

Design refinement tools for a teacher education curriculum: the example of a service learning course

NADINE PETERSEN

Senior Lecturer
Faculty of Education
University of Johannesburg
nadinep@uj.ac.za
011 559 3487
011 559 2262 (fax)

ELIZABETH HENNING

Professor of Educational Linguistics
Centre for Education Practice Research
Faculty of Education
University of Johannesburg
ehenning@uj.ac.za

This article addresses the issue of the theory-practice divide in pre-service teacher education from the viewpoint of design-based research (DBR). Using the example of a course in service learning (SL), the authors discuss their reflection on a curriculum that failed to help the students convert declarative knowledge to procedures of pedagogy, or to internalise this knowledge to become part of their disposition as teachers. The students' theoretical work had remained in an epistemological apartheid zone where it did not meet with practice in either- procedural, conditional-, or reflective knowledge-making. The authors then explore part of a curriculum revision model as proposed by Ruthven et al. (2009) who use DBR principles for curriculum refinement, including some of their "intermediary framework" set of tools in a revision that aimed to create an interface for theory and practice.

Keywords: theory-practice divide, design-based research, intermediary framework, teacher education, service learning

Introduction

Few theorists would argue that professional education of any kind struggles with the integration of theory and practice, with much of even procedural knowledge remaining to a large extent of the "declarative", procedural type (Snow, Griffin, & Burns, 2005). This means that skills are described or "declared" and not necessarily practised. In the education of teachers it is even perhaps more so, as students are required to "apply", or rather "convert" what they know from text in their pre-service experiences to processes in classrooms. In our practice we have found that most students operate according to the dictates of this divide, thinking that theory will somehow "morph" into practice by itself. Our premise is different; we suggest that theory and practice meet each other in the same way that Vygotsky argued for the meeting of "scientific" and "spontaneous" concepts - through planned, systematic, mediated action (Vygotsky, 1978, 1987; Kozulin, 1998). Strategic curriculum sequencing can be such action.

Drawing on Snow *et al.* (2005) we argue that, despite our efforts to raise pre-service teachers' awareness about different epistemological spaces, most of their knowing will remain "knowing that". These authors refer to this type of knowing as the "first point" in a teacher's career, while the "second point," that of novice teacher, will see an increase in situational and reflective knowledge. As curriculum designers in teacher education we have been searching for ways to bring practice closer to theory in

a shared epistemological space where ideas and action can meet. In a revision of a course in Service Learning (SL) we introduced what Ruthven, Laborde, Leach and Tiberghien, (2009) have recently referred to as an “intermediary framework” in design-based research (DBR).

A main tenet of DBR, as development research (Van den Akker, Gravemeijer, McKenney, & Nieveen, 2006) is the use of theory-based principles to design educational interventions and then to use certain tools to activate the curriculum accordingly. DBR as tool for inquiring into programme and curriculum development is increasingly used in education to harness design principles and frameworks from theory as well as the empirical world (Design Based Research Collective, 2003). We situate our work in a new trend in DBR, which focuses on the detail of the design process tools, searching for ways to navigate the intersection of theory and practice (Gravemeijer & Cobb, 2006) in education.

We begin by describing briefly what initially (2004) constituted the SL curriculum in our case and we give a summary of an inquiry into the first cohort's (n=178) engagement with it in 2004 (Petersen, 2007). We then draw on the work of Ruthven *et al.* (2009) who accentuate the generative aspect of DBR and show how we have used some of their conceptual tools in our own hybrid of their “intermediary framework” tool in the recent redesign of this curriculum. We specifically focus on pre-service teachers' learning to cross-articulate educational theory and their developing notions of practice.

