Surfing the waves of learning? Exploring the possibility of enabling greater cumulative knowledge building through pedagogy using Semantics

Sherran Clarence
(Directorate of Teaching and Learning, University of the Western Cape, sclarence@uwc.ac.za)

Abstract
This paper contends that current research and practice in teaching and learning that tends to overfocus on social aspects of education is influenced by constructivism, a paradigm that tends to have a relativist stance on knowledge, generally arguing that knowledge is constructed in socio-historical contexts and is therefore largely inseparable from those who construct it and from related issues of power. This leads to a conflation of knowledge with knowing, and knowledge is thus obscured as an object of study. Being able to see and analyse knowledge as separate from but connected to knowing is important for understanding how we can build knowledge, both conceptual and applied, over time within educational contexts. Legitimation Code Theory, in particular the dimension of Semantics, is proving particularly useful in examining some of the conditions necessary for students' ability to build 'powerful knowledge' (Young, 2008) cumulatively over time in their fields. This paper will report on part of the findings from one case study within a larger study to show how semantic tools can provide us with a different way of thinking about teaching as enabling students to become familiar not just with 'content' and 'skills' that are often seen as two different parts of teaching or curricula, but also with connected concept chains within disciplinary 'systems of meaning' (Wheelahan, 2010). Drawing on qualitative data obtained from teaching observations, interviews and document analysis, this paper argues that the 'what' of learning – the knowledges of the discipline – must be a clear and present part of designing pedagogic approaches, and must not be conflated with the knowing of them. If we overfocus on knowing we risk constraining many students' ability to see the systems of meaning they are working within as well as their ability to work effectively across the boundaries between 'everyday' and 'theoretical' knowledge (Wheelahan, 2010). The paper suggests that the conceptual tools offered by Semantics in particular can provide academic lecturers with a set of tools that can enable them to 'see' and understand their own teaching more clearly, as well as the possible gaps between what they are teaching and what their students are learning.

Keywords
Knowledge-building; legal education; Legitimation Code Theory; pedagogy; semantic density; semantic gravity; student learning

Introduction
If you were to ask a broad cross-section of academic lecturers teaching undergraduate students today what the most important goal of teaching and learning is, you would probably hear a version of the following: '…for students to connect their learning together, and to be able to work with different kinds of knowledge in appropriate ways' (Field notes, 2013). In terms of the literature one could read that has been concerned with questions like this, one would find researchers writing about 'transfer' (Burke, Jones and Doherty, 2005) and the need for students to be able to carry or take learning (skills, knowledge, understandings and so on) from one context to others and use it in relevant ways. It is not clear, though, that 'transfer' is the most useful term because it is too closely connected to much-criticised 'skills' discourses in higher education policy and research that assume an autonomous student learner who is open and ready to receive and learn and range of knowledge and skills, packing a metaphorical suitcase full of these skills, knowledges, practices and so on as they move through their degree course, and taking these with them to be unpacked selectively in different locations according to students' ability to understand what kinds of skills, knowledges and practices are required.

Much research in the academic literacies field since the early 1990s has shown that this notion of the autonomous student learner is a problematic one (Lillis, 2001) and that undergraduate students do not necessarily always see and understand the tacit 'rules' that govern which skills, knowledges and practices apply in different contexts and disciplines, nor do they necessarily know how to navigate those rules and apply a nuanced understanding of them in their own learning (Field, 2006; Lea and Street, 1998; Lillis, 2001). One of the reasons could be that the purpose of the application of knowledges in simulated contexts in higher education is different to that in the workplace (Steyn, 2014). Another could be that, in teaching, student are not clearly

shown how to connect more abstract concepts with their contextualised applications, and rather than seeing what they are learning as connected parts of a system of meaning, they may rather see what they are learning as sets of knowledge to learn in order to pass texts and exams (Clarence, 2014).

A more useful term, but also one that needs to be unpacked and clearly understood, could be Maton's term 'cumulative knowledge-building' (2009, 2013a). Cumulative learning or 'knowledge-building' is understood in LCT terms as building knowledge both within and across contexts such as a course or a disciplinary field, and can also be extended to cover the transitions from the world of higher and further education to the workplace. It could be described as being relational or connected learning or knowledge-building in the sense that students should be able to seek and find links between concepts and their application, and between different concepts and different types of application where relevant, as well as between concepts used across disciplinary contexts. Making those links should be made possible through curriculum design as well as pedagogic approaches and action, and pedagogies that enable cumulative knowledge-building, rather than segmented learning can function, in a way, as the 'connective tissue' of learning.

