method is effective in its endeavour to begin to eradicate knowledge-blindness on generic pre-sessionals. These findings, therefore, have implications for future teaching on, and design of, generic EAP programmes.

This research contributes to the growing interest in the enactment of LCT within the field of English for Academic Purposes. With current publications focusing on academic writing and the EAP curriculum. This research complements the work of Monbec (2018) in its focus on the EAP curriculum but explores building knowledge *alongside* language (as well as academic behaviour) rather than knowledge *about* language. This study also reaches outside the field of LCT to address issues of 'language-blindness' within other theories of education (namely Threshold Concepts).

Interdisciplinarity requires stewardship of powerful knowledge

Education is increasingly being asked to solve the world's 'wicked problems', problems that have unclear boundaries and which emerge from systems of social injustice and environmental degradation. There is a strong sense that this requires an ability to work across the silos of specific disciplines which often bring very particular ways of producing knowledge. In response to such calls, a number of curriculum innovations have been put in place to ensure a focus on the 'real world' in ways that move to the more concrete and interdisciplinary. These innovations include problem-based learning, outcomes based learning and so on.

A core concern with such innovations is that they may ensure strong semantic gravity at the expense of access to more abstracted principles that can transcend contexts and thereby constitute 'powerful knowledge'. The study reported on here looks at how two knowledge fields, Anatomy and Physiology, were merged to form one integrated subject, Human Biology, which was then taught to Physiotherapy and Occupational Therapy students.

This study asks the question:

To what extent does the structuring of the foundational Human Biology curriculum shape students' access to professional knowledge?

The study explored whether the organisation of the interdisciplinary foundational curriculum served the fundamental needs of the professions, and whether, as a matter of social justice, students' access to powerful knowledge was enabled by the form that the fundamental curriculum assumed.

The study drew on two LCT concepts: Specialisation and Semantics in order to map out what was legitimated in the curricula of Anatomy and Physiology, and to then look at legitimation in the Human Biology curriculum. This entailed looking at what forms of knowledge were deemed valuable and the extent to which these were tied to specific contexts or not and the extent to which they demanded the acquisition of semantically dense terms and concepts or not. It also entailed looking at the extent to which one had to become a specific kind of knower with a particular gaze on the world in order to be considered an appropriate member of the field. By using the tools offered by Specialisation and Semantics, we were able to map the various ways in which legitimation was meted out in the curriculum and the extent to which such legitimation shifted as the integrated Human Biology curriculum came into place.

This curriculum study at a particular Faculty of Health Sciences foregrounded the structuring, organisation and differentiation of disciplinary knowledge, and reflected a twenty-year period that included not only transitions in professional education but also extensive transformation in, and a different approach to, health delivery. Curricular documents for a twenty-year period were analysed quantitatively and qualitatively to establish the positioning of Physiology and Anatomy before and after the disciplines merged. Teaching staff were interviewed for their understanding of what specialises the physiological and anatomical components of the Human Biology curriculum, what they considered as powerful knowledge for the professions, and who they envisaged as the knower. The degree of context-dependence for meaning-making in the different disciplinary domains and the condensation of meanings inherent in the respective practices and contexts, were analysed.

Following the merger, it was found that Anatomy is preferentially legitimated as powerful knowledge at the expense of Physiology; that the ideal of disciplinary integration is not reached, and the segmental organisation and structuring of the curriculum negatively impacted on cumulative knowledge-building and application of professional knowledge in the clinical arena. After the merger the disciplines lost their shape, and in particular the hierarchical knowledge structure of Physiology was compromised. By not having access to the necessary disciplinary knowledge structures and their associated practices, students' ability for scaffolding and integrating knowledge into the clinical arena was constrained. The organisation of the current Human Biology curriculum is thus limited in its facilitation of cumulative learning.

The study shows that interdisciplinary programmes should be carefully considered, and there is an added imperative in the health professions which ultimately realise treatment of patients. If the students are combined cohorts from various professional fields, then a sound understanding of the epistemic requirements of each profession is required. Those involved in curriculum development in various fields need to take these recommendations into account to enable cumulative learning and enable epistemological access to powerful knowledge for an increasingly diverse student body.

Knower-building: Seeing axiological constellations in the humanities

Recent years have seen a rapid growth in studies of knowledge-building. Amongst other things, these studies have revealed the principles underpinning cumulative knowledge-building and the discourse that is used to organise it across a range of fields. Moreover, this focus has driven developments in practice where tools such as semantic waves have been put to work in the classroom. Much of this work has centred on explicit knowledge-building such as we tend to find in knowledge codes. It has looked in detail at how fine-grained technical knowledge is pieced together in classrooms, textbooks and across a range of semiotic resources. It has also given a sense as to how vast networks of meaning are pulled together to form an integrated whole. In contrast, less focus has been directed toward knower-building – how dispositions, values, and moral and aesthetic stances are developed – such as often found in the knower codes. For fields underpinned by stronger social relations, such knower-building is essential. For students to be successful in such fields, they must be progressively cultivated into nuanced ways of seeing the world that offer subtle stances and interpretations of an expanding range of phenomena. This regularly leads to elaborated networks of meaning known in Legitimation Code Theory as ‘axiological constellations’ to form. For those already well integrated into the field, these meanings will be clear. But for those new to a field or who have not had such cultivation, they may be obscured. As such meanings are essential to the uncommon-sense ways of seeing the world across a wide range of fields, if we are to develop a pedagogical approach to teach more effectively these meanings, we first need to be able see these axiological constellations and understand how they develop in discourse.

In this paper I explore knower-building in humanities disciplines such as poetics and literature. I will show how axiological constellations can be analysed step-by-step in a cumulative way. This is important for our understanding of knower-building as axiological constellations offer unique insights into the intricate configurations of meaning that underpin conceptual development oriented to values, stances and dispositions but also offer means for understanding the different readings of these meanings that are tied to alternate perspectives. To see how these develop in discourse, we will step through a selection of rhetorical strategies used to build axiological constellations. These include where texts position certain meanings as being from a particular perspective; where particular meanings or perspectives are opposed to each other; where meanings, positions or oppositions are likened to other meanings, positions or oppositions; and when all of these are charged with value. Through these rhetorical strategies we will see the highly nuanced, yet consistent building of meaning that occurs in many fields and develop a way of seeing how knowers are cultivated to view the world in particular ways.

Learning to learn: Autonomy tours for autonomous science learners

Inadequate articulation between secondary and higher education can be problematic for many, but particularly so for students from poor quality educational contexts. This 'articulation gap' can manifest through disparities in content, conceptual understanding, skills, literacies, and language and learning practices. The focus in this study is on student 'learning practices', a term which has social connotations and infers underpinning values as opposed to the more a-contextual 'study skills'. It is recognised that the transitional journey from being a relatively successful but passive and rote learner at school, to an active, self-directed learner who develops deep understanding at university, can be profoundly difficult for many. To support and guide students in this transition, Introduction to Science Concepts and Methods (ISCM), a South African higher education science access course, has introduced a number of interventions under the banner of a reflective learning portfolio (RLP). These interventions form the object of this study, and the question being addressed is whether and how they enable development of appropriate student learning practices. Since the 'learning practice' interventions were usually contextualised using content knowledge, the LCT Autonomy -dimension, which shows how diverse knowledge practices can be brought together, is used as an analytical tool.

Task handouts and written answers of 44 students formed the main source of data to identify target content and purpose and to trace autonomy pathways taken by each tutorial intervention. Somewhat unusually, science content was allocated as weaker positional autonomy - as student attributes or learning practices formed the 'content' in this analysis, representing stronger positional autonomy.

Each intervention could be classified as one of three task-types. The first, self-reflective tasks in which students considered who they were as learners and how they could achieve their goals, resulted mainly in stay trips in the sovereign code. The second, modelling appropriate learning practices such as consolidating a lecture, tended to result in one-way trips to the exotic code, with some students returning to the sovereign code. The third guided student reflection on learning practices and effect on performance. One intervention in this task-type is the focus of this presentation.

Marked tests were returned during a tutorial and students were required to consider (a) how they learned for a particular question, (b) the effectiveness of their learning based on marks they achieved, (c) how they could learn differently if needed, and (d) content knowledge that would earn full marks. During the tutorial session students worked through the reflective part of the handout on their learning practices individually, but discussions amongst students and the two facilitators focused on science content appropriate for answering the test questions. The target content for this intervention, representing stronger positional autonomy, was individual student learning practices associated with a particular test. The target purpose, representing stronger relational autonomy, was to guide students in reflection on effectiveness of learning practices to enable improvement. Depending on levels of engagement students went on complex tours between all four codes, sometimes but not always ending back in the sovereign code.

Follow-up interviews with 14 students indicated two key issues. Firstly, reflective engagement on own learning practices was best achieved when autonomy tours were complex and involved more than two codes. Secondly, students generally needed more guidance and support to return effectively to the sovereign code in many tasks. Subsequent interventions this year have taken these findings into account.

Generally, LCT autonomy codes are used to examine how diverse knowledge practices can be brought together to support knowledge building. This study was unusual in that the primary 'knowledge' practice was a learning practice which exhibits weaker epistemic relations, with knowledge being directly related to practice. The secondary 'knowledge' practice was science, which exhibits stronger epistemic relations. Despite this, this study has shown that it is productive to integrate such disparate knowledge practices (i.e. learning practices and science) to enable effective learner development. However, it also indicates innovative effort is required to ensure 'round-trip' autonomy tours if integrative knowledge building for learner development is to take place.

Mind Matters: An on-line resource for actuarial science students

"...our 'mental models' determine not only how we make sense of the world, but also how we take action...The problem with mental models arises when they are tacit – when they exist below the level of awareness." (Gardner, 1994)

Actuarial Science is a sought-after profession in South Africa with high attrition rates at university and in the workplace. Slow transformation of the profession to reflect a more representative sample of the population is exacerbated by the long route to qualification. The Actuarial Society of South Africa (ASSA) is committed to bringing about change. They have established the ASSA Academy to provide extra tuition for those who continue to fail exams after several attempts. Statistics show that barriers in the final stages of qualification do not reflect a lack of technical or application skills but a clear sense of being an actuary and using a bigger picture skillset in responding to the questions. Furthermore, articulating these elements in writing is another challenge and more so for those for whom English is not their home language. These elements are less tangible than what is required in earlier exams where the Academy has been more successful.

Data from two interviews with an actuary and course convenor of an introductory course who is also a lecturer in a fourth-year course in actuarial science, were analysed. The questions explored the nature and description of the profession as well as what knowledge is valued in the field of practice and the discipline. The analyses provide a basis for the 'actuarial type content' that is displayed on the Mind Matters site. I used Karl Maton's Legitimation Code Theory, and in particular the epistemic relations and social relations of the Specialization dimension to provide a potential positioning of actuarial science within a Cartesian plane when analysing the interview data. Specialization therefore is the theoretical underpinning of the creation of Mind Matters.

Mind Matters content provides a range of topics which gives exposure to scenarios from our world where mathematics and statistics are at work without us having realised it. It unpacks the underlying concepts which may at times relate to specific actuarial exams or at the very least help build a bigger picture skillset and critical thinking. The topics open potential avenues of discussion on most societal and economic issues. Artificial Intelligence, data analytics and the implications of these for the profession and the individual are also a common theme.

As a non-actuary, my engagement with actuarial students over 13 years has been to facilitate the acquisition of actuarial knowledge and support graduates in their endeavours to qualify. Given the need to transform I wanted to create an online resource that would be an aid in achieving these objectives and reach as many students as possible. In my experience I find that students entering university know very little about the profession and actuarial knowledge. They are hampered by ineffective study habits which they are afraid to discard because a) the cultural adjustment to university makes them feel insecure and b) their study habits had been a huge part of their success at school. These concerns led me to design a platform that would incorporate psycho social support and optimal learning methods which would expose students to mental models that are better suited to acquiring complex knowledge than the ones they are accustomed to.

Mind Matters is practically founded upon four gateways to assimilating knowledge:

- how the brain works
- learning skills
- emotional intelligence and
- mindfulness practice.

A fifth gateway is linked to the goal of becoming an actuary. Mind Matters provides a quarterly report containing a breakdown of and links to all articles in national media where actuaries and ASSA are mentioned.

Through regular engagement with the material students are sensitised to their mental models and how these can serve them positively in acquiring the élite codes (Maton, 2014) of an actuary.

The ASSA Academy has provided the funding required to set up and convene this resource and the University of Cape Town (UCT) has endorsed the Mind Matters project providing the internal platform on which it runs. Overall evaluation of the site by students and the ASSA Academy Panel augurs well for making Mind Matters available to other universities and enhancing content and design through collaboration with lecturers and actuaries across the country.

Understanding first-year students' participation in the curriculum: A specialization gaze

First-year (both mainstream and Extended Curriculum Programme) students generally struggle with transitioning from high school to universities for several reasons, including issues of diversity, new curriculum content, differences in engagement with learning, and differences in assessment practices compared to their high schools (Bovill et al., 2011; Kift, 2008). In South Africa, and across the world, first-year students are typically expected to confront new kinds of knowledge, and to enact competencies in these knowledges in ways that often confound them. It is perhaps these new ways of knowing, doing, and being (Dall'Alba & Barnacle, 2007) that give rise to some serious contradictions between high school students' school-leaving attributes and their readiness for university studies. While there is extensive literature on first-year students' transitioning to universities, not enough attention has been placed in investigating how first-year students' voices and individual experiences are reflected in first year curriculum in South Africa. More so, very little is being done to investigate how the design and enactment of first year curriculum could be more representative of first year students' diversities.

This paper explores the design and enactment of a University 101 transition module at a university of technology in South Africa. The paper first uses Engeström's (1987) concept of an activity system in cultural-historical activity theory (CHAT) to examine how the University 101 module's collaborative platform can serve as a mediating tool allowing for greater student participation in the curriculum. The paper then uses Maton's notion of gaze in Specialization, specifically the varying strengths of two kinds of social relations: that of subjective and interactional relations, in exploring how a remedial module such as University 101 is perceived and appreciated by stakeholders in the faculty.

Data used in this study was collected during the piloting of a University 101 module throughout 2017, at a university of technology in South Africa. Both quantitative and qualitative data, sourced through surveys, interviews, and document analysis was used. 320 students, 12 lecturers, and 20 peer mentors were purposively sampled. Key findings in the study include how first-year students' socio-economic background, and prior schooling experiences influence the way they engage with the curriculum; and the difficulties that the lecturers and learning support staff face in understanding the challenges facing first-year learning. The varying subjective and interactional gazes from first year students and their lectures exposes the depth of contradiction in first-year student support at the university. The findings demonstrate that through a participatory and collaborative enactment of a University 101 module, both first year students and their lecturers will find innovative ways to better support all first-year students.

Autonomy pathways to compare active teaching methods in undergraduate Physiology classes

Physiology undergraduate students grapple with large amounts of content and mostly memorize facts to pass tests and exams. As organ systems are usually taught separately, students also struggle to understand how different systems cross-talk and/or are integrated within the whole organism. It has been argued that science teachers should spend more time on how scientists *do* science, i.e. the process of science, and less on the academic content, i.e. the products of science, if they are to help students develop strategies such as hypothesis generation, problem solving, experimental design, and evidence evaluation (Mierson, 1998). Here the focus is on the Autonomy dimension as it allows for an assessment of how different knowledge practices are integrated and used to solve real-life problems, thus allowing teachers to make explicit how scientists do science.

Goodman et al. (2018) recently suggested four broad types of active learning interventions for Physiology undergraduate classes, i.e. a) posing questions (at start or end of lectures), b) encouraging think-pair-share activities, c) use of multiple analogies, and d) introducing problem-solving activities. However, they also state that it is difficult to compare the efficacy of such methodologies to identify those most suited to be used within the classroom. This paper therefore examined selected examples of in-house developed Physiology class activities at Stellenbosch University, i.e. case-based learning ("Burning Questions"), Running Questions ("CSI-type"), and pair-share activities ("Check Mate-Sole Mate") aimed at fostering critical reasoning and problem-solving skills. The four active learning strategies include the use of short- and longer-term case studies for student research, team work and reflective engagement.

For this paper the argument is put forward that Legitimation Code Theory's (LCT's) Autonomy dimension (Maton & Howard, 2018) offers a first step towards answering Goodman's question regarding the comparison of different active teaching methods that are aimed towards problem-solving. The various class activities listed were analyzed using a unique translation device that was specifically designed for this purpose. We employed this approach to assess the various steps in each method (content, purpose) in order to plot autonomy pathways between the four codes. The basic premise is that "inside" or "target" is the module content for teaching problem-solving in Physiology. Thus, strong positional autonomy (PA) constitutes module content, while other Physiology content would imply a weaker PA (less "inside"). Other non-Physiology content would be considered even weaker. Teaching for the explicit purpose of integrating knowledge for problem-solving in Physiology would constitute strong relational autonomy (RA), while teaching just for problem-solving generally would be weaker. Teaching for other purposes (content: Physiology or something else) would represent a weaker RA.

Our findings include examples of various autonomy pathways, e.g. multiple analogies where students are reminded that they have encountered similar problems before in other contexts comprises a return trip. By contrast, some of the Burning Questions, where students are expected to explain a real-life scenario using their Physiology knowledge, represent an example of a one-way trip to the target. Interestingly, the CSI-type Running Questions provided a scenario with an extended Autonomy tour.

In summary, an assessment of such active learning techniques through the lens of Autonomy enabled us to determine the putative value and efficacy of each respective method in terms of promoting a problem-solving culture within Physiology undergraduate classrooms.

'Unpacking' and 'repacking' during the tutorial journey: Surfing semantic waves in multi-lingualism

This paper enacts the LCT concepts of semantic gravity and semantic density in the investigation of tutors' movements downwards and upwards along the semantic scale, during tutorials. The object of the study was to evaluate the effectiveness of tutorials by investigating the role played by tutors in promoting learning among tutees. The research question that guided this study was: How do tutors support the learning of tutees?

Using a mixed-method approach, qualitative and quantitative data from tutor and lecturer interviews as well as a self-administered questionnaire completed by 896 tutees were analysed using semantic gravity (SG) and semantic density (SD).

The results showed that the pedagogical strategies that the tutors adopted enabled them to strengthen and weaken both SG and SD, for semantic wave construction and cumulative knowledge building. For example, by explaining concepts and using examples tutors helped tutees move knowledge downwards (SG+, SD-) on the semantic scale. Tutors also moved upwards on the semantic scale (SG-, SD+) by focusing on the application of formulae (for example in Accounting and Physics) and supporting tutees in practical experiments.

Further, within the context of this study, technical language was not the only issue that needed to be considered in the creation of semantic waves but multi-lingualism as well, given the diversity of the tutee respondents, most of whom spoke an African language. By using the tutees' mother-tongue, tutors were better able to help tutees move knowledge downwards on the semantic scale to strengthen SG and weaken SD, than if English alone were used. This paper argues, however, that the use of mother-tongue education in tutorials could pose a challenge in the upwards movement on the semantic scale as some African languages might not have the English equivalent of certain technical terms.

This paper makes an important contribution to knowledge in the field because the role of multi-lingualism in the construction of semantic waves, to enhance learning during tutorials in higher education, is not well documented. The implication for African Languages is that there is a need for the creation of semantically dense terms. The implication for future tutor training programmes is that tutors need to be better trained on how to use language effectively to facilitate movements upwards, and not just downwards, on the semantic scale in order to create semantic waves.

Knowledge and knowers: the case of the academy and teacher education for PCET

Set against a background of policy shifts that call into question the continuing role of universities in initial teacher education (ITE) provision (Beauchamp, Clarke, Hulme & Murray, 2015; Childs 2013), the doctoral research précised in this paper is an exploration of university-based teacher educator (TEd) knowledge in the context of ITE for the post-compulsory and training (PCET) sector in England. There is no publicly agreed, codified knowledge base for teaching, and the academic preparation of TEds for ITE work is not formalized in any professional qualification. It is possible, therefore, that there may be differences amongst TEds as to what counts as appropriate or relevant teacher knowledge, or what knowledges should be privileged, potentially conveying mixed messages as to the basis for success and achievement in PCET teaching. This may also have implications for cumulative knowledge development in the field of ITE PCET and, more broadly, ITE PCET's place in the academy. The study was motivated by a paucity of empirical research into the knowledge practices of university-based TEds for ITE PCET who are generally considered, along with their compulsory schooling TEd counterparts, to be a poorly understood and under-researched occupational group (Murray & Kosnik, 2014).

The research adopted a qualitative approach, drawing on data from 27 in-depth semi-structured interviews with university-based TEds from three universities in England. These institutions reflected the range of types of university engaged in this provision: the research-intensive, the teaching-led, and the hybrid research-teaching institution. Supplemented by programme and associated documentation, the interviews explored TEds' perspectives and experiences of knowledge practices in intellectual production, curriculum construction and pedagogy. The focus of this paper will be TEds' research practices in the intellectual field.

The theoretical framework reflected a social realist approach, in which the intention was to make visible TEd knowledge as an object. The aim was to uncover and explore the structuring of this knowledge by surfacing the potentially competing claims to legitimacy as inhered in its organizing principles. The Autonomy and Specialization dimensions of Maton's (2014) Legitimation Code Theory (LCT) have provided the conceptual architecture for this purpose, furnishing the means of conceptualising the structuring of ITE's external relations (that is, external to university-based ITE PCET as a distinct field in its own right) and relations between its social and knowledge dimensions.

The findings suggest that TEds perceived their field as one of relative low autonomy in which they had little collective agency to insulate it from external sources of power and influence; the values that stemmed from outside the academy courtesy of increasing government control and intervention were the principal bases of legitimation. Further, university-based ITE was portrayed by TEds as marginalised within the academy, deprived of resources with which other academic disciplines and their disciplinary custodians in the academy, it was claimed, were equipped. TEds considered their field to be one lacking academic legitimacy in the eyes of non-ITE academy peers. Collectively this appeared to have consequences for TEds' knowledge practices in which knowledge specialization seemed to be relatively weak, particularly, but not solely, in the context of TEd research practices.

Analysis drew attention to the potential for TEds to strengthen university-based ITE's intellectual autonomy and the epistemic power of its knowledge base. It may be suggested, for example, that re-orienting TEds' research foci in consideration of teacher educator pedagogy as a researchable object of study, would be a valuable first step in that regard.

Semantic profiling as means for assessing student teachers' practicum lessons

This paper presents a method for assessing student teachers' practicum lessons. A practicum in Sweden lasts between five and ten weeks and during this period, the student is expected to teach an increasing number of lessons. During the practicum a visiting teacher from the university makes a two to three hour visit to observe a lesson and have a concluding discussion with the student in order to assess the students' teaching abilities. Assessment in this manner is a complex task for a number of reasons. First, the students have a single opportunity to demonstrate their teaching abilities – good reason to be very nervous, in other words. Secondly, the assessment and grading process of these lessons is difficult as assessment criteria are broad, aspiring to cover all aspects of teacher work. In reality few lessons can cover this breadth of criteria, and hence, a method of finding a focus for lessons is essential.

Looking at research on the practicum from the perspective of the European *Didaktik* tradition can be conceived as didactic triangle that describes the three main considerations in an educational setting as being the learner, the teacher and the content in relation to each other and in a particular context. Previous research has tended to focus on the student or the teacher and not necessarily content or knowledge during lessons. Furthermore, previous research has focused on relational aspects and communicative abilities, rather than on knowledge, or content, in these practicum assessments. Finally, earlier studies have focused on why student teachers might 'fail' in a practicum assessment.

