Knowledge-building

Educational studies in Legitimation Code Theory

Edited by
Karl Maton, Susan Hood and
Suellen Shay

ROUTLEDGE

Praise for *Knowledge and Knowers* by Karl Maton (Routledge, 2014), the direct precursor to *Knowledge-building*:

> This tour-de-force will set the agenda for the future of the sociology of education. Maton's writing is always engaging and thought-provoking … a 'must-read'.
>
> Professor Michael Grenfell, *Trinity College, University of Dublin, Ireland*

> A truly majestic contribution…. It is a formidable piece of work: imaginative, thought-provoking, intellectually out-reaching, and will surely constitute essential reading across the social sciences.
>
> Professor John Evans, *University of Loughborough, UK*

> Maton's inspirational volume consolidates a sociology of immense theoretical insight and undaunted analytical precision … social theory of this order is a very best friend indeed.
>
> Professor J. R. Martin, *University of Sydney, Australia*

> [T]his book is for those who want to take learning and knowledge in a new direction.
>
> Professor Jill Thistlethwaite, *UTS, Australia*, review in *Journal of Interprofessional Care*

> [A] guidebook – the journey is carefully signposted and there is much encouragement for the traveller … its impact on higher education studies is going to be significant.
>
> Professor Jennifer Case, *University of Cape Town, review in Higher Education*

> [R]ich, layered, and highly imaginative … a major contribution.
>
> Dr Graham McPhail, *University of Auckland,* review in *Pacific-Asian Education*

> [T]he scope and ambition of Maton's work is remarkable and should be taken seriously … a significant contribution to the sociology of education.
>
> Dr Brian Barrett, *SUNY,* Cortland, USA, review in *Educational Theory*

> This highly stimulating volume … is a must-read … this fascinating, wide-ranging, and internally coherent book will be of the greatest interest to sociologists and education policy scholars.
>
> Ernst Buyl, *Ghent University, Belgium,* review in *Journal of Education Policy*

> [L]ucid, generous and written with elegance and conviction … provocative, thought-inducing and generative; offering a powerful, multi-faceted array of

analytical tools.

Fiona Jackson, *University of Kwazulu-Natal, South Africa*, review in *Journal of Education*

Knowledge-building

Education and knowledge have never been more important to society, yet research is segmented by approach, methodology or topic. Legitimation Code Theory, or 'LCT', extends and integrates insights from Pierre Bourdieu and Basil Bernstein to offer a framework for research and practice that overcomes segmentalism. This book shows how LCT can be used to build knowledge about education and society. Comprising original papers by an international and multidisciplinary group of scholars, *Knowledge-building* offers the first primer in this fast-growing approach.

Through case studies of major research projects, Part I provides practical insights into how LCT can be used to build knowledge by:

- enabling dialogue between theory and data in qualitative research;
- bringing together quantitative and qualitative methodologies in mixed-methods research;
- relating theory and practice in praxis;
- conducting interdisciplinary studies with systemic functional linguistics.

Part II offers a series of studies of pressing issues facing knowledge-building in education and beyond, encompassing:

- diverse subject areas, including physics, English, cultural studies, music and design;
- educational sites: schooling, vocational education and higher education;
- practices of research, curriculum, pedagogy and assessment;
- both education and informal learning contexts, such as museums and masonic lodges.

Carefully sequenced and interrelated, these chapters form a coherent collection that gives a unique insight into one of the most thought-provoking

and innovative ways of building knowledge about knowledge-building in education and society to have emerged this century. This book is essential reading for all serious students and scholars of education, sociology and linguistics.

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In memory of Basil Bernstein, Pierre Bourdieu and Rob Moore

Contents

Figures

Tables

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This collection is dedicated to the memories of Basil Bernstein and Pierre Bourdieu, whose frameworks are developed by Legitimation Code Theory, and Rob Moore, who supported, sustained and nourished this ongoing attempt at cumulative knowledge-building from its earliest beginnings.

1 Legitimation Code Theory

Building knowledge about knowledge-building

Karl Maton

A practical theory

‘“Data! Data! Data!” he cried impatiently. “I can’t make bricks without clay”’ (Conan Doyle 1892/1981: 268). Sherlock Holmes thereby declared a desire to neither proclaim without evidence nor assume the facts will speak for themselves. In contrast, research into education and society all too often falls for this false dichotomy of speculation or description. Despite Kant’s famous argument of 1781 suggesting theory without research is empty and research without theory is blind, the two frequently remain divorced or, at best, not on speaking terms. Researchers often seem faced with concepts that make sense until encountering the reality of data and empirical studies that lack explicit conceptual frameworks. Theory remains freely-floating, unable to fully connect with data; empirical descriptions remain mired in minute particulars, unable to reach beyond the specificities of their objects of study. Moreover, this is not the only forced choice faced by researchers of education and society: qualitative or quantitative methodologies, analysing practices or shaping them, generalizability or depth, humanism or science, behaviour or meaning, and so on. Typically presented as jointly exhaustive and mutually exclusive, false dichotomies abound. It is as if above the entrance to the field is inscribed the legend ‘EITHER-OR’ and in crossing the threshold one must leave behind any possibility of ‘BOTH-AND’.

Such dichotomous thinking is deeply debilitating to knowledge-building about education and society. At the level of individual studies it gives rise to segmentation not only between theory and the data it purports to explain or the practice it aims to transform but also between potentially complementary

frameworks, and between potentially complementary methodologies for enacting those frameworks. A perceived demand to make monotheistic choices leads researchers to prematurely renounce possibilities for explanatory power. At the level of the intellectual field, dichotomous thinking encourages the proliferation of strongly-segmented micro-fields, each addressing a discrete topic typically defined by various combinations of education sector (vocational, higher, etc.), institutional level (school, university, etc.), subject area (music, physics, etc.), and disciplinary approach ('sociology of …', 'educational linguistics', etc.). Further, this endemic exceptionalism recurs geographically: each national system, by virtue of some unique characteristic, is held to require its own, strongly-bounded field of research. The resulting fragmented specialisms are often unable to speak to one another, negating the possibility of cumulatively building knowledge across disparate phenomena and through time. In short, disciplinary, theoretical, methodological and substantive sectarianism is driving segmentalism within the study of education and society.

This book contributes to avoiding false dichotomies and overcoming segmentalism by illustrating an approach – Legitimation Code Theory (LCT) – that enables both the exploration of knowledge-building and the cumulative building of knowledge. Since LCT emerged at the turn of the century the framework has evolved into a multidimensional conceptual toolkit (Maton 2014b). Research enacting the framework is growing exponentially.[1] Its integrative potential is illustrated by education, where the theory is serving as a basis for empirical studies:

- into diverse practices (research, curriculum, teaching, learning, evaluation, attitudes, beliefs, identities, etc.);
- across the disciplinary map (from physics to ballet, engineering to jazz, educational technology to journalism);
- in all forms of institution (schools, vocational colleges, universities, etc.);
- at different levels of analysis (education system, discipline, institution, course, classroom, single text, individual wording, etc.);
- across national contexts (African, Asian, Australasian, European, North American, Scandinavian and South American countries);
- with other approaches (including numerous models, systemic functional linguistics and critical realism); and

- using a range of methods (such as qualitative interviews, quantitative surveys and documentary analysis).

As this diversity of topics, complementary frameworks and methodologies suggests, studies enacting LCT are animated less by a command to choose 'either-or' and more by pluralistic engagement with possibilities for generating greater explanatory power. To paraphrase Pierre Bourdieu, social research is something much too serious and too difficult to allow ourselves to mistake rigidity – 'the nemesis of intelligence and invention' – for rigour and thereby deprive ourselves of potential resources (Bourdieu and Wacquant 1992: 227). Consequently, where the segmentation of much educational research affords only a fragmented account of education, studies enacting LCT are building on one another to embrace a growing range of issues (Maton 2014b: 196–217). They speak to each other through the theory. The framework thereby enables the possibility of a more integrated account of education.

LCT is being used not only to interpret the world in various ways but also to change it. Concepts from the framework reveal different dimensions of what Bourdieu called the 'rules of the game': the bases of achievement underlying social fields of practice. Such bases are often unwritten and unspoken, they 'go without saying' in ways that, when accessible only to actors from specific backgrounds, generate social inequality. By making such organizing principles visible, LCT enables these bases of achievement to become accessible to more actors, promoting social justice. They can be taught and learned, or changed. Accordingly, LCT concepts are being embedded, both explicitly and tacitly, within transformed and transformative practice, such as pedagogy and professional development.[2] Furthermore, uses of LCT are not confined to education. Studies are exploring and shaping diverse social fields of practice, including law (Martin *et al*. 2012), museums (Carvalho 2010), theatre (Hay 2014), and armed forces (Thomson 2014). It thus also holds open the possibility of generating an integrated account of society.

A guide to Knowledge-building

The rapidly-growing body of work enacting LCT is helping to overcome

segmentalism in understanding education and society – it contributes towards knowledge-building. The current volume, *Knowledge-building*, illustrates how LCT enables such research and practice. Specifically, the book is structured into two main parts that offer complementary insights. Part I represents a kind of 'primer' in using LCT concepts in research and praxis by analysing projects that overcome false dichotomies between theory/data, quantitative/qualitative, theory/practice, and different disciplines. Part II provides a series of empirical studies, within and beyond education, that illustrate the explanatory power of the framework. Together, they offer insights into how research is enacting LCT across a diverse range of issues.

For the reader new to LCT, *Knowledge-building* can serve as an entry point on its own. This chapter introduces the framework and summarizes key concepts used in the book; each chapter briefly defines the concepts being enacted; and an 'architectural glossary' in Chapter 12 describes how concepts interrelate within the framework. Nonetheless, this book also builds on its precursor volume, *Knowledge and Knowers* (Maton 2014b). That volume delineated more of the conceptual framework and at greater length. It also demonstrated how LCT cumulatively builds knowledge by extending and integrating existing ideas within concepts that enable greater fidelity to more phenomena with improved cohesion and economy. However, space precluded extensive discussion there of the processes for putting the concepts to work. As I shall discuss, LCT is a *practical theory* of practice. Concepts can be enacted in empirical studies to engage in genuine dialogue with data and embedded within transformed practices to generate praxis. In *Knowledge and Knowers* showing *how* this can be done was but touched upon and discussion of studies was necessarily limited. In *Knowledge-building* the processes and products of enacting LCT in research move more to centre stage.

Part I: The craft of LCT

Part I of this book comprises four chapters in which research practice is foregrounded in reflexive analyses of major studies. They are somewhat unusual in focus, revealing what is typically hidden in published research: how finished products are reached. Moreover, they do so in an unusual fashion. Rather than discussions of method abstracted from research, each

chapter reveals how theory, method and data were intimately related within the unfolding context of a real research study. However, rather than descriptive travelogues of the journey of a project, each chapter analyses the practices whereby the research was conducted, drawing lessons for future studies. These chapters thereby contribute to making visible the craft of LCT and making more available the gaze that guides research practice that is appropriately using the framework.