Given the pressing demands placed on higher education everywhere to produce graduates with relevant knowledge, skills and attributes, and given that current constructivist approaches to both curriculum design and pedagogy are unable to provide an adequate theoretical explanatory account of knowledge that enables us to think about how different kinds of knowledge need to be drawn into the curriculum, and recontextualised into pedagogic discourse and practice, there is a great need for well-founded empirical research on what is happening in higher education lecture halls and tutorials that can help us to recognise gaps and locate struggles, analyse and understand why these may be there, and find approaches that have a 'stronger theory of knowledge' (Maton, 2013a: 6). In terms of Legitimation Code Theory (LCT) research, pedagogic practice in higher education is still an under-researched area, and there is much to be done. This paper aims to contribute to this particular area of research and practice by arguing that using LCT's conceptual tools of semantic gravity and semantic density can enable a deeper and more powerful analysis of pedagogy than constructivist approaches currently offer. By harnessing these tools, both lecturers and students alike can learn to 'surf' the waves of learning and create more enabling educational environments for cumulative knowledge-building and meaning-making.

Knowledge and pedagogy

Different knowledges are structured differently, and are acquired differently (Bernstein , 2000; Maton & Moore, 2010; Maton, 2013a), and the implications of the ways in which knowledges are structured and acquired for curriculum development and for pedagogic practice are therefore worthy of brief exploration here. In order to become part of a disciplinary community, and learn to think and know and act like a practitioner or knower in that field or community, students need more than just knowledge and related skills. Becoming part of a disciplinary community, such as Law, and learning to think, speak, act and write in ways that are recognised and valued by other members of the community, like lawyers for example, requires an ability to interrogate the way that knowledge is cumulatively acquired, used and eventually produced within the discipline (Maton & Moore, 2010). In other words, students need to know what they are learning about as well as why the knowledge is important, how the different pieces fit together to make a coherent whole, and where the smaller pieces of the puzzle fit within the bigger intellectual field of discipline, inside of and beyond the university. Thus, questions about knowledge, as an objective object, as a structuring structure and as an end as well as a means, are important, and need to be asked and answered in higher education research about pedagogy and curriculum. Notably, questions about how students are learning cannot be asked separately from what they are learning, and the roles and purposes that the knowledge within the curriculum is playing within the academy, and within the wider intellectual fields of knowledge outside of it.

Social realism can provide a theory of knowledge that enables us to hold both knowledge and knowers/knowing together, without reducing the former to the latter. A social realist approach to pedagogy would argue that it is possible to see and analyse both actors (students, lecturers, tutors) within social fields of practice as well as knowledge as something that is produced by these actors but also about more than just these actors and their practices; thus knowledge can be understood as emergent from these practices and fields but not reducible to them (Maton & Moore, 2010). Social realism, drawing from Roy Bhaskar's critical realist philosophy (2008[1975]), is intent on looking at the real structures and mechanisms that lie beneath appearances and practices in order to understand the ways in which these practices are shaped, and change over time. Legitimation Code Theory is a realist conceptual framework that has, as its central aim, the uncovering and analysis of organising principles that shape and change intellectual and education fields of production and reproduction of knowledge. In other words, the conceptual tools Legitimation Code Theory (LCT) offers can enable an analysis of both knowledge and knowers within relational social fields of practice by enabling the

analysis of the ways in which these fields, such as academic disciplines, are organised and how knowledge and knowing are understood in educational practice.

LCTSemantics as a pedagogic tool

LCT(Semantics), or Semantics, can enable us to research more meaningfully the kinds of pedagogic practices that enable and constrain cumulative learning (see Maton, 2013a, 2013b). Briefly, Semantics uses the concepts of semantic gravity and semantic density as conceptual tools for exploring the kinds of teaching and assessment that are happening, their aims, and the kinds of learning that is could be happening (Maton, 2013a, 2013b). Together these codes and movements from stronger to weaker semantic gravity and semantic density and back again can form what LCT terms the 'semantic wave', which can be used to map a teaching and learning event, such as a lecture, part of a lecture or a whole series of lectures. The semantic wave is posited as the key to cumulative learning, and also to progression in learning (Maton, 2013a).