Therefore, this paper sets out a small project that sought to find out if semantic profiling could be used for evaluating student teacher work and become a valid assessment tool, based on the content and knowledge focus of the assessed lessons.

In this paper, we describe the use of semantic profiling to focus grading observations and subsequent judgements on content and knowledge inclusion in lessons. Semantic profiling allows for visualizing student teachers' lessons and how their teaching allows for cumulative knowledge building, ideally a core focus for any lesson, and through which aspects of relations and communication also are portrayed. Semantic profiling, in this instance, has been limited to the concept of 'semantic gravity' which is a visualisation of the degrees of context-dependence; the stronger the semantic gravity the more meaning is dependent on the context (Maton, 2014). It was decided to only focus on the semantic gravity, as examination lessons are not recorded rather an "on the spot" assessment is made.

In order to find ways to make the grading of this one-off-opportunity reliable and valid, semantic profiling focusing on semantic gravity. Following Kirk (2017), we have developed a semantic gravity profile for 13 practicum examinations of approximately 60 minutes each. Student teachers prepare a lesson plan to the visiting teacher prior to the visit and these lesson plans were first analysed and a semantic profile of the lesson created. During the visit, the pre-lesson semantic profile was complemented with a profile outlining what took place during the assessed lesson, with a focus on the content of the lesson. The profiles were then used to guide the follow-up discussion with the students, and formed an evidentiary basis for the grade.

The results suggest a discrepancy between lesson plan and lesson enactment. Many lesson plans suggested the enacted lesson would have semantic flatlines. In the actual lesson, however, there were quite clear waveforms in parts of the lessons. The analyses of these semantic profiles suggest that teacher students can become better at planning their lessons in relation to content, and that teacher education programs can become better at teaching about planning for content. Students need to be able to be more specific about what to teach instead of copying syllabus aims, focus on time management and structure, and leaving contents to "improvisations" during teacher-led Q&A-sessions.

This study contributes to research into teacher education practicums and puts a focus on knowledge and content rather than of the relational aspects of teacher work. However, it is small scale and made by one visiting teacher.

Seeing knowledge and knowers in the field of Political Studies

The 2015–2016 student movements in South African higher education sharply critique what was perceived to be the slow pace of institutional transformation and decolonisation in institutions of higher learning. One of the academic fields that has come under scrutiny is Political Studies, which has been accused of being un-transformed, irrelevant and not reflecting local, indigenous scholarship in curricula or pedagogy. Although this literature critiques neo-colonial predominance of western thought within the field, and the need to re-centre non-Western modes of being, thinking and intellectualising, I argue that this literature actually considers epistemologies without necessarily making a razor sharp critique at the underlying mechanisms and processes of Political Studies knowledge, and the extent to which it can be decolonised and transformed. It is in this gap that I make a contribution to the field.

This study is positioned in the field of higher education decolonisation, with a specific focus on exploring knowledge and knower structures in Political Studies. I explore the various ways in which knowledge is valued and legitimated in the field of Political Studies by asking the “how” question – that is, how is knowledge legitimated in Political Studies? This includes a consideration of how the Postgraduate Diploma in International Studies (PDIS) programme, designed to promote and enable an “expert in African International Studies”, legitimates a certain kind of knower in the field. I employ Basil Bernstein’s pedagogic device as a theoretical foundation for exploring 1) what the field of Political Studies knowledge production looks like, 2) how knowledge is recontextualised from the field of production and into the PDIS curriculum, and 3), how that knowledge is legitimated and evaluated through the programme’s assessment documents, and what they reveal as valued and legitimate curriculum knowledge in the field. Karl Maton’s Legitimation Code theory (LCT), specifically Specialisation, is called upon to offer sharp analytical tools for investigating the underlying mechanisms and processes of the knower and knowledge structures that the programme legitimates. It particularly sheds some light on the kinds of gazes that are valued in the field of Political Studies in general, and in the PDIS programme in particular.

The case study for this research is Rhodes University, a historically white university which required consideration of its contested history into the kinds of being, knowledges and knowers that were historically legitimated and valued in the institution, as well as the current institutional landscape, and challenges with which the institution is grappling. The data generation included the formally planned curriculum as contained in the programme’s curriculum documents. These included course outlines, and details regarding seminar critiques, presentations, class participation, class discussions, essay questions and exams/exam portfolio. The data generation also included semi-structured interviews with the lecturers who were regarded as the “recontextualising agents”, who taught in the programme and who offered key insights on some of the curriculum choices regarding selection, pacing, sequencing and evaluation of the curriculum knowledge in the PDIS programme.

The research presented here revealed that that the PDIS programmes values and legitimates curriculum knowledge by ensuring that students have a critical understanding of African political economy, war and conflict on the African continent, as well as the challenges of peacekeeping and peace building in new and fragile African states. This was also seen in how the attributes and dispositions of knowers were also valued in how students needed to have social and cultural gazes in order to access the curriculum and to successfully participate as knowers in the field. This suggested that access to both curriculum knowledge and to being a valued knower in the field, could be said to be relatively open and unrestrictive.

In my presentation, I first argue that looking critically at how Political Studies knowledge is recontextualised from the field of production and into the PDIS curriculum can be seen as a decolonising process as it enables us to see the underlying mechanisms and processes of how Political studies knowledge and knowers are valued and legitimated in the field. This offers us an insightful space to see to what extent the fields of production, recontextualisation, as well as reproduction of Political Studies in general, and the PDIS programme in particular, could be said to have a colonising gaze. It also offers insight on how we can go about exploring, transforming and decolonising Political Studies and the PDIS programme. Secondly, exploring the knowledge and knower structures of the PDIS programme can help curriculum designers, lecturers and students identify the knowledge and knower codes of the curriculum, and to critically reflect on their curriculum codes and how to enable epistemological access to students. Furthermore, the study being presented can help lecturers and curriculum designers construct their curriculum in ways that are inclusive, open, and socially just, by being critically aware of the kind of knowledge that they choose to legitimate, and those they choose to disregard in their knowledge recontextualisation and its evaluation.

Reflection as knowledge building in teacher education?

'Reflection' is widely recognized as an important component in the practice of teaching and plays a central role in many teacher education programs. Yet the concept is much criticized and discussed in the literature. A recurrent theme in these discussions is the lack of clarity in the use of the concept and the question of what the valuable outcome of these processes of reflection is or could be for the development of the teacher student. This paper applies the dimensions of Specialization and Semantics from Legitimation Code Theory to analyze the understanding and function of reflection in the education of upper secondary teachers in Denmark.

The paper presents a case study of case-based teaching as a practice of reflection – focusing on the following questions:

- What characterizes the understanding of reflection and the practice of reflection in the education program for teachers for the upper secondary school in Denmark?
- What kind of knowledge-building is made possible through this practice of reflection?

Based on these findings, the paper presents a discussion of what could count as powerful teacher knowledge in LCT terms, and how this might be developed through practices of reflection.

The paper draws on the LCT dimensions of Specialization and Semantic. Specialization, in particular the 4-K model, provide the analytical tools for characterizing the understanding of reflection in the education. Semantic gravity and semantic density will provide the analytical tools for analyzing and discussing to what extent the kind of knowledge that is developed through the processes of reflection can be characterized as professional – as opposed to practical – teacher knowledge.

The analysis is based on data from field notes and audio-recordings and also include excerpts of interviews with two student-teachers with very different code-orientations and disciplinary backgrounds (natural sciences and liberal arts, respectively). Results of the analysis of curriculum-documents and teaching programs serve as background data to help establish the context for the case-work analysis.

The paper shows that the practices of reflections as they unfold in the case-work, for the most part are characterized by a 'flatline' semantic profile. It will be argued that this is partly due to the weakening of epistemic relations that we see moving from curriculum-documents over teaching programs to the actual case-work as well as the educations lack of cultivation – and thereby not helping the teacher students gaining 'epistemological access' to the needed theoretical resources and knowledge about how to use them in the practice of reflection. As if reflective thinking were intuitive.

Another critical point being that the representations of 'practice', the teaching situations, which serve as the objects of the case-work, aren't specific enough and exhibit too weak semantic gravity for the teacher students' reflections to actually engage with elements of their teaching practice that matters. Together this results in a practice of reflection that neither reaches far enough 'down' to the specific problem-situations of teaching, nor reaches 'up' to a high enough level of conceptual complexity. As a result, the practices observed contain very little potential for a cumulative development of powerful teacher knowledge.

The paper contributes to the growing body of research using LCT to explore professional education, and more specifically to the understanding of the role of reflection in professional education. In addition, the paper illustrates the relevance of LCT as an analytical framework for analyzing the organizing principles of practices of reflection and its relevance for the question of what it takes to build professional teacher-knowledge through reflective practices such as case work. On a conceptual level the paper explores if and how the specific development of teacher knowledge through reflection could be conceptualized as cumulative and powerful in LCT terms.

The sum of its parts?: Autonomy analysis of combined app use in primary schools

Educational apps are one of the fastest growing areas of technology use in the classroom. However, the quality of apps and contribution to learning continues is under question. This is in part because research has struggled to show clear benefit of app use in learning. In reality apps are used in combinations and possible benefits are likely to be from use of multiple apps (Howard, et al., 2018). We argue that app use needs to be understood as a combined practice, rather than individual apps. Given the acknowledge importance of quality early learning and the high use of apps among young children, it is critical that a better understanding of this use in learning is developed.

To explore this issue, this paper presents an analysis of app use data from 30,000 Android tablets in primary school classrooms (Years K-3; Ages 5-9) across Australia, between 2015 and 2017. Data were first clustered to identify patterns of use. Five unique usage patterns were identified (see Howard et al., 2018). The current analysis further explores these clusters and usage types to understand their relation to learning using the concept of Autonomy. 'Autonomy begins from the simple premise that any set of practices comprises constituents that are related together in particular ways' (Maton & Howard, 2018, p. 6). Each of these apps can be understood by its position (positional autonomy [PA]) within the learning context and its relation (relational autonomy [RA]) to other constituents, specifically how insulated they may be. These can be understood along a continuum as stronger or weaker relations. Strength of positional autonomy was based on whether the app was aligned with curriculum (PA++), if it was generally educational (PA+), if it was not explicitly educational (PA-) or if it was non-educational (PA--). Relational autonomy was assessed in regard to whether an app had an explicit educational use (RA++), had a general educational use (RA+), the use was not necessarily educational (RA-), or if it was explicitly non-educational (RA--). Using a modified walk-through method, apps were coded for PA and RA (Light et al., 2016). Results were then plotted on the cartesian plane based on this analysis.

Each of the five clusters showed a different distribution of apps across the cartesian plane. All of the clusters showed some use of educational apps, arcade games and personalization tools. Two of the clusters included a high occurrence of education-focused apps (PA++/+, RA+), many of the apps fell in the sovereign code and were strongly related to learning. However, they were typically only apps for practicing numeracy and literacy. These typically have very little positive effect on learning (e.g. Domingo & Gargant, 2016). Apps coming from outside of learning (PA-), such as Minecraft and Word processing, but used for educational purposes (RA+), fell into the introjected code. These apps were more likely to elicit higher order thinking and organization of information, which suggests deeper learning. Two clusters included use of these apps, along with numeracy and literacy, and arcade game apps. These clusters had a wider range of learning opportunities and would be more likely have a stronger overall relation to quality learning.

Findings from this research suggests that combined app use including apps that are not designed for education, but used for educational purposes, may be more beneficial in learning than more 'education' apps. Further research broadening this analysis to include other elements of the educational context, such as other technologies and teacher practice will be conducted. Given that apps are used across a range of international education contexts, findings from this analysis have the potential to inform technology integration and learning design internationally.

Specialization: An alternative language of description for Threshold Concepts

Many academics are having conversations about improving pedagogy by focusing on transformative classroom engagements. One of these conversations involves unpacking difficult concepts in subjects that are traditionally known to be challenging to students entering professional practice programmes. The focus of this study is a 'threshold concept' in Radiation Physics, a specialised subject in the Bachelor of Science in Radiation Therapy programme. The research questions guiding this study were:

1. What are key threshold concepts in undergraduate Radiation Physics?
2. What are the challenges experienced by first year students in learning such concepts in Radiation Physics?

Threshold concepts are often described as 'sticking points' in a curriculum that students find difficult to master, but that are key for progressing within a discipline or field. All difficult concepts are often labelled as threshold concepts; however, these concepts cannot be identified based on subjective methods alone. Lecturers as subject experts and based on their experience play an important role when selecting and identifying threshold concepts. However, as Meyer and Land (2005) explain, it is not easy for lecturers to distinguish key concepts from threshold concepts – making even the identification of threshold concepts a threshold in itself! Wilson et al (2010) confirm that it is difficult to identify what in a particular concept makes it troublesome for learners. Rowbottom (2007) critiques and contests the threshold concept framework by claiming that thresholds are unidentifiable. A more recent argument by Chalasani (2010) is that "threshold concepts cannot be identified, but that concepts contained in people's minds have thresholds". In this study, we argue that Legitimation Code Theory's (LCT) Specialization dimension (Maton 2014) is able to address these difficulties. The specialization plane has two continua on which threshold concepts, and the 'troublesome' nature of their acquisition, can be shown. The study proposes a translation device that offers a theorised description of the relative complexity of the threshold concept, as well as the different stages of its acquisition.

Cousin's (2009) 'transactional curriculum inquiry' was used as a methodological approach that provides opportunities for students and subject experts to engage in extended dialogues to uncover why particular concepts might be troublesome, as well as how mastery of these concepts might be achieved. Transactional curriculum inquiry is an approach that involves a range of stakeholders in the identification of threshold concepts. The interdisciplinary (or transdisciplinary) discussions and reflections between students, academic and clinical staff offer 'a more holistic representation of the complexity of knowledge, skills and practice within a curriculum' (Barradell and Peseta 2016).

The research data comprised curriculum documents, as well interviews with first year students, the academic staff, and clinical educators teaching on the programme. Discourse and thematic analysis were used to identify potential threshold concepts in the first-year curriculum. The focus of this paper is on one of the identified concepts, the isocentre.

Both student and staff participants confirmed that this concept was troublesome to teach and difficult to learn. The paper's contribution to knowledge is that the intersection of multiple key concepts in disciplines such as Mathematics, Physics and Radiation Physics, dramatically strengthen the epistemic relations to create a threshold concept. The findings of this study have implications for university teachers in professional practice programmes with regard to identifying, and teaching threshold concepts in existing curricula, as well as extending knowledge of threshold concepts with LCT.

Insights from a Semantic analysis of key Media Studies course readings: Implications for pedagogic intervention to improve student academic reading competencies

A second-year Media Studies 'Introduction to Cultural studies' course at a South African University has for many years faced a number of challenges: high failure rates, low class attendance and minimal completion of the required readings. This paper presents the findings of a semantic analysis of four key prescribed readings for the first section of the course, which introduces students to the concepts of pre-modernity, modernity and ideology and their significance for study of the Media. Modernity is presented as a conceptual backdrop to introducing students to the evolution of the theorization of ideology, via the theories of Marx, Althusser, Gramsci and Foucault, and the importance of these theories for understanding the role of the media in the modern world. The nature of the semantic gravity waves for each reading is presented, and the extent of similarity/difference of these waves is considered. The results of a comparative semantic density analysis of the readings are also presented and the relationship of the semantic density profiles to the semantic gravity patterns is discussed. The implications of these findings for the development of a structured intervention, integrated into the regular teaching program of the course, to increase students' independent academic reading competencies, is then explored. The reading development intervention uses the principles of scaffolded support of the Reading To Learn Program (Rose, 2005,). The implications of the insights from the Semantic analysis of the texts for the lecturer's preparation for the Detailed Reading phase of the program, in elaborating aspects of the structure of the texts being read to the students, are considered.

Code Match: Semantic-Autonomy Waves in Junior Secondary Literary Analysis

This paper shares findings from a multi-dimensional LCT analysis of the underlying patterns of knowledge-building in student literary analysis. It explores principles distinguishing highly successful from less successful literary analyses in an 8th grade subject English classroom in the southeastern United States. Data from the study included video, pictures of board notes, interviews with the teacher, and written student products from a classroom lesson designed to cultivate students' abilities to critically interpret literary texts. The LCT dimensions of Semantics (Maton, 2014) and Autonomy (Maton and Howard, 2018) were employed in an analysis of writing samples selected by the teacher as representative of high, medium, and low achievement on the assignment.

Student products were analyzed using the LCT concepts of semantic gravity (SG) and positional autonomy (PA) to explore how the students connected broad claims with specific textual evidence and connected information from the literary texts with knowledge from beyond the lesson's target to build up judgments of the characters. Findings contribute to the body of research on Semantics and Autonomy in classroom activities and suggest implications for teaching and learning in school subject English.

Semantic gravity was used to map the movement between specific details from the text and more abstract thematic claims valued in subject English. The development of a translation device (Maton and Chen, 2016) for the data revealed a broad range in semantic gravity, from information grounded in the source texts (SG+) to meanings that went beyond the context set by the writing prompt (SG-). Between these poles, neutral semantic gravity (SGØ) referred to information with the same semantic gravity as the writing prompt, which asked students to explain the three main Harry Potter characters' attitudes toward elvish enslavement in the wizarding world of the novels. For success on the assignment, students were required to do more than answer the question using general information from the passages (SGØ). Specific details and quotes from the source texts (SG+) were necessary to support the claims made about each character. The most highly evaluated writing, however, also reached beyond the world of Harry Potter to make broad philosophical claims or references to contemporary and historical social attitudes towards slavery and other forms of oppression, extending the field of the text and expanding the context of the discussion (SG-).

Autonomy was subsequently employed to explore the degrees to which each written product remained 'on topic' and how movement around the autonomy plane related to changes in semantic gravity. The concept of positional autonomy (PA) was used to analyze the extent to which students remained focused on the task's targeted subject knowledge (characters' attitudes toward elvish enslavement) while relational autonomy (RA) conceptualized the degree to which the writing aligned with the purpose of the task (to critically interpret a literary text). Variations in relational autonomy were relatively minor, with all products aligned with the lesson's purpose. All products also exhibited strong positional autonomy (PA+) throughout the majority of the text. Highly evaluated products, however, also briefly moved into positions of weaker positional autonomy (PA-) by bringing in non-target information, such as historical knowledge of slavery in the United States. The autonomy analysis showed that highly evaluated products brought in information from beyond the target knowledge of the literary source texts to bolster interpretations of the characters, and that these shifts in positional autonomy often aligned with shifts in semantic gravity.

Bringing the two analyses together shows how bringing in non-target knowledge broadened the students' axiological claims by drawing on common cultural knowledge relevant in contexts beyond this particular classroom.

Students who took such an autonomy tour clearly positioned themselves and the reader with regard to the subject of the text and task while intensifying their moral evaluations of the characters. Importantly, this assisted their critical readings of the text by intensifying the negative evaluations the text's main character, and because the values of equality and social justice with which the student text are aligned are often met with resistance in the cultural context of this community.

This study offers a model for multidimensional LCT analysis of classroom products in the discipline of subject English. The findings have implications for the development of curriculum, instruction, and assessment that are conducive to powerful knowledge-building within the discipline and beyond.

Surfacing the knowledge and knowers in school leadership development clubs

This paper draws on research within a Bachelor of Education Honours Educational Leadership and Management elective at Rhodes University referred to as 'Learners Lead', which focused primarily on the leadership development of school learners and argues that learners should be treated as people whose ideas matter. As part of this elective, the Honours students (practicing teachers) establish leadership clubs in their schools and involve learners in a change initiative in pursuit of leadership. Whilst learners engaged in club projects to varying degrees of success (2013 – 2018), little is known about the knowledge practices of such clubs. LCT Specialization offers an explanatory framework to examine the knowledge and knower practices that characterise the leadership club member's meetings and interactions in the ELM Honours elective.

For this research in progress, 10 of the 21 students in the 2018 ELM Honours elective were purposively sampled and interviewed following a questionnaire to the entire cohort designed to answer the following research questions:

- What are the organising principles that shape the interactions amongst the club members whilst engaged in activities that lead to leadership development?
- What constitutes legitimate knowledge practices in club interactions and why is this the case?
- How can these knowledge practices contribute to the development of a leadership course or programme for school learners encouraging democratic citizenship?

The dimension of Specialisation is used as an explanatory framework as it provides a useful lens through which to establish the organising principles that shape the interactions amongst the club members while engaged in activities that have the potential to leadership development. Furthermore, the concept of semantic gravity helped to gain insight into knowledge practices and the type of knowledge privileged during the interactions. By making such organizing principles visible, "LCT enables these bases of achievement to become accessible to more actors, promoting social justice" (Maton, 2016, p.3). In addition, by focussing on knowledge in the leadership clubs the aversion of the subtle 'conceptual conflation' of leadership skills and leadership knowledge can be avoided (Corbel, 2014, p. 109).

There is a tendency for ELM programmes to privilege a knower code (Kaje, 2018). The preliminary analysis of the data on club member's interactions also revealed a similar tendency. An interrogation of the knowledge practices suggests that different types of knowledge are being privileged across these interactions. Practical/ Utilitarian knowledge was prevalent during club interactions. However, a few clubs focused on contemporary leadership theory. This is the first step in the theorising of knowledge that supports leadership development amongst learners. The outcome of the research suggests the need to standardise and make explicit the leadership knowledge necessary for the successful development of leadership in learners during club activities and interactions. A strong recommendation coming out of this research is to develop a more formal course which makes explicit some of the key leadership practices that will benefit the leadership development of learners. By making explicit the knowledge practices that lead to leadership development will be addressing a social- justice concern as 'knowledge does matter' (Wheelahan, 2010).

Diving for pearls: Exploring EAP curriculum enactment with Semantics

This talk reports on doctoral research that sought to better understand and articulate how English for Academic Purposes (EAP) is locally enacted. The research context was a university summer pre-session programme for international students. At the time of data collection, I was the course director and the questions shaping the research emerged over a number of years in this role, particularly through the observation of teaching staff. Taking a case study approach and informed by a social realist lens (Bernstein, 1990; 2000; Maton, 2014), the research asked:

- How is EAP locally enacted?
- What are the organising principles underpinning this enactment?

Drawing on Bernstein's notion of recontextualisation and theorising of the epistemic pedagogic device (Maton, 2014, after Bernstein, 1990), the study explored the 'double enactment' of EAP: firstly, from the values and beliefs shaping the pre-session ethos into curriculum, and then from pedagogic materials into classroom practices. Data collection and analysis combined interviews with the course designers, examination of curriculum materials, and exploration of videos of teaching.

The analytical framework drew on two dimensions of Legitimation Code Theory, Specialisation and Semantics (Maton, 2014). Specialisation's component concepts of epistemic relations (relations between knowledge and its object of study) and social relations (relations between knowledge and knowers) were used to explore the macro-orientation and goals of the pre-session programme. The Semantics concept of semantic gravity (the relative context dependency of meaning) was then enacted to analyse the structuring principles of materials design and classroom recontextualisation.

In this talk I focus on the insights gained into the principles structuring teaching materials and their 'translation' at the chalkface by EAP practitioners. I thus limit discussion mostly to Semantics based analysis. I present the language of description (LoD) developed from and for data exploration, and show briefly how this LoD emerged through examination of both study materials and classroom practice. Analysis of pedagogic potential in the EAP coursebook and its differential realisation by three experienced teachers revealed signature features on the page and in pedagogy. I present one particular signature profile, which emerged as a leitmotif across tasks and lessons in course design. Given its contour, I dub this the 'pearl dive'. I also provide examples of signature practices exhibited by teachers. These help to make visible how practitioners enact the values and expectations underpinning course design.