Background to the Service Learning course

Our programme of SL for pre-service teachers aims to afford students an educational experience of service, framed by an ethos of care and social justice. In constructing the curriculum, the work of a care theorist like Noddings (1998) and the work of social justice writers such as Scrace (1997) and Bell and Griffin (2007) was invoked. Noddings (1998:196) asserts that “as teachers we are (as) dependent on our students as they are on us”. Her ideas form the foundation of the SL curriculum in which teachers could learn what the task of educating young people in a world of “social interdependence” (Johnson & Johnson, 2009) comprises. This was encapsulated in what Schwab (1978) would describe as the “substantive knowledge” aim: learning to become a teacher is learning to serve with a conscience, to serve by way of a caring pedagogy. Our premise is that pedagogic care encompasses more than an attitude in the caregiver; that it includes an epistemic position of what counts as caring knowledge (Noddings, 1998). We argue that this epistemological shift is vital if teacher educators are to help students recognise that pedagogic care cannot be separated from social justice. We also wish to interrogate prevailing notions of “helping” as social charity (Osman & Castle, 2006). We furthermore emphasise service as a discursive activity in which we create pathways for action that are grounded in (harsh) reality (Butin, 2003; Ebersöhn, Bender & Carvalho-Malekane, 2010; Morton, 1996). It has been this type of theorising that highlighted the theory-practice disjunction in the evolution of the course. However, for students theory remained theory and practice comprised a set of skills and techniques of teaching and communicating. Students, when they were faced with opportunities to demonstrate care in practice, continued to talk about “how to care” and were not able to make an epistemic shift to actions and dispositions of care. On reflection we realised that we had started in the wrong place (by introducing students to the theory first – see Table 1) and subsequently the curriculum lost its sequential logic. We all had fallen into the trap of “converting” theory to practice instead of joining them epistemologically.

Table 1: Extract of sequential arrangement of academic themes in the first SL curriculum

Themes in chronological order	Designers' comments during revision of the curriculum
SL theoretical underpinning and role of reflection	"Reflection" comprised a set of skills
HIV and AIDS – biological "facts"/ awareness	Just more information
Social justice education SL in school curriculum	Human rights information/ some "high" theory Assumed students had internalised Noddings
Revising personal philosophy of education in light of academic themes	Ambitious expectation: students had internalised "care as social justice"

The initial inquiry of the SL course in 2007

The 2004-2007 inquiry about the 2004 course was initiated with some optimism that the theory-rich course would have opened students' eyes to an attractive pedagogy of SL in a country like South Africa. A number of data collection- and analytical tools were used to capture students' engagement with the course by way of their comprehensive end-of-year portfolios and through interviewing. These included critical discourse analysis of visual material and written work (Fairclough, 2003), data content analysis in grounded theory mode (Charmaz, 2003; Strauss & Corbin, 1999) and ethnomethodological analysis (Heritage, 2005) of the opening paragraphs of their course portfolios. In the latter instance we wanted to see how students positioned themselves in the recounting of their experience right at the outset of their reporting.

Petersen (2007) found, in her PhD study, that the majority of students were unable to identify with a pedagogical discourse of social justice as care and could not deal with the challenges posed by a curriculum that required deep engagement for deep learning – and thus for epistemological shifting. Students separated theory and practice and could not practise what they had learned theoretically, nor theorise what they had practised. The learning loss was thus bi-directional.

These findings opened not only a Pandora's Box of information about students' dispositions, but left us with a shocking sense of failure of the curriculum. The curriculum had not moved further than declarative knowledge or "substantive" knowledge (Schwab, 1978) as students wished to appear "academic" and thrived on theory citations, without building what Schwab (1978) refers to as "syntactical knowledge." The theory of care and social justice and the overall theory of social interdependence (Johnson & Johnson, 2009) became new "book knowledge" and were treated and manipulated as such. We realised that the students needed very specific experiences to integrate/amalgamate theory with both their "epistemological and cognitive domain" (Ruthven *et al.*, 2009:332). We had to go back to the drawing board.

From 2008 to 2009 we worked on ways to refine the curriculum to address the students' false sense of learning and to cause sufficient perturbation for them to make some epistemological shift. In this process we came across the design tool of Ruthven *et al.* (2009) in the *Educational Researcher* and we used it to gain a better understanding of where we went wrong and how we could improve the curriculum.