Semantic gravity and semantic density

Semantic gravity (SG) describes the degree to which meanings are tied to their contexts (Maton, 2013a, 2013b). Weaker semantic gravity describes a more distant relationship between concepts or knowledge and the context in which they can be applied or used, where meaning is less dependent on context, for example where one is working with very abstract or highly conceptual or theoretical knowledge. Stronger semantic gravity describes a closer relationship between concepts or knowledge and the context in which it is used, where meaning is very dependent on its context, for example when theory is being applied to a problem or task (Maton, 2013a, 2013b). The ability to accumulate knowledge and transfer it between and across contexts and tasks is compromised when teaching and learning leans too far towards weaker or stronger semantic gravity to the exclusion of the other. In other words, if learning is only/too abstract or only/too context-dependent, students may struggle to take the knowledge and use it differently in other contexts.

Semantic density (SD) refers to the concentration of meanings within socio-cultural practices, whether these are comprised of terms, concepts, gestures, symbols, phrases etc (Maton, 2013a). Stronger semantic density denotes a symbol that has a greater concentration of meanings within it, whereas a symbol that has weaker semantic density has fewer meanings concentrated within it. These meanings can relate to emotions, feelings and sentiments as well as to empirical facts and features of the concept or term (Maton, 2013a). Semantic density strengths, like semantic gravity strengths, can be represented along a continuum, and can be relatively weaker or stronger at different points over time.

Semantic gravity and semantic density can also change independently of one another, or they can change in relation to one another (Maton, 2013b). Semantic gravity and semantic density can be mapped separately, although they need to be considered together if one wants to talk about semantic *waves*, and as these are at the heart of cumulative learning, this paper will be focused on semantic waves where semantic gravity and semantic density shift inversely in relation to each other. A semantic wave, heuristically, indicates the inverse strengthening and weakening of semantic gravity and semantic density as teaching moves between more conceptual learning and more contextual application, for example. LCT argues that in order to accumulate and transfer knowledge, students and academics alike need to move successfully through a series of *semantic waves*, and these will not all be uniform.

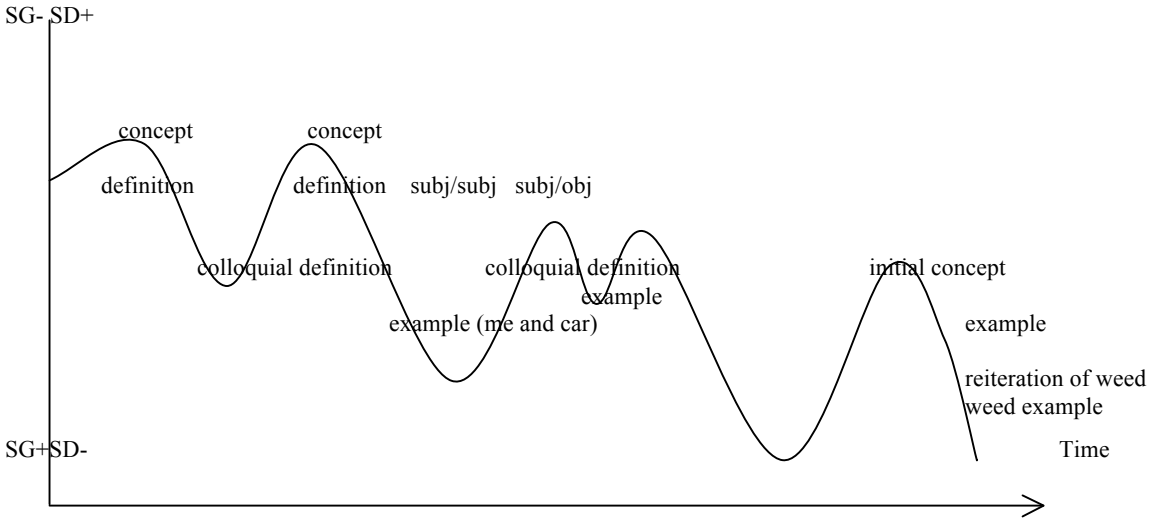
When learning demonstrates a broken wave, where the first part of the wave referred to above is completed (the unpacking) without then repacking and completing one 'cycle' of the wave it can result in what could be called 'down escalators' (Maton, 2013b). In this study, down escalators represented for the most part 'lists' of concepts and their meanings that students needed to know (and would probably try to memorise as such). The following section looks at some illustrative examples from the Law case study, before moving on to the conclusion.