Taken together the principles structuring these practices reveal the ways in which local values and commitments become configured in curriculum and classroom. In a profession still in flux and characterised by significant variation across contexts, this study provides a basis for articulating the local instantiation of EAP. Little work of this kind exists to date. Most EAP research that nods to practice tends to overlook or ignore the shifts that occur in recontextualisation. More work enacting LCT concepts for research into the grounded enactment of EAP is needed, I argue therefore, to better understand and theorise the local realisation of materials and methodology.

Semantic Density in NSW HSC Legal Studies examination responses

The object of the present study is to ascertain the varying levels of semantic density in examination papers submitted by students in the New South Wales Higher School Certificate (HSC) examinations. This study will contribute to my PhD, *The Subject Specific Literacies of Legal Studies*. The LCT concept of Semantics, specifically the concepts of Semantic Density and Condensation will be the areas of focus in this paper.

The data includes a structured array HSC papers at 100%, 80%, 60%, 40%, and 20% mark levels in a range of Legal Studies topic areas in the final public examinations in NSW, the Higher School Certificate. These papers (Board of Studies, 2012a) were obtained from the examining body at the time, The Board of Studies (BOS), now known as the New South Wales Education Standards Authority (NESA), and have all been double marked by official markers for the HSC (Board of Studies, 2012b). The marks awarded represent the markers application of the Performance Standards (Board of Studies, 1999b) applied to each response. The Methodology for this study will involve the selection of papers from the available data, and will include one paper from each of the 100%, 60% and 20% responses, randomly selected from focus area B in the topic 'Family', essay responses to the question "To what extent does the law adequately protect family members in relation to birth technologies and surrogacy?" Each chosen response will be coded and analysed using the Semantic Density (SD) (Maton & Doran, 2017b) and Epistemological Condensation (EC - clausing and sequencing) (Maton & Doran, 2017a) translation devices, which were developed to reveal the complexity of knowledge practices in discourse. The coding will include the generation of detailed graphs of the semantic density of each of the texts. Where appropriate, reference may be made to related concepts in SFL.(Maton & Doran, 2017c)

Preliminary analysis indicates that the papers have, at a wording level, significant levels of semantic density. At clause and text level this density is more marked in the papers from the higher bands. The precise nature, of this condensation of text, will be the key focus of this presentation.

By explicitly understanding what forms of writing are best rewarded in the Legal Studies HSC examination, teachers could more effectively teach the essentials of writing practice appropriate to public examination, in line with their professional responsibilities to teach literacy as a general capability (ACARA, 2019) and specifically in Legal Studies, to teach students to "communicate[s] legal information using well-structured and logical arguments" (Board of Studies, 1999).

Practice or personal? Pre-service teachers giving peer-feedback

When teachers, as members of a practice, are providing one another with peer feedback, on what grounds do they legitimise their contributions? What knowledge counts when recognising the quality of the work of other teaching professionals? The conceptual tools offered by LCT are useful in analysing the grounds on which teachers legitimise their evaluation of another's practice. The knowledge bases that are employed by differently qualified preservice teachers in order to engage in pedagogical reasoning of preservice teachers are the focus of this paper, developing the central argument that differently qualified pre-service teachers, drawing on different grounds of legitimation for their judgements on an artefact of practice call into question whether teaching is seen as a professional or highly individualised practice.

This paper explores an empirical study into the contributions that groups of student teachers, who have followed different qualification routes to become a teacher, make in providing feedback to a novice teacher. Contributions ranged from merely contributing popular maxims about teaching, to the personal recollection of the practices of own teachers, to learning during pre-service courses. While all participants in the study were quite convinced of the value of their contributions, all needed to be prompted to consider the grounds on which these judgements were legitimised. The implications of this prompting was that participants were required to actively consider the knowledge that legitimated their judgement on practice.

A question arises about what each of these grounds of legitimation contributes to the conception of teaching as a professional or a highly individualised practice. As such, this study requires the construction of a translation device that draws on the specialisation and semantic codes in order to develop an explanatory framework for exploring the knowledge bases that differently qualified pre-service teachers draw on to legitimise their feedback to a colleague. The use of semantic codes opens up possibilities to explore the extent of networked ideas (or ideas with many nodes of meaning) in the justification (using semantic density), as well as the extent to which the justification draws on experiential or contextual knowledge (using semantic gravity). The specialisation codes open up possibilities to explore the location of the justification (using epistemic relations), as well as the distance from the self that the justification is articulated (using social relations). In this paper, I present a sample of responses from across a spectrum from very personalised to the responses that relied less on personal, experiential, knowledge, but vested the authority of the knowledge of the practice within others, and within theory.

I conclude by briefly exploring the implications of these grounds of legitimation in terms of the quest to professionalise teaching practices by strengthening the epistemic relations (communally owned practice with codified knowledge base), and the tension this has with teaching as seeking to develop teachers as expert knowers (strengthening the social relations). The possibilities for a code clash or shift in this regard are considered.

Knowledge and knower structures in self-directed learning

This paper deals with 'self-directed learning' spaces in Higher Education.

This is one of the main principles of the pedagogical approach, Problem Based Learning (PBL), which has become more prevalent in Denmark in recent years. The principle of self-direction implies that the students are expected to make extensive decisions about their own learning. The paper focuses especially on dilemmas in the relations between teachers and students and between students themselves. It draws on results from a recently completed research project initiated by the Association of University Colleges in Denmark.

It is commonly known among actors involved in PBL, that the principle of 'self-directed learning' contains some contradictions for both learners and teachers. On the one hand, students are encouraged by the PBL-pedagogy to develop their autonomy and personal traits, build on their own experience etc. On the other hand, the educational system as such requires that student performances are sanctioned against objective standards.

This is typically seen in exams where the requirements for the students often appear more clearly than they were first informed about by the PBL-pedagogy. Some dilemmas seem to arise: The challenge for the students is to find out to what degree they can pursue their own interests and preferences compared to what is objectively required of them. Another dilemma is how to balance two teacher-roles through the PBL-programs: instructor and/or facilitator.

B. Bernstein's concept of 'invisible pedagogy' captures some of such contradictions and dilemmas (Bernstein, 2000).

The purpose of this project was to investigate the contradictions in the seemingly conflicting codes in the pedagogical discourse associated with the PBL in order to gain a deeper understanding of what characterizes self-direction dilemmas for the actors, both teachers and students. In this paper, focus is on the question:

What characterize the structuring features of self-directed learning spaces in PBL-organized educational practices, and how can dilemmas in such learning spaces be conceptualized?

With 'structuring features' as a central object, an educational sociological approach was considered relevant for the study. Specialization codes from the LCT-framework were enacted to explore different structural principles for knowledge practices within PBL-organized educational settings (Maton, 2000) (Maton, 2014).

As analytical tool in this project, the two structuring principles, Epistemic Relations (ER) and Social Relations (SR) were agreed-on to identify dominating codes and code ambiguities/shifts between curriculum and pedagogical practice (see next section). With inspiration of Bourdieu's theories of capital and how actors position themselves in a field, the students' educational dispositions were analyzed in order to discover any possible conflicts between such dispositions and the transmitted pedagogic discourse.

The project was designed as a qualitative multiple case study comprising two educational programs with different cultures and different PBL-concepts. The two chosen cases were a "Constructing Architect"-program and a "Retail & Design management"-program.

Analytically, we distinguished between two levels in the educational device: 1) Curriculum and 2) pedagogical practice. This was done to enable us to trace any possible changes in the pedagogical discourse from one level to another.

- Research of curriculum documents, such as directives, syllabuses and study plans
- Observations of classroom activities:
 - Introductions to project phases and subject areas (interaction between teachers and class)
 - Project guidance (interaction between teachers and project-groups)
 - Student interaction in project groups
- Interviews with teachers at the beginning and the end of PBL-course.
- Group interviews with project groups
- Individual interviews with students from project groups

While the curriculum documents emphasized individuality and student agency, i.e. relatively strong social relations (SR+), this was downplayed in classroom practices. Here emphasis was on acquiring certain disciplinary knowledge (ER+). The curriculum documents exhibited a knower code, but in the classroom practice the code changed towards a knowledge code. This happened in both cases. However, this was not a clear code shift, but a shift to a more ambiguous code. The ambiguity of the code was – on one side – what created the self-directed spaces, but on the other side, it also created dilemmas and uncertainties. The paper discusses this with strong reference to Bernstein's concept of invisibility, especially the 'play' that occurred between students and teachers, hence the teachers' reluctance to provide solution-oriented responses. On the one hand, the students felt that this uncertainty improved their learning. On the other hand, they also became frustrated and thought it was too time consuming.

The paper also presents how a vertical knower hierarchy emerged in the study group by the students own positioning of each other according to their cultural (educational) capital. This knower hierarchy reflected to some extent how the students interpreted the ambiguous code they met.

One of the main points in the study is that the task is not for teachers to eliminate invisibility and dilemmas, but to develop a language by which the actors can discuss what is expected from them within the open frames – the 'rules of the game'. In the first place, this means that teachers and students need to develop an understanding that making the rules of the game clearer is not a matter of reframing or changing the code. Instead, it is a question of realising, that ambiguity is an embedded element in self-directed studies. Both parties are part of a 'game' where there will always be some uncertainty of how various 'knower-at-tributes' will be assessed, when students are to prove their competences.

Specialization codes form LCT together with Bernstein's concept of invisible pedagogy' has enabled a deeper research into the structuring mechanisms of self-directed learning spaces and the contradictions and the dilemmas that follow from becoming a 'self-directed knower'.

Analysing Specialization through a systemic functional-multimodal discourse analysis

This paper aims at exploring how principles of Specialization may be investigated through systemic functional-multimodal discourse analysis. The theoretical discussion is anchored in ongoing substantial studies of arts programs in compulsory education, more precisely, various specialist and non-specialist music classes across nations. The interesting issue here is in what ways such programs are specialized in a similar manner and differing from each other in the discursive composition of epistemic/social relations. In this paper, video recordings of official stage performances by students (concerts) are analysed. The point here is to illuminate underlying principles of specialization by analyzing instances where semiotic recourses are used, arranged, and displayed on stage.

The theoretical framework integrates the LCT dimension of Specialization (Maton, 2014) with Systemic Functional-Multimodal Discourse Analysis (O'Halloran, 2008). In this paper, SF-MDA contributes to Specialization by explaining how various semiotic recourses are used and combined for making meaning in relation to specialization and functionality (cf. Jewitt, Bezemer & O'Halloran, 2016; Kress & Van Leeuwen, 2006; Tan, O'Halloran, Wignell, Chai & Lange, 2018). The analysis is focused on the canons of use in a particular social context, that is, the instantiation relation between the performance and the underlying system of rules (Ledin & Machin, 2018).

Data consist of video recordings of authentic concerts, uploaded on YouTube by parents/teachers/school boards. In this paper, a comparative analysis of two Swedish schools is presented. One of them is recognized as a renowned elite school with students of higher SES (Adolf Fredrik's Music School), while the other represents low-performing schools in the area of lower SES (Alfred Dahlin).

The performances of Adolf Fredriks' Music School (AF) demonstrate principles of an elite code where students have acquired advanced skills in musical performance, and where the students represent a homogenous social group of higher SES and well-educated parents. Alfred Dahlin, on the other hand, reflects the code where you have to be interested in music, but without requirements of special skills or a particular social background.

Although students from AD sometimes convey an ungrammatical use of music (e.g. not in tune, irregular in beat or accent), the distinguishing features are the canons of use and differing orientation to register. While the performances of upper music classes are typically formal, lower music classes make an informal arrangement of semiotic resources. For instance, AF's performances are located in concert halls and cathedrals, while the performances of AD are located in school canteens and informal auditoriums. The differing orientations to formality and social order is perceptible just by looking at how students are lined up on stage, whether there is a use of a formal conductor, a teacher, or an informal performance by students themselves. Furthermore, there are differences in the choice of stage clothes, and not least how intended and unintended gestures are displayed through the performance. In sum, the different choices of registers signal distinctions in the definition of legitimate behaviour and significant others (class, identity etc.).

This paper show how specialization may be analysed through a multimodal discourse analysis in order to expose non-linguistic recourses in discursive communication. Although SFL has been elaborated for studying the interaction between linguistic and non-linguistic resources in multimodal meaning making, musical forms of communication have hardly been considered (in comparison to contributions on visual images and film – see e.g. Bateman, 2014; Kress & van Leeuwen, 2006; O'Halloran, 2008; O'Toole, 2011). Methodological challenges include how to modelling the functionality of non-verbal semiotic recourses – a field of research in need of further development.

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Practice of Police Crisis Negotiation: A Multimodal Discourse Analysis from a Joint Approach of SFL and LCT

In the past decades, police crisis is a frequently happening crime in China. Taking as the only non-force means for police law enforcement units to deal with these emergency incidents and to settle police crisis with the lowest sacrifice and cost, police negotiators have to judge according to the immediate situations of the crime scenes to decide the first choices of negotiation tactics and strategies (Royce, 2013; 2015; Mei, 2005; Liu, 2005; Yu, 2013; 2017; He, 2014). The analysis of the immediate situations of the police crisis crime scenes and the suspects is definitively of utmost importance and will provide inspiring findings. A mixed methods approach will be employed, integrating systemic functional approaches (Halliday, 1996, 2004, 2014; Martin, 2005, Martin & Rose, 2007; Martin & White, 2008) with the Legitimation Code Theory, especially devices of Autonomy and Specialization (Maton, 2009, 2011, 2013; 2019 forthcoming), together with multimodal discourse analysis (Hodge & Kress, 1988; Kress & Leeuwen, 1996; O'Toole, 1994; Royce, 1998; O'Halloran, 2004; 2008; 2011; 2016a; 2016b). This study is to investigate the intertwined discourse, paralanguage and situational relations of the police crisis negotiators, the suspects and the crime scenes, to reveal the characteristics and development mechanism of policing crisis, tactics and strategies used by the police negotiators in power manipulation with different language codes on the purpose of settling the crisis, and to offer constructive suggestions for the public security organs to deal with the relevant police crisis effectively.

The diminishing autonomy of vocational education: Teachers' perspectives

This paper will examine how vocational education teachers respond to reform by utilizing the LCT dimension of Autonomy. Since the 1980s public budget pressures and neoliberal economic philosophy have prompted governments to focus on getting "more for less" [Hood 1991] by increasingly borrowing practices from business to make the public service more efficient. Education policy has not been immune from these transformations. The vocational education sector in Australia has taken these changes comparatively further than most other developed nations [Wheelahan 2014a]. Vocational education has often been the 'testing ground' for educational policy reforms in Australia due to its comparatively low status and autonomy compared to the higher education sector [Wheelahan 2014a]. Repeated reforms over the past ten years have put vocational education in a state of flux, resulting in an abundance of academic commentary examining the various reforms. However, this research generally does not include the perspective of vocational teachers – those who are actually implementing the changes and mediating their effects on-the-ground. Teachers similarly felt that they did not have a voice in the policy creation process [O'Brien and Down 2002; Martin 2012], which is problematic as these reforms are ultimately enacted in the classroom. As such this paper aims to bridge this gap by providing a space for teachers to voice these concerns and contribute to educational discourse. To this end, the research forefronts the opinions and experiences of those actually involved in the implementation process and uncovers their effects on-the-ground.

This paper offers insight into how one dimension of LCT, Autonomy, [Maton & Howard 2018] can be used to understand the divergence between how different teachers within vocational education respond to marketization reforms. Positional autonomy and relational autonomy allow us to identify shifts in how the teachers position themselves within the educational field as well as how they perceive the underlying logics of the field shifting due to reforms. Particularly, the concepts of 'code match' and 'code clash' will be utilized when examining the positions of different groups of teachers in relation to the reforms.

The data in this paper was gathered from interviews with vocational educators from two different departments: nursing and trades teachers. These departments were chosen due to their diverse histories within the vocational education sector. The semi-structured interviews focused on the teachers' changing roles within vocational education, where they felt the reforms originated from and how they felt the values of the sector had changed in response. The open nature of the interviews allowed the participants to guide the process and fully explain their complex understandings of reforms and how they affected their teaching practice. Further, data from a concurrent survey of teachers from a variety of different sections within vocational education will be provided to triangulate findings from the interviews.

The study demonstrates that the disciplinary orientation of vocational education teachers impacts their attitudes towards reform. Autonomy codes were vital as an examination tool for identifying which aspects of this disciplinary orientation were most important in explaining teachers' reticence towards reforms. These results highlight the usefulness of autonomy codes when examining changing norms or principles within a sector. Furthermore, these results also provide greater understandings of teachers' perspectives and responses to marketization reform, an area still largely under-researched. This insight is particularly important in the current context, as changes in vocational education in Australia appear to be acting as a weather vane for similar educational policies targeting the tertiary education sector.

The Grand Tour: LCT Informing Pedagogy & Instructional Design

In this presentation I would like to look at the confluence of theory and praxis between my own proposed doctoral research into the knowledge practices of teaching coding using LCT as a lens, and my practice as an IT teacher re-designing my grade 8 computer literacy curriculum using Autonomy as an Instructional Design philosophy.

Coding and Computational Thinking are relatively new additions to the curriculum, and their arrival has been accompanied by often extravagant claims, fuelled by a sense of their centrality in a rapidly changing world in which Artificial Intelligence and the Singularity mark a tipping point in human history. More generally the integration of ICTs into the classroom, accompanied by moves towards Problem-Based Learning, The Flipped Classroom, Games Based Learning and a host of other techniques are all offered as pedagogical interventions which will transform education in some way. Simultaneously there is an increased focus on Thinking Skills and teachers are exploring pedagogical approaches such as Computational Thinking, The Harvard Visible Thinking Routines and Thinking Maps as a means to transforming educational practice and pivoting from a content-based to a skills-based curriculum.

The South African curriculum offers Information Technology and Computer Applications Technology as subjects in the Senior Phase (Grades 10-12). Historically very few students take this choice to Matric. Many schools also include some kind of computer literacy training in junior and middle school, and increasingly coding and robotics form part of this intervention. As there are no state syllabi for computer skills training, teachers are free to design their own and a plethora of approaches are followed. The knowledge practices of teaching coding thus represents an emerging field of study. Proponents of teaching coding argue that coding, robotics and computational thinking represents both a discrete field of knowledge, but with benefits of skills transfer across the curriculum. In my proposed doctoral research, I aim to assess these claims within the context of a Professional Learning Community and emerging practice.

As a practicing teacher I have been exploring LCT both as a pedagogy and as an Instructional Design Philosophy. Semantics and Autonomy were used as explicit tools informing the instructional design of a new Grade 8 Computer Skills Curriculum. It is often assumed that digital natives do not need to be taught computer literacy, and yet research and experience do not bear this out. A skills-based curriculum is somewhat atomized and dry. Skills learned need to be applicable to contexts across and outside the curriculum. In designing a course that would include Office packages, Adobe Creative Suite, Research & Information Literacy Skills and some coding, the problem of skills transfer was foregrounded. The LCT concept of the Autonomy Tour was used as an Instructional Design. The hypothesis was that a full tour through all the modalities of autonomy – a Grand Tour, was essential to maximising opportunities for skills transfer. Gamification represented an initial move into the Exotic Code, deploying games-like elements but attempting to move beyond Points, Badges and Leader boards to explore the use of game narrative to weave a curriculum together. The Flipped classroom allowed for student access to just-in-time instruction in skills needed to solve problems and represented a move into the Introjected Code and a return to the Sovereign Code. But crucial to skills transfer was the move into the Projected Code, encouraging students to apply their skills to new contexts and problems.

This Grand Tour evidenced increased productive output and levels of engagement measured by the amount and quality of work submitted but led to mixed student reactions around the nature of the scaffolding available. While some enjoyed the increased freedom to work at their own pace and follow personalised learning paths, others missed the more formal classroom approach. The role of the teacher appears vital in managing these conflicts. Questions of how to assess skills transfer effectively remain unanswered.

Semantic waves in novice and experienced teacher-talk

The criteria for evaluating teachers who just graduated from teacher training colleges in Nigeria (novice teachers) and teachers who have been teaching from five years above(experienced teachers) appears to be subjective. This study is aimed at addressing this problem by proposing an objective framework that can serve as a basis for differentiating novice teachers from experienced teachers. To achieve this objective, this study examines how content knowledge is mediated by novice and experienced secondary school teachers in selected Nigerian schools. The study adopted a qualitative (unobtrusive observatory) research design to achieve the objective of the study. Data for the study was derived from the analysis of six lessons (three in arts and three in science). Three of the lessons observed were in classes where the teachers have less than three years work experience while the other three lessons observed were in classes where the teachers have teaching experience of more than five years. Each of the six lessons was audio-recorded and transcribed in order to determine the knowledge building strategies used by the two categories of teachers. Micro Teaching Moves related to explanation, definition, reformulation and exemplification in lessons by both categories of teachers were identified and analysed base on insights from LCT Semantics. The patterns of knowledge in each of the six lessons observed were plotted on a graph in order to assign a profile to each of the six teachers. Results of the analysis revealed that although both categories of teachers blend specialized and non-specialized knowledge units during lessons, the experienced teachers tend to unpack the meaning of technical terms and concepts more that the novice teachers. The study concludes that novice and experienced teachers do not mediate content knowledge in the same manner. This finding suggests that novice teachers need to be better trained on how to build knowledge using insights from Legitimation Code Theory Semantics.

The constrained autonomy of the postgraduate supervisor

This study looks at how postgraduate education has been conceptualised in universities in South Africa. It does this in the context of the so-called 'knowledge economy', where there is enormous pressure on postgraduate supervisors to increase their supervision loads and to ensure students complete their studies and graduate in minimum time. A number of drivers have been put in place to encourage supervisors to this end, such as funding incentives and promotion criteria. Postgraduate education is a complex pedagogy which entails the supervisor supporting both the knowledge production process and the development of a knower as a legitimate member of a disciplinary community. The supervision aspect of postgraduate education has been very well researched as a teaching practice with conferences and special editions of journals dedicated to the matter. Furthermore, a number of books and supervision courses (such as www.postgradsupervision.com and <https://www0.sun.ac.za/crest/dies-crest-online-training-course/>) have been developed to support the supervisor as she takes on this challenging yet intellectually rewarding task. However, there has been much less focus on the broader context in which postgraduate supervision occurs and the ways in which the context may enable or constrain the roles the supervisor might play (Motshoane & McKenna, 2014). This blind spot has the potential to suggest that the supervisor has complete autonomy over the postgraduate process and has the agency to determine the outcome. Though there is some acknowledgement in the literature that the student also has a large degree of power over the way in which the postgraduate process plays out, what is generally lacking in this literature on postgraduate education is a nuanced consideration of the roles played by the structure of the target knowledge, the culture of the department or postgraduate programme, the ethos of the broader research environment, and so on.

This study applies concepts from the Autonomy dimension of Legitimation Code Theory (with a smidgeon of Specialisation). Autonomy provides the means to identify the underlying principles of practices, principles, beliefs and dispositions of actors. Autonomy allows the analysis of actors, ideas and objects to see the ways in which these are organised according to particular principles. The analysis in this case makes evident the strength of the boundaries between the roles of various actors involved in postgraduate education, between the various concepts of postgraduate education, and between other mechanisms that emerge in the context as enabling or constraining postgraduate education.