Design-based research and a generative process for the refinement of a curriculum

Having worked with DBR in other projects (Greyling, 2007, Seligmann, 2008), we decided to use its tools again in the recent revision (Van den Akker *et al.*, 2006). Specifically, we both appropriated and adapted the design tools of Ruthven *et al.* (2009). When they refer to the revision of a curriculum in DBR mode they argue that

Equally revision of design often involves taking into account of aspects of the working situation that were not recognised or prioritised in the original formulation of the design. Our argument is that the availability of design tools capable of identifying and addressing specific aspects of the situation under design can support both the initial formulation of a design and its subsequent refinement in the light of implementation.

In the revision of the SL curriculum, the findings of the earlier inquiry were valuable. The main finding was the students' lack of integration of what Ruthven *et al.* (2009) refer to as "two worlds," the world of declarative knowledge and formal theories and the world of everyday, "lived," or action knowledge, which is coupled with tacit theories. We used the findings in the process of restructuring the curriculum into what we hope will be a more functional sequence of practice- and theory learning experiences that would scaffold the integration of the two worlds. Ruthven *et al.* (2009) refer to this as the generative component of design and they emphasise that a "systematic apparatus" can be used to make the process of re-design accountable and transparent. This is what we will focus on in the remainder of this article.

An intermediary framework – from grand theory to field

Ruthven *et al.* (2009:334) make explicit the "bridging between theoretical principles and design processes". The notion of the explication of principles for design that have been distilled from theory is in itself not new in the DBR discourse (Gravemeijer & Cobb, 2006). The process itself, however, has not been set out as Ruthven *et al.* (2009) have done it. We will show how we have brought the "grand theories" that underpin the SL curriculum to the university classroom by way of a heuristic tool that these authors describe as an "intermediary framework." Our example is the work of Nel Noddings (1984, 1998) in our curriculum. We will show how we anticipate that the students will integrate their everyday notions about service practice (and concomitant tacit theories) with those very grand theories that they study.

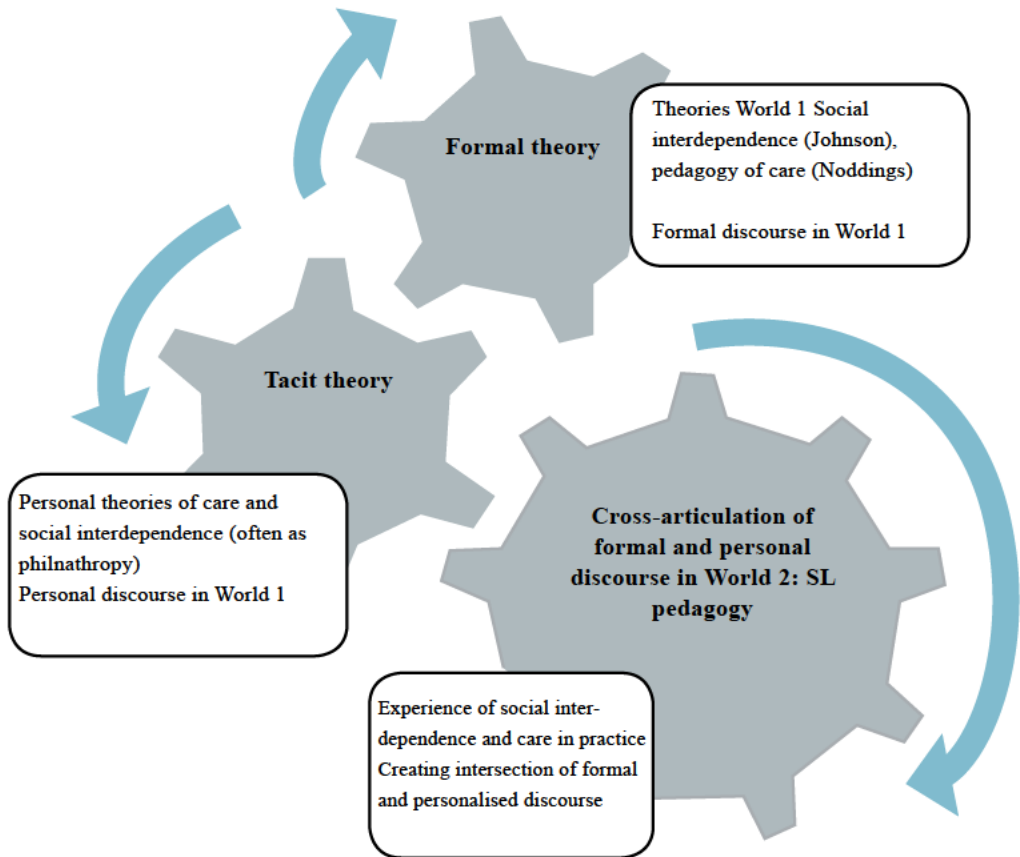
In this SL course the intention is that the students are prepared optimally for the world of work in schools, but with sufficient understanding of the theory so that they can reflect and theorise as they need it in practice. They need to be able to "think on their feet" with theory as a scaffold and a guide. For this they need a comfortable epistemic space where these two domains of theory of SL and practice of SL meet (see Figure 1).