As indicated by their main titles, Part I chapters address how to enact LCT in: qualitative research (Chapter 2), mixed-methods research (Chapter 3), praxis (Chapter 4), and interdisciplinary research (Chapter 5). These issues are concretely addressed through discussion of the processes shaping major research studies into: the effects of constructivist pedagogy on student experiences (Chapter 2); low uptake of school music qualifications and the differential integration of educational technology in classrooms across the secondary school curriculum in the largest one-to-one laptop programme yet conducted (Chapter 3); the creation of mobile e-learning environments for informal learning contexts, such as museums (Chapter 4); and knowledge-building in secondary school History and Biology classrooms (Chapter 5).

At the same time, as indicated by their opening motifs, each chapter discusses how to use LCT to transcend a false dichotomy underlying segmentalism. Chapter 2 charts the processes unfolding through a qualitative research study for creating a 'translation device' that enables genuine dialogue between theory and data. Chapter 3 illustrates how to integrate qualitative and quantitative methodologies by tracing the evolution through mixed-methods studies of an instrument that embeds LCT concepts into the heart of quantitative data collection and analysis. Chapter 4 re-analyses the processes underlying the creation of 'languages of enactment' that embed LCT within practice to enable 'informal learning of principled knowledge'. Chapter 5 describes the strategies evolved through an interdisciplinary research project that enacted LCT and systemic functional linguistics in complementary analyses of shared data. I should emphasize, however, that each chapter offers insights beyond its specific focus. For example, describing how a quantitative instrument was evolved in Chapter 3 reveals characteristics of LCT of relevance to research using any method, and discussing interdisciplinary research in Chapter 5 involves strategies that are applicable to studies using LCT only. Throughout Part I the focus is thus on

explicating the craft of LCT, the principles underlying the practical processes shaping research projects, to enable future studies of different issues to contribute to knowledge-building.

Part II: Composing with LCT

Part II of the book shifts emphasis from processes towards products of research. These six chapters are more than mere 'applications'. LCT is an explanatory framework rather than any specific substantive account and, as Archer (1995: 6) states, 'an explanatory framework neither explains, nor purports to explain, anything'. Concepts and conjectures – the framework and outcomes of its enactment within specific studies – are not identical. LCT invites use to generate explanations and such use is anything but passive. As Bourdieu argued:

> … just as music may be made not to be rather passively listened to, or even played, but to open the way to composition, so scientific works, in contrast to theoretical texts, call not for contemplation or dissertation, but for practical confrontation with experience; to truly understand them means to activate in relation to a different object the mode of thought they express, to reactivate it in a new act of production, just as inventive and original as the initial one.
>
> (Bourdieu 1996: 180)

LCT is, metaphorically, music made to open the way to composition. Rather than recitals of a score, the chapters of Part II thus offer six examples of composition. They demonstrate the creative nature of research that involves the selection, assembly and enactment of concepts into uncharted waters. This recontextualization of elements of the framework may, in encounters with the specificities of objects of study and mediated through the dispositions of researchers, rework the concepts to capture, where successful, something new but essential for that study. Such shifts in meaning can then 'speak back' to the theory, potentially highlighting the need for conceptual refinement or new developments.

The chapters of Part II thus illustrate the active appropriation and reorientation of concepts. At the same time, they exemplify (though do not

circumscribe) the manifold diversity of problems, topics, contexts and practices that LCT can be enacted to explore. These chapters explore: how 'ethnographic' forms of story-telling can encourage segmentalism in the humanities and social sciences (Chapter 6); the nature of building knowledge through a vocational curriculum, focusing on the example of design at university (Chapter 7); how English literacy studies cultivates legitimate forms of literary knowers through the years of schooling (Chapter 8); the significance in physics education of understanding the forms of knowledge appropriate to solving specific kinds of problems (Chapter 9); the nature of academic writing in music education, specifically in jazz studies at university (Chapter 10); and the role of tacit pedagogic practices in informal learning contexts, specifically masonic lodges in France (Chapter 11).

Each chapter briefly outlines the concepts being enacted in the research being discussed. Nonetheless, to provide a common touchstone for the recontextualization of LCT by these studies, I shall briefly introduce the framework before summarizing key concepts drawn on in this book.

Introducing Legitimation Code Theory

What kind of theory is 'Legitimation Code Theory' and how does it enable knowledge-building? These questions are intimately interrelated. LCT analyses of research across the disciplinary map are revealing the complex diversity of organizing principles at play in enabling cumulative knowledge-building (Maton 2014b). Lessons learned from these studies are, in turn, drawn upon to improve the framework's own capacity for building knowledge. Limits of space here preclude extensive discussion of these manifold traits and their embodiment in LCT.[3] As a way into introducing the framework I shall thus focus on the issue with which this chapter began: the false dichotomy between speculation and description that pervades studies of education and society.

One way LCT enables knowledge-building is by bringing theory and data into genuine dialogue. Concepts can be enacted in research into real-world problems to generate explanations that reach beyond any specific context of study. As discussed above, Part I chapters in this volume demonstrate how this is achieved in research practice. Here I shall highlight some overarching

characteristics of the framework that make it possible. Put simply, LCT is a *practical theory* in at least two senses. First, LCT is neither divorced from nor reducible to empirical studies. Figure 1.1 develops Archer (1995) to distinguish 'meta-theories' offered by ontologies, 'theories' embodied by explanatory frameworks, and 'substantive theories' generated by research studies. LCT is an *explanatory framework* rather than a meta-theory or collection of substantive theories (Maton 2014b: 14–17). However, as the arrows in Figure 1.1 highlight, LCT maintains dialogic relations with both ontologies and studies. Thus, while engaged in fruitful exchanges with meta-theories (such as critical realism), LCT is a conceptual toolkit and analytic methodology rather than a paradigm or '-ism'. Similarly, while LCT evolves in relation to studies, the framework is distinct from their substantive accounts. Thus, LCT is neither overly distanced from nor identical with any specific context of research.

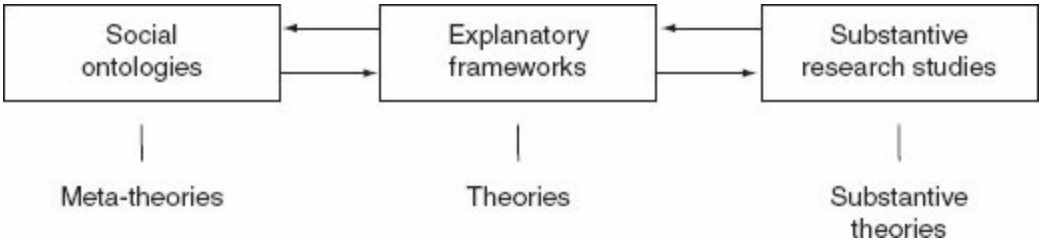


Figure 1.1 Meta-theories, theories, and substantive theories.

Second, LCT avoids both theoreticism and empiricism. On the one hand, it is designed not for freely-floating theoretical discussion but rather for practical engagement. The theory 'is not a sort of prophetic or programmatic discourse which originates by dissection or by amalgamation of other theories for the sole purpose of confronting other such pure "theoretical theories"' (Bourdieu and Wacquant 1992: 161). Rather, the framework develops within and for empirical research into substantive problems. On the other hand, against empiricism, the findings of this research are not locked within those issues. LCT enables research to go beyond endless and ad hoc empirical descriptions to explore the organizing principles underlying practices, dispositions and contexts. The framework allows researchers to get, metaphorically speaking, 'under the surface' of appearances. Analyses of their organizing principles can systematically reveal underlying similarities

and differences with other practices, as well as change over time. Moreover, the theory is generative. As I discuss below, LCT reveals a particular 'setting' of organizing principles underpinning a set of practices as one of a range of possible modalities, each of which could generate alternative practices. It thereby reaches beyond 'what is' to 'what could be'. In getting 'under the surface' of appearances to generatively explore possibilities, LCT thereby helps to avoid the context-dependence and segmentalism of empiricist models.

Bourdieu, Bernstein and beyond

Moving beyond appearances involves both ways of seeing and analytic tools, both a gaze and a conceptual framework, issues concerning both knowers and knowledges. Introducing these two facets also highlights the contributions of approaches central to the development of LCT. The framework draws insights from a range of sources including philosophy, linguistics, physics, anthropology and cultural studies. However, its most directly foundational influences are the sociological theories of Pierre Bourdieu and Basil Bernstein. LCT develops rather than displaces their approaches, albeit in different ways. Though neither neatly divided into nor confined to these issues, one aspect of their legacies is that Bourdieu's 'field theory' illustrates the kind of dispositions or gaze necessary, and Bernstein's 'code theory' models the form of concepts required to overcome segmentalism.

Beyond Bourdieu's gaze

Bourdieu repeatedly emphasized the difficulty of moving beyond our sensual, commonsense experiences of the world. These understandings are taken for granted as self-evident, an illusion of immediacy and transparency that naturalizes and essentializes social inequalities (Bourdieu *et al*. 1991). To break from this view, he argued, requires a new way of seeing and thinking:

> The task is to produce, if not a 'new person', then at least a 'new gaze', *a sociological eye*. And this cannot be done without a genuine conversion, a *metanoia*, a mental revolution, a transformation of one's whole vision of the social world.