This study analyses the extent to which the varied mechanisms affecting the postgraduate education journey are conceptualised and taken into consideration by three sets of actors: postgraduate scholars, postgraduate supervisors and those tasked with some form of oversight of the postgraduate process, such as Deputy Vice-Chancellors: Research, Faculty Deans and Postgraduate Directors. The study also analyses the supervision policies of ten universities.

The study to date has indicated that supervisors generally have strong positional autonomy and are strongly bounded in relation to other actors. Their roles are generally well defined in the documentation and their sense of themselves and the way they are defined by others is fairly explicitly classified.

The study found great variance in relational autonomy. In institutions with strong research cultures, there is relatively strong relational autonomy whereby practices of supervision seem to draw to a large extent on the specific specialisation code that is evident in the discipline or on the values and interests of the individual supervisor. In institutions with a small number of postgraduate students and weaker research cultures, the relational autonomy seems to be weaker with institutional requirements playing a significant role in the ways in which supervision occurs across all faculties. This has implications for the development of strong research cultures, where the nurturing of autonomy may be key.

Using LCT (Semantics) with Reading to Learn to develop an Integrated Literacy Pedagogy for Biblical Studies

The practical problem this paper addresses is how to develop a pedagogy for teaching both reading and writing development and content knowledge within one lesson cycle to first year tertiary students in a School of Religion at a South African University. The specific case study was a lesson cycle on Narrative Criticism in a course titled Introduction to the New Testament. This section of the course aims to introduce narrative methods for interpreting the Bible. However, the mismatch between the Academic English in which the module is delivered and the English Additional Language curriculum which has informed the experience of the majority of students in High School necessitates that I integrate reading and writing development into my delivery of the content knowledge during the lesson cycle.

Therefore I employed an 'integrated literacy pedagogy' based on Reading to Learn (RtL) (Rose 2015). In addition this paper will report on how I attempted make use of pedagogic tools suggested in by Martin (2013), the Power Trilogy of highlighting Power Words, Power Grammar and Power Composition in the elaboration of the text. I will present translation devices for how I used these ideas in conjunction with Maton and Doran's (2017a, 2017b) work on Epistemic-Semantic Density (ESD) and Epistemic Condensation (EC) which provides a method for analysing the organization of meaning within a piece of discourse through the wordings, word groupings, clausings and sequencing. Using these tools within an integrated literacy lesson cycle helps to reveal the semantic codes and code shifts which I need to make explicit while deconstructing the specialized technical language and condensed meaning of the prescribed texts on Biblical scholarship and how the processes of elaborating these for students enables them to read and rewrite them successfully.

In the paper I will demonstrate how I used the ESD and EC tools to analyse the text on Narrative Criticism that is the basis for the lesson in preparation for delivering it to the students and how this can be translated into a script for delivering content knowledge in the classroom. I will also show how these tools can be translated into the Power Trilogy in order to uncover the working of texts and to deliver literacy knowledge crucial for the students to paraphrase this text successfully in their assignments.

Autonomy journeys and pedagogic moves: an analysis of a Reading to Learn lesson Cycle in a Biblical Studies classroom at a South African University

The practical problem addressed by this paper is how to elaborate ideas, knowledge and technical concepts, which is a central concern for most educational settings, in a first year module at a South African University. The specific module in this case the study is in a Biblical Studies classroom in which I was attempting to teach historical sociology as a tool for approaching analysing the Bible. However, in the light of the literacy challenges of the mismatch between the language of learning and teaching, Academic English, and the experience of the students in High School, English as an Additional Language, I am also simultaneously a literacy teacher. In the module I employed a pedagogy based on Reading to Learn (RtL) (Rose 2015a, Yi 2011:1) which aims to integrate academic reading and writing development into the module by using appropriate texts which teach the module content as the basis for both the lectures and the scaffolded assignments.

In this paper I use LCT (Autonomy) to analyse the deconstruction phase of my pedagogy, that is how I unpacked the text that was the focus of this lesson cycle. The tools offered by LCT (Autonomy) (Maton and Howard 2018) are useful for focussing my attention on the core target activities of this lesson cycle, namely the elaboration of ideas related to the historical sociology of first century Palestine as outlined in extracts from a text by John Riches. However, for this elaboration to be successful much of the lesson cycle needs to be focussed on associated non-target activities. This is because a number of key areas of knowledge i.e. patron client systems, the Hellenistic polis and ancient agrarian land tenure patterns are not in fully explained in the source text. In addition, the lesson cycle needs to create a bridge towards that knowledge for students by including ancillary target activities which is to draw parallels between these ancient societies and contemporary issues arising from the history and context of South Africa.

The paper will draw evidence from the researcher's script developed in order to deliver this lesson cycle and the field diary of day to day pedagogic activities which he kept during the lesson cycle. The paper concludes with the observation that this detailed analysis of the working together of target and non-target pedagogic activities can become a powerful tool for a self-reflexive practitioner aiming to constantly develop the effectiveness of their teaching.

“We’re all in this together”: Building Knowledge and Knowers in a longitudinal professional learning programme in the health sciences

In the Faculty of Health sciences, University of the Witwatersrand, Johannesburg, the Centre for Health Science Education (CHSE) offers a longitudinal professional development programme in the form of a postgraduate diploma in health science education (PGDip). The diploma consists of four modules to be completed over one or two academic years: Theories of teaching and learning; Methods of teaching in the Health Sciences; Assessment in the Health Sciences and Curriculum Development. Participants are encouraged to engage with the theories of higher education and to become critically reflexive of their practice and their context. We aim to develop practitioners who are able to theorise and enact their roles with respect to their own disciplines and society in general as change agents.

For most healthcare practitioners who enrol in this course, the curriculum is a revelation of ‘ways of thinking and being’ which challenge their inherent assumptions about their teaching role and higher education in general. Feedback tends to be positive concerning their depth and breadth of learning, and their intention to change their previous pedagogic practices. Whilst some indeed do describe improved classroom practices, several report on their frustration in trying unsuccessfully to influence practice of colleagues or policies within their Departments or Schools (Mc Inerney et. al, 2017).

It was therefore of interest to examine the underlying structures which govern what is valued as knowledge in the course and the ways in which the participants engage with this knowledge, in order to improve their ability to become “educational” change agents in their own environments.

The research questions guiding this study included:

1. What is valued as knowledge in the programme which leads to empowering participants?
2. What are the dispositions and practices of the course participants that either enable or constrain developing agency?

The LCT dimension of specialization was enacted as the analytical tool to examine the underpinning organizing principles of the forms of knowledge valued by the PGDip in the field of health science education, and the aptitudes, dispositions, and ways of being of its knowers (Maton 2014).

The data for this study were sourced from PGDip course and module proposals, university policies and archival documents, participants’ written final assignments, semi structured interviews, observations and critical reflections. Ethics approval to conduct the study was granted from the University of the Witwatersrand’s Human Research and Ethics Committee. All eleven Wits staff members who completed the postgraduate diploma in Health Science education in 2016 volunteered to participate (non-Wits members of the 2016 cohort were excluded from the study). In addition, nine line-managers and/or Heads of Schools of the 2016 diplomates were interviewed. Interviews were audio-recorded, then transcribed verbatim for analysis.

Epistemic relations in this context were underpinned by knowledge and evidence of application of educational theory. Social relations exhibited a shift from a positivist ontology to a more critical realist stance, which identified legitimate knowers as those able to acknowledge the contestation of knowledge and relinquish the authority they perceived conferred by their professional identities in the hierarchical healthcare system. For some participants, their transition from a “knowledge code” orientation of content delivery at the start of the course towards a more nuanced “knower code” acceptance of student individuality exhibited a code shift which presaged success in developing their own agency. This analysis afforded a detailed examination of the curriculum and led to a series of adjustments in subsequent cohorts of the course, which includes more scaffolding of the forms of knowledge and knower dispositions valued in the course. The use of LCT highlighted that identity work is important in developing agency following a longitudinal professional development programme and identification with an education-oriented community of practice empowers participants to change.

Exploring project-based learning to navigate the articulation gap

First-year students' journey through their first-year in higher education is often impeded by a disjointedness between their previous learning experiences (secondary education) and their new learning environment (tertiary education). This phenomenon is known as the articulation gap. Recent studies in South Africa shed valuable light on this surprisingly wide gap, more specifically between high school and first-year biology. This raises the question: How can innovative first-year curricula then be structured to assist current contemporary students in navigating the gap between high school and first-year in higher education?

Several authors propose that first-year curricula and their delivery should embody a transition pedagogy, where students are supported on their journey from their earlier learning experiences to the style and ways of learning at university. Such curricula would thus contribute to bridging the gap and work with 'what students bring with them', disregarding expectations and assumptions. Teaching and learning in such curricula should further address the world of current contemporary students. These post-millennials are very different from the ones for which the current system was designed and prefer hands-on, immersive learning experiences, with low tolerance for passive learning. A number of studies have drawn on Legitimation Code Theory, specifically the Semantics dimension to analyse and shape both first-year curricula and pedagogy, using the concepts of semantic gravity (the context dependence of meaning) and semantic density (the complexity of meaning). The ideal is to enact semantic shifts or so-called semantic waves in practice, where meaning is continually transformed between concrete and abstract, as well as between simpler and complex meaning, in recurring cycles. In such practice, students are more likely to make connections to their previous knowledge while making sense of new discipline content.

This study also draws on LCT Semantics and explores the inclusion of project-based learning (PjBL) to enact semantic waves in a first-year biology curriculum to assist in the transition for current first-year students. PjBL is a teaching and learning approach that allows students to master concepts and develop skills by exploring real-world problems, scenarios or challenges. This method has been shown to lead to students developing deep content knowledge, while also developing essential skills such as critical thinking, creativity, communication, collaboration, etc. in the process. Interestingly, this approach is very commonly used in the school curriculum, in contrast to the university curriculum that has been mostly lecture driven.

Two student projects were designed for the PjBL approach to align the first-year biology curriculum to the content and ways of learning in high school, thus previous learning experiences. Project one aimed to provide real-world context to a very abstract section of the first-year curriculum, therefore to strengthen the context-dependence for these abstract concepts. Students were required to research a variety of poisons and venoms and their effects on victims and living cells. Their presentations were recorded and evaluated by using LCT Semantics. A second project aspired to develop scientific language skills of first-year biology students and strengthen their ability to work with stronger complexity of meaning. For this, students were required to immerse themselves into the world of a renowned molecular scientist, research the structure of a living cell by using appropriate literature (high stakes reading), and then and write a report about their findings (high stakes writing). Students were thus required to read a complex text, make sense of it, and repack the content in their own words (shifts in semantic density). The relative quality and complexity of their work were evaluated using semantic density.

Results showed that these purposefully designed projects (PjBL) actively engaged these first-year students in the learning process. Moreover, the familiar way of learning (PjBL) connected the new discipline knowledge to their past learning experiences. During the process, they were steered through cycles varying between concrete and abstract meaning, and simpler and complex meaning, thus enacting semantic waves. This study therefore suggests that purposefully structured PjBL has the capacity to enact semantic waves, expose students to powerful theoretical concept knowledge, while also affording access to the tools and practices needed to make sense of the new abstract complex disciplinary content. This familiar hands-on teaching and learning approach could therefore be a valuable component of first-year curricula and teaching practice, assisting students during the transition into higher education.

Developing scientific discourse through project-based learning

The code of conduct among scientists is to argue the validity of their research among their peers with the main aim of persuading their colleagues of the legitimacy of their claims. In scientific discourse, scientists communicate in a manner that their peers would interpret their knowledge claims as both logical and probable. The construction of their writing therefore aims to maximize the likelihood that readers will understand it as intended. Moreover, in science, language enables the enactment of scientific practices. In science classrooms, however, very little of this skill of authentic scientific argumentation is modeled and developed. Instead, these learning spaces are more lecturing orientated, in reality preventing argumentation or even regular conversation about scientific concepts.

Scientific discourse is a specialized language and is practically foreign and very complex to novices in the field. Scientific language usually involves the passive voice with abstract nouns derived from verbs, technical terms that are used differently than in everyday use, as well as a range of discipline specific terminology. It has been suggested that two levels of discourse emerge when students make knowledge claims. They ground their claims either by expressing a personal knowledge domain (also called mundane talk) or by referring to a shared scientific epistemic domain (scientific talk). Connection between the two can be achieved through two types of interactional practice: formulation practice, as well as recontextualization. Thus, educators need to make an effort to model scientific discourse and provide students with opportunities to develop this 'new' language. This may include activities such as scientific argumentation using evidence to support knowledge claims, hypothesizing about scientific phenomena, writing up of experiments and referring to data and patterns in data.

Our study was undertaken to develop the scientific discourse skills of first-year biology students by using project-based learning. The study draws on the LCT Semantics dimension for both project design and analysis. In university curricula we expect students to engage with written forms of knowledge such as textbooks, class notes and other academic literature, so-called 'high stakes reading'. Thereafter, we require them to demonstrate their mastery of the subject knowledge in a number of ways, one of them being scientific writing, which represents 'high stakes writing'. However, in practice we often find that students struggle to articulate their knowledge in a scientific manner.

Our study describes a student project (PBL) that required students to research a real-world scenario from their textbook and other resources ('high stakes reading') and to present their findings in a written report ('high stakes writing'). This was meant as an opportunity to develop their scientific language skills, and aimed to teach them the 'rules of the game' and the skill of shifting between simpler and complex meaning to 'unpack' and 'repack' complex concepts, thus navigate the gap between 'high stakes reading' and 'high stakes writing'. We believe that this approach will contribute to linking the two types of student language, mundane and scientific talk. This paper focuses on the development of an epistemic semantic density translation device for the analyses of the students' scientific writing and some of the challenges experienced during this process. We also show how the project design steered students towards shifts in semantic density, potentially assisting in navigating the gap between 'high stakes reading' and 'high stakes writing'.

Autonomy: Analysis of the Mathematics Comprehension Test of Academic Potential (MCOM) using Legitimation Code Theory

This paper is a report on the structure of the Mathematics Comprehension Test of Academic Potential (MCOM) using Legitimation Code Theory (LCT) as a tool for analysis. This diagnostic test, whose purpose is to assess a test taker's potential to learn new mathematical knowledge and skills, is taken as part of the orientation process for the Science Faculty students at the University of Cape Town. The results are used in conjunction with other tests (the National Benchmark Tests and the first faculty tests at 6 weeks) to inform on placement of students in either the main or the extended stream. The main feature of the MCOM is in the way the questions are constructed. Items focus on specific features of mathematical concepts that compel the student to apply prior knowledge to understand the context; as opposed to resorting to reproducing knowledge learnt by rote. This is a recurring feature in the faculty's Mathematics curriculum in particular, and so the MCOM is designed to set the tone for the rest of the Mathematics programme in this manner. From the examiner's perspective, it then becomes possible to assess from this test specific areas of a student's understanding and ability to synthesise learning processes. This knowledge becomes valuable for both student and lecturer especially in the design and provision of additional support on the extended programmes.

The purpose of this study, therefore, is to explore the structure, as well as the nature of the knowledge at play in the test, using the LCT concept of autonomy in particular. Autonomy is a concept that explores the relations between two sets of knowledge; their constituents as well as their purpose. I proceed by giving a brief background to the MCOM, highlighting the theory espoused by this assessment practice, its assessment criteria and the elements that constitute its achievement. I then explore the various ways the test may benefit from an analysis using autonomy by using two major research strategies: firstly a qualitative analysis of the structure of the test items, and secondly, a quantitative analysis of student response data. The analysis is an attempt at highlighting the tacit structural nuances underlying what is considered as the legitimate knowledge that defines the test; and the relationships that exist between this legitimate knowledge and the prior knowledge that is brought in by the student. The end goal is to see whether concepts from LCT can uncover additional layers of alignment between the test construct and its intended outcomes. It is hoped that such a study would contribute to the interpretation of test-taker performance in the test and to research in assessment for placement in Higher Education.

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Exploring the progression of knowledge about the Earth's movement in space in the South African Primary Sciences Curriculum

All formal learning settings follow a learning programme in a form of a curriculum. Scholars argue that the sole purpose of education is provision of knowledge (Wheelahan, 2012). In addition, it is argued that provision of knowledge at institutions of learning is a human right. However, there is no straight forward answer as to what kind of knowledge and whose knowledge matters. The question which then comes to mind is whether a curriculum should be a mile wide and an inch deep or vice versa. Furthermore, how knowledge progresses cumulatively across grades is a crucial factor. Thus, recently in South Africa, many voices have been calling for more apprenticeship based knowledge rather than theoretical knowledge.

The aim of the South African Natural Sciences curriculum is to expose learners to opportunities that will enable them to reorganize their naïve ideas about nature into meaningful and scientifically correct explanations. Thus, in this paper we explore knowledge progression in the primary school sciences curriculum, the Curriculum and assessment Policy Statement commonly called [CAPS]. What is the nature of knowledge progression about the Earth's movement in space in the Primary Sciences curriculum (Emis)? In order to answer this question, we adopt Karl Maton's legitimation code of semantics to understand cumulative knowledge progression (Maton, 2009). Using semantic gravity, [SG] we aim to understand the level of concreteness of curriculum statements meanings as well as the levels of condensation of meanings in the curriculum statements across Grades R-7 using semantic density.

Semantic profiling in South African medical rescue education

In this study the semantic codes of medical rescue-related subjects were profiled to evaluate knowledge building over time. Theory and practice co-exist within the Bachelor of Emergency Medical Care with each having a particular strength through which knowledge building could be analysed. Semantics is a dimension of LCT which explores forms of knowledge pertaining to the concepts of 'semantic gravity' and 'semantic density' (Van Krieken, 2014).

LCT tools used include the Semantic dimension. An objective of this study relates to the appraising of the educational knowledge gap of the BEMC Physics (EBS100S) and Extrication (EMR203S) subject guide content utilising the LCT Semantic dimension. The relational power of dependence to the Semantic dimension in terms of context and theory could be heuristically illustrated by means of a wave or flatline through which change is represented over time (Maton, 2014). The change could be analysed using for example the delivery of subject content in terms of the theoretical and contextual dependence over time in relation to the order in which it is covered (Maton, 2014).

A translation device was developed and applied to sampled subjects relevant to medical rescue education. The units of study were ordered in terms of study themes and their chronology. The translation device was applied and results were graphically displayed.

The emergent wave pattern suggests the presence of segmentalism in knowledge building in medical rescue education. The segmentalism found may constrain transference of knowledge across core subjects. The pattern also suggests incoherence in structure and poor articulation of design of the medical rescue curricula. The Semantic code profile of the Physics and Extrication subject guides units of study reveals that waving occurs over time as the units of study is not covered in a linear manner. The waving pattern is an indication that the study themes have erratically strong or weak gravity or density.

Shay (2012) stated that both the theoretical and practical knowledge is principled, with there being an important difference as the principled practical knowledge emerge from the principles from the practices themselves, and it is a codification of practice. Such a relationship between theory and practice, and abstract and situated knowledge has hitherto not been evaluated in medical rescue education in South Africa. Appraisal of the knowledge gap using educational theory with powerful grammar, like that of LCT, for medical rescue education and practice would validate, and strengthen knowledge development in this field for further and future research.

Semantic density in Zimbabwean judgments: Implications for social justice

This presentation is based on ongoing PhD research into the development of the legal judgment as a genre in Zimbabwe from 1960 to 2010 in terms of its capacity to build sufficient knowledge on issues presented before the courts and the implications of this for social justice. A legal judgment attracts attention owing to the differences in the interests and levels of understanding of its audiences. These are the litigants, legal professionals and the public. In the context of Zimbabwe, the period 1960 to 2010 sits astride two epochs, one being colonial and the other being postcolonial. These eras were characterised by ideological conflicts which could find expression in genres such as judgments. Genres, being artefacts, have the potential to reveal past and present practices. Cognisant of the above, the following are the research questions for the overall research project:

- a) What linguistic resources do Zimbabwean judgments written between 1960 and 2010 draw on in terms of:
 - i) ideational meaning; and
 - ii) interpersonal meaning?
- b) What are the similarities and differences between the semantic profiles of the colonial and postcolonial judgments?
- c) What are the implications of the semantic profiles for social justice during the respective epochs?
- d) How can the linguistic resources in the legal judgments be best deployed in order to achieve a semantic profile that enhances effective knowledge building in matters to do with social justice in a manner that suits all the audiences of judgments?

There is a strong relationship between civil suits and social justice as the former is the only legal way to claim property rights and benefits recognised at law. Social justice entails a just relationship between an individual and society. It is measured by opportunities, privileges, compensation and distribution of resources among individuals. The construal of justice is both deontic and axiological: some acts/ideas are construed as permitted while others are prohibited; and some acts/ideas are construed as being more just than others (Vallentyne, 2003). This underlines the relevance of focusing on ideational and interpersonal meanings in the judgments and the relationships of these linguistic resources to epistemic- and axiological-semantic density. Semantic profiles are useful for inferring the degree to which the judgments successfully build knowledge around matters at hand. Differences in the semantic profiles of the judgments in different epochs can assist one in inferring aspects of the evolution of the genre as a knowledge practice. On the other hand, SFL shows that genres evolve as society adapts them to better serve their functions. This evolution can be observed through examining the ideational and interpersonal metafunctions.

The research thus employs an eclectic theoretical framework of Legitimation Code Theory (LCT), specifically the Semantics dimension (Maton, 2014) and selected Systemic Functional Linguistics (SFL) resources outlined by Martin and Rose (2007) and Martin (2017). The SFL resources are grammatical metaphor, technicality, attitude, engagement and graduation. These resources are known to have strong relationships with semantic density (Martin, 2017). SFL and LCT have been enacted in a linear arrangement, where SFL resources are analysed first and interfaced with semantic density within the broad context of social justice.

In the presentation, I partly focus on questions (b) and (c), without making the comparisons that the questions imply as I focus on only one postcolonial judgment made in 2010: a civil case entitled 'Mafusire v Greyling & Anor'. Results show that the shape of the semantic profile is affected by the discourse function of respective sections of the judgment and that some parts of the profile exhibit more potential for knowledge-building than others. Whereas some parts show a flatline, most parts show waves within waves. Concepts that have stronger semantic density are unpacked through use of other lower-order concepts or technical terms, which require to be explained in their own right thereby giving rise to small waves within the bigger waves. I argue that such characteristics serve different audiences of judgments in different ways. Importantly, non-professionals are afforded a window to peep into what is legally acceptable through the explanations, which is a positive step in the direction of entrenching social justice in a society.

Academics' Conceptualisations of innovation in Engineering Education in Zimbabwean Universities

Innovation has become a catch-phrase for many institutions that promise its development as a key outcome of the curriculum. But there is little clarity as to what innovation looks like or how it is curriculated. In this study, I attempt to make sense of how innovation is legitimated (or not) by those responsible for design courses in engineering curricula. The need for such a study arises from the call for Zimbabwean Higher Education to drive the innovation agenda set by the State to produce graduates who can contribute to the resolution of the economic predicament the country is facing. In this regard, this paper aims to investigate some of the complexities surrounding the conceptualisation and promotion of innovation in two Zimbabwean universities.

Using Legitimation Code Theory (LCT), the study investigates how innovation is legitimated as knowledge in engineering curricula. Drawing on one dimension of LCT, Specialisation (Maton 2005, 2011, 2013), the study examines underlying structuring principles of innovation in engineering education uncovering how innovation is conceived and legitimated. Specialisation analyses what makes something worthy of distinction (Maton et al., 2015) and is useful in determining how education practice is legitimated in a field. It looks at relations to knowledge skills and processes, epistemic relations (ER) and it looks at legitimation through relations to the knower, social relations (SR).