This design tool highlights the need for integration of various types of knowledge, originating in tacit theories of everyday life, or in grand theories, such as care theory and social interdependence theory, but meeting somewhere around the middle in a shared epistemic space. This meeting can be compared to how Vygotsky (1978) described the meeting of "spontaneous" and "scientific" concepts during mediation (Minick, 1987; Wertsch & Tulviste, 1992). The following example demonstrates this conundrum: Social interdependence theory, as overall framework of the course, emphasises the reciprocity between participants (school communities and university students) in the SL programme. We use this perspective in SL in order to ensure that students do not see themselves as philanthropists who wish to give service or "do good," but as teachers whose role in society is to care responsibly and to work collaboratively towards the goal of reciprocity and the overall goal of social justice. The students learn about school life and thus benefit from the experience. In their SL course at the time of the inquiry they wrote and talked eloquently about the construct of social interdependence, but failed to see interdependence when they were confronted with it in practice. Their "two worlds" had not intersected.

Another aspect that was problematic in the original design was the students' struggle to identify with "relational forms of knowing" (Noddings, 1984:4; 1998:218) as it was expected to be practised in a "curriculum of care". They were thus not able to see how their practice at the service sites became a form of knowledge to be integrated/amalgamated with theory – how the two can become one in what Snow *et al.* (2005) refer to as "situational-reflective" knowledge. They mostly mimicked the discourse of the texts they (thought they) had learned. We thus needed to find a way to make the theory-to-practice design process more transparent and explicit. This is where the value of the Ruthven *et al.* (2009) DBR process was most apparent.

To this end we have now created an intermediary framework tool, which we have adapted from Ruthven *et al.* (2009:235) and which we use as heuristic to facilitate planning of sequencing and content selection in the curriculum. We refer to this framework as the double categorisation framework, which is close to what the authors describe as the “two worlds framework” (Fig 1). The two worlds model views the learning of new concepts as a multifaceted process in which there are also “two worlds” of theorising, one tacit and one formal, or “grand.”

Figure 1: Where high theory and tacit theory meet.



The idea with using this framework is to try to overturn the students’ reliance on using declarative/substantive knowledge and to problematise it with a sense of practice. At the same time we wish to challenge their tacit theories about what it means to live interdependently in a service environment. We see this as happening inductively-sequentially from their everyday (tacit) knowledge, while gradually building a “language of description” (Bernstein, 1996) of social care in education.

The “double categorisation” as design tool explains the following: students’ weekly experience of service (over one year), with its close encounters with the children of distressed communities. Theory and practice thus meet, ideally, at the interface of these two “cultural planes” (Vygotsky, 1978). We also believe they will be able to traverse the different “worlds” of theory and practice, as they will have been

co-constructors of the epistemological (road) building process that connects the two worlds. They will have the technical tools to do so by seeing their own intermediary frameworks in action (see Table 2).

This process may assist in the positive objectification of the object of service, much as a health professional sees care as a professional task without getting lost in the suffering of patients. Thus, instead of studying social interdependence theory and then “applying” it to SL practice in a subsequent linear activity, they will encounter sequences of learning opportunities that systematically, but inductively, help them make links between everyday life, in which they interact with people who have been marginalised, and their “academic” lives. The notion of a separate “application” process is then removed and students build a repertoire of a language of description, gradually linking theoretical concepts to their experience (see Table 2). In this iteration, in this sequence, we argue, the students will begin to see the literature in a different light and they will systematically exchange concepts and descriptions from tacit, everyday theory for concepts and descriptions from “grand theory” (and vice versa).