(Bourdieu and Wacquant 1992: 251; original emphases)

This ‘new gaze’ involves a break with thinking in terms of separate and visible empirical entities in favour of a realist and relational mode that conceives phenomena as realizations of underlying organizing principles.[4] Put simply, this is to view empirical practices as patterned, a particular pattern as one of a number of possible patterns, the constitutive characteristics of a pattern as deriving from its relations with other patterns, and the organizing principles of each pattern and the system of possible patterns as discernible through analysis. More grounded discussions of this mode of thinking are provided in Part I of this volume, and concepts that embody the mode are outlined below. Here my point is to highlight Bourdieu’s insistence on the significance of a specialized gaze. This valuably warns against an unthinking, semi-mechanical or shallow application of theory, as if slavishly following a recipe. It foregrounds the *craft* of social science and the need to shape actors’ dispositions, to convert a theory into a mode of thinking, acting and being (hereafter ‘gaze’), in order to ‘master in a practical state everything that is contained in the fundamental concepts’ (Bourdieu *et al*. 1991: 253).[5]

LCT integrates this significance of gaze, but goes further to show that dispositions by themselves are not enough for knowledge-building (Maton 2014b: 125–47). A realist and relational gaze is invaluable, but without concepts capable of shaping, enacting and sustaining that gaze, it becomes limited and limiting. This can be explained using Bourdieu’s own ideas. Bourdieu described actors’ dispositions as durable and transposable: they take repeated and often lengthy exposure to circumstances to create or change. Apprenticeship into a new gaze thus typically requires prolonged experience, immersion in exemplary models, and intimate pedagogic relations with an expert. Accordingly, it may be available only to a few select initiates. Moreover, simply using Bourdieu’s concepts is not enough to reshape one’s gaze, for they do not embody that gaze: they do not realize his intention to be realist and relational. For example, one cannot analyse the organizing principles of a habitus separately from empirical description of the practices to which it gives rise. Though ‘habitus’ is defined as a ‘structured and structuring structure’ (1994: 170), the forms taken by this structure

cannot be revealed. That is to say, the concept does not offer a relational system of generative principles that can show a specific actor's habitus as characterized by, for example, the structure 'X' among a range of possible structures such as 'W, X, Y and Z' (Bernstein 2000; Maton 2012b, 2014b). One can describe the practices to which this actor's habitus gives rise but not the specific form taken by the habitus that generates them. Thus, one cannot get 'under the surface' to systematically describe similarities, differences or changes in habituses. The concept may be defined by Bourdieu in realist and relational terms, but it does not enable realist and relational analysis (and the same can be shown for his other 'thinking tools'). Thus, even prolonged use of Bourdieu's concepts is insufficient to shape, enact or sustain a realist and relational gaze.[6] Unsurprisingly, few scholars have conducted analyses akin to those of Bourdieu – few share his dispositions. Furthermore, another obstacle to knowledge-building arises even when actors do acquire the requisite gaze: the resulting dispositions are again durable and slow to change and thus not particularly responsive to lessons to be learned from different data. Tellingly, once established, Bourdieu's framework changed relatively little. Application to a growing range of topics was not matched by evolution of concepts towards greater generality and complexity.

These limitations can be overcome by recognizing that in addition to being cultivated through apprenticeship, gazes can also be trained through conceptual means. LCT is not only a craft, it is also a science. While the gazes of crafts and arts are typically gained through cultivation, the gazes of science are gained through mastery of knowledge and skills. A key medium here is theory. Thus, where Bourdieu highlighted the need to convert theory into a gaze, LCT additionally converts that gaze into theory. It extends Bourdieu's notion by articulating an explicit, systematic, principled and hierarchically organized conceptual framework. Through providing concepts capable of shaping, enacting and sustaining a realist and relational mode of thinking, LCT thus makes the basis of the gaze more explicit, more democratically available, more responsive to data, and more amenable to change (Maton 2014b: 125–47). This is neither to diminish the significance of gaze nor to reify knowledge. Concepts do nothing by themselves; their potential for knowledge-building is realized by actors. Rather, it is to highlight that a gaze alone is not enough and to foreground in addition the

form taken by theory itself.

Beyond Bernstein's codes

A framework that models the form required for a realist and relational theory is that developed by Basil Bernstein (1971, 1977, 1990, 2000). In *Knowledge and Knowers* (Maton 2014b), I show how LCT cumulatively builds on Bernstein's theory by extending inherited concepts to embrace a greater range of phenomena within a systematic and economical framework. Here, I shall simply highlight that Bernstein's approach illustrates how to avoid theoreticism and empiricism. Of particular note are his notion of 'codes' and 'devices'. Bernstein's concept of 'pedagogic codes' demonstrates how to move beyond empirical appearances to explore the organizing principles of dispositions, practices and contexts, in this case as combinations of strengths of boundaries ('classification') and control ('framing'). His model of the 'pedagogic device' then shows how to (metaphorically) dig deeper to explore the mechanism generating those organizing principles. There are thus layers to the framework that move beyond appearances to successively excavate the underlying relational systems of which they are instances and thence the mechanisms generating those systems. However, this is not to abandon the empirical. 'Code' concepts can be enacted in substantive research and what Bernstein (2000) termed 'external languages of description' explicitly translate between those concepts and the specificities of empirical data (see Chapter 2, this volume).

The form taken by this framework is fundamental to the architecture of LCT. Moreover, LCT goes beyond the concepts inherited from Bernstein in a number of directions. First, LCT explicitly broadens the referents of 'codes' beyond the 'pedagogic'. All practices are construed as *languages of legitimation* or claims to legitimacy whose organizing principles are conceptualized as *legitimation codes*.[7] The term 'legitimation' also foregrounds both sociological issues of cooperation and struggles over status, and ontological and epistemological questions of the potentially legitimate nature of practices. Second, LCT inaugurates a fundamental change that enables a more relational framework by reconceiving 'codes' in terms of both typology and topology. Traditionally, 'codes' have been described (using

combinations of ‘strong’/’weak’ classification and framing) as if comprising four boxes for categorizing practices. As I discuss below, LCT realizes the relational potential of this mode of theorizing by redescribing code concepts as axes of Cartesian planes that map out a topological space of infinite possible positions. This foregrounds the *relative* nature of strengths of elements (as ‘stronger’/’weaker’) in *relation* with other elements as well as enabling a more dynamic view.

Third, LCT deepens and diversifies the ‘codes’ and ‘devices’ available to research. Much of Bernstein’s framework remained at the tantalizingly suggestive stage of types which, as he stated (2000: 124), are limited in their generative power. Conceptualization of the organizing principles generating such types was limited to ‘pedagogic codes’ (classification and framing). LCT extends and integrates ‘classification’ and ‘framing’ within the broader concepts of *specialization codes* (see below) in a way which also recasts other concepts identified by Bernstein (2000) as landmarks in his framework (see chapters 2–5 and 9 of Maton 2014b). Moreover, LCT explores a series of additional organizing principles, such as *semantic codes* (see below), *autonomy codes* and *temporal codes*, which shed new light on practices. In parallel, LCT extends Bernstein’s ‘pedagogic device’ to capture the multifaceted nature of the generative mechanism underlying social fields of practices as a multidimensional *Legitimation Device*. I now turn to introduce some of these concepts.

Specialization and Semantics

LCT comprises a multidimensional conceptual toolkit. There are currently five dimensions: Specialization, Semantics, Autonomy, Temporality and Density. Each dimension comprises a series of concepts centred on capturing a set of organizing principles underlying dispositions, practices and contexts. (See Chapter 12 for explanations of the concepts that together comprise a ‘dimension’.) Each set of organizing principles represents a species of *legitimation code*: ‘specialization codes’, ‘semantic codes’, ‘autonomy codes’, etc. Each dimension also identifies a different *aspect* of the Legitimation Device, the means whereby these principles are created, maintained, transformed and changed. In this book, concepts are drawn from two dimensions, Specialization and Semantics, whose principal concepts are

summarized in Table 1.1. Space precludes discussing here all their constitutive concepts; see Maton (2014b) for ‘structures’ and ‘devices’ and Chapter 12 (this volume) for their interrelations within the framework. Here I introduce the ‘codes’, ‘planes’ and ‘profiles’ of Specialization and Semantics that are central to subsequent chapters of this volume.

Table 1.1 Basic concepts of Specialization and Semantics dimensions

Specialization		*Semantics*
	explores practices in terms of	
knowledge–knower structures		*semantic structures*
	whose organizing principles are given by	
specialization codes		*semantic codes*
	comprising strengths of	
epistemic relations and *social relations*		*semantic gravity* and *semantic density*
	which are mapped on the	
specialization plane		*semantic plane*
	and traced over time on	
specialization profiles		*semantic profiles*
	to explore the workings of the	
epistemic–pedagogic device		*semantic device*
	which is an *aspect* of the Legitimation Device	

Specialization codes

The concepts of *specialization codes* begin from the simple premise that practices are about or oriented towards something and by someone. One can, therefore, analytically distinguish: *epistemic relations* (ER) between practices and their object (that part of the world towards which they are oriented); and *social relations* (SR) between practices and their subject, author or actor (who is enacting the practices). For knowledge practices, these become

epistemic relations with proclaimed objects of study and social relations with authors or actors.

Each relation may be more strongly (+) or weakly (−) bounded and controlled or, simply put, more or less emphasized as the legitimate basis of practices, beliefs and identity.[8] These two strengths may be varied independently to generate *specialization codes* (ER+/−, SR+/−). As shown in Figure 1.2, the continua of strengths can be visualized as axes to create the *specialization plane*, a topological space with four principal modalities:

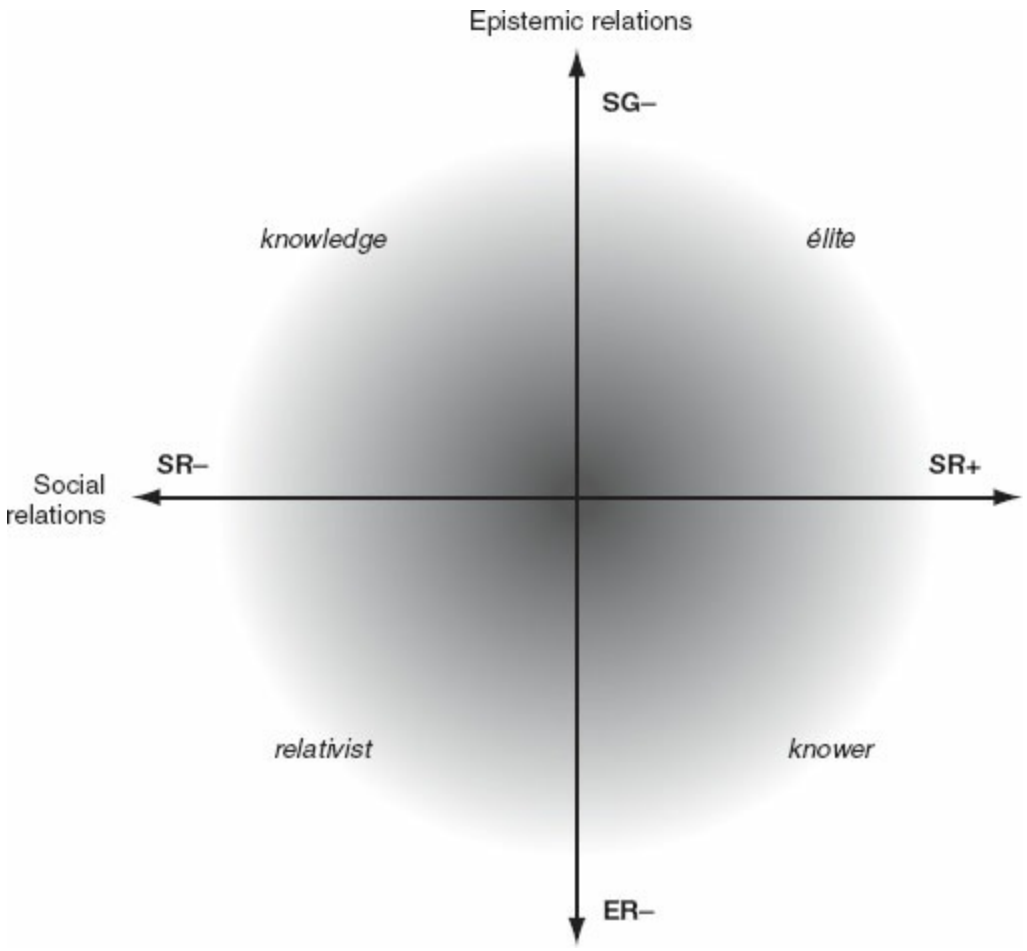


Figure 1.2 The specialization plane.