The evidence of knowledge of innovation as a set of processes, possibly entailing engineering concepts, engineering calculations, subjects incorporated in the product design, with little concern about having a particular gaze or way of being may reflect a knowledge code. If, on the other hand, there is little evidence of innovation as a set of skills, processes or concepts but there is strong concern with evidence of attitudes, experiences and related characteristics related to innovations development, this could reflect a knower code. If both strongly the means of Specialisation, this indicates an elite code. If innovation was nowhere or only weakly evident in both ER and SR, then this would constitute a relativist code. This study interrogated these concepts to help understand what is legitimated as innovation by academics in engineering education in Zimbabwe.

This study employed a case study methodology. Case study methodology was chosen because of the alignment with the LCT framework due to the intensive focus on meaning making and relations within a context (Yin, 2013) aligned to the analysis of actors' dispositions and practices in those contexts (Maton 2013). The paper focused on the voice of the lecturers and their curriculum. The study employed a case study design, with a two-pronged data collection protocol, entailing document analysis and interviews. Data was collected through in-depth interviews with key informants who are the Dean of the faculty/school, two Chairpersons and one Director of Innovation (the school/faculty management team) from each of the two institutions under study and interviews with 10 lecturers from one institution and 8 from the other institution teaching courses related to design projects. The interviews each took between thirty minutes and an hour. Data was also collected in the form of documents such as: module outcomes, design project briefs, final design project assessments, teaching resources, methods of delivery and any other documents related to the promotion of innovation that they avail to students. Textbooks were also included in the document analysis with lecturers indicating which aspects or chapters were regarded as seminal for developing innovation in the curriculum. Document analysis was in this case be used to validate interview data.

The research design allowed an exploration of a socially constructed phenomenon (Creswell, 2009) specifically in this study the conceptualisation and promotion of innovation within engineering education in Zimbabwe's Higher Education system. Plotting how lecturers conceptualised innovation assisted in establishing the extent to which they regard innovation as being informed by social and/or epistemic relations. The responses from the interviews as well as the document analysis were plotted using a scatter diagram on the Specialisation Cartesian plane to establish the dominant code (Friendly and Denis 2005). Plotting the ways in which lecturers conceive of innovation and how innovation is indicated in the curriculum documents, helped to establish how innovation is conceptualised and legitimated in the design modules of the engineering curriculum in Zimbabwe's HE. It is hoped that the results will inform higher education engineering studies by uncovering the rules by which academics recognise and assess innovation and the keys for success can be made more explicit to students.

Negotiating semantic waves: Integrating LCT into EAP

International students make up more than 20% of student numbers at Australian universities and are required to meet English language entry requirements for their destination faculties. A significant number of these students do so through high stakes university pathways programs which are designed to develop students' knowledge of English for Academic Purposes (EAP). Such programs have a wide range of objectives, from developing students' content knowledge and academic writing, reading, listening and speaking skills, to supporting student wellbeing and successfully transitioning them into Australian universities. While finding space in curricula to effectively build knowledge in all these areas presents challenges, LCT offers a pedagogical toolkit to reveal how this might be best achieved.

LCT's dimension of semantics comprises two tools, semantic gravity and semantic density, which identify degrees of abstract knowledge and condensation of meaning. The weaving together of these meanings can be illustrated by a semantic wave, visually depicting the integration of conceptual understandings with application or problem-solving. A growing number of publications suggest that this is essential for cumulative knowledge-building in a range of academic disciplines (see e.g. Maton 2013, Blackie 2014, Szenes & Tilkaratna 2015, Georgiou 2016, Brooke 2016, Kirk 2017). The concept of the semantic wave has also been used in teacher training and development, and with academic language specialists (see e.g. Clarence 2017, Hassan 2017, Ingold & O'Sullivan 2017).

This presentation reports on ways in which Semantics is being used in EAP courses at Monash College to assist students in selecting and arranging knowledge in their academic writing. It also presents the challenges in designing materials for teachers with no knowledge of LCT and negotiating space for materials in already packed curricula and syllabi.

This presentation demonstrates the recontextualisation of LCT's dimension of Semantics in student-facing materials for EAP courses. These materials have been developed to clarify understanding of reflective writing in sociology courses, and reflective essays and reports in education. Challenges in their implementation will be presented for discussion.

In this way, the presentation will demonstrate the practical potential of LCT to empower students in academic writing while testifying to the real struggle of enacting change.

Challenging paradigms: Literacy interventions in tertiary environments

As the number of international student enrolments in the Australian higher education sector continues to increase, institutions are being forced to consider the barriers to learning faced by this cohort of students. Although language proficiency (or deficiency) in English, (as the language of learning and teaching) is a frequently cited barrier to success for international students, the issue is more complex. Students come from a variety of cultures and educational systems, bringing with them a range of dispositions, and are expected to engage with new discipline-specific discourse communities whose expectations, cultures and concepts are often tacit in nature. To enable the full participation of international students, Monash University has invested in a pilot program delivering language resources closely aligned to curriculum and assessment. Entitled Communicate for Success, the pilot offers specialised English language support through predominantly online resources that provide students with engaging and purposeful learning opportunities in communicating through English. It aims at supporting students in meeting high academic standards whilst also, it is hoped, developing their communication skills and social capabilities allowing them to productively function within the Australian context and prepare them for success in their professional lives.

While there is shared agreement on the need to assist students, there are different views on the ways in which this can best be achieved. Understanding what drives the competing views does not have a straightforward answer, particularly as there are limited opportunities to fully explore all of the challenges and their underlying principles. This paper draws on LCT's multidimensional conceptual framework as a means of generating a common language for a more sophisticated understanding of what counts as legitimate and what does not, and who gets to decide that and when they get to do so. The dimension of Semantics offers a potential way to understand tension between approaches that are context-dependent within a particular unit or freely-floating to allow transferability of resources across units and disciplines. Specialisation allows comparison of the organising principles underlying the pilot with those underlying the key units selected for support. Autonomy sheds light on why key players may react differently to proposals based on their beliefs about the role and application of the pilot. In this way, the paper explores how an LCT framework can be employed to best encourage informed discussions about the challenges and clarification of ways in which literacy interventions of this nature can succeed.

Touring the Epistemic Plane: student question-posing in chemical engineering education

Engineering education must walk a tightrope between examining 'calculation ability', and fundamental understanding – creating assessments which parse these can be challenging. In order to appropriately design and analyse pedagogies, interventions, and teaching methodologies, a theoretical framework to conceptualise student learning is needed. LCT's Epistemic Plane allows for a graphical description of how students experience the relationship between strongly/weakly bounded phenomena and approaches, and may allow insights into how to improve depth of learning.

This study uses the Epistemic Plane to examine and investigate the efficacy of an intervention in a 3rd year chemical engineering course on reactor design. A recurring and substantial issue during undergraduate engineering education is students' adopting a pattern recognition route to problem solving, belying a poor grasp of the content and concepts being examined. This problem can be particularly pronounced in courses such as reactor design, which implement an algorithmic methodology to problem solving. Students can easily hide behind recognising the pattern of the algorithm, rather than grappling with the meaning and fundamentals behind said methodology. These superficial learning methods give rise to 'correct answers' but shallow understanding. Within the Epistemic Plane this represents a narrow transversal between the doctrinal and purist quadrants. We hypothesise that a more complete transversal of the Epistemic Plane may give rise to improved learning.

One assessment method which has seen application in courses susceptible to this 'pattern recognition' problem, particularly in medical education, is student problem-posing (usually in the guise of multiple choice question creation). In this method, students are asked not to answer questions posed to them, but rather to devise questions (and solutions) of their own, within particular subject parameters. In our study the lecturer assigned a problem-posing assignment to 3rd year chemical engineering students within the reactor design course. Students were requested to set up both the answers and complete model solution to a standard reactor design problem, including discussion of what concepts they intended to examine and how marks are allocated. They were then graded and given feedback on how well they examined the topic and whether they produced a 'correct' solution. As part of this study, student feedback, in the form of a questionnaire, was solicited. The discussions with students, student feedback, and assignment submissions were then used to attempt to trace the path the students' traversed on the Epistemic Plane through completing this assignment.

The potential of problem-posing in the reactor design context is in allowing (and forcing) students to explore the algorithmic nature of reactor design from multiple perspectives, and in so doing enabling students to shift (collectively) towards more open-ended approaches (situational insight). That is, they need to conceive of the problem from their own experience (knower insight), simultaneously and iteratively set-up the question and solution, and consider both the 'correctness' of the mathematics, and not simply as a way to 'game the system', but also whether the question examines the content appropriately. This allows for reflective learning and contributes to student concept development, and concomitantly represents a more complete transversal of the Epistemic Plane, speaking to our hypothesis; although more data is needed before a firm conclusion can be reached.

This ongoing study aims to, firstly, demonstrate a teaching intervention which improved student involvement, understanding and self reflection. Secondly, this discussion hopes to illustrate the explanatory power of the Epistemic Plane in theorising and understanding how and why this intervention was successful, with a view to application in other modules.

The specialization codes of law and order

The use of police force in restoring law and order is the theme of this paper; the language that surrounds the legal use of force is its object of study. The question we address is: to what extent is the lack of professional training of police forces a culprit in the disappearance of 43 students participating in protest activities?

As we address this question, we draw on Legitimation Code Theory, particularly specialization codes, in order to calibrate the relations of power and prestige of the armed forces in a country such as Mexico. In mapping the specialization codes of armed forces in the context of a developing country, we focus on a specific instance of their realization: during the confluence of social demands concerning education, extreme use of force, and ensuing disappearance of 43 students from the teacher college in Ayotzinapa, Guerrero in the year 2014.

Samples of specialization codes used by members of the police, which were made public during the investigation of this event, are examined in the light of SFL lexical-grammar analysis in order to examine the linguistic resources employed as they engaged in their professional practice. We also draw on Critical Discourse Analysis to trace the discursive practices of institutions in charge of training and hiring members of the police force as well as institutions that oversee their professional practices, such as the Comisión Interamericana de Derechos Humanos –CIDH.

This work is part of ongoing research concerning conflicts and contradictions in public education policies in Mexico. On this occasion however, we report on this event by virtue of expected changes in national policy concerning the use of armed forces in the control of violence. This study will hopefully provide grounds for the claim that education and law enforcement share misguided notions of discipline. The underlying contradiction between the force of law to maintain order and the force of education to transform is in the core of the asymmetrical power relations in this country which is reputedly in the process of development. As final outcome, we hope for the advancement of social justice through knowledge-building, as it concerns the social practice of violence for the sake of order.

From Frustration to Exhilaration: A tour with LCT

Each year the academic development (AD) centre at our institution finds itself “fighting for survival” and needing to justify the programmes we offer. The challenges of trying to show impact, being accused of not delivering the service expected of us and the constant uncertainty can leave one feeling disillusioned. With over 40 years combined experience in the field of AD, we as academic developers who have constantly attempted to become knowledgeable in the field, are seeking to find answers to why is AD at DUT being seen as having limited impact.

This presentation will focus on trying to unravel the underlying tensions between what is expected and what we deliver as Academic Development specialists. Through the use of Autonomy tours and Specialization we will be able to describe the current situation, identify the tensions and envision new possibilities. The presentation will report on the analysis of two programmes offered in the centre namely Mainstreaming academic literacies (AcLits) and the Scholarship of Teaching and Learning (SoTL) Fellows Programme. Both these programmes are informed by a transformative orientation which is often challenged by the dominant discourse of underpreparedness and skills training. We will use Specialization to analyse programme documents and reciprocal self- interviews to reveal what the intentions are, what is expected from the programmes, and how it is being enacted.

Autonomy will reveal how the forces and dynamics acting on the design and enactment impact on the programme and provide a tool to look at new possibilities (new tours).

A conceptual framework for understanding the complexities of Mathematics proficiency

As many as ninety percent of the prospective students for tertiary education institutions in South Africa have no more than an intermediate level of mathematical proficiency. This has been identified as a key obstacle to student success and emphasizes the need for specialized support programmes for developing mathematical proficiency.

In this study the Epistemic Plane of the Specialization dimension of Legitimation Code Theory is proposed as a conceptual framework for illuminating the complexities of developing mathematical proficiency and for designing differentiated support in first year mathematics. This framework is orthogonal with the vertical axis, or ontic relations (OR) axis, translated as 'what mathematical knowledge' and the horizontal axis, or discursive relations (DR) axis, translated as 'how one thinks/reasons mathematically'. The resulting four quadrants of this framework represent four strands of mathematical proficiencies.

A Doctrinal insight represents procedural fluency ('how' dominating 'what') in the sense of the knowledge of mathematical procedures of when and how to use them appropriately, and the skill in performing flexibly, accurately, and efficiently.

A Purist insight represents mathematical understanding in the sense of integrated and functional grasp of mathematical principles and mathematical thinking/reasoning.

A Situational insight represents strategic competence ('what' dominating 'how') in the sense of the ability to formulate/represent problems mathematically and to solve them using appropriate mathematical computations.

A Knower insight represents an intuitive approach using few mathematical principles and limited mathematical reasoning.

Navigating between these insights corresponds to integrating the four strands of mathematical proficiency and thereby developing a productive disposition towards mathematics, that is, the tendency to perceive mathematics as both useful and worthwhile, to be an effective doer of mathematics, and to believe that steady effort in understanding mathematics pays off.

This conceptual framework is shown to provide a systematic approach to thinking about the range of proficiencies identified by the National Benchmark Test (NBT) for Mathematics. A key observation is that mathematical proficiency presents differently in individual students and this may be understood in terms of gaps in mathematical knowledge and mathematical reasoning skills in five core areas assessed by the NBT: algebraic processing, functions, trigonometric functions, geometric concepts, number sense. This information is being used to guide individualized curriculum integrated differentiated support in first-year mathematics. Success of such support could then be evaluated in terms of how students navigate between the four insights and in terms of improvement in student success in STEM programmes.

Cultivated knowing, constrained knowledge: Jazz educators' espoused and enacted curricula

This paper about teaching and learning in creative fields focuses on jazz education as an illustrative example of ways in which knowledge-building might be constrained and knower-cultivation facilitated in knower-code pedagogies. It explores the questions of what it means to be 'good at playing jazz' and how that is taught and learnt and uses the Legitimation Code Theory (LCT) dimensions of Specialization and Semantics. Specialization is used to show the basis of achievement in the espoused and enacted curricula of three case-study jazz educators, contrasting rhetoric and practice. The concepts epistemic and axiological semantic gravity and semantic density are used heuristically to show what kinds of knowledge-building and knower-cultivation occurred in a series of group lessons given by each teacher and potential implications for knowledge and knower-building.

Jazz education is an example of a field dominated by a knower code that presents a public face in which rhetoric downplays the importance of specialist knowledge or technical aspects of performance but places strong emphasis on personal attributes such as talent and innate predisposition as the basis of achievement. Publicly, the ruler of the field is not techniques but the personalities who create the music. This paper delves into the private reality of jazz lessons to give insight into how jazz educators go about teaching that which they themselves may argue is unteachable.

The qualitative research from which data are drawn, part of an ongoing PhD study into jazz education, used case studies of three jazz educators to investigate the reality of pedagogy in lessons and contrast enacted curricula with the teachers' espoused rhetoric about learning, playing, and teaching jazz. Sources of data included semi-structured teacher interviews and classroom video of each educator giving a series of four 90-minute group lessons at a jazz camp for teenaged students. The research also used documentary analysis of a corpus of writing about jazz education to establish the field as dominated by a knower code.

The first teacher espoused and enacted a knower code, downplaying techniques or specialist musical knowledge – weaker epistemic relations (ER–), and emphasizing personal attributes and dispositions as contributing to student success in learning jazz – stronger social relations (SR+). The second teacher espoused a knower code but enacted variously a knowledge code (ER+, SR–) and a knower code. In contrast, the third teacher espoused an elite code (ER+, SR+) and enacted a knowledge code.

Analysis of the lessons in terms of Semantics revealed that the enacted curricula of the knower-code teachers were characterized by knowledge that was relatively contextual and simple, but ways of knowing that were generalizable with richer axiological meanings. In contrast, the knowledge-code teacher taught generalizable principles and more complex specialist knowledge, but context-dependent and simpler ways of knowing. The knower-code teachers also tended towards more tacit teaching, even of knowing, and viewed direct instruction negatively. This paper concludes that neglect of either the knowledge or the knowing side of jazz in teaching may problematize the potential of students to take away from lessons more sophisticated knowledge or knowing that might help them transcend context and better learn how to play jazz or be jazz musicians. It is possible that such constraints on learning might be an implication of a teacher's Specialization orientation if allegiance to rhetorical stances overshadows the reality of what students really need to know in order to succeed. This paper will point to ways of teaching in creative fields like jazz that make explicit the basis of achievement to offer more equitable outcomes for all students as an alternative to implicit instruction that favours those who already know.

It is suggested that two of the teachers in this study are potentially illustrative of the field in that they shared its knower code. The knowledge code of the third teacher's enacted curriculum located him as in accord with and thus potentially representative of an approach widely criticized in the field as overlooking the knowing aspects of jazz (Galper, 1993, N.D; Nisenson, 1997; Watson, 2012). While this paper focuses on jazz education, it provides an example of how teachers in creative fields more generally might build knowledge and cultivate knowers, and potential educational implications for students arising.

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Feedback as Knowledge Practice: Code Clashes in Student Expectations and Teacher Practices

Feedback on student writing has received much research attention in the last three decades hence, there is vast literature available on feedback practices for writing instructors. One area that has not received adequate research is the impact of the quantity and quality of teacher-feedback on student motivation or ability to revise their texts in contexts such as first-year composition or English for Academic Purpose writing programmes where students can produce multiple drafts before final submission. A few scholars have raised concerns with writing instructor's reluctance to comment qualitatively or provide text-specific commentary on student writing. Such practices seem to be rooted in the dominant process or psycho approaches to writing to which composition teachers popularly subscribe. In process orthodoxies of writing, teachers take on the role of non-interfering bystanders who encourage their students to avoid authoritative domination as writing instructors. However, a lack of explicitness in writing pedagogy – such as those provided by genre informed methods – tend to favour middle-class English speaking 'native' writers because they have often already learned implicit codes of literacy. Second language writers are therefore often disadvantaged because they lack the 'inner-directed' language capacities pre-supposed in psycho/process approaches to writing instruction. This issue motivated this study since students in the context of study were all second language writers. The study aimed to investigate the impacts of teacher feedback on student ability to revise their texts in a first-year composition programme at a Sino-American university in China. Conceptual tools from the Specialisation Dimension of LCT was selected for its power to reveal the knowledge codes that underlie teacher feedback practices and student expectations. Analysis of teacher comments on student drafts and interviews with students and teachers reveal code clashes between student expectation and teacher practice in almost all five criteria of generic writing rubric used for composition programmes: information flow, grammar, vocabulary, content or ideas, and mechanics. Teachers strongly favoured commenting on grammar and vocabulary revealing a *knower code* (ER-, SR+) feedback practice, whereas students largely expected feedback on content /ideas revealing an emphasis on epistemic relations (ER+, SR-).

In cases where students did report satisfaction with teacher comments on content or ideas, analysis of the writing tasks revealed a social relation *basis* since the writing tasks required students to use their own experience or previous knowledge rather than use a conceptual or procedural benchmark. Student interviews also revealed reduced motivation to revise their essays when there were too much or too few feedback comments. The study recommends criteria-based feedback training for writing instructors as a first-step to increasing student motivation to revise their texts. Training for question setting for writing instructors is also recommended.

Blended Learning and Knower Building: Reconcilable or not?

The ever-changing student population requires lecturers to constantly reconsider and adjust their teaching methods, considering large classes, learning technologies, student engagement, etc. The South African Council on Higher Education (CHE), in a recent report, called for “more and better trained academics” (CHE, 2016, p. 147) to adequately support students from lower socio-economic backgrounds. However, in the same report they state that increasing staff workloads is a reality for most higher education employees. This raises the question: how do we offer professional growth opportunities for overburdened academics?

Electronic media, through the option of well-developed online resources, could offer a possible means of addressing this need by providing just-in-time, easily accessible professional development resources that are tailored to our context. It is however important that we consider our conceptions of effective teaching and determine whether blended and online workshops and courses can achieve the goals stipulated by the CHE.

Drawing on arguments in Legitimation Code Theory (Maton 2014) and previous work done at Stellenbosch University (SU) (Leibowitz et. al., 2009 and 2011), it needs to be noted that becoming a “better trained academic” as the CHE suggests, is not only about gaining the required knowledge, but also about interacting, talking and sharing, and ultimately developing a mutually acceptable set of values and way of thinking.

In this presentation, we will discuss two instances of professional development opportunities using blended and online formats. Employing Laurillard’s Conversational Framework (Laurillard, 2002) and the Specialization dimension of Maton’s Legitimation Code Theory (Maton, 2014), we will address two questions:

- 1) How is effective teaching conceptualised in these two examples? Is it about the knowledge – disciplinary and/or educational – that the teacher has, or about their attributes and values?
- 2) Are the two cases offering learning facilitators appropriate opportunities to become effective teachers, per the conception expressed in their design?

The two frameworks were used in an approach similar to that of Maton and Chen (Maton and Chen, 2016) in their study of constructivist pedagogy, with the Conversational Framework acting as organisational framework and Specialization acting as analytical framework. The Conversational Framework describes the learning process as a conversation between lecturers and students, students and students, as well as between concepts and practice. It identifies six different ways of learning, drawn from the most prominent learning theories. It argues that “the good teacher will use all these types of learning that continually prompts the learner to generate and modulate the concepts and practice” (Laurillard, 2012). It thus offers a way of looking at the extent to which online learning incorporates the six ways of learning and was used to analyse the soundness of the design of the two cases in our study.

Specialization focuses on whether different knowledge practices valorise the possession of specialised knowledge or knower attributes, both or neither (Maton, 2014) and was thus used to look at what is valorised in conceptions of good teaching.

The two examples in our study, were an online short course offered to science tutors and a suite of online teaching and learning workshops offered to science lecturers, from the same faculty. We also analysed national and institutional teaching policy and guideline documents in order to determine the general conceptions of good teaching in the South African context.

Analyses of these data sets revealed the conception that effective teaching requires both the possession of specialised (educational) knowledge and specific attributes. Whilst acquisition of specialised knowledge can be achieved through acquiring specialized knowledge and skills (Maton, 2014), developing the required attributes requires a slower process of cultivation or immersion, which raises the question whether short courses, by their nature, can achieve this.

Integrating the two frameworks allowed us to see how effectively the design of the online environment is able to support the conceptions of good teaching expressed in the policy and guideline documents. What we learn is that there are limitations to what online professional development might be able to achieve, but that this could possibly be addressed through deliberate design of the face-to-face aspects of blended opportunities.

The findings of this study is of value to all who are using shorter online forms of professional development.

Influence of feedback on assessment by using Semantic learning waves

According to feedback provided by industry on local and international scale argued about skill deficiencies in engineering graduates, and findings from both cognitive science and thousands of educational research studies, there are serious deficiencies in traditional teaching methods. These have had the effects of provoking calls for changes in how engineering curricula are structured, delivered, and assessed (Felder, 2012). The pedagogic community has critiqued how engineering courses are taught and assessed, showing crucial misalignment between assessment approaches and assessment purpose (Biggs, 2003). The main principle in education, according to Biggs (2003) is the notion of constructive alignment, where explicit learning objectives are aligned to forms of learning, methods of teaching and assessment. Many engineering graduates are not truly career ready, despite intensified efforts to teach and assess many of the bodies knowledge and skill sets that are demanded by industry and mandated by accreditation agencies. Empirical evidence of this gap is spotty and tentative but appears to be growing.