Planning topics and sequences in the curriculum – iterations

This process will accelerate (again systematically) as students encounter increasingly challenging episodes during service work. At this juncture we propose that they take the empirical knowledge of the service field, and “zig-zag” incrementally from theory to field and back until they have constructed what Schwab (1978) describes as “syntactical knowledge” in which they build their own “grammar” of the field. This knowledge will be of a kind that they can use authentically in their reflection journals and that they will be able to describe in a sophisticated, scholarly discourse, which they will gradually build and nurture through a number of iterations. In Table 2 we give examples of how the language of description of everyday experience can blend with the discourse of formal theory. As Ruthven *et al.* (2009:335) explain,

specific frameworks, intermediary between grand theory and the process of design... extract, coordinate, and contextualise those aspects of several grand theories that are pertinent to developing, analysing, and evaluating teaching designs

The object of design activity is thus not just to have an outcome (a new curriculum), but as Gravemeijer and Cobb (in Ruthven *et al.*, 2009:330) argue, one has a way of showing how you are “accountable to the activity of design” itself.

The table illustrates some of our thinking made overt.

Table 2: Double categorization as intermediary tool

2007 Research findings	Tacit theory	Grand theory	Blend
Students mimic discourse of theory.	Service as educational philanthropy	Social interdependence Social justice/ Care	Service is a tangible example of social interdependence, social justice and care theory-in-action where service sites inform theories.
Conflict between declarative and experiential knowledge. Practice and theory are far apart (epistemic apartheid)	“...the problems are too big for me to handle.”	To care as an educationist means to practice justice at all levels of society	I am a social justice practitioner in all of my pedagogic actions. <i>Noddings writes about me!</i>
Pathologising marginalised people. The rules of the world of practice and the world of theory are different	People are the cause of their own problems	Interdependence theory posits psychological processes that opens individuals to shared action and responsibility	Some people are marginalised because of their circumstances. I can do something about it, but I must learn how. Developing a discourse about it is one way to begin.

The next step is to think of a topic and a sequence in the curriculum with which these student responses can be addressed. In deliberating about the issue of applying the intermediary framework, we managed to show, in a double categorisation, that tacit theories and grand theories are often far removed from each other. We use examples from the work of Nel Noddings (1984, 1998) as a major theorist in our curriculum.

First set of epistemic categories

- “Grand theory:” Social interdependence, social justice, care, and their integration in an epistemic position for pedagogy.
- “Double categorisation:” Students’ self image of a caring teacher is juxtaposed and later integrated with Noddings’s theory. Students examine core concepts to search for an understanding of their work during service (see Table 3).
- Tacit theories of care: Empirical knowledge of care with students using examples from their peers.

Second set of (incremental) categories: a hypothetical case based on a composite from the 2007 research findings

- How would Noddings describe me? Students use Noddings’s discourse to describe themselves.
- Students analyse a SL episode with the language of description of Noddings, amended with their own discourse.
- Comparison with tacit theories of service/care/social justice. Students write their own personal theory of care, which is juxtaposed with the earlier vignette.

In this iteration the students reflect on the power of tacit theories, for example bias and stereotypes and how language of care is juxtaposed with the language of “othering.” In this hypothetical example the gradual move from high theory to personalised, internalised knowledge is patterned into the design that we try to achieve. Students do not “apply theory to practice” but gradually merge their own “languages of description” with the discourse of theory in a parallel process where tacit theory makes more space for the high theory and vice versa. Ultimately, we argue, when students invoke terms that Noddings uses –they will have merged the two discourses and will have made personalised knowledge. This has become the major design principle for the revision/refinement of the curriculum.