- *knowledge codes* (ER+, SR−), where possession of specialized knowledge, principles or procedures concerning specific objects of study is emphasized as the basis of achievement, and the attributes of actors are downplayed;
- *knower codes* (ER−, SR+), where specialized knowledge and objects are

downplayed and the attributes of actors are emphasized as measures of achievement, whether viewed as born (e.g. ‘natural talent’), cultivated (e.g. ‘taste’) or social (e.g. feminist standpoint theory);
- *élite codes* (ER+, SR+), where legitimacy is based on both possessing specialist knowledge and being the right kind of knower; and
- *relativist codes* (ER−, SR−), where legitimacy is determined by neither specialist knowledge nor knower attributes – ‘anything goes’.

Specialization codes conceptualize one dimension of the ‘rules of the game’ embodied by practices, dispositions and contexts. In the four codes listed above what matters is: ‘what you know’ (knowledge codes), ‘the kind of knower you are’ (knower codes), both (élite codes), or neither (relativist codes). A specific code may dominate as the basis of achievement, but may not be transparent, universal or uncontested. Not everyone may recognize and/or be able to realize what is required, there may be more than one code present, and there are likely to be struggles among actors over which code is dominant. One can thus describe degrees of *code clash* and *code match*, such as between: learners’ dispositions and pedagogic practices; education policies and subject areas; different approaches within an intellectual field; curriculum and pedagogy of a subject area; and many others. For example, the study re-analysed in Chapter 2 (this volume) explored how Chinese students brought knowledge-code dispositions from past educational experiences to an Australian university context dominated by knower-code practices, creating a code clash with deleterious consequences for the students. Similarly, a major study discussed in Chapter 3 showed that a large-scale policy initiative successfully integrated educational technology into subject areas that matched its knower-code intentions but produced less integrated outcomes in subjects characterized by other specialization codes.

As well as matches or clashes, the dominant code may also change, such as between subject areas, classrooms, and stages of a curriculum (or, for dispositions, through education or over the lifecourse). These *code shifts* effectively change the ‘rules of the game’. For example, the school music curriculum in English schools involves shifts from a knower code at primary schooling to a knowledge code during the early years of secondary schooling, and then towards an élite code for formal school qualifications in upper secondary schooling (Chapter 3, this volume). Such code shifts can have

profound implications, such as rendering previously successful actors unable to continue to achieve or, in this example, reducing the take-up rate of a qualification.

Such changes need not be categorical – one can also describe *code drift* or change *within* codes (in Figure 1.2, movement within a quadrant of the plane). This highlights a key attribute mentioned earlier above: the specialization plane embodies *both* a typology of four codes *and* a topology of infinite positions in which epistemic relations and social relations are continua of relative strengths. The concepts are fully relational. Each is 'strong*er*' or 'weak*er*' in relation to other practices (rather than dichotomously 'strong'/'weak'). One can thus also analyse processes of *strengthening* and *weakening* relations (ER↑/↓, SR↑/↓) creating code drift and code shift. The tools thereby enable organizing principles of practices to be analysed without effacing the manifold diversity typically found in data. The four codes are not homogenizing categories. A set of instances (of, say, practice) can be represented as a scatter pattern across the plane, showing the diversity of codes present and which code dominates the context. Changes in this pattern can also be plotted through time, tracing changes within and between codes. LCT thereby embraces both complexity and simplicity, both empirical instances and generative principles, and both inter- and intra-category change, within a relational theorization.

LCT is also a generative framework. As mentioned earlier, concepts are not limited to exploring what has been, they can also envisage what could be. Each set of practices can be analysed as a realization of codes whose 'settings' can be varied to generate other possible codes that would be empirically realized as different practices. For example, the strongly bounded and controlled educational knowledge and 'one-size-fits-all' teaching that characterizes 'traditional' pedagogy can be conceptualized as emphasizing epistemic relations and downplaying social relations: a knowledge code (ER+, SR−). Varying the strengths of these relations generates at least three other codes (ER−, SR+; ER+, SR+; ER−, SR−). The empirical realizations of these codes as pedagogic practices can then be generated. Taking a readily recognizable example, a knower code (ER−, SR+) would comprise weaker boundaries around and control over legitimate knowledge and stronger boundaries around and control over kinds of knowers, and is thus likely to be characterized in pedagogic practice by (among other attributes) blurring

boundaries between academic subjects and more individualized teaching and learning. Thus, even if 'traditional' pedagogy had been the only practices ever experienced, other forms of practice can be generated (such as, in this example, 'constructivist' pedagogy). The possibilities are numerous: the specialization plane offers far more than four positions; both epistemic relations and social relations comprise constituent relations that generate different forms of each specialization code (see below); and other organizing principles (e.g. semantic codes) can be analysed. Thus, LCT is a sociology of possibility that embraces the unimagined or obscured.

There is more to specialization codes than can be covered here. Further levels of delicacy include the '4–K model', which distinguishes different kinds of epistemic relations and social relations to conceptualize *insights* and *gazes* (Maton 2014b: 171–95). These concepts characterize different forms taken by specialization codes and enable analysis of their differential effects for issues including knowledge-building and social justice. Chapter 10 (this volume), for example, draws on the distinction between knower codes based on *cultivated, social* and *born* gazes to explore the basis of achievement in student assessments in jazz education. A further level of delicacy in the 4–K model explores different kinds of *lenses* that modify 'insights' and 'gazes', again with differential effects. Moreover, as Table 1.1 shows, in addition to 'codes' concepts, Specialization includes: the *epistemic–pedagogic device*, the generative mechanism over which actors struggle for control that 'sets' the comparative values of specialization codes and thus establishes the basis of hierarchies in a social field; and *knowledge–knower structures*, which describe the forms taken by social fields characterized by different specialization codes. Both offer complementary insights into the basis and effects of practice, as illustrated in Maton (2014b).

Semantic codes

The dimension of Semantics (Table 1.1) explores practices in terms of their *semantic structures* whose organizing principles are given by *semantic codes* that comprise strengths of *semantic gravity* and *semantic density*.

Semantic gravity refers to the degree to which meaning relates to its context. The stronger the semantic gravity (SG+), the more meaning is dependent on its context; the weaker the semantic gravity (SG−), the less

meaning is dependent on its context. Semantic gravity traces a continuum of strengths with infinite capacity for gradation. One can also dynamize this continuum to analyse *weakening* semantic gravity (SG↑), such as moving from the local particulars of a specific case towards generalizations, and *strengthening* semantic gravity (SG↑), such as moving from generalized ideas towards concrete and delimited cases.

Semantic density refers to the degree of condensation of meaning within practices. The stronger the semantic density (SD+), the more meanings are condensed within practices; the weaker the semantic density (SD−), the fewer meanings are condensed. The strength of semantic density characterizing a practice is not intrinsic to that practice but rather relates to the *semantic structure* within which it is located. For example, the term 'gold' commonly denotes a bright yellow, shiny and malleable metal used in coinage, jewellery, dentistry and electronics. However, within the discipline of Chemistry it is related to an atomic number, atomic weight, electron configuration, and much more. Many of these meanings involve relations to other meanings as part of compositional structures, taxonomies, and explanatory processes; for example, its atomic number represents the number of protons found in the nucleus of an atom, identifies it as a chemical element, and situates it within the periodic table. Thus, 'gold' in Chemistry is located within a complex semantic structure that imbues the term with a greater range of meanings. (Another way of conceiving semantic density is 'relationality': the more relations with other meanings, the stronger the semantic density; see Maton and Doran 2015a, 2015b.) Semantic density traces a continuum of strengths with infinite capacity for gradation. This continuum can also be dynamized to describe *strengthening* semantic density (SD↑), such as moving from a simple symbol or practice towards a more technical concept or complex practice, and *weakening* semantic density (SD↓), such as 'unpacking' technical concepts into simpler terms.

All practices are characterized by both semantic gravity and semantic density; what differs are their strengths, which may be varied independently to generate *semantic codes* (SG+/−, SD+/−). As shown in Figure 1.3, these continua of strengths can be visualized as axes of the *semantic plane* with four principal modalities:

- *rhizomatic codes* (SG−, SD+), where the basis of achievement comprises

relatively context-independent and complex stances;

- *prosaic codes* (SG+, SD−), where legitimacy accrues to relatively context-dependent and simpler stances;
- *rarefied codes* (SG−, SD−), where legitimacy is based on relatively context-independent stances that condense fewer meanings; and
- *worldly codes* (SG+, SD+), where legitimacy is accorded to relatively context-dependent stances that condense manifold meanings.[9]

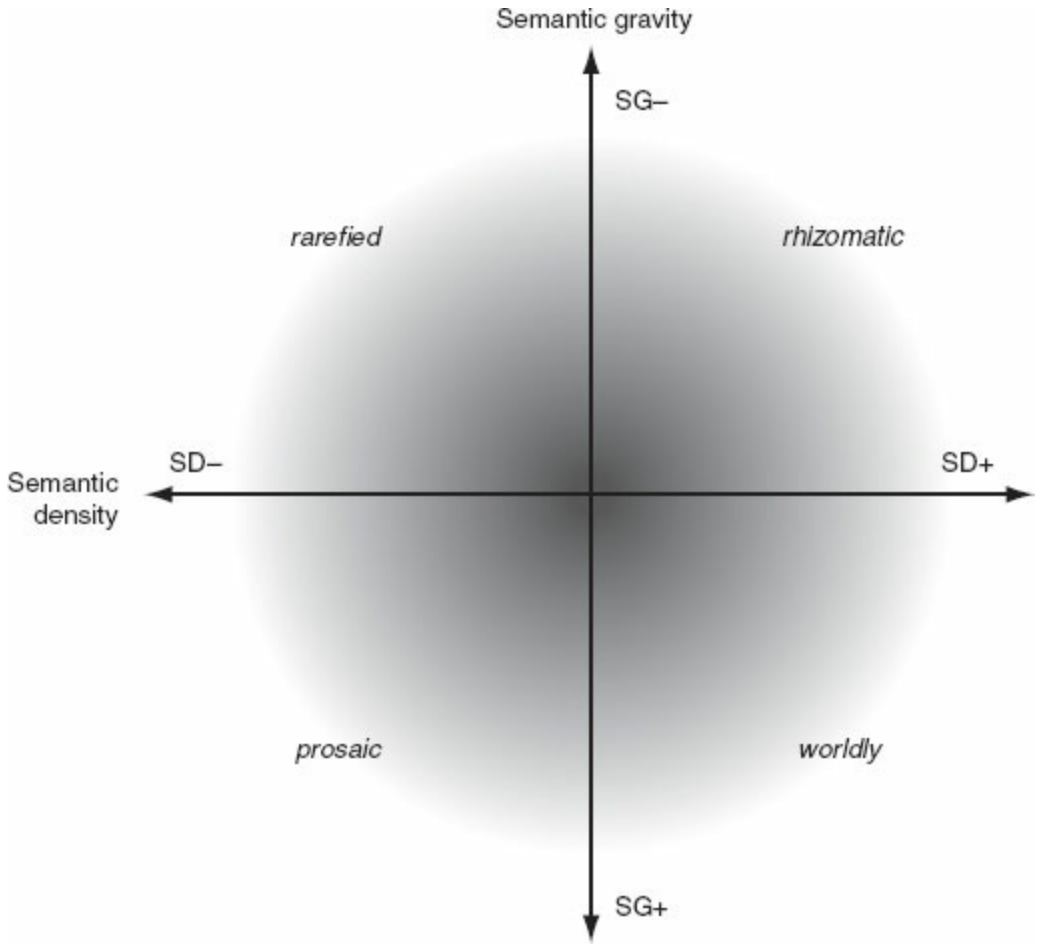


Figure 1.3 The semantic plane.