The case study

The case study reflected on in this paper is from a recent PhD study, and is a first year Law course called the Law of Persons taught by two lecturers teaching different groups of students. This course is a foundational course for further study in the LLB degree. Data included in this paper comes from teaching observations of both lecturers, including detailed fieldnotes over the course of a semester as well as interviews with the two lecturers and study guides and notes. The data was qualitatively organised and analysed using Nvivo10®. As space is limited here, not all of the data can be presented. Thus two examples with a brief account of what is being focused on in terms of the central argument of this paper will be included here.

A basic example could be drawn from Law, the case study drawn on in this paper (Fig 1). The lecturer was teaching students about law in the subjective and objective sense, and she started from a point of stronger semantic density and weaker semantic gravity, because this is presented initially as an abstract concept with several meanings condensed within it. As she begins to explain what the concept of the law in these two senses means, she begins to strengthen the semantic gravity and weaken the semantic density, as she starts to unpack this concept with a formal and then more colloquial definition. She then goes back 'up' to the concept itself, before then moving further towards a more concrete example that brings the concept towards its application. Then she goes back 'up' again towards weaker semantic gravity and stronger semantic density as she introduces to more less dense concepts of subject to subject and subject to object relations. She then goes even further towards the context and application by taking all of these concepts into an example that further weakens the semantic density and strengthens the semantic gravity, before reiterating the concept in a more abstract manner (but less so that when it was initially introduced, and then reiterating the more contextualised or concrete example. She then proceeded to pull this concept along as she went, adding concepts and their applications as she sought to deepen both students' understanding of the abstract concepts in this course and their meaning and applications in the law over time (see Figure 1).

Figure 1: Semantic wave on law in the objective and subjective sense (Clarence 2014: 111)



However, there was concern on the part of both lecturers teaching this course, echoed in the introduction, that students seem unable to 'transfer' what they learn in this course to other courses in the first and second years. Further, students seem to compartmentalise concepts they learn in different study units within this course, and in assessment many students were tending towards writing down everything they had memorised from their notes or listing information rather than constructing relevant, coherent answers that demonstrated understanding rather than memorisation. Both lecturers were unable to get at why students were doing this, but using Semantic tools has begun to shed some light on these concerns, and is moving us towards an answer and a way forward.

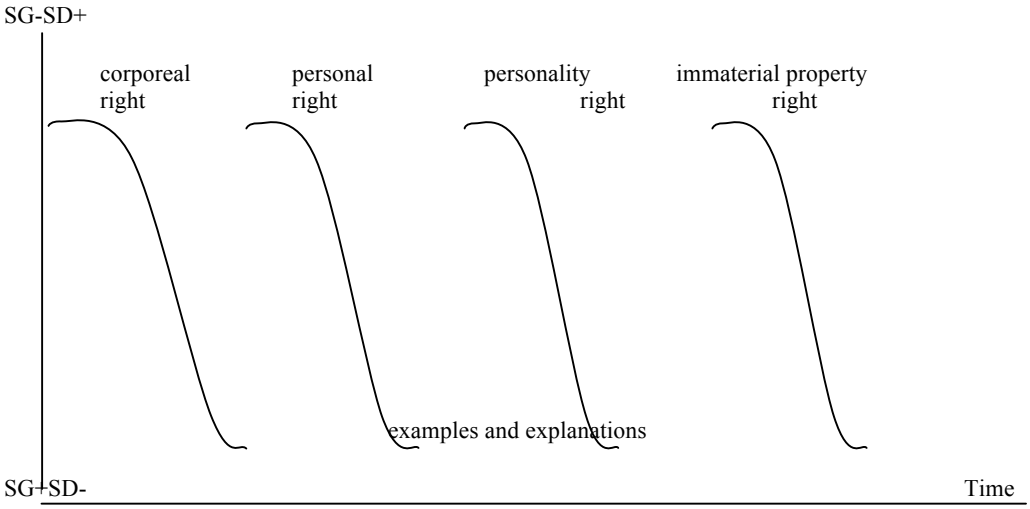
What we found, within larger waves, were series of down escalators, as well as learning objectives for study units that asked students to list or define rather than to use and apply concepts and the ways in which they were being taught to apply them to answer questions that assessed understanding rather than memory. Fig 2 represents one instance of the down escalators on the subject of different kinds of rights a legal subject can acquire. Each concept is first introduced in the abstract and then defined and unpacked with an example before the next right is then given the same treatment. Example 1 shows an exemplar of a learning outcomes or objectives for the study unit in which the concepts in Fig 1 and Fig 2 are taught.