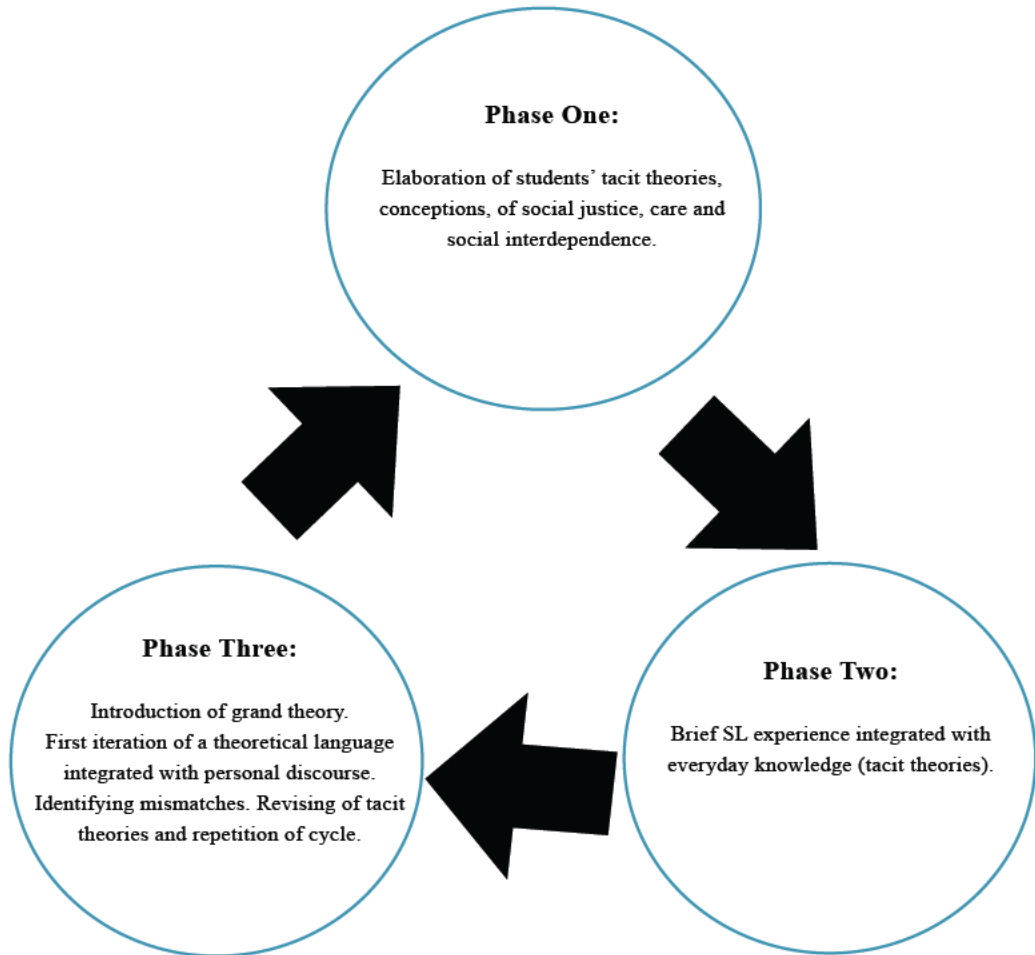
Using Noddings’ discourse in Table 3 we place ourselves in the mind of the student and try to envisage what students will be likely to say when they begin thinking and writing like theorists. This portrays the gradual epistemic shift that we envisage – taking grand theory into a more personal space. We foresee that students, in the process of thinking about the theory and what it means for action, will be likely to be more honest and less contrived in their emotional responses as captured in their reflective writing. The second reflections (in italics) give some indication of the type of discourse that also arises around theoretical notions and contrasts somewhat with the carefully worded writing of the first part of the student writing.