Wiggins (1989), who first related the term 'authentic assessment', defined 'tasks set in a real-world context' as tasks which 'are either replicas of or analogous to the kinds of problems faced by adult citizens and consumers or professionals in the field.' By using authentic real-world environments and exemplars in the assessment, educators can make engineering subjects more 'visible' (Winberg & Winberg, 2017), particularly if industry's needs and recommendations are included in the design of engineering assessment practices. In the assessment, the feedback should be meaningful, when it is a linked series of learning opportunities across the entire learning cycle. This research paper will focus on how to enhance students' performance by providing authentic and meaningful feedback during the assessment process in engineering education. Building on this line of thinking (Boud and Molloy 2013; Carless 2015; Carless and Boud 2018), feedback is conceptualised as a process in which learners make sense of comments about the quality of their work in order to inform the development of future performance or learning strategies.

The study has been conducted by Prasetyo (2017) in relation to authentic assessment compared to traditional assessment. A study completed by Ghosh (2017) found the important aspect that authentic assessment collects the evidence of the students' competence to perform workplace tasks. Prasetyo listed six elements with differentiating a traditional test from an authentic assessment as follows in Table 1. Table 1: Comparing studies between traditional assessment and authentic assessment (Prasetyo, 2017).

No	An aspect of the study	Traditional assessment – as assessment of learning	Authentic assessment – assessment for learning and as learning
1	Students' preparation	Knowing in advance to ensure the validity	Most of the cases it is not announced before
2	Focus	Students' performance	Students' progress, students' engagement, validate and reliable performance

3	Results	Score / grade	Marking according to the rubric. Extended feedback (Mark 1, 2) and monitoring progress.
4	Frequency	Regularly planned as a form of formative and summative assessments	Continuous during the year. Demonstration (report, critique and feedback).
5	Format	Oral presentations, multiple choice questions tests, written exams based on the covered material.	An integrated project, portfolio, log-book, case –studies (problem –based tests), wicked problems, practical skills tests (formative feedback)
6	Context	Frequently contextualised	Contextually simplified engineering problems and design solution. Disciplinary content in more applied ways.

Following by Shay (2008), Wolff and Hoffman (2014) mentioned in examples of mechatronics students were expected to demonstrate solution for the project to a given problem is feasible and economically viable, the so-called 'value of a product' (the solution), as opposed to the value of a 'process' (how problem was solved). These are the two different functions served by assessment in engineering education.

Shay (2008) argued the different philosophical paradigms have had profound implications on what we think we are assessing (a matter of ontology) and how we go about assessing (a matter of epistemology). Are we assessing knowledge, if so, what knowledge? Are we assessing knowers? Are we assessing knowing?

Following Shay (2008), Ingold (2018) debated firstly, a language of description for disciplinary knowledge and secondly, a better understanding of the relationship between these disciplinary forms of knowledge and assessment. Some suggestions include that instructors should clearly explain the purpose and expectation of the activity, acknowledge the challenges of the new approach ramp up slowly provide students with feedback and support through the process align activities with other courses. In Legitimate Code Theory (LCT), Semantics looks at how much meaning is packing into word or sustainable feedback. LCT (Maton, 2012) is a sociological toolkit for the study of practice. LCT Semantics has been used to demonstrate how real learning in engineering involves a 'cumulative' process that sees the relationship between theoretical knowledge and practical knowledge applied beyond the classroom (Wolff, 2018:736). Maton's legitimate codes provide a potentially useful theory for conceptualising the evaluative criteria which assessors' bring to bear on student performance. The theoretical framework by applying LCT promises to bring enriched understanding to the role of assessment. Blackie (2014) applied Semantics approach for chemical engineering students and found that assessment has a significant influence on the way in which students learn. A study by Hassan (2017) explore LCT concepts of semantics to investigate how feedback from tutors moved upward and downward along the semantics scale to make semantics waves as part of cumulative knowledge – building in practical exercises.

The specialization dimension explains knowledge claims and knowledge practices as always involving both knowledge and knowers and thus relations to knowledge and relations to knowers and their practices (Winberg, 2018).

As a lecturer, my challenge is to develop my assessment in order to properly assess the difference between gain in complexity and gain in abstraction. Although feedback is recognised as essential and part of the assessment, it has been suggested that students disregard feedback if they perceive no potential gain to be obtained by responding to the provided feedback (Guszzomi et al. 2015). This situation is common in traditional assessments tasks where feedback is often supplied too late to be integrated into the engineering tasks to improve the performance. The conception of feedback as dialogue implies its integration throughout the learning process, not just as part of the formal assessment. Wolff (2018:1) argued that a synergistic 'feedback approach' is necessary, not just with respect to student feedback during a course, but from the eventual site of practice – industry expectation of graduates.

The paper presents a pilot analysis – using LCT Semantics – of a case study in Mathematics for Engineering which involved the shift from manual to electronic assessment. For every chapter during the semester the students should complete tutorials as part of a formative assessment by submitting online. This intervention will identify when the student has a learning gap and how the student can improve the learning process and performance in order to be ready for the summative assessment. The feedback process on tutorials can increase students' cumulative learning opportunities. The paper will propose a way to improve the feedback element and using Semantics approach. Drawing on the data from 2018 and 2019 on the formative assessments for engineering mathematics 1 for the first-year students. This paper uses Semantics to explore how educators might provide significant feedback as part of the learning cycle process for students. It looks at the nature of a feedback loop, how we can provide better feedback for students, and produce more effective assessments which can improve student performance. For the feedback process to be enhanced, students need both appreciations of how feedback can operate effectively and opportunities to use feedback with the curriculum. The research is still in progress, in order for us to collect more significant data about cumulative learning.

Example of engineering assessment process pattern - making more of feedback

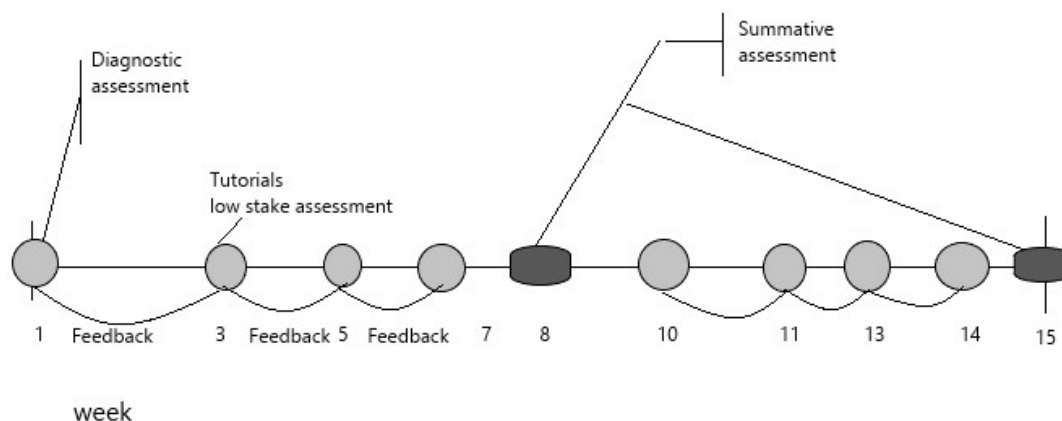


Figure 1: Engineering assessment as a process of providing sustainable feedback

The main implications for practice follow from Figure 1. A key teacher role is to design curriculum and assessment in up and down learning waves sequences which enable students to use feedback and develop their own capacities in making academic judgments. For feedback processes to be productive, students need to be involved actively in making sense of information and engaging with it for the purposes of ongoing improvement. The enhancement of learning strategies implicit in double-loop feedback processes may be even more useful than shorter-term focus on improving a specific piece of work because effective learning strategies are essential for productive long-term learning.

Enhancing the student role in the feedback process by applying a Semantics approach

It is a well-known statement in pedagogy that the way we teach students should also assess them. An effective and more realistic method of teaching and assessing students in professional qualifications is by applying it to real world applications, such as career perspectives and job responsibility requiring critical and logical thinking and working in a team.

An LCT approach can enable students to see the future application of real-world applications and abstract knowledge including the theoretical and technical knowledge of engineering disciplines. All these important tools are part of learning and assessing processes in engineering education.

Assessment and feedback have consistently been the lowest rated aspect of the students learning experience with the South African Student Survey, and like many universities, the Cape Peninsula University of Technology recognised the importance of improving the assessment experience and prioritised this as an action for the Institution (Russell 2013:172).

As a lecturer, my challenge is to raise the student's expectation of an engineering course for example, what should I do to meet the student's expectation and not just for the student to pass the course but most importantly, creating a deep understanding of the course. The links between the social nature of learning, the social nature of dialogue and the role of feedback as a dialogue in a broader transformative learning process, and not merely as an adjunct to assessment. The conception of feedback as dialogue implies its integration throughout the learning process, not just as part of formal assessment.

The concept of Feedback is not just what we say to the student or what the student subsequently does. The feedback can only be understood in life of the effect it has meaning we need to shift away the feedback inputs to effect so what effect it has is not just the information provided to the student, it is the learning cycle process.

The research question: How do we provide significant feedback as part of the learning cycle process for students by using semantics? What is a feedback loop and how we can provide feedback for students producing more effective assessment and student performance.

The empirical and theoretically driven evaluation study enacts Karl Maton's Legitimate Code Theory (LCT) concepts of Semantic Gravity and Semantic Density in the investigation of the assessment process movement along the semantic scale.

This study uses qualitative and quantitative data which will be analysed in accordance with semantic dimension of LCT. The qualitative data will be gathered by face-to-face interviews with students and staff. The quantitative data will be collected via a research survey. The research survey objectives will be:

- 1) To understand the role of feedback in engineering education by conducting assessment;
- 2) how we can improve the students' performance by using semantics to conduct assessment and;
- 3) ascertain whether the assessment had an impact on the students learning;

According Hassan (2017: 99) the unpacking of abstract, condensed meaning was accomplished by the tutors when they explain the concepts to the tutees and used everyday examples to enhance understanding of the students. Engineering lecturers would focus on abstract terminology and then will go into depth in terms of explaining and moving towards concrete, less condensed meaning.

This paper is based on research to be implemented during the course of 2019-2020 and offers an analytical framework through which to consider the data. Blackie (2014:462) mentioned that LCT provided a framework within which she teased out the different kinds of knowledge which were required for mastery of the subject and assessment. Semantics will be applied as an analytical tool to demonstrate how feedback for assessment will help students build knowledge through the construction of semantic waves (Hassan, 2017:100).

This LCT research will answer the key question: How to design authentic assessment by using feedback and prepare future generations of the engineers for the modern world.

Stretching Legitimation Code Theory a bit: Towards the Racial Contract Code Theory

This conceptual paper reports on emerging theoretical framework, the Racial Contract Code Theory (henceforth, R-C-C-T) (Sabata, forthcoming) which seeks to extend Karl Maton's (2005, 2014) Legitimation Code Theory (henceforth, LCT) with Charles Mills's (1997) the Racial Contract (henceforth, RC) in order to account for continuing reproduction of racialized education inequalities in the 'post' colonial South African field of Higher Education (henceforth, HE), so that changes can be effected to facilitate epistemic justice for all. It is my view that there is a causal relationship between colonial history of our education system and continuing racialized education opportunities and outcomes in this context. Unfortunately, this causality is mainly ignored in sociological analysis of our education system and thereby leading to theorizing about 'process without system' (Archer, 1997: xvi). Inherent in this knower blind spot is that analysts tend to homogenize the structure of educational systems and emphasize universal, instead of variable processes of change. The danger is that without understanding this system actors tend to reproduce, instead of transforming the system.

This paper starts off by flagging this theoretical lacuna through engagement with works of leading South African scholars around curriculum and transformation. I argue that resurgence of calls for decolonization of education in South Africa could be attributed to our failure in taking serious the relational network structure of our education system. I thereby present LCT as a useful explanatory toolkit necessary (even though not sufficient) if we are to engage with the decolonial agenda. LCT enables engagement with both 'knowledge and knowers' (Maton, 2014). Using LCT's Autonomy dimension I demonstrate how LCT might enable our engagement with relations of power and demonstrate the centrality of this dimension in all our engagements with knowledge practices within the field of HE. I argue that unlike its major heritage sociological theories of education i.e. Bernstein and Bourdieu, LCT does not attempt to homogenize the structure of education systems (Archer, 1997) and therefore demands historical account of the relational structure of the education system. I therefore demonstrate through engagement with studies using LCT in our South African that we have not yet fully comprehended potential benefits presented by this explanatory toolkit for our peculiar socio-historical reality. To achieve full benefits presented by the LCT I propose that we stretch LCT a bit with the RC (Mills, 1997) to give it purchase to the complexities of post-colonial university. In conclusion, I demonstrate how the newly developed theory (R-C-C-T) might extend and strengthen LCT grammar and facilitate decolonial agenda in the post-colonial universities in South Africa.

The application of the wording tool in the analysis of semantic density shifts in chemistry teaching

In this study, we present partial findings of an ongoing research study in which we explore the variation of semantic density in classroom discourse in secondary Chemistry teaching. Based on discourse analysis, we attempt to answer the following research question: how do teachers and students change the degree of semantic density to become more condensed or more rarified during Chemistry classes?

We are keen to study the epistemic domain of Chemistry classroom discourse as developed by the Legitimation Code Theory (LCT). The semantic codes provide us with the concepts of semantic density and semantic gravity, which allow us to analyze the nature of knowledge in discursive practices, such as teaching practice. Semantic density describes how meanings are condensed and interrelated within knowledge practices (Maton, 2013).

We propose a model to analyze semantic density in Chemistry classroom discourse in which we configure four different levels:

Semantic Density	Level	Form	Description	Example
Strong	4	Symbolic	Chemical symbols, diagrams, graphs, images	Diagram of change of state
	3	Submicroscopic conceptual	Demands the understanding of corpuscular theory to explain the phenomena	Association between the boiling temperature of a liquid and its molecular properties
	2	Macroscopic conceptual	Relates scientific concepts with macroscopic aspects of the phenomena	Association between evaporation and boiling temperature of a liquid
	1	Macroscopic or phenomenological	Relates concepts used in the daily language regarding the phenomena	Association between the evaporation of a liquid with the empiric description of the observation
Weak				

We observed and video-recorded the classes of four Chemistry teachers in different secondary schools in Brazil. All these classes covered the same knowledge content (physical states of matter), hence we could compare and contrast the discourse used across them.

Our data *corpus* are the transcriptions of the audiotapes of these four classes. After analyzing the complete transcriptions of the classes, we separated them into episodes and attributed different levels of semantic density to them, according to our framework. Then, we searched to identify the elements that promoted the shift in the levels. One of our findings is related to the movement in discourse that teachers used to change from level 1 to level 2. Most of these movements could be analyzed with the use of the wording tool (Maton & Doran, 2017). By introducing new technical names, they raised the semantic density in the classroom discourse: "The change of physical states receives special names. From solid to liquid, what is the correct name?", asks a teacher. "From liquid to gas we call it vaporization. Vaporization can occur by three different ways, and we call them evaporation, boiling and heating", explains another one. The use of wording also can present a taxonomy: "We can classify as endothermic or exothermic process every change of state".

By far, most of the discursive practices revealed by the application of the wording tool correspond to the nominalization process driven by grammatical metaphor (Halliday, 1998). The use of nominalization was not exclusive to the change from level one to level two, as we observed its use in the other levels as well, but it was most remarkable in this particular movement. The application of the wording tool in the analysis of classroom discourse indicates the move from everyday words to technical ones.

We believe that our study shows the fruitful use of Legitimation Code Theory applied to Chemistry education, corroborating what Blackie (2014) found previously in her work. We are also concerned about the usefulness of Systemic Functional Linguistics to better understand the movements through the classroom discourse that shifts the levels of semantic density. We need more studies to understand the function of tools like wording in changing the level of semantic density, since the movement between the levels share a significant point to knowledge-building in Chemistry teaching.

A translation device for axiological-semantic density in Daily Sun articles

Post-apartheid South Africa is faced with the challenge of including millions of previously-disenfranchised citizens in democratic decision-making. The tabloid Daily Sun, South Africa's most widely-read newspaper, is one medium through which a large audience of working-class and lower middle-class citizens gain knowledge that informs their participation in democracy. Axiological-semantic density (Maton, 2014) is essential to political knowledge-building, as it describes the strength of relations between various people, political stances and moral judgements, enabling these to be positioned in relation to each other in constellations. I present a multi-level translation device designed to identify strengths of axiological-semantic density in Daily Sun political news articles.

This translation device is a product of a PhD project developed in response to the following research questions:

1. How is language used to associate different policy positions and moral evaluations with political parties in the Daily Sun?
2. What organizing principles lie behind the grouping of different policy positions and moral evaluations with political parties in this newspaper, in the light of South Africa's socio-political context?
3. What are the implications of the responses to the above questions for:
 - (a) the ways in which the use of language in political positioning can be conceptualized using Legitimation Code Theory (LCT) and Systemic Functional Linguistics (SFL), and
 - (b) the transformation of political discourses in South African public spheres?

In particular, the translation device assists in responding to questions (1) and 3(a). This translation device is an external language of description (L2, Bernstein, 2000) that demonstrates how axiological-semantic density was enacted in this study. It shows the ways in which language is used to constellate particular political parties together with policy positions and moral judgements in the Daily Sun's coverage.

In the study, a corpus analysis of six months of Daily Sun's political news coverage was conducted to identify broad-scale trends in the positioning of political parties. Following this, complementary fine-grained exploratory analyses of three articles were carried out using LCT and SFL. In the LCT analyses, the concepts of axiological-semantic density and constellations were enacted. In the SFL analyses, various linguistic resources identified by Martin (2017) as contributing to 'mass' – a linguistic corollary of semantic density – were used to describe how political positioning was being accomplished in the articles. These three exploratory analyses were used as a basis for an initial draft of the translation device. The researcher and a team of student research assistants ranked various expressions from the articles according to their perceived strengths of axiological-semantic density, and then the researcher divided these rankings up into various types, which were included in the translation device. Later, the device was tested, refined and exemplified through targeted analyses of three articles selected to reflect the trends in political positioning shown in the corpus analysis.

The final translation device has five tools:

- a wording tool, which describes the contribution of individual words to axiological-semantic density
- a charging tool, which describes the strength of charging enacted by individual words and short expressions
- a modifying tool, which describes the contribution to axiological-semantic density of words that modify a head word in a group of words
- a clausing tool, which describes the contribution of entire clauses to axiological condensation
- a sequencing tool, which describes the contribution to axiological condensation of links between short passages of text

In this paper, I outline the structure of the translation device and describe some insights that can be gained from the relations between these five tools. Then I describe the wording and charging tools in detail, using examples from Daily Sun political news articles.

Each of these tools reveals insights into South African political discourses and ways in which axiological-semantic density can be enacted in future research. The wording tool shows the primacy of 'ideas', abstract systems of thought usually including the suffix -ism in English, in shaping political discourses in South Africa. The charging tool illustrates the influence of resonance (Maton & Doran, 2017) in axiological charging.

This translation device represents a description of how axiological-semantic density was enacted to examine one object of study, and could be adapted to examine discourse in other contexts. Making axiological-semantic density visible using such a translation device can also assist readers in understanding the ways in which publications such as the Daily Sun position political parties, enabling them to become more critical consumers of news.

Planning and Scaffolding Academic Writing with Semantics in Teacher Education

Like most tertiary education, teaching-degree programs require students to employ academic writing skills to demonstrate understanding of the curriculum. Through writing, students establish their ability to independently research, investigate, develop and communicate relevant theory in order to analyse, evaluate and reflect on tasks and challenges within the teaching profession. Yet education students (aka pre-service teachers) in Denmark often exhibit difficulty writing about practice in a theoretically informed way (Nielsen, Henningsen, Laursen, & Paulsen, 2006). Introducing students to concepts from Legitimation Code Theory, and applying these to analyse examples of high-achieving assignments provides students with simple yet powerful tools for understanding how to connect theory with practice in writing their bachelor projects.

This paper draws on the LCT dimension of Semantics. More specifically, the concepts of semantic gravity and semantic density (Maton, 2014) provide analytical tools for planning progression throughout a module in a teaching-degree program, with the aim of building students' understandings of what academic writing in the teaching profession is. These concepts are also explicitly taught to the students along with the heuristic, the semantic wave, as a way of analysing professional academic writing assignments and bachelor projects. Semantics are enacted as a scaffolding tool throughout the academic writing module.

Students' understandings of writing academically is further scaffolded by exploring more closely the various linguistic resources employed in examples of both medium- and high-achieving professional academic writing assignments. These insights are informed by SFL (systemic functional linguistics) (Halliday & Matthiessen, 2004; Martin, 1992) and Appraisal Theory (Martin & White, 2005), exploring, for example, students ability to attribute knowledge and express degrees of certainty and agreement play an important role in developing a successful academic argument.

Results will presented in two parts. Module evaluations and student interviews provide insights into students' experiences throughout.

In the first part, the paper will show how the concepts semantic density and semantic gravity were used to plan the module content. Throughout the module, students are supported in increasing semantic density of appropriate theoretical concepts by revisiting these in different readings, contexts and applications. Concurrently, students understanding of semantic gravity increases, by identifying their experiences in the module and as student teachers (ie. In practicum periods) as constituting greater semantic gravity, while their ability to relate to these in terms of theories of language and learning correlates with weaker semantic gravity. 'Waving' (Blackie, 2014; Maton, 2014) between these throughout the module is a way of building up students understandings and ability to analyse academic writing more generally.

The second part of the paper will focus on presenting types of activities in which students participated throughout the module, building their understandings of what constitutes successful academic writing. Showing how students were introduced to semantic gravity and semantic density also provides examples of the types of analyses students were introduced to, and themselves practiced implementing. Here we also look more closely at the linguistic resources explored with students, and their correlations with the lower, mid and high ranges of the semantic scale. These insights are informed by SFL as mentioned earlier. However, as students were not expected to have knowledge of SFL or Appraisal theory to participate, neither will this be a prerequisite here.

Providing students with the analytical tools from Semantics and applying these to examples of professional academic writing develops students' understandings of how to appropriately analyse and discuss through written language in a bachelor project. Explicitly teaching students the LCT concepts of semantic gravity and semantic density, as well as exploring related linguistic patterns in model texts, allows instructors to make visible how the otherwise ambiguous aim of 'combining theoretical studies with a practical approach' can be realised in successfully in professional academic writing.

Supplementing LCT analyses with SFL and Appraisal analyses, however, also provide implications theoretically, suggesting areas of development between these theories and supporting their mutual relations.

Semantic analysis of introductory physics assessments: towards cumulative learning

Physics is based on the application of highly abstract core concepts in different contexts ranging from commonplace to highly specialised. Success in building the hierarchical knowledge structure of physics requires cumulative learning, defined as learning that facilitates the ability to 'transfer knowledge across contexts and build knowledge over time' (Maton 2009).