The capacities of ‘specialization codes’ outlined above are also applicable to these concepts. Semantic codes can be enacted to analyse the ‘rules of the game’, reveal similarity and difference, explore degrees of code clash and match, and show change over time (code shifts and drifts) in dispositions, practices and contexts. They too combine the advantages of typologies and

topologies, offering both four principal modalities and an infinite range of positions on the semantic plane (Figure 1.3). Moreover, they too enable the generative theorization of practices that are unrealized empirically or have become obscured. For example, education debates have been dominated by a recurring opposition between 'theoretical' and 'practical' knowledges. Semantic codes reveal this opposition as a false dichotomy: these forms represent *rhizomatic codes* (SG−, SD+) and *prosaic codes* (SG+, SD−), respectively, and exclude the possibility of *rarefied codes* (SG−, SD−) and *worldly codes* (SG+, SD+). Such blind spots have consequences, such as presenting a false choice to professional and vocational educators between 'theoretical' or 'practical' curricula (Shay 2013). Using semantic codes highlights that professional and vocational practices can involve not simply context-dependent but also condensed and complex forms of knowledge: *worldly codes* (SG+, SD+). Chapter 7 (this volume), for example, argues that design courses at university move through a series of stages from rarefied codes towards worldly codes. In short, the distinctive organizing principles of professional and vocational practices have been rendered invisible by dominant visions of education. The generative nature of LCT makes the invisible visible and thereby amenable to analysis, in turn allowing these bases of achievement to be explicitly taught and learned.

A further affordance of the concepts is enabled by the analytic method of *profiling* (Maton 2013, 2014a). Tracing the strengths of semantic gravity and semantic density of practices over time (such as the unfolding of an intellectual field, classroom practice, curriculum, or a text) reveals a *semantic profile* and an associated *semantic range* between their highest and lowest strengths. Figure 1.4 offers a heuristic representation of three simplified profiles and their ranges: a high *semantic flatline* (A), a low *semantic flatline* (B), and a *semantic wave* (C). The value of profiling is being illustrated by a growing body of research that is revealing further 'rules of the game' for achievement and bases of cumulative knowledge-building across different kinds of practices (Maton 2013). Studies of student work products are suggesting written assessments structured as semantic waves are rewarded across subject areas and levels of education (e.g. Maton 2014b; Wolff and Luckett 2013). They are also highlighting how these can vary over time and across subjects. Chapter 8 (this volume), for example, analyses the changing semantic profiles demonstrated by writing in school English literary studies

at different stages of schooling. Similarly, studies are revealing the falsity of viewing academic literacy as either generic or subject-specific by showing how subjects are characterized by semantic waves but with distinctive profiles (Szenes *et al*. 2015). This method is, however, not confined to analysis of assessments. Studies of classroom practices are revealing the semantic profiles that enable and constrain knowledge-building in different subject areas (e.g. Martin and Maton 2013). Moreover, studies of research are highlighting the debilitating effects of the false dichotomy with which I began this chapter: between a high semantic flatline of decontextualized theorizing and a low semantic flatline of context-dependent empirical descriptions. In contrast, they reveal the potential for knowledge-building of theories that trace semantic waves and embrace a greater semantic range (Maton 2014b).

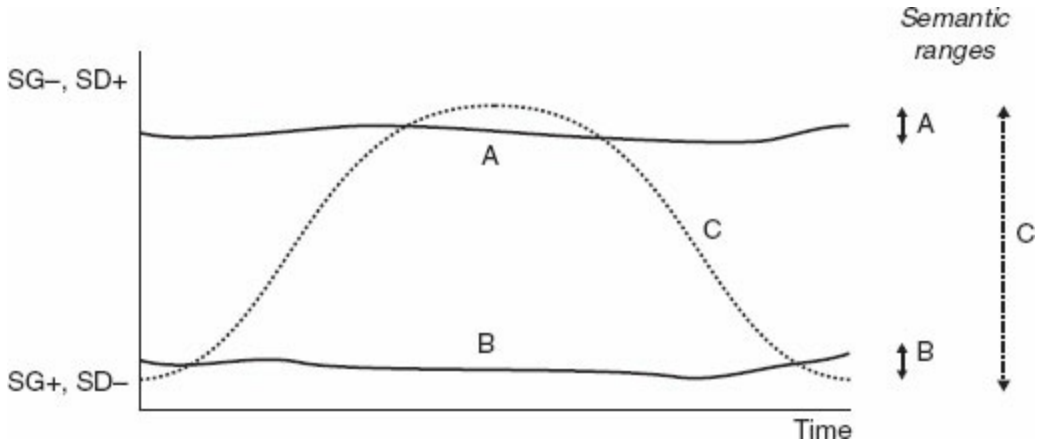


Figure 1.4 Three illustrative semantic profiles.

Profiling can also be used for specialization codes: tracing strengths of epistemic relations and social relations generate *specialization profiles*. Such shared capacities among concepts from different dimensions of LCT raise the question of how the concepts are related. Table 1.1 places Specialization and Semantics side by side because LCT dimensions are ‘simultaneous’: they explore not different practices but rather different organizing principles that may underlie the same practices. Specialization codes and semantic codes can be used together to analyse the same empirical data and offer complementary insights into the same phenonema. For example, Chapter 6 (this volume) enacts specialization codes and semantic gravity to analyse ‘ethnographic’

writing, and Chapter 7 and Chapter 8 enact semantic gravity and semantic density to explore the basis of cultivating a knower code in design and school English, respectively. Similarly, the *semantic device* that 'sets' the comparative value of semantic codes, and the *semantic structures* of social fields generated by the interplay of those codes (see Maton 2014b), can be explored alongside their equivalent concepts from Specialization. Conversely, each dimension can be used separately; indeed, each concept can be enacted alone. For example, Chapter 9 analyses student work in physics using 'semantic gravity' to reveal a 'Goldilocks zone' for context-dependence in student answers: too strong or too weak can lead to failure. The basis of choosing how many and which concepts to enact cannot be legislated in advance – it is a matter of possessing the right gaze, to which I now return.

Gaze at the future

The explanatory framework of LCT – of which two species of legitimation code have been outlined – embodies depth realist and relational modes of thinking. Concepts embrace but also move beyond sensual appearances to explore their organizing principles, reveal this patterning as one of a range of possible patterns, and excavate in turn their generative mechanisms. Each organizing principle and each patterning are relationally defined. Moreover, they enable studies to conceive practice relationally by bringing together analyses of the legitimation codes of dispositions, contexts and practices (e.g. Chapter 2, this volume). LCT thereby converts a realist and relational gaze into theory and offers a conceptual means of shaping, enacting and sustaining that gaze. However, just as the gaze is insufficient without concepts that enable the gaze, so the potential of those concepts may be unrealized if researchers do not acquire the gaze. Doing so is not simply a matter of learning definitions – it also requires practice at putting the practical theory into practice. As Bourdieu (2004: 40) argued:

> The difficulty of initiation into any scientific practice (whether quantum physics or sociology) lies in the fact that a double effort is required in order to master the knowledge theoretically but in such a way that this knowledge really passes into practice, in the form of a 'craft', 'knacks', an

‘eye’, etc., and does not remain in the state of a meta-discourse about practices.

Such craft work is typically obscured in discussions of both theories and methods. Where it does appear, practices are often couched in vague, mysterious or ethereal terms, as if learned through a magical process of initiation. This book aims to help begin make the craft more explicit. The *modus operandi* embodied by LCT becomes most apparent in the context of substantive studies. Without the questions and data that animate the course of real projects, discussions of method quickly become detached from the everyday practicalities of research. Accordingly, as outlined earlier above, Part I of this volume explicates practical principles of LCT through analysing the development of real projects, and Part II provides examples of results of studies. Together they also demonstrate there is more to the craft of LCT than enacting realism and relationalism. Here I shall briefly highlight three additional attributes, namely LCT as *problem-oriented, dialogic* and *conjectural*. These characteristics are related: the centrality afforded problem-situations emphasizes the value of dialogues for explanatory power and highlights the conjectural nature of the resulting knowledge claims.

Problem-oriented

Ensuring the problem-situation – the combination of a specific object of study, research questions and forms of data – remains at the heart of decision-making is a core principle of LCT. Here inspiration is drawn from Bernstein’s call for less allegiance to approaches and more dedication to problems (1977), Bourdieu’s strictures against theoreticism and methodologism (1996), and Popper’s insistence that ‘What matters is not methods or techniques but a sensitivity to problems, and a consuming passion for them’ (1963: 95). Theory constructs a problem-situation – without theory, there is an infinite flux of possible data. However, where this relationship is one way and theory entirely defines data in its own image, the resulting ideas become relevant only to that imaginary world (Maton 2014b: 177–84). Thus, key to the craft of LCT is constructing problem-situations in ways that enable dialogue between theory and data, so that each problem-situation can in turn shape the selection, assembly and enactment of concepts in research. This is

also crucial for knowledge-building that neither remains locked within nor neglects the specificities of objects of study. One strength of 'legitimation codes' is their capacity to be applied at many levels of analysis to explore diverse kinds of phenomena. However, the concepts are realized differently in each case. Accordingly, as Part I of this volume shows, LCT offers means for mediating between theory and the specificities of each problem-situation, in the form of 'translation devices' between concepts and data (Chapter 2), context-sensitive data collection instruments (Chapter 3), and 'languages of enactment' for relating concepts and practice in determinate contexts (Chapter 4).