Example 1: study unit 2 objectives (given on PPT slide in lecture)

OBJECTIVES

- Define 'law of persons'
- Draw a distinction between 'objective law' and 'subjective law'
- Define 'legal subject'
- Define 'legal object'
- Distinguish between 'legal subjects' and 'legal objects'
- Explain who or what would be classified as legal subjects
- Distinguish between the two different types of legal subjects

Figure 2: Down escalators on legal subjectivity – legal rights (Clarence 2014: 113)



What can be noted here, and in other similar examples from further study units (this was the second of ten for the course), is that what is desired is for students to 'acquire a long-term knowledge and understanding' (LOP Study Guide, 2013), but what has tended to happen for many students, according to one of the lecturers, is that they have not realised this goal sufficiently – they are not successfully 'transferring' or accumulating knowledge and related practices or skills.

> Lecturer: …law firms don't want to appoint because students don't know how to do research, they don't know how to write etc, etc. So we are trying to instil that – just reminding them that…'whatever you have learnt this year carry it with you throughout – don't forget how to summarise a case'…in second year, the Lecturers are also telling them that. For third year they tell them too and for final year 'please carry it with you'. I don't know if they do.
>
> Researcher: Why don't they take it with them?
>
> Lecturer: That was the biggest frustration for me…'what makes you think that the skills that you should have acquired don't work or do not apply in my course?' (Interview, Courtney, 2013)

Both lecturers spoke to students about how there was a gap between what they were expecting from students and what they saw in formal assessments. After the first test, Lecturer 1, Rachel, talked in class to her students about not knowing how to answer questions – 'lots of useless repetition; lack of clarity; poor grasp of key concepts; *not seeing the overall picture – the connections between* questions as part of a whole paper (some of them offered contradictory answers in some questions that were broken into parts)' (Field notes, 2013, my emphasis). Looking at the teaching observation data, and using Semantics as an analytical lens, we can see possible reasons for this lack of connection in many students' thinking; it also gives us insight into ways in which we can rethink the pedagogy in lectures to better enable students' cumulative rather than compartmentalised learning over time.

Conclusions

This paper began by raising concerns about the notion of 'transfer' in higher education and the concerns about students' inability to take knowledge and skills learned in one course or in one part of a degree programme into other courses, and use these knowledges and skills in the appropriate ways. It posited that one of the reasons that students struggle with this transfer – or to use a more useful term, cumulative knowledge-building – is that there is perhaps too much of a focus on getting students through the content of the discipline, partitioned up into one course at a time, rather than on the principles underpinning what counts as knowledge and how new knowledge is created. An overfocus on the disciplinary content of the knowledge rather than on the disciplinary knowledge itself (Wheelahan, 2007) can constrain lecturers' ability to actually create semantic waves, and show students not only where the connections between concepts and applications are and how to make them, but give students

opportunities and time to practice making these connections in lecturers, tutorials and through assessment. This can then further constrain many students' ability to make meaningful and disciplinarily relevant or appropriate connections between concepts and the contexts or problems in and to which they can be applied.

What lecturers should be focused on in their teaching is less the content, which can change over a shorter period of time, and more the principles by which knowledge claims in the discipline are judged, and that govern how new knowledge is made, debated, disseminated and challenged. It is this focus that enables students to acquire 'long-term knowledge and understanding' cumulatively over time, building in terms of understanding the whys and hows of the disciplines and not just the whats. Further it is this focus that can make it possible for lecturers to analyse their own current pedagogic approaches to not only see the potential waves and the gaps and incomplete waves, but also begin to adapt and change their approaches to draw their students into the teaching and learning spaces more effectively as they learn to surf these waves of learning within their disciplines.

While constructivist approaches can offer us a way of considering students approaches to knowing and learning, this paper ultimately argues that these approaches can only ever offer a very partial picture of pedagogy. We need to be able to analyse and see both knowledge and knowers because what the knowledge is does affect the whys and hows of how we judge knowledge claims, challenge existing knowledge and make new knowledge. LCT, drawing on social realism, and specifically the Semantic conceptual tools, offer a novel and potentially powerful way of not only analysing pedagogy to see more clearly what is happening and why this may be so, but also effecting change to the way we teach and hopefully also the ways in which our students learn.

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Author note

Sherran Clarence is a teaching and learning specialist and the coordinator of the Writing Centre at the University of the Western Cape in Cape Town. She has published in the field of academic literacies and writing research, and has recently completed her PhD in higher education studies. Her main research interests are pedagogic practice, social realist approaches to education research, academic writing and literacies, and the sociology of knowledge.

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