In South Africa, where student cohorts have highly diverse educational backgrounds and where success rates of under-represented groups is a priority (Conana, Marshall, and Case 2016), cultivating cumulative learning among first year students is particularly critical and challenging. In first year Physics modules, cumulative learning means that the students must be able to formulate the core concept in the curriculum and apply these concepts to analyse scenarios and solve problems in a variety of everyday contexts. Past experience from introductory physics modules in our department suggests that students struggle to identify, formulate and apply the core concepts when faced with an unfamiliar problem and instead try to re-apply patterns of previously worked-out examples. We had to address this problem.

The Semantic dimension of Legitimation Code Theory offers a framework to distinguish between levels of abstraction (semantic gravity) and complexity (semantic density) (Maton 2014). Shay (2008) proposed LCT as a useful theoretical framework for conceptualising the relation between knowledge and assessment criteria. Our study is motivated further by the arguments that cumulative learning is promoted by exposing and, in particular, assessing students in an appropriate range of semantic gravity levels (Maton 2013, Kilpert and Shay 2013). To our knowledge our study represents the first application of the Semantic dimension to cumulative assessments in physics.

We report in this paper how we have used the Semantic dimension to critique the quality of assessments of two sequential mainstream physics modules, and how the results are used to inform assessment and education practice.

The study concerns two calculus-based introductory physics modules offered in the first and second semester respectively to students in physics, chemistry, mathematics and other related programmes. We started the study by analysing the semantic gravity profiles of past test and exam question papers over the 2012–2016 academic years. The results showed weaknesses in the papers and highlighted the difficulty students have at both the weaker and stronger ends of the semantic gravity range.

The results informed an intervention during the 2017 academic year. During interactive moderation sessions the two lecturers and internal moderator did semantic gravity analysis of the test and exam question papers before finalising the papers. The process was empowering as it challenged lecturers to rethink the dependence of knowledge on context and provided for the first time a practical language to categorise questions. The process guided both lecturers and students to focus on core concepts in the teaching and learning of the module content. The impact of the intervention was determined by detailed analysis of the students' grades before and during the intervention. The results show that the intervention improved students' understanding of the core concepts and their ability to apply these in everyday scenarios, suggesting improved cumulative learning.

The next step in the study is the development of a useful translation device for analysing semantic density in physics assessment questions. Whereas semantic gravity has been an empowering tool to rethink the focus and context dependence of our assessments, semantic density enables us to determine how complexity influences students' responses to questions. Students' diverse educational backgrounds may cause large variation in their ability to deal with complexity. We also have to investigate whether the intervention may have had an unintentional effect on the level of complexity in the question papers. The initial results of these analyses will be discussed. The results of this study can inform educators from various disciplines on how Semantics can contribute to the design of assessments aimed at cumulative knowledge building.

Inter-weaving the legitimate codes of professional legal education *and* global citizenship education... Amazing, Technicolour Dreamcoat or Emperor's New Clothes?

There is a nascent yet growing ideological movement to include tenets of global learning (or more popularly, "global citizenship" education) within professional degrees. Since 2008, University College of London (UCL) has led research of such attempts within its own medical, engineering and pharmaceutical degrees. It concludes with a clear theme of resistance or even bewilderment in attempts to merge job-oriented, technical professional training with a more contextual and critical, global learning pedagogy. This reflects the contests within the evolving "beyond GDP" narrative: evaluating what truly matters in our globalised yet challenged world.

Drawing on a comparative PhD study of two dominant London Law Schools – which have recently included ethical, global teachings within their core subjects – this paper aims to address three core questions:

- 1) Is there an ideal 'code' for global learning/global citizenship education?
- 2) What is the dominant code of professional legal education, specifically in London?
- 3) What are the challenges and the opportunities for integrating – and more importantly legitimizing – global learning within professional legal education?

While complementing UCL's work above, this study also builds on Sherran Clarence's research (2013) of legal education. Clarence used the LCT dimensions of Specialization and Semantics to reveal the dominance of knowledge over knowers, and semantic density over semantic gravity.

My research follows the epistemic-pedagogic device (EPD): from legal practice, to law school curriculum to classroom. It draws on qualitative interviews with senior partners in influential law firms, law school course designers and teachers, as well as syllabi and classroom observations. I explore the emergent properties of these fields with Specialization and Autonomy codes. Specialization best identified the character and requirements of the field: what counts for being a law graduate, compared to a global citizen. Autonomy emerged as relevant given the interviewees' responses: each field felt they were mostly responding to the demands of the one 'above'. Such discursive gaps are arguably as important as the educational codes they deal with.

A very clear and perhaps inherent code clash appears in this study: between training for jobs versus learning for life. The former dominates legal education, evidenced mostly as a Knowledge code, with strong ontic *and* discursive relations (the what and the ways of knowing: the law, legal method, legal principles). It suggests too a trained gaze of strong interactional relations, as law schools target experienced lawyers for legitimacy in teaching. Global learning on the other hand presents a far more critical, contextual, subjective pedagogy. It is seemingly a Knower code: the legitimate character is that of the *value* of perspectives, on all matters. But this is perhaps its ideal form. Its many iterations and lack of centralised principles could just as easily earn it relativist status.

Early attempts to marry these two codes reveal the imposition of the law on the critical. However, there is scope to draw on the ontic crossroads of each code (the real-life issues that law also inextricably deals with), to develop legitimacy. Arguably a case of Semantic waves meets inter-disciplinary Specialization waves. However, that may ultimately depend too on how power relations continually assess what 'success' means.

Evaluative language for knower construction in promotional blurbs of English literary study books

Promotions of academic books are discipline-specific and have to follow the assumptions and conventions in different disciplines. Similarly, evaluative language for the purpose of academic promotion should follow discipline-specific requirements. The study aims to find out how evaluative language contributes to promotion in the blurbs of literary study books from the perspective of knowledge-knower structures. The three research questions are:

- 1) How does evaluative language contribute to the creation of a knower?
- 2) How does evaluative language contribute to the creation of another specialized area of research?
- 3) What are the patterns of evaluative language used in the promotional blurbs of English literary study books?

The study uses the theory of knowledge-knower structures (Maton 2014) and appraisal theory (Martin & White 2005). Maton (2014: 30) distinguishes knowledge codes from knower codes in knowledge production. Knowledge codes emphasize specialized principles and procedures for knowledge production and downplay the personal discretion of knowledge producers (Maton 2010). Knower codes, however, emphasise a legitimate kind of knower legitimated by reference to unique insights and dispositions of an ideal knower (Maton 2014: 32). Commenting on the development in horizontal knowledge structure, Bernstein (1999: 163) suggests "that what counts as development is the introduction of a new language. A new language offers the possibility of a fresh perspective, a new set of questions, a new set of connections, and an apparently new problematic, and most importantly, a new set of speakers." Featuring a knower structure, the discipline of literary studies should reflect the characteristics of development in a horizontal knowledge structure: a new specialized area of research and a new knower for the specialized research area.

Effective academic promotions in literary studies should highlight the characteristics of development in a horizontal knowledge structure. The evaluative language for the promotions is analysed under the framework of appraisal theory. According to Martin and White (2005), appraisal theory deals with what attitudes people express towards people or things, how they graduate their attitudes in either force or focus and how they negotiate their attitudes with the audience who might hold different attitudes.

The data for my study comprises 610 promotional blurbs of literary study books which are prepared by publishers and sent to various universities in China. University faculties are treated as clients who hold the authority of purchase. To sell the products, promotional blurbs are used as advertisements promoting the books to the audience of disciplinary professionals. As a result, they make good textual resources for the study of evaluative language in this promotional genre.

Prior to the analysis I extract all the evaluative expressions from the data. Then relying on appraisal framework (Martin & White 2005), I classify all the evaluative expressions according to their own meaning content. A quantitative statistical analysis is firstly conducted to determine the statistically significant types of values realised through evaluative expressions. Then a qualitative analysis of the favourite types of values is conducted to offer a detailed interpretation of how knower structures in literary study book blurbs are

constructed in text.

The study discovers that the values of being new and original, being insightful and being authoritative have been more frequently promoted than the values of being deep and profound in study, being rich and meticulous in analysis and being convincing in argument. The first three values are about the book reviewers' axiological judgments about either the books or the researchers and highlight the researchers' unique insights and perspectives. The latter three values are concerned with the research output and highlight the book reviewers' epistemological evaluations of the internal organization and argument validity in the books. This pattern of evaluative language serves to highlight the creation of a unique understanding in a certain subject area and an ideal knower in the specific subject area. It manages to stake out a new research area and create a new reference point against which future achievements in the same area will be evaluated.

Revealing patterns of evaluative language and how they contribute to the creation of knower structures, this study illuminates the ways for discipline-informed promotions in the field of literary studies. Understanding the promotions of academic works may help us appreciate how literary study works are valued in the discipline. Pedagogically, this understanding may benefit the teaching of English for the field of literary studies, helping researchers package their works with discipline-appropriate promotions and reach a bigger audience. This study also emphasises the importance of knowledge-knower structure theories in LCT for the analysis of academic promotions.

How educative is educative? Using LCT to examine mathematics curriculum materials

All too often, curriculum materials developed to support school mathematics gain short-term acceptance, but soon become little more than a set of good ideas or tasks to be used on an ad hoc basis if there is time. As such they fail to fulfil their goal of promoting sustainable reform in school mathematics. I argue that in order to promote sustainable change curriculum materials ought to be educative (Davis & Krajcik, 2005) in the sense that they enable teachers to understand the intent of the designer, and to engage with the resources in ways that are powerful for both teacher and students. Ideally educative curriculum materials:

- help teachers anticipate what learners may think about or do;
- support teachers in their own learning of the subject matter;
- describe ways in which the separate resources relate to each other and build progressive understanding;
- make visible the designers' pedagogical decisions; and
- promote teachers' pedagogical design capacity.

But how educative is educative? How do we decide whether or not, or to what extent, or how, curriculum materials actually enact and embed the principles described in the literature?

Legitimation Code Theory provides a framework that enables us to examine curriculum materials to determine the extent to which they promote the knowledge building ideals that the designers seek to embed, as well as the effectiveness with which these ideals are communicated to teachers. This paper will use the Semantics dimensions of LCT to examine school mathematics curriculum materials.

I use textual analysis of two sets of curriculum materials with the same focus and intent, but different design features. One set of materials comes from a mathematics textbook, in which students are provided with principles and techniques, which they then apply in a carefully graded set of exercises. They may then apply these to problems that have a supposed real-world connection. By contrast the other set of materials comes from an Australian mathematics curriculum project, reSolve: Mathematics by Inquiry, in which students first encounter a situation that may be puzzling or challenging, then explore the situation, unfold the mathematics and seek meaning, and ultimately build conclusions that apply more generally.

As with all resources, however, it is eminently possible that teachers may fail to see the principles embedded in the materials no matter how well designed they may be. As Schoenfeld (2006, p. 17) says: "one can imagine curricular materials that, when used in the way intended by the designers, result in significant increases in student performance, but, when used by teachers not invested or trained in the curriculum, result in significant decreases in student performance."

Hence, the paper examines both the extent to which the two contrasting resources build deep student knowledge, and also the extent to which they let teachers "in on the secret". Specifically, the paper asks:

- 1) What semantic codes are evident in the curriculum materials?
- 2) How do the materials suggest variation in terms of semantic gravity and semantic density?
- 3) How are these organizing principles of knowledge-building communicated to the teacher through the curriculum materials? That is, how educative is educative?

The study simultaneously informs both the mathematics education research and design community and the LCT community. It provides a new perspective on mathematics curriculum and knowledge-building that remains unexplored but offers much potential in mathematics education research. At the same time, it adds to the body of work currently examined using LCT. The study sheds light on how LCT can be used to examine written curriculum materials that are designed to be educative for teachers and leads to practical recommendations and strategies for enhancing the educative quality of such resources.

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Knowledge and Rhetoric: A Specialization Analysis of Courtroom Argumentation

Legal cultures grounded on abstract principles or rhetorical appeals to moral feelings would seem to be diametrically opposed. Yet, in courtroom argumentation, there is a balance between interpreting events with legal statutes; and moral evaluations of character and intentions (Shi, 2017). The mix of epistemic and social elements suggests a problem: what is the basis of legitimation in courtroom argumentation and what stance-taking strategies do defence lawyers and prosecutors use to influence the outcome of court cases? These problems are not merely of theoretical interest. The judicial field is a key arena of struggle closely related to the field of politics (Bourdieu, 1986: 815) – legitimation within the courtroom is a fulcrum for the operation of power. This operation also has important pedagogic implications for legal education as understanding the social practices of the judicial field is crucial for aligning graduate qualities with the professional standards of legal practice. The rapid transformation of China's legal system since 1979 and the corresponding expansion of legal education, credentialism, and tightening professional standard bring these issues to the fore (Zhou, 2009; Ji, 2017).

To address this question, this paper employs the Specialization dimension of Legitimation Code Theory (LCT) to analyse transcripts of 20 court cases from the People's Republic of China that involve several different types of criminal offenses. Specialization codes allow for insight into the basis of courtroom strategies, differentiating between claims that emphasize or deemphasize relations between knowledge and the object or method of study (epistemic relations) or claims that stress or downplay the importance of relations between knowledge and the author of the claim, either because of their ways of knowing or subjective characteristics (social relations) (Maton 2014:29). We apply these concepts to courtroom discourse and develop a translation device (Chen and Maton, 2016) to facilitate the Specialization analysis. We operationalize epistemic relations in terms of appeals to legal principles, processes of fact construction and interpretation; and social relations in terms of evaluation of moral character and the subjective intention of defendants.

Courtroom argumentation is orientated towards legal principles and the supremacy of the law. However, the law allows a range of strategies and the specialization analysis reveals code shifts and clashes occur in such institutional contexts. Defence lawyers and prosecutors both engage in strategies that emphasis epistemic relations and social relations, depending on the affordances of the relevant legal statutes and range symbolic resources available. Statutes that define a crime and the criteria to judge if a crime has been committed provide relatively stable technical meanings; while statutes that outline grounds for the mitigation of sentences leave more latitude for the interpretation of people. This legal context and the facts of the case provide the constraints and resources that lawyers exploit to enact different argumentative strategies. Emphasis of the law and rhetorical appeals to moral feeling are two potential paths to follow.

Despite the objectivity characteristic of legal language and judicial ideology (Bourdieu, 1986), Specialization analysis also reveals the social and axiological aspects of legal practice that are often concealed. This study offers an operational understanding of Specialization codes in legal discourse and provides a case study of social relations within a field that obscures or downplays these relations in its self-representation. These findings have implications for understanding the ideology of the judicial field in China and pedagogy that neglects the rhetorical aspects of courtroom argumentation.

Facilitating epistemological access by developing students' experiences of undergraduate research: An LCT perspective

The paper uses semantic codes from Legitimation Code Theory (LCT) to characterise epistemological access in terms of developing students' experiences of undergraduate research. Several higher education scholars (Lopatto 2004; Healy and Jenkins 2009; Howitt *et al.* 2010; Healey, Jenkins, & Lea, 2014; Hill and Walkington 2016; Walkington *et al.* 2018) have indicated that embedding research knowledge and skills within the undergraduate curriculum strengthens the students' undergraduate research experiences. The value of undergraduate research in student learning is to promote skills such as problem solving, critical thinking and reflection, communication, increasing motivation and confidence, and to encourage the pursue of postgraduate study. Pedagogical interventions such as integrating research into the design and teaching of the undergraduate curriculum, using group supervision to facilitate the development of dialogue between supervisor and student and the inclusion of student-led seminars and workshops in the timetable to help facilitate students' engagement into the university's research community are being widely advocated. There is, however, a need for more rigorous reporting on developing students' experiences of undergraduate research, particularly from the perspective of epistemological access. In essence, epistemological access is about how academics find meaningful and responsive ways of teaching to enable students' access to and acquisition of knowledge. Regarded as a 'practical theory' (Maton 2016), LCT analyses the dispositions of actors, the context within which they are situated and their resulted experiences and practices. For LCT, knowledge and educational practice are conceived as 'languages of legitimation', that is what counts as legitimate knowledge in a particular field is demonstrated through the kinds of knowledge being built and the literacy practices surrounding them. Epistemological access is thus understood as students' acquisition of such languages. Using LCT to characterise epistemological access therefore helps to foreground the ways in which research discourses and practices at an undergraduate level influences pedagogy and students engagement in learning. Notwithstanding this, institutional impediments such as the unequal distribution of students amongst supervisors with high undergraduate teaching obligations, particularly in Universities of Technology, affect students' capacity to conduct research.

A qualitative case study research design following an interpretative paradigm was used. Interviews through focus groups were used to capture and describe the students' teaching and supervision experiences of undergraduate research. The participants involved were the Degree of Bachelor of Technology (B Tech) students from two different programmes at the Durban University of Technology in Durban, South Africa. In particular, the 2015 students (n=10) from the Operations and Quality Management programme in the Faculty of Management Sciences and the 2016 and 2017 students (n=20) from the Dental Technology programme in the Faculty of Health Sciences participated in the study. To characterise the underlying principles of students experiences in a meaningful way, interview feedback was analysed using the concepts of semantic gravity and density. These concepts were used to understand to what extent were students able to transfer knowledge across contexts and through time (cumulative learning), or was transfer inhibited or bounded from other knowledge and contexts (segmented learning). This helped to characterise the underlying principles of their experiences in a meaningful way.

The findings predominantly showed that the students' description on the teaching of research as the 'theory' and the supervision of research as the 'practice' created different semantic waves. This has useful implications on the re-design of the undergraduate research curriculum in order to increase students' epistemological access to the various research discourses. Notably, the teaching research nexus is an underexplored area in the South African higher education context of LCT-based research. The findings therefore have valuable applications in the teaching and supervision of undergraduate research across all disciplines, specifically in terms of enhancing student-learning outcomes by improving the constructive alignment between the teaching and supervision objectives of the undergraduate research curriculum.

LCT in surfacing knowledge and knowers in Namibian Educational Leadership and Management (ELM) Masters curricula

Tertiary education curricula should strive to provide relevant knowledge required by human capital to propel the economy (Maton, 2014). This is because the effectiveness of the graduates depends on the relevance and quality of the curriculum they are exposed to. Hence, tertiary education curriculum on which basis economic growth depends, should seek to produce knowledgeable graduates. However, literature reveals that studies on the curricula of tertiary education specifically master's degree in ELM, which forms focus of this study, are very minimal (Hallinger 2017). I agree with Webbstock (2016) who contends that curriculum is a neglected area of discourse and what counts as knowledge is in 'rapid flux and this has major implications for how higher education is organised, for curriculum, for research and teaching and learning' (p. 15). Therefore, this study will investigate the coursework master's curricula in Educational Leadership and Management (ELM) in Namibian higher education institutions. Maton (2014) emphasises that we live in knowledge societies and work in knowledge economies. He further adds that knowledge is 'the basis of education as a social field of practice- it is the creation, curricularization and teaching and learning of knowledge which make education a distinctive field' (ibid, p. 3). Like South Africa, who has experienced a speedily shifting higher education landscape (le grange, 2011), Namibia also has shared a similar tendency. As a result, the questions surrounding knowledge in the curriculum becomes a key issue.

Against this backdrop, this paper argues for the need for a doctoral study focusing on knowledge and knowers in Namibian, MEd (ELM) curricula. One of the goals of this doctoral study is to establish the type of content knowledge valued in the ELM curriculum for masters' degree in Namibian tertiary institutions. A final goal will be to ensure that ELM curricula provide graduates with relevant and contemporary knowledge for economic growth through a collaborative change laboratory process with the academics involved in Masters (ELM) curricula.

The study will be guided by the following overarching question:

What content knowledge is privileged in these curricula?

Sub- questions:

What is the basis of legitimation of the M Ed ELM programmes in Namibia?

Whose knowledge is valued in these programmes and why might this be the case?

How do students experience the knowledge practices and teaching practices in these programmes?

How can the Change Laboratory workshops contribute to the development of these programmes?

In addressing the above research questions, this study will use Legitimation Code Theory as an explanatory framework to surface the bases of legitimation across the two institutions' curricula.

My rationale for using LCT is further strengthened by its ability to focus on codes which provide a means to conceptualise the structuring principles of intellectual and educational fields. This is of importance as the focus of my study is at the level of recontextualization (curriculum) which is a part of an educational field. The tool of specialisation will be very useful in this regard. Specialisation refers to the notion that human

practices are about or positioned towards something and are concerned with the relations to subjects. Specialisation will enable knowledge practice to be seen, their organisation principles knowledge to be conceptualised and their effects to be investigated (Maton, 2014). Furthermore, the tool of semantics will also be relevant to this study which referred to the structuring relations to context and the condensation of meaning.

This study intends to generate data through document analysis, observation, questionnaires, semi-structured face to face interviews and change laboratory workshops underpinned by Cultural Historical Activity Theory's (CHAT) third generation. The relevance of CHAT to this study is its belief of its 'central role of contradictions/tensions as a source of change and development' (Engestrom, 2001, p. 137). Another reason for using CHAT in this study is that it provides the 'possibility of expansive transformation in activity systems' (Engestrom, 2001, p. 137) in the Change Laboratory.

This study is therefore significant as its findings will help to inform policy makers on contemporary insights regarding curriculum development, which may result in restructuring current master's degree programmes to address current socio-economic needs. The study will also make available literature pertaining to the studies of curricula for ELM in Namibia, at master's levels, which is currently proved to be minimal. Such availability will provide solid database for future scholars to use as foundation for their research studies in ELM within the Namibian context. Hence this study is significant in filling the literature gap that is currently existing, as far as curricula studies for ELM at master's level is concerned in Namibia.

Pride and Prejudice: The one-sided nature of the feedback dialogue

It is a truth universally acknowledged that feedback given, is feedback ignored. Research has shown that tutors often lament students' perceived unwillingness to learn from, implement or even read their written feedback (Chanock, 2000; Burke, 2009; Carless et al., 2011). Tutors may find themselves commenting on the same issues across successive assignments, thereby making it seem as though students are not interested in feedback. This, however, is in spite of the fact that research has shown that students do in fact read and engage with feedback (Weaver, 2006; Orsmond, Merry and Reiling, 2005), though seemingly not in the way that tutors intended. Consequently, feedback remains an unsatisfactory experience for both tutors and students.

Underlying this dilemma is an often overlooked (or under-considered) aspect of feedback, namely that it is in essence a dialogue between tutor and student about their work (Higgins, Hartley and Skelton, 2001). Yet, it is a rather unequal dialogue, as tutors may often use it to indicate their (superior) knowledge of the field, while students may be unfamiliar with the concept of dialogic feedback and therefore do not know how to act on the comments (Kapp and Bangeni, 2005; Weaver, 2006). Practice wisdom, however, suggests that the blame, so to speak, for the ineffectiveness of feedback is largely placed on students and their perceived indifference towards feedback, thereby suggesting that tutors are engaging in a one-sided, unreciprocated dialogue through their feedback-giving practices. This paper hopes to show, however, that the one-sided nature of feedback is not necessarily caused by students, but by the tutors themselves, and specifically, by how tutors' pride and prejudice may hinder the feedback dialogue.

Using Semantics, I hope to show how the problem lies not with students failing to implement feedback, but rather that feedback is often un-implementable. Semantic gravity will be used to unpack how context-dependent comments are, that is, whether comments are bound to a particular essay (SG+) or whether they are more generally-applicable (SG-) (Van Heerden, 2018). Semantic density, on the other hand, will be used to unpack how many actions are implied in a comment, that is, whether comments are easy to implement (SD-) or require some unpacking before it can be implemented (SD+) (Van Heerden, 2018). A semantic wave will therefore be used to trace the implementability of the feedback given.