Foregrounding problems also guards against theoretical and methodological fetishism. It highlights that one only needs as much theory as the problem-situation demands – not all concepts are required for all substantive studies. Moreover, as Part II chapters demonstrate, the craft of LCT is to begin from real-world issues and engage with real-world data, rather than embroiling the framework in the intellectual gymnastics of theoretical polemics, 'an impotent and sterilizing metadiscourse' (Bourdieu 1996: 180). Real-world data keeps you honest and grounded. Methodologically, emphasizing problems ensures pluralism does not slip into relativism. While studies enacting LCT deny such false dichotomies as qualitative/quantitative, the aim in doing so is not to fetishize multiplicity but rather to generate explanatory power about a problem-situation. As Chapter 3 illustrates, the choice and enactment of techniques must, therefore, always be appropriate to the problem at hand. Accordingly, in discussing how LCT overcomes dichotomies, Part I chapters engage not in theoretical or methodological debates but rather ground discussion of the craft of LCT in real examples of substantive research.

Dialogic

Foregrounding problem-situations underlines the significance to knowledge-building of a dialogic stance. While monologic theories can become extremely ornate, their baroque frameworks are soon dogmatic, narcissistic and evermore detached from reality. In contrast to inward-looking for theoretical purity, a dedication to problems encourages looking outwards for explanatory power, to other theories, methodologies, objects of study, and

data. Dialogue is also crucial for overcoming the false dichotomies that bedevil studies of education and society. To avoid reducing one side of a dichotomy to the other requires respecting the integrity of each side and making explicit how they can be related. Accordingly, as Part I chapters discuss, constructing these relations as dialogic is characteristic of LCT. Developing 'translation devices' enables dialogue between theory and data, and provides a means for substantive studies to 'speak back' to the framework (Chapter 2). Evolving complementary quantitative and qualitative instruments brings the results of different methods into dialogue to strengthen validity and reliability of findings and shed more light on phenomena (Chapter 3). Creating 'languages of enactment' enables dialogue between theory and specific arenas of practice that generates praxis (Chapter 4). Developing processes for bringing analyses using different theories into productive dialogue enables complementary insights to be related, provoking theoretical innovations (Chapter 5). Moreover, in the craft of LCT such dialogic relations are not merely proclaimed tenets but realized as practical strategies for research. For example, Chapter 5 outlines three dynamics for facilitating dialogue between theories within interdisciplinary projects: *zooming* between a bigger picture and more specific cases; *refocusing* between fuzzier and precise analyses; and *alternating* between parallel analyses by each theory and joint analyses. These dynamics provide practical ways to maintain an 'essential tension' between theories being too close or too distant, avoiding tendencies towards monologic reductionism or detachment that often characterize 'interdisciplinary' research.

Dialogue is not confined within studies; it also characterizes the wider community of research enacting LCT. As discussed earlier above, the chapters of Part II illustrate how the framework embraces diverse phenomena, from research to student work, from physics to jazz, and from schooling to university and informal learning beyond education. Rather than each topic being segmented by empiricist models, LCT allows a wider conversation among these studies. Though time and space precluded illustration in this volume, the field of research enacting LCT is wider than a single book and findings from these and many other studies are being brought into relations to help provide a more encompassing and integrated account of education and society.

Conjectural and open-ended

LCT inherits problems and bequeaths problems, for every answer to a question in turn raises more questions. The explanatory framework cumulatively integrates and extends ideas from existing theories to offer concepts that will continue to evolve. Substantive studies enacting those concepts offer explanatory conjectures open to refinement or refutation. 'Translation devices' for relating theory and data (Chapter 2) or practice (Chapter 4) make visible the analytic process, enabling rational discussion and offering conceptual tools for adaptation by future studies. Thus, each paper is neither the beginning nor the end, neither the first nor the last word on its subject. Each forms part of a broader conversation through time, one which builds on the past to offer a contribution to present understanding that is always provisional, and may be built on in the future. The centrality of problems and dialogue thus encourages an open-ended sense of knowledge-building to suffuse the craft of LCT.

Accordingly, this book is but a partial snapshot of a framework and a body of research that are in motion. There is much more to LCT than the concepts introduced in this chapter and there are many more topics and issues addressed by studies enacting those concepts than can be represented in this volume. Moreover, LCT foresees its own repeated refinement, deepening and extension through dialogues with concepts inherited from existing frameworks, substantive studies that reveal new issues to be addressed, and complementary frameworks that shed light on different facets of phenomena. Knowledge claims generated through LCT are thus an invitation to engage, to 'only connect', to speak to one another, to join in discourse and deed such that together we become more than the sum of our parts. There is no conclusion to the task of knowledge-building. So, as Sherlock Holmes would proclaim, let us tarry no longer in this chapter – the game is afoot!

Notes

1 To keep abreast of this work, see the LCT website: www.legitimationcodetheory.com.

2 Pedagogic enactments are less publicly visible than publications but growing quickly (see LCT website). Pedagogic studies are underrepresented here because they were few in number when this volume was first commissioned but have

subsequently blossomed (e.g. Blackie 2014; Clarence 2014; Macnaught *et al*. 2013; Maton 2013; Weekes 2014).

3 For example, analyses enacting LCT reveal the significance for cumulative knowledge-building of a theory progressing as 'semantic waves' with a high 'semantic range' (Maton 2013, 2014a, 2014b: 125–47; Chapter 6, this volume), two traits which LCT itself then enacts in both research (Chapters 2 and 5, this volume) and praxis (Macnaught *et al*. 2013). I define these concepts further below.

4 Bourdieu uses 'realism' variously to refer to different stances. By 'realist' I refer not to empiricism but to depth realism that posits a stratified and emergent ontology, such as critical realism (Bhaskar 1975). I add 'realist' to Bourdieu's phrase because 'relational mode of thinking' does not make explicit his arguments for exploring the generative principles underlying empirical practices.

5 By using the term 'gaze' I am building upon Bernstein (2000) and Bourdieu, as well as connecting with the LCT conceptualization of different 'gazes' (Maton 2014b). In LCT the term does not imply a restriction to or privileging of the ocular but rather refers to dispositions underlying 'know-how', modes of thinking, acting and being that are commonly referred to variously as 'feel', 'ear', 'nose', 'taste', 'sense', or 'eye'.

6 Ironically, Bourdieu's concept of 'habitus' cannot describe the organizing principles of the 'scientific habitus' he argues is essential for enacting his framework.

7 In the name of the framework, 'legitimation' is not classifying a subtype of 'code theory': LCT is a theory of legitimation codes.

8 See Maton (2014b: 31) for a distinction between *focus* and *basis* of practices. For example, knowledge claims may *focus* on a 'knower' issue (such as physical experience of pain) but on the *basis* of specialized knowledge (such as a medical report). Specialization codes concern the *basis* rather than the *focus* of practices – organizing principles underlying practices rather than their surface content.

9 These terms supersede earlier names for these concepts found in Maton (2014a).

Part I

A practical theory

Putting Legitimation Code Theory to work

2 LCT in qualitative research

Creating a translation device for studying constructivist pedagogy

Karl Maton and Rainbow Tsai-Hung Chen

Transcending the divide between theory and data.

Introduction

Qualitative researchers often experience two moments of crisis: when they move from discussing theory to collecting data, and when they move from collecting data to analysis. Too frequently they find their chosen theory lends itself neither to enactment in substantive research nor to engagement with empirical findings. They sense a gap between their theory and data but lack the means of translating between them. Thus, theoretical ideas and arguments that make sense in the abstract often unravel when faced with the real world of research. Moreover, this gap is repeated in the places to which they might turn for guidance. On the one hand, philosophies of social science are typically silent on practical questions. They address ontology and epistemology and may offer meta-theoretical tenets for research but rarely demonstrate their implications for substantive studies. On the other hand, methods textbooks typically offer concrete strategies divorced from the explanatory frameworks that would give them meaning. They explain research techniques, but not why they should be employed. The problem of enabling productive dialogue between theory and data thus remains keenly felt by many scholars of social science.

As Basil Bernstein (2000: 132) highlighted, a key source of this problem resides in the form taken by theories themselves. Bernstein distinguished

between the ‘internal language of description’ of a theory or how the constitutive concepts are interrelated, and its ‘external language of description’ or how those concepts relate to referents beyond the theory. Each language can be stronger or weaker. An internal language is stronger where concepts are tightly interrelated and weaker where they are less integrated. An external language is stronger where concepts and referents are related in relatively unambiguous ways and weaker where these relations are vague or unclear. In these terms, qualitative researchers often face frameworks with stronger internal languages but weaker external languages: they make sense in their own terms, but their enactment in empirical research is problematic. Crucially, they struggle to engage with data.

This chapter addresses how Legitimation Code Theory (LCT) can be used to overcome this divide in qualitative research. Specifically, we discuss how to develop an ‘external language of description’ or *translation device* between theory and data. We ground our discussion in the example of a major study that enacted the LCT concepts of *specialization codes* (Chapter 1, this volume) to explore how constructivist pedagogy shapes the educational experiences of students (Chen 2010). First, we elaborate on Bernstein’s notion of an ‘external language’ – its rationale, its role in research, and ways it has been interpreted – to clarify the nature of a ‘translation device’. Second, we introduce the study we use to exemplify how such a device can be evolved. Third, we analyse the evolving process of that study. There are few published examples of ‘external languages’; there is even less public discussion of how they can be developed. Publications typically reveal the products of research; here we reveal the process as well as the product, to make explicit part of the craft of LCT (Chapter 1, this volume). We analyse the study as an unfolding narrative, focusing on how relations between theory and data were negotiated in the development of an external language of description. Last, we introduce the resulting translation device, discuss how it enables dialogue between theory and data, and consider the nature of the process more generally.

We should emphasize that this chapter is intended to be neither a definitive guide nor a template for enacting LCT. More widely, it aims neither to normatively define how theory and data should be related nor to restrict diversity in how this can be achieved. As we discuss, there are several interpretations of ‘external languages’, and, as other chapters in this volume

illustrate, there are many ways of using LCT and developing translation devices. Rather, by focusing in detail on one study we hope to shed some illustrative light on how the framework can be used in qualitative research to generate explanatory power through fostering dialogue between theory and data.

A discursive gap

As Bernstein insisted, all research involves a theory of some kind, the question is how explicit that theory is made:

> we all have models, some are more explicit than others; we all use principles of descriptions, again some are more explicit than others; we all set up criteria to enable us both to produce for ourselves, and to read the descriptions of others, again these criteria may vary in their explicitness. Some of our principles may be quantitative whilst others are qualitative. But the problem is fundamentally the same. In the end whose voice is speaking? My preference is to be as explicit as possible. Then at least my voice may be deconstructed.
>
> (Bernstein 2000: 209)

By 'voice', Bernstein meant not a reductive reading of identity, whereby knowledge claims are reduced to 'voicing' social categories such as class, gender or ethnicity. Rather, he highlighted the often neglected voice of researchers *qua* researchers – the basis of claims as a sociologist, as an educationalist, as a linguist, etc. The point is that without making explicit one's theory and the principles of its enactment, and in ways that enable others to recreate the analysis for themselves, the veracity of one's knowledge claims remains obscured.