Table 3: Taking theory home: making it epistemically personal

Constructs from Noddings's theory of care	Contrasting examples of student writing: the thinking of a curriculum designer (who places herself in the shoes of a student)
Caring defined as a "relational ethic"	How would I describe the relationship that is developing between me and the pupils I work with at the school where I do service teaching? Is this relationship an example of "care as a relational ethic" as Noddings' sees it? <i>My care is to do some things while I am at the school. I don't really want to think too much about it. My essays are okay when I write about how care theory works. I know how care theory works. I know what a relational ethic is. I don't like to be with these kids. My point is: can you force someone to care for someone else?</i>
The teacher is firstly the "one-caring" and is only thereafter the "enactor of specialised functions"	In building my relationship with this pupil I must first understand his/her issues, what affects their lives outside of school, their hopes and dreams and what forms their personality/character. This means that I can describe myself as the "one-caring" only when I know these constituent elements of <i>this learner</i> and genuinely care about him/her. <i>Okay – so I can't teach before I care for a kid? What if I don't like them? I guess I still sort of care for them because it is my job to care, like a nurse has to help a patient that she does not like or respect. But it's not care from deep in my heart like for my niece. The theorists make care sound so profound while it just means you do your job well.</i>

In this way tacit theories can be explored by way of "grand" theory on a regular basis. We would refer to this as systematic and theoretically-scaffolded, reasoned reflection instead of the usual outpouring of a "flow of consciousness". The sequencing of this intermediary work would thus be as follows: students would work iteratively, with their inductively described notions (tacit theories) of social justice, care and social interdependence, concomitant with the introduction of service experience and theory. The cycle in Figure 2 would be repeated throughout the course, with the three levels becoming more and more integrated. The design tool of double categorisation has helped us to refine the interaction of these three levels of operation.

Figure 2: Sequence of theory, everyday experience and clarification of tacit theory in an iterative cycle



Subsequent to Phase Three of the first curriculum cycle the processes will be repeated, with the increasingly demanding service field experience requiring students to capture the experience in the language of description that gradually has a stronger theoretical undertone, but which is at the same time also personally more authentic.. They are now required to use some of the “high” discourse tools to relocate some of their conceptions, rendering them more scientific and lifting them out of everyday experience, but continually accompanied by some everyday discourse. Hopefully they will then also be relocating their moral imperative and their epistemological position accordingly. Tacit theories, with their inevitable biases, will most likely surface during the cycles, but as the students become more adept at theorising with the help of grand theory they will continue to lift out (*aufheben*) their tacit theories and critically appraise them in the light of “high” theory. This process of objectification we see as reflection, devoid of indulging in the emotions of the personal experience only, something we know too well and have tried to limit in reflective journals.

Conclusion: towards deep theorising in practice

The ideal of this type of designs is to assist students to relocate epistemologically – to see “knowing” in a different way. The aim is also to let them grasp specifically that the knowing of theory and their “theory

of practice” (Reckwitz, 2002) are constant partners and that the one does not have to be “converted” or “applied” to become the other. Students each have to find a personal epistemic home for their SL pedagogy, a home where theory and practice can reciprocate in their thinking and doing. In the epistemology of this form of knowing, practice and experience meet at the intermediary framework as confluence of theory and experience. This “intermediary” theorising is inherently temporary, as subsequent cycles will possibly reveal other issues. However, what has made the DBR route, and specifically this tool of “go-between” theorising, especially valuable is that it has helped us to “optimise didactical variables,” (Ruthven *et al.*, 2009:335), such as conceptions of the divide between epistemological domains. It has also helped us to lift these variables out of the somewhat obscure state in which they may have remained without the deliberate search for the confluence.