I will be focusing on the written feedback that two students received over the course of a semester in an English Literary Studies course. Student A received a consistent fail grade, while Student B received an A-grade. In both instances, the feedback they received may have (inadvertently) locked them into certain marks categories, which may both impede their attempts at becoming better essay writers and at achieving the underlying developmental aims of the course. This paper hopes to show the potential danger in tutors not taking into account how their pride - assuming that they are giving useful, implementable feedback - and prejudice - assuming that students are neither willing nor able to engage with feedback - may affect the feedback dialogue. Ultimately, the aim of the paper is to show that we need to (re)consider and (re)conceptualise what constitutes implementable feedback before the blame gets placed solely on students.

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Semantic weaving to develop inclusive practices for pre-service teachers

Classrooms are increasingly complexified by a diverse student population, including those vulnerable to marginalisation and exclusion. Newly qualified teachers must be able to teach inclusively to ensure that these children realise their right to inclusive education. To this end, Initial Teacher Education (ITE) programmes in many countries include some coursework content on inclusive education, and then expect further learning about inclusive teaching during field experiences. One of the big problems in university-based teacher education is the disconnection between field experience and coursework. This is a particular challenge in inclusive education where it has been noted that ITE 'programmes lack an organised approach linking courses and field experiences within a conceptual framework' (European Agency for Development in Special Needs Education, 2010, p. 35). We frame this challenge as the need for cumulative knowledge-building as part of developing inclusive teaching as a knowledge-based practice and suggest how 'semantic waves' from Legitimation Code Theory (LCT) enables an understanding of this challenge, and a way to address it.

The Semantics dimension of Legitimation Code Theory provides a conceptual repertoire that assists teacher educators to identify what is required to prepare teachers to be both theoretically informed and contextually responsive to the demands of inclusive classrooms. The competencies involved in inclusive teaching demand both stronger semantic density (SD+) and stronger semantic gravity (SG+). Knowledge that embodies stronger semantic density (rhizomatic code: SG-, SD+) is achieved as pre-service teachers are introduced to theories and meta-theories that might inform their professional judgment in practice. This usually takes place in Higher Education Institutions and involves systematic engagement with a range of ideas in structured coursework. In contrast, knowledge that exhibits stronger semantic gravity (prosaic code: SG+, SD-) would emphasise experience and reflection, be context-specific and focus on the acquisition of practical skills. This knowledge is usually acquired during field experiences in the complexity of classroom life. Neither university-based coursework nor field experiences alone are sufficient to enable prospective teachers to develop the worldly code (SD+ and SG+ knowledge) needed for inclusive teaching.

Many teacher education programmes combine coursework and fieldwork in some way to develop competencies for inclusive teaching. We identify instances where ITE programmes add field experiences specific to the concerns of special or inclusive education to the coursework. In this approach, learning through coursework focusing on abstract ideas and organising principles alternates with learning in the realities of classroom life, resulting in alternating high and low semantic flatlines. Connections between the two flatlines are likely to be incidental and highly dependent on the capacity of individual pre-service teachers themselves to make the links necessary for cumulative knowledge building. Intentional linking of coursework with field experiences is advocated to overcome the shortcomings of the additive model. We identify 'down escalator' profiles in examples of this intentional linking, as programmes expect coursework principles to be systematically applied to classroom practices. 'Up escalator' profiles are also evident, as other programmes advocate a practice to theory approach. We identify the limitations in both linking approaches and argue for a curriculum design that organises intentional semantic weaving to build the knowledge needed for inclusive teaching.

We offer suggestions for knowledge-building for inclusive education with a focus on requirements and assessment of pre-service teachers during field experiences. We present a series of critical questions developed to guide pre-service teachers to move iteratively between what they have learnt in coursework and what they learn in the classroom, showing how the questions might promote semantic weaving. We conclude that LCT provides a framework for teacher educators to enable pre-service teachers to make explicit connections between their conceptual learning from university-based coursework, and their pedagogical decision making in the context of the lessons they teach.

Using Specialization to Conceptualise Musical Performance Assessment in Higher Education

This paper explores how musical performance assessment is conceptualised in higher education. Assessment environments in higher music education are complex. In Australia, as in other parts of the world, historically-independent institutions of professional music education, such as conservatoires, have been absorbed into the broader higher education sector, bringing together two contrasting educational cultures (Forbes, 2016; Harrison, 2014). In an educational sector where high premiums are placed upon quality assurance and accountability (Carey & Lebler, 2012; Wrigley, 2005), institutions of higher music education have been characterised as 'secret gardens' (Burwell, Carey & Bennett, 2017; Hyry-Belhammer, 2010; Perkins, 2013) wherein musical performance is a central focus (Lebler, 2016, 2015). Despite significant development in assessment theory over the past three decades, musical performance assessment remains problematic. At the scholarly level, the question of how to assess creative work remains a contentious point of debate, and multiple approaches have been advocated for (Sadler, 2009). At the institutional level, developments in assessment theory have 'not yet had a strong impact' (Partti, Westerlund, & Lebler, 2015, p. 477) in higher music education, and the influence of traditional practices –such as master-apprentice styled learning and teaching– remains strong. Assessment scholars in the broader higher education context have also expressed similar concerns, observing a slow uptake of theoretical advancements in assessment at a practical level (Boud et al., 2016). A need has thus been perceived for new ways of studying and theorising assessment (Boud et al., 2016; Shay, 2008) that emphasise 'forms of knowledge' (Shay, 2008, p. 596).

In order to explore this gap in the higher music education context, this project included twenty-five semi-structured interviews with musical performance faculty and students at six Australian higher music education institutions. These interviews focused on the ways in which the participants thought about and conceptualised the practice of assessing musical performances in higher education contexts. In analysis, the Specialization dimension of Legitimation Code Theory (LCT, Maton, 2014) provided a framework for exploring the data. The concepts of epistemic relations (ER) and social relations (SR) were used to unpack the participants' conceptions of musical performance assessment, and this paper discusses the ways in which ER and SR were seen to manifest within the data. Relative emphases on ER and SR were seen to distribute legitimacy to particular ways of thinking and acting, effectively proclaiming rules for succeeding in the assessment of musical performances, where 'success' is not limited to students' achievement, but also to the ways in which assessment is enacted and otherwise participated-in.

In adapting theoretical tools from LCT to explore and theorise forms of knowledge underpinning musical performance assessment in higher music education, this research elucidates effects that knowledge structures can have on actors' ability to successfully participate in such assessment. In particular, it contributes a fresh approach to conceptualising musical performance assessment in the higher music education context and provides a theoretical framework that can be applied by other scholars working in similar research contexts.

Variations on a theme: Understanding student learning through semantic codes

Learning is a process towards knowing and being, where one does not simply acquire knowledge, but actually becomes a knower (Barnett, 2009; Maton, 2014). Learning processes can be compared to learning a new language. One can learn the grammar, the syntax and acquire the vocabulary. However, without immersing oneself in the culture of that language, one is unable to really and truly speak a language with fluency. In educational learning the curriculum provides the framework for this journey and goes far beyond the content of what is taught and also includes teaching pedagogy, the teaching style of the educator, who the student is, and teaching, learning and assessment practices. Knight (2001) reminds one of the importance of ensuring coherence in the curriculum between what is planned, executed and most importantly what is understood and experienced by the students. If learning is a journey, what does this journey look like, how is it experienced and how can one visualise it? Maton (2014) provides us with a profound language to understand a student's learning process. At the same time, one should not overlook students' emotional responses to the complexity of the learning process as they struggle to navigate the variations of semantic density and asemantic gravity in a given course.

This study draws on the experiences of two academics, an engineer and a social worker who both completed a postgraduate diploma in higher education at a South African University. For the purposes of this study the two academics reflect on their roles as students. The postgraduate diploma programme is comprised of three core courses: teaching and learning, assessment and curriculum development. This study explores the response of these two academics to a specific assessment task within the curriculum development module. In the task, students were asked to critically reflect on their own trajectory of learning in the module and how this trajectory has affected each student's development as an educator, curriculum developer, learners and being.

The engineer used semantic codes to show how learning in the module took place in two main stages akin to a musical theme-and-variations format. The initial variations in semantic density and gravity facilitated the building of the academic's foundational knowledge and skills. This development of the theme was followed by a series of assessment tasks that allowed that gained knowledge to be recontextualised in a number of different ways. This stage was characterised by oscillations in semantic gravity, giving added meaning to the concepts.

The social worker described the journey through the module in terms of the lived experience. She focused on the process of her own learning, while also reflecting on the cognitive and emotional processes which her students may encounter during the oscillations of semantic gravity. Her trajectory of learning emphasised how educators need to consider students' learning in a holistic manner and acknowledge the cognitive as well as emotional processes which students experience during their process of knowing and becoming. A preliminary investigation into these two interpretations of the learning experiences shows that they are complimentary. In this study, through a thematic analysis of the two assessment tasks, we propose to show how these academics' learning was facilitated through variations in the semantic density and gravity.

If we want to be educators that are responsive to our students learning, we need to understand how they acquire knowledge and respond to the learning processes so that we can provide more appropriate and relevant pedagogic interventions to guide our teaching practices.

How to illustrate condensation of meaning: An alternative way to diagram the accumulation of complexity over time

Many studies enacting LCT use diagrams to illustrate their analyses. Plotting research findings on diagrams such as specialization planes, semantic planes and autonomy planes provides an effective way to represent the relational characteristics of knowledge practices and affords a useful method to visualise changes in practices over time. Studies enacting the LCT dimension of Semantics often employ 'semantic profiles' to illustrate analyses, which essentially use simple line graphs to visualise shifts in strength of semantic gravity and semantic density over time. While this form of diagramming is an effective means of illustrating changes in strengths of variables over time, it is arguably less successful at representing the accumulation of variables – such as condensation of meaning – to the same extent.

Working specifically with the concept of *epistemic-semantic density*, this methodological-focused paper offers insights into a new method of visualising the accumulation of complexity of knowledge practices over time through a 'complexity formalism'.

Unlike a semantic profile, which is an effective way to show the different strengths of epistemic-semantic gravity (ESG) or epistemic-semantic density (ESD) over time, the formalism is argued to be better able to represent the *accretion of complexity* as a text unfolds. It is especially useful for representing strategies of weaker ESD. When represented on a profile, the move down the y-axis to weaker ESD may be misinterpreted as a *lack* of complexity or that complexity is no longer being added. The formalism, in contrast, is able to show that even when weaker ESD strategies are enacted in writing, the preceding meanings that have been accumulated by that point are still carried forward (i.e. complexity is still being increased).

The formalism is a simple diagram that is governed by a straightforward, adaptable set of rules to suit the accompanying translation device. A single unit of meaning is represented by a single box. When meanings are related together, a connection is established between them. The type of connection that is established will depend on the translation device being used. This process of relating meanings together is represented by two boxes, which are connected by a particular kind of line. Depending on the type of relation established, the strength of the connection will be greater or weaker. When meanings that already hold technicality are added (such as a theoretical concept) the box representing that unit of meaning is shaded to reflect the increased complexity.

To illustrate how the formalism works and to demonstrate how it can be adapted to suit any translation device, two illustrative examples from doctoral writing are used. The first example will show how the formalism can be used in conjunction with Maton & Doran's (2017) clausing tool to show the effects of the drafting process in doctoral writing. In particular, the formalism is used to show how doctoral candidates learn to build more complex knowledge more successfully through drafting. To illustrate this process, a formalism representing a draft text is compared to a formalism representing the final version of text.

The second example is taken from a history dissertation's 'findings' chapter, which is written in a knower code. This illustrative example is used to demonstrate how the formalism can be adapted to suit a specific translation device for a specific object of study. It also reveals how the formalism is better able to represent small increments of complexity over time, which would typically be represented by a low semantic 'flatline' when using semantic profiles.

The methodological-focused paper offers other scholars who work with the concept of semantic density insight into how they can use the complexity formalism in their own research to diagram condensation of meaning in practices.

Using Lego and Semantics to mediate conceptual grasp of Thermodynamics

The first law of thermodynamics (the conservation of energy) is often confusing to students, partly due to the intangible nature of energy itself, and partly due to its apparently obscure description in terms of mathematical equations. The majority of second year engineering students do not appear to understand that the mathematical objects and their operators constituted in complex equations make up individual parts, with each part representing a physical reality. In other words, students are not well versed in mathematical semantics.

The Legitimation Code Theory (LCT) dimension of Semantics helps to differentiate between different forms of conceptual meaning and different levels of complexity. Together, the semantic gravity (SG) and semantic density (SD) continua as represented on the semantic plane can help to illuminate the nature of thermodynamics concepts in science and engineering education. Researchers in these fields using LCT have already begun to make a notable contribution to understanding and improving educational practices designed to address poor South African student performance (CHE, 2013) in Science, Technology, Engineering and Mathematics (STEM).

This paper showcases an intervention in a second-year engineering course at a traditional, research-intensive institution. Based on the use of Lego blocks, and informed by LCT Semantics, a tutorialised game was devised to enhance student understanding of mathematical equations in thermodynamics, and enhance lecturer understanding of student learning. Many of the abstract aspects of energy and its mathematical formulation can be understood by representing the energy of an ideal gas as a cube in three-dimensional space. The various dimensions, areas and volumes of the cube represent different physical properties. By interacting with a tangible and deformable cube, students can learn about key concepts such as intensive- and extensive variables, integration and differentiation, work and heat transfer. The Lego Conceptual Comprehension Cube for Thermodynamics or 'LC3T' maintains the stronger semantic density (SD+) of a mathematical equation but greatly strengthens its semantic gravity (SG+), enabling students to ground their understanding of the concepts.

Students were given the opportunity to partake in a voluntary 'intervention' where fundamental concepts were explored using the LC3T system. Only a subset of the class attended, and the performance of students attending was compared to the students who did not attend. Further qualitative data were gathered from lecturer observation notes, student feedback and key assessment responses. These data (as well as the theoretical concepts entailed in Thermodynamics) were interpreted using the semantic plane, and analysed to illustrate the stages of student engagement with the LC3T as well as shifts in student conceptions.

Results indicate that students who attended showed a marginal but statistically significant ($p=0.06$) improvement in performance in the first major assessment. However, student feedback suggests that students did not perceive the impact of the intervention to be significant. The intervention did, however, provide the lecturer with unique insights regarding student learning in thermodynamics, revealing additional unidentified challenges to student learning. The LC3T represented a game to students where the rules of the science were embedded in the experience of the game. The intervention allowed the identification of key properties of a successful translation or mediation device for learning in the sciences, these being self-evidence, emergence, and testability. The paper hopes to make a contribution to strategies for operationalising LCT concepts in the field of STEM learning.

What matters in the workplace: Generic skills or specialised knowledge?

Educators in the twenty first century are still grappling with an apparent tension between education for specialised knowledge and education for the development of graduate competencies. Anecdotally graduates often report that they don't use very much of their academic knowledge when they move into practice, and employers consistently call for the importance of social competencies. Within education research, 'Knowledge theorists' argue that proficiency with specialised concepts and the rules legitimate combinations between concepts, separate from the concern of the world, is necessary prior to enacting them in the world. 'Progressive education theorists' argue for the development of generic graduate attributes, a notion of becoming. The LCT Specialisation dimension offers a way to reconcile the knowledge requirements of education with the development of social traits required in the workplace.

In this paper we present a case study of five recently graduated engineers working in an engineering consultancy. The question that we explore is to what extent do these graduate engineers draw on specialised disciplinary knowledge and to what extent do they rely on generic competencies in the workplace? The data were collected over a two-week period through interviews and observations. The researcher had an established relationship with the company, and as a student engineer participated in the day to day activities of the company. Each participant was interviewed about two projects that they had been involved in recently. The semi structured interviews probed questions of knowledge and practice in terms of both their experience of the project and their perceptions of how well their education prepared them for practice. Each participant was also observed as they went about their daily activities, including routine administrative tasks, project specific tasks, and meetings.

The data were coded in terms of epistemic relations (ER) and social relations (SR). The epistemic relations were coded with reference to the engineering science knowledge typically taught in an engineering degree, knowledge of other disciplines (for example economics or environmental sciences) considered complementary to an engineering degree and perhaps introduced in a degree programme, technical knowledge of the things of engineering, or no apparent specialised knowledge required. The social relations were coded in terms of the evidence of formal 'generic competencies' defined by accreditation requirements, other social relations evident, or no apparent social relations apparent.

The analysis shows that, in the engineering consultancy investigated, the strong epistemic relation in engineering confirms the findings of Carvalho, Dong, and Maton (2009) that engineering is a 'knowledge code'. But the analysis also suggests important, if tacit, dimensions of the knower intertwined with knowledge. Martin, Maytham, Case, and Fraser (2005) make a similar point, which in LCT terms would be that although the social relations are more important than the work of Carvalho et al. (2009) might suggest, they do rest on the epistemic relations. However, what is perhaps more interesting is the coding of the range of activities that engineers engage in in the workplace that covers a far wider semantic range than is evident in formal engineering project work. This touches on the work of Karin Wolff (2018) using an elaboration of the epistemic plane to analyse engineering work in practice. Her research also illustrates the importance of shifting between all quadrants of the semantic plane in the process of professional problem solving.

The Didactic Design of Surveillance Law in Upper Secondary VET Instruction

The paper presents a case of knowledge recontextualisation (Guile, 2018) practices in one of the 12 national vocational programmes in upper secondary school in Sweden. The development of vocational knowing, versed in curricular terms, in vocational education and training (VET) has been previously described as regionalised (Shay & Steyn, 2016). Such regionalisation is about the variety of sources that vocational knowing constantly feeds upon, e.g., both academic and practical knowing. Thus the article contributes to studies of knowledge-building in the instruction of vocational subjects (Maton, 2014). The concept of autonomy codes is utilised to explore how knowledge can be repurposed, shedding light on the pathways of knowledge through knowledge practices in VET instruction (Maton & Howard, 2018).

Students between 16–20 years in Sweden can study to become security officers by attending a vocational programme that is integrated with upper secondary school. Their training consists of instruction in vocational subjects delivered by regular teachers as well as in collaboration with the security industry and their trainers. Surveillance law is an important part of the instruction whereas managing surveillance law is a marker of becoming a security officer (Wyszynska Johansson, 2018). This article illuminates knowledge recontextualisation regarding surveillance law in the instruction of so the called Diploma project. The goal of the Diploma project, here delivered by regular vocational teachers, is to assess the students' ability to perform recurrent work tasks.

A secondary and selected data analysis is used here, based on focus group interviews with young students and participant observations of instruction for prospective security officers (Wyszynska Johansson, 2018). Wyszynska Johansson et al. (2018) have shown how mastering surveillance law enhances students' experience of vocational becoming as security officers as service workers.

The main result shows that surveillance law presented a malleable epistemic content that can be made to fit in instruction that aims for practicing pedagogised encounters (Wyszynska Johansson, 2018). These pedagogised encounters are framed as a tool for interaction-intense service occupations, e.g., security officers. Further, surveillance law during the instruction in a Diploma project underwent several moves on the autonomy plane. Firstly, surveillance law was introjected from outside, that is, from an occupation specific context delivered by the security industry instructors (introjected code). Then surveillance law was configured to fit a purpose of non-occupation specific school group work with little teacher assistance (exotic code). Accordingly, surveillance law was turned into a vehicle for practicing social skills for peer school group work, though framed in the instruction as preparation for service work. Lastly, through their assessment practices the teachers in a Diploma project brought surveillance law to enhance the students' social skills for pedagogised encounters (sovereign code). Thus, surveillance law as vocational knowledge during the instruction has moved on the autonomy plane. This tour has started from the introjected code and moved to the sovereign code. However, during the group work, which was relatively independent and mainly student-driven, the students in small groups contributed to shifting law in surveillance into an exotic code position. Some teacherly interventions contributed to shifts from exotic code positions towards a sovereign code whereas others did not.

In conclusion a pedagogical implication can be drawn. As shifts on the autonomy plane may occur due to both teacherly and student intervention in classroom instruction, the use of group work in VET can be closely monitored. Closer monitoring of independent group work, not reported here, may be conducive to autonomy tours as opposed to stays in order to enhance knowledge-building in VET.

Analysis of Semantic Waves in College English Teaching Classroom

The objective of the research is to capture and depict the dynamic waving changes of the semantic waves in the college English classroom discourse and analyse how semantic waves help to build knowledge cumulatively.

The research questions are as follows:

- 1) How do the semantic waves of classroom discourse in the semantic profile show?
- 2) How many waves can be found in one class? what is the waving range of those waves? how are the waves related to each other?
- 3) How do teachers unpack and pack the knowledge points?
- 4) What kind of role does semantic wave play in the cumulative knowledge building?

The LCT concept used in the research is Semantic Wave. Semantic Gravity and Semantic Density are used to depict semantic profiles and analyse the packing and unpacking in the cumulative knowledge building. The reason for choosing the concept is inspired by the idea of revealing and analysing the direct dynamic form of classroom discourse instead of static form. More importantly, the relations between waves are expected to reveal how the segmental discourse are integrated into bigger and then the whole discourse. As for the contextualisation and decontextualisation parameters in the defining Semantic Gravity and Semantic Density, the Rhetorical Units by Carmel Cloran is brought in to analyse the vertical coordinate in the semantic profile.

The study is both quantitative and qualitative based on ten videos (each lasts 20min by ten different teachers) about English teaching class. Excel is used to depict the coordinate system of semantic profile. ELAN is the instrument used first to transcribe the video and analyze the transcription, then to code and annotate in different tiers. SPSS is used to analyse and compare the ten videos. Qualitative analysis is done by the data and evidence gathered by those means.

The study is still being undertaken and has not been finished yet. The results are expected to find out a Suseful translation device of semantic wave to achieve the research objective and conclude answers to the research questions. The data and evidence is used to induct some conclusions about discourse analysis using semantic wave.

The study is a practice under semantic wave concept. LCT provide a big framework about sociology of education. And its dimension of Semantics is an important interface between Systemic Functional Linguistics and Sociolinguistics. More studies are expected to be done to enrich the applicability and diversity of the framework.

Building chemistry knowledge through images

In recent years, Maton and Doran have established a series of 'translation devices' for exploring complexity (epistemic-semantic density) and context-dependence (epistemic-semantic gravity) expressed in English discourse. These devices are crucial for knowledge-building as they explicitly and systematically relate English discourse to the knowledge being expressed. However, language is only one form taken by knowledge practice, and there are various other forms, among which image is a prominent one used by numerous disciplines. Currently, LCT has not yet explored the role of images in knowledge-building. Therefore, this paper will reveal 'translation devices' for analysing images and show their role in knowledge-building.

We focus on chemistry. Images are frequently used by chemistry for building knowledge as it needs to show both the macroscopic and microscopic chemical world. A variety of images such as pictures, diagrams, graphs, charts and icons are used to represent different levels of chemical knowledge. They can be abstract and complex of various degrees according to different learning stages. It is clear that these gradations are significant for chemistry knowledge-building. However, at present, in LCT there is no tool yet which makes explicit the relation between different images and the knowledge being expressed. To solve this problem, this paper attempts to create 'translation devices' for images in LCT based on chemistry textbooks used by secondary schools in New South Wales Australia. It provides typologies for identifying different kinds of images and describes how these types manifest different degrees of context-dependence (epistemic-semantic gravity) and complexity (epistemic-semantic density). These tools reveal how different chemical images build knowledge through different stages in secondary schools, which is highly significant for both the development of pedagogy as it can inform using appropriate images at different schooling levels and for supporting students engage with and understand chemical images more efficiently.