A key aspect of this issue concerns relations between the theoretical and the empirical. All research involves what Bernstein (2000: 209) called a 'discursive gap' between theory and data, but frameworks differ in whether and how this gap is traversed. Most fail to either recognize or overcome this gap – they may 'have a powerful and persuasive internal conceptual language but reduced powers to provide externally unambiguous descriptions of the phenomena of their concern' (Bernstein 2000: 208). This constrains their

capacity for building epistemologically powerful knowledge. Substantive studies using such theories are less able to relate their findings to one another as their processes of analysis are less visible and thus less open to scrutiny by others. They thus lack what Bernstein (2000: 168) called ‘a crucial resource for either development or rejection’ of concepts or the explanations generated by their enactment, leaving the theory at risk of becoming frozen in time.

Reinforcing this problem is a tendency for research into education and society to portray explicit means of enacting concepts as imposing theory onto data in a ‘cookie-cutter’ model that ignores the particularities of objects of study. While such an approach would indeed be deaf to data, so is denial of the discursive gap. Failure to recognize that relations between theory and data are not immediate or unproblematic but rather require an explicit means of translation typically leads to theory becoming deaf to data, for nothing seems to fall outside the theory. Conversely, belief in the possibility of purely inductive explanations, free of pre-existing theory, is a fantasy that renders invisible and thus unquestionable the implicit theories held by researchers. Bernstein’s notion of ‘external languages of description’ suggests an alternative to the false dichotomy of either imposing theory on data or miraculously deriving theories from data. It acknowledges the discursive gap but offers a means for traversing that gap through dialogue by positing the possibility of a translation device.

Interpretations of ‘external language’

What is an ‘external language’ and how can one be developed? Bernstein offered somewhat abstract criteria for external languages but few published examples (2000: 131–41), a paucity that has encouraged divergent interpretations. Though potentially confusing in all using the term ‘external language’, these interpretations have engendered complementary tools for research. We shall distinguish three such tools as what we shall term *data instruments, mediating languages*, and *translation devices*. We should emphasize our aim here is to clarify our focus – a means of enabling dialogue between theory and data – rather than to normatively define the term ‘external languages’ or definitively interpret Bernstein’s meaning. Moreover, while ‘translation devices’ will form our focus in this chapter, the other two represent valuable tools for research and all three may be fruitfully used

together.

First, *data instruments* provide a methodological guide to a project by delineating how concepts suggest foci for data collection and questions for analysis. They make explicit the movement *from* theory *towards* data. For example, in a study of Australian teachers' pedagogic strategies with Taiwanese students, Dooley (2001) includes data instruments for classroom discourse and interview data. Each comprises plans for enacting concepts from Bernstein's framework by identifying key issues they highlight for analysis (e.g. 'instructional discourse' is enacted within classroom talk as such categories as 'dialogic structures' and 'monologue') and questions to ask data (e.g. 'Is speech key to the activity or is spoken discourse minimized?'). Similarly, in research into the professional knowledge base of Anglophone teachers working overseas in Indonesia, Exley (2005) includes a 'data generation instrument' of sample interview questions (e.g. 'How did you organize your content?') and a 'data analysis instrument' of questions for organizing and interrogating data (e.g. 'What did teachers say about the specialization of this content?'). Such data instruments offer tools for methodological engagement by illustrating the kinds of questions posed by concepts when exploring specific objects of study. They differ from what we are describing as 'external languages of description' in that they concern the process rather than the product of research. In effect, they formalize and condense the kind of narrative we shall unfold below but not the translation device it leads to. Crucially here, they do not systematically show how concepts are instanciated in data and how data can be read across to their conceptualization. Nonetheless, such data instruments valuably make explicit the methodological rationale and workings of research practice.

Second, *mediating languages* take the form of typologies or networks that distinguish sub-categories for the realizations of a concept to create a more empirically sensitive instrument and avoid 'the dominance of high-level structuring concepts' (Brown 2006: 140). The main concept is divided into or reconceptualized as categories which, through engagement with data, are recursively divided into sub-categories until the network is able to account for all data in the study. For example, in research into parental participation in mathematics education, Brown (1999) delineates 'a system of conceptually consistent categories organized in the form of a network' (2006: 140). In a simpler example, Straehler-Pohl and Gellert (2013) suggest three foci for

applying ‘classification’. Such tools are not part of the ‘internal language’ (L^1) of a theory because they represent means for enacting concepts to describe something beyond the theory. However, they typically have a far broader focus than what we are calling ‘external languages’ (L^2). For example, multi-level typologies developed for calibrating strengths of ‘semantic gravity’ and ‘semantic density’ conceptualize different types of wording, clausing and sequencing in English discourse as a whole rather than, say, a specific corpus of observation data.[1] Thus they represent what can be termed *mediating languages* (or ‘$L^{1.5}$’): while offering a basis for developing translation devices, their broad focus and wide range of possible data means they may require extension by external languages to engage with a determinate problem-situation. In short, mediating languages comprise a network of potential forms that researchers may encounter and external languages comprise a translation device for recreating the analysis of a specific study. (Put another way, a mediating language can be described as a more general, and an external language as a more specific form of translation device.)[2] However, when set within a broader context of exemplars such typologies and networks may form part of external languages (while also offering more transposable types). Brown (1999), for example, provides detailed descriptions of distinctions and empirical examples that make explicit how to translate between his network and data.

A third interpretation is our focus in this chapter. The notion of external languages as *translation devices* was first exemplified by studies enacting Bernstein’s (1977) concepts of ‘classification’ (strength of boundaries between contexts and categories) and ‘framing’ (strength of control within contexts or categories). By conceptualizing organizing principles of practices, these code concepts operate at a relatively high level of abstraction and condensation. They require external languages to describe how they are realized within any specific study, such as what boundaries ‘classification’ refers to and what ‘strong’ or ‘weak’ classification looks like in the data. Such devices typically comprise a concept, indicators of how the concept is realized empirically, criteria against which relations with data can be decided, and examples from the data. An example of sustained development of such languages is offered by Morais, Neves and colleagues (e.g. Morais *et al*. 2004; Neves *et al*. 2004), who focus on classroom interactions. Table 2.1

presents an extract from an external language for analysing 'the discursive rule sequence' in terms of 'framing'. It includes an indicator ('exploring/discussing themes under study'), a four-point scale of strengths of 'framing', descriptions of criteria for these strengths, and two examples of classroom interactions for a 'F++' and a 'F−−' value. The external language of description we shall discuss in this chapter includes similar components. (We explain how they translate between theory and data, further below.)

Creating a translation device

If this begins to exemplify what an 'external language' looks like as a translation device, the next question concerns how to develop one. Existing external languages have been presented as finished products and Bernstein (2000: 131–41) offered but brief insights into the process. Nonetheless, several general characteristics can be discerned (cf. Moore and Muller 2002; Moore 2013).

Table 2.1 An external language of description for the discursive rule sequence (Morais *et al*. 2004: 79)

Example of indicator

Indicator	F++	F+	F−	F−−
Exploring/ discussing themes under study	The teacher explores contents according to a rigid order which is never altered even when children intervene	The teacher explores contents according to a given order but accepts children's interventions at the level of the microsequence	The teacher explores contents altering the microsequence, and occasionally the macrosequence, as a result of children's interventions	The teacher explores contents, even changing the macrosequence, as a result of children's interventions

Examples of transcripts

F++ Ronaldo reads aloud the material needed to the realization of an experiment planned by his group.
David, who is part of another group, wants to ask a question.
'No, sorry, we are leaving doubts to the end.' (Teacher).

F−− Children made a variety of experiments about several state changes of various

substances.
The description of the experiences and the presentation of the results are done according to an order chosen by children.
Teacher's questions intends to clarify some aspects referred to by children, but do not suggest any sequence to work presentation.

First, an external language is not simply an extension of the internal language of a theory but rather arises from its engagement with the specificities of an object of study. The intention is to enable new or unexpected information to emerge from the data that may reshape both the way concepts are enacted and, potentially, the concepts themselves. Evolving an external language thus requires a measure of distance from the internal language and immersion in the data of the study.

Second, this immersion is necessary because concepts are often realized differently in different problem-situations. For example, the LCT concepts of *epistemic relations* and *social relations* are being enacted across a wide variety of social fields and practices. In studies of the low uptake of school qualifications in music, 'social relations' are realized in curriculum documents as musical aptitude, attitude and personal expression (Lamont and Maton 2008, 2010); in research into internationalized online education, they are realized in online student postings as personal experience of national cultures (Doherty 2010); and in studies of standpoint theories, they are realized in knowledge claims as membership of social categories (Maton 2000a). While the concept always refers to relations between knowledge practices and actors, these relations take different empirical forms within each problem-situation. Thus immersion in the data is essential – one cannot impose pre-existing categories from a theory's internal language (though one can begin from or adapt an existing external language).

Third, immersion in data is not enough: one also needs to move beyond the specificities of the object and back towards theory. For example, the studies just mentioned do not remain locked within their specific foci but relate data to concepts of greater context-independence and condensation, namely *social relations* and thence *specialization codes*. This enables their disparate explanations of diverse problem-situations to be brought into relation through the shared internal language of the theory. One can, for example, compare the roles stronger social relations play in subject choices, online learning, and

research.

These general characteristics suggest that evolving an external language involves iterative movements between theory and data. As Moss (2001: 18) describes:

> The researcher must be 'prepared to live with the muddle which is the unordered data, and enjoy the pleasure of its potential, in order to be able to generate the theoretical apparatus which is specific to it' (Bernstein, personal communication). Get in there too soon with the theory and it will overwhelm the data, limiting its potential to say something new. Delay pulling back from the data too long, and the researcher runs the risk of ending up submerged in the specifics, with no way of identifying the general principles which underpin the whole.

The timing of these movements is thus a matter of judgement. If the product seems more 'scientific', the process is more akin to 'art' or 'craft' (using these terms loosely). This is to say that, once developed, an external language is an objectified vehicle for inter-subjective meaning-making: anyone can use the device to read the data and reconstruct the analysis for themselves. In contrast, as the quote implies, the process of creating such languages is fluid, subjective and requires guidance by experience. In short, it is a matter of gaze. Nonetheless, as Chapter 1 (this volume) emphasizes, such craft work can be made explicit and visible. Thus, analysing the processes involved in creating a translation device forms our focus for the remainder of the chapter.