References

- Bell, LA & Griffin, P 2007 (eds). *Teaching for diversity and social justice*. Part 1. 2nd edition. London: Routledge (Taylor Francis Group).
- Bernstein, B 1996. *Pedagogy, Symbolic Control, and Identity*. New York: Rowman & Littlefield.
- Butin, DW 2003. Of what use is it? Multiple conceptions of service-learning within education. *Teacher Education*, 105:1674-1692.
- Charmaz, K 2003. Grounded theory: Objectivist and constructivist methods. In NK Denzin, & YS Lincoln, (eds). *Strategies for qualitative inquiry*. Thousand Oaks: Sage.
- Cobb, P, Confrey, J, diSessa, A Lehe, R & Schauble, L 2003. Design experiments in educational research. *Educational Researcher*, 32(1): 9-13.
- Design Based Research Collective. 2003. Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher*, 32(1): 5-8.
- Ebersöhn, L, Bender, GCJ & Carvalho-Malekane, WM 2010. Informing educational psychology training with students’ community engagement experiences. *Perspectives in Education*, 28(3):87-98.
- Fairclough, N 2003. *Analysing discourse. Textual analysis for social research*. London: Routledge.
- Gravemeijer, K & Cobb, P 2006. Design Research from a learning design perspective. In J van den Akker, K Gravemeijer, S McKenney, & N Nieveen (eds). *Educational design research*. London: Routledge.
- Greyling, FC 2007. The why and how of technology-assisted Learning: authentic professional development for higher education practitioners. Unpublished doctoral thesis Johannesburg: University of Johannesburg.
- Heritage, J 2005. Conversational analysis and institutional talk. In KL Fitch and RE Sanders (eds). *Handbook of language and social interaction*. New Jersey: Lawrence Erlbaum Associates.
- Johnson, DW & Johnson, RT 2009. An educational psychology success story: Social Interdependence Theory and Co-operative Learning. *Educational Researcher*, 38(5):365-379.
- Kozulin, A 1998. *Psychological tools: A sociocultural approach to education*. Cambridge, MA: Harvard University Press.
- Minick, N 1987. The development of Vygotsky’s thought: an introduction to LS Vygotsky, *Thinking and speech*. New York: Plenum (edited and translated by N. Minick).
- Morton, K 1996. Issues related to integrating service-learning into the curriculum. In Jacoby and Associates. *Service-learning in higher education. Concepts and practices*. San Francisco: Jossey Bass.
- Noddings, N 1984. *Caring. A feminist approach to ethics and moral education*. Berkeley: University of California Press.
- Noddings, N 1998. An ethic of caring and its implications for instructional arrangements. *American Journal of Education*. 96(2):215-230.
- Osman, R & Castle, J 2006. Theorising service learning in higher education in South Africa. *Perspectives in Education*. 24(3):63-70.
- Petersen, NF 2007. Pre-service teacher education students’ engagement with care and social justice in a service learning module. *Education as Change. Special Issue. 11(3): 69-181*.

- Reckwitz, A 2002. Towards a theory of social practices. A development in culturalist theorising. *European Journal of social theory*, 5(2):243-262.
- Ruthven, K, Laborde, C, Leach, J & Tiberghien, A 2009. Design Tools in Didactical Research: Instrumenting the Epistemological and Cognitive Aspects of the Design of Teaching Sequences. *Educational Researcher*, 38(5):329-342.
- Seligman, J 2008. Integrating language and subject content: A pedagogy for course design. Unpublished doctoral thesis: University of Johannesburg.
- Schwab, JJ 1978. Education and the structure of the disciplines. In I Westbury, & NJ Wilkof (eds). *Science, curriculum and liberal education*. Chicago: University of Chicago Press.
- Scrace, TJ 1997. (ed). *Social justice and third world education*. London: Garland.
- Snow, C, Griffin P & Burns S 2005. (eds). *Knowledge to support the teaching of reading. Preparing teachers for a changing world*. San Francisco: Jossey Bass.
- Strauss, AL & Corbin, J 1999. *Basics of qualitative research. Grounded theory procedures and techniques*. (2nd Ed.). Thousand Oaks, CA: Sage.
- Van den Akker, J, Gravemeijer, K, McKenney, S, & Nieveen, N 2006. Introducing educational design research. In J. van den Akker, K. Gravemeijer, S. McKenney, & N. Nieveen (eds), *Educational design research*. London: Routledge.
- Van den Akker, J., Gravemeijer, K., McKenney, S., & Nieveen, N. 2006 (eds), *Educational Design Research*. London: Routledge.
- Vygotsky, LS 1978. *Mind & society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Vygotsky, LS 1987. *The collected works of L. S. Vygotsky*. Vol. 1. (in RW Rieber & AS Carton, (eds) (N Minick, Trans.) New York: Plenum.
- Wertsch, J & Tulviste, PE 1992. L/S. Vygotsky and contemporary developmental psychology. *Developmental Psychology*, 28(4):548-557.