Case study and frameworks

Our case study involves a doctoral researcher, Rainbow Tsai-Hung Chen, and her supervisors, Sue Bennett (University of Wollongong) and Karl Maton (University of Sydney). We shall describe this study as a narrative involving ourselves as protagonists (using surnames), based on contemporaneous correspondence, documents and notes, supplemented by cross-checked recollections. The research explored the effects of online constructivist pedagogy on Chinese students at an Australian university. The context to this focus was threefold. First, the dramatic expansion in international students in recent decades had outpaced research into the effects of different forms of

pedagogy on their educational experiences. The study focused on Chinese learners as they represented a high proportion of Australia's international students (Australia Education International 2012). Second, existing research into Chinese students overseas had overwhelmingly focused on the students alone, attributing both their comparative success or failure to proclaimed culturally based attributes. This reductive and non-relational approach thereby exhibited 'knowledge-blindness' (Maton 2014b) by largely ignoring the role played by the educational contexts in which students were situated. Third, in recent years literature proclaiming the suitability of constructivism for online education had grown exponentially. It was also widely proclaimed that this approach empowers learners. However, relatively little research had been conducted into learners' experiences.

Chen's study focused on: the experiences and expectations brought to Australia by Chinese learners from their previous education; the curricular and pedagogic practices they encountered at the Australian university attended; and how the learners negotiated these educational practices. The data collection comprised: three focus groups with Chinese international students at the university; eight interviews with teachers of online courses in the university's Faculty of Education and analysis of their course outlines; and multiple in-depth interviews with seven Chinese students in the Faculty, conducted at regular intervals through the course of their studies.

The research drew on the LCT dimension of Specialization, specifically the concepts comprising *specialization codes* (Maton 2014b; Chapter 1, this volume). At the time Chen commenced the research (2006–7), these concepts were being enacted in a growing number of projects but few extant external languages were available for adoption or adaptation. Thus, a translation device had to be developed from scratch. The research itself is reported more fully in Chen (2010) and summarized in Chen *et al*. (2011). Here we discuss in four principal stages how the external language was evolved, highlighting in each stage wider lessons for enacting LCT in qualitative research. First, we engage with the process of choosing theoretical frameworks for the study. The research did not begin from LCT but rather came to LCT to address questions left unanswered by frameworks more closely connected to the substantive topic. Second, we discuss how Chen's scholarly gaze was shaped through an extended immersion in theory, and how she then began enacting and refining this gaze in data collection through immersion in her object of

study. Third, we describe moves back from data towards theory during an extended phase of analysis, including the many iterative movements between the two that evolved the external language. In each of these stages we highlight common temptations awaiting researchers and how these potential obstacles to enabling dialogue between theory and data can be avoided. Last, we turn from processes to products of research by discussing how the external language works as a translation device and its role in the substantive theory advanced by the completed thesis. Our narrative is, of course, simplified. No account can do justice to the numerous movements between theory and data involved in this study. Instead, our aim is to provide, in broad brushstrokes, a basic sense of the dialogic nature of the process whereby LCT was enacted in qualitative research.

Choosing frameworks

When beginning her doctoral study, Chen knew from previous research training that she needed a theory to help construct her research problem. However, existing studies into her chosen topic offered little to build on. A voluminous literature on Asian learners' experiences of 'Western' education has emerged over recent decades but lacks adequate theoretical foundations. Typically, disparate studies of different educational contexts and groups of learners have generated empirical descriptions of various cultural attributes said to characterize Chinese students. Given Chen's proposed research concerned people moving to another culture, she cast a wider net to review work on intercultural exchange more generally. This literature suggested Berry's acculturation framework (2005) as a starting point. The model identifies factors affecting cross-cultural adaptation, including 'the heritage culture', 'the host culture', and 'contact' between them that leads to possible outcomes. Chen adapted the model for educational settings: 'heritage culture' became Chinese contexts and practices that shaped students' educational dispositions; 'host culture' became the educational contexts and practices they encountered in Australia; and the consequences of 'contact' became the students' educational experiences.

Berry's framework provided a starting point for the study (see Chen *et al.* 2008). However, it did not address specifically educational practices. For this Chen turned to Bernstein's notion of education as comprising three 'message

systems': curriculum, pedagogy, and assessment (1977). This provided a means of dividing each of Berry's three main components ('heritage culture', 'host culture', and 'contact') into three sub-categories of curriculum, pedagogy, and assessment, generating nine issues to explore. From her supervisors Chen came to understand that this combined model offered an 'organizing framework' but not an 'analytic framework' (Maton 2014b: 210). That is, it provided a list of what to explore but not the conceptual means for doing so. Chen still required concepts for analysing the *organizing principles* of dispositions, practices and contexts across the heritage culture, the host culture, and contact outcomes, in order to reveal similarities, variations and differences among them. Descriptive data analyses, such as 'Chinese education values learning a large amount of content knowledge' (on curriculum in the heritage culture) and 'Australian online courses emphasize learners deciding which part of the content is important to them' (on curriculum in the host culture), do not by themselves allow systematic comparison. They describe the realizations of organizing principles but not the principles themselves. To move beyond such empirical descriptions required an 'analytic framework' of concepts that capture those organizing principles.

It is common for researchers to begin, as Chen did, with models that focus on their own substantive concerns. This flows from the typical starting point for research: a review of existing literature on the topic. Berry directly related to intercultural exchange; Bernstein directly described educational issues. However, a shared substantive topic does not guarantee a framework will offer explanatory power for one's own study. Conversely, that an alternative theory has yet to be used to explore an object of study does not mean it cannot do so or would not offer comparatively greater explanatory power. It is thus invaluable for scholars to explore frameworks from beyond the often narrow confines of their substantive concerns.

This became clear to Chen upon discovering Legitimation Code Theory. Through attending seminars on theory in educational research, she learned about the framework and met Maton, who was later appointed to help supervise her doctoral research. LCT helped reveal the limits of her existing framework, not through explicit critique of that framework but in comparison. As outlined in Chapter 1 (this volume), LCT comprises a multidimensional conceptual toolkit, each dimension offering concepts for

analysing a set of organizing principles underlying practices as a species of *legitimation codes*. At the time of this research (2006–7) Specialization was the most developed and enacted dimension of LCT (e.g. Maton 2000a, 2000b, 2004, 2006, 2007). Concepts comprising Specialization – including *specialization codes*, *epistemic–pedagogic device* and *knowledge–knower structures* – extend and integrate concepts from Bernstein's code theory (Maton 2014b: 54–7, 196–205). Put simply, they systematically conceptualize not only knowledge but also knowers. It is beyond our scope here to discuss this development, except to note that this enables constructivist practices (the focus of Chen's study) to be more fully explored by capturing their emphases on learners' attributes, dispositions and experiences (Chen *et al*. 2011; Maton 2010).

The concepts of specialization codes offered three additional features crucial for Chen's project. First, they provide a means of conceptualizing the organizing principles of dispositions brought by learners, their current educational contexts, and their practices in negotiating these contexts. Second, in doing so, they enable these three factors to be systematically related, in contrast to the exclusive focus on learners' dispositions characterizing existing studies on overseas Chinese students. Third, by transforming empirical descriptions into analysis of their organizing principles, the concepts reach beyond the specificities of any specific project, enabling the findings of Chen's study to be valuable for research using the same concepts to explore very different issues and contexts. Thus, while the combined Berry–Bernstein model provided an organizing framework for her research, concepts from LCT offered an analytic framework.

Evolving an external language of description

From theory to data

After selecting Specialization as the analytic framework for her study, Chen immersed herself in theory for many months, reading about LCT, frameworks that are extended and integrated by LCT, and studies enacting concepts from all these approaches. This reading sharpened Chen's sense of the focus of her data collection in two principal ways. First, it explicitly

guided her methods, such as generating questions for focus groups, interviews and analyses of course materials. In a similar manner to the ‘data instruments’ discussed earlier in this chapter, the concepts foregrounded key issues to address. For example, Specialization highlights, *inter alia*, the role of ideal knowers in shaping the basis of achievement, generating questions such as ‘What kind of student is considered a good student in China?’ and ‘What kind of student tends to do better in your course?’.

Second, the immersion in theory helped shape the way Chen thought about her object of study and research more generally. This kind of influence is not always as obvious to the noviciate. Unlike explicit questions, it is difficult to see or measure, particularly from the viewpoint of the person whose gaze is developing. Yet it is a crucial aspect of apprenticeship into the gaze embodied by an approach. A set of questions alone could limit seeing or hearing what the object of study is showing or saying, leading to a shallow and semi-mechanical application of theory. To be alive to the possibilities of the data additionally requires the flexibility of a refined gaze. In Chen’s case, this involved learning to think in a realist and relational manner, such as in terms of organizing principles as well as empirical descriptions, relative strengths as well as dichotomous types, and topologies as well as typologies (Chapter 1, this volume). For this, LCT was invaluable, as the concepts themselves embody these attributes and thus can help shape, enact and sustain the gaze. Doing so required Chen not only to read but also to write about the theory, alongside numerous discussions with her supervisors, and to write always in relation to her problem-situation rather than as a metadiscourse of theoreticist comparisions among theories. However, reshaping dispositions is not quickly or easily achieved: it emerges from an extended apprenticeship, of which immersion in theory is but a starting point. We return to how this process continued through data analysis, further below.

While immersion in theory is crucial, it is also a phase apprentice scholars can be reluctant to move beyond. Reading about ideas and discussing hypothetically their potential enactment in one’s study can feel safe compared to the uncertain whirl of data collection. Indeed, some doctoral candidates never reach beyond this stage, either remaining ruminants or leaving their studies. Nonetheless, while one may keep returning to theory throughout the research process, immersion in theory must end if substantive research is to begin. This is something Bennett and Maton made clear to Chen, explicitly

directing her to initiate data collection and immerse herself in the object of study itself. Knowing when to make such movements between theory and data is itself a craft skill to be learned through guided experience.

The data collection lasted ten months, during which Chen concentrated on interviewing participants, analysing course materials, and transcribing and translating data (focus groups and interviews were conducted in Mandarin). She continually wished to connect data to theory, often feeling apprehensive at being unable to digest the large amount of data her research was generating. Again, this is a common experience. Having invested time and energy in theoretical immersion and knowing that the data will have to be analysed in the near future can create an impatient desire to make it definitively explicable as soon as possible. Learning to live in the primeval chaos of data and feel at home there, to paraphrase Ludwig Wittgenstein (1980), is not easy. However, heeding her supervisors' regularly repeated advice, Chen remained patient and immersed herself in collecting and understanding the data on its own terms. To reiterate the quote from Bernstein, to 'live with the muddle' of unordered data is also to 'enjoy the pleasure of its potential', for it speaks its own language, one that is not that of the internal language of the theory.

From data to theory (and back again)

The temptation to reach for theory too soon is perhaps strongest when moving from data collection to analysis. Having spent considerable time and energy 'in the field', the desire to know that you have not wasted your efforts can be overwhelming. The temptation is further fuelled by the capacity of well-established researchers to glance at data and declare X an 'integrated code', Y a 'cultivated knower code' or Z as revealing a 'middle-class habitus'. Such realizations of a well-seasoned gaze may appear to newcomers like divine instruction but provide little guidance for employing theory in analysis.[3]

Whether from enthusiasm or anxiety, novice researchers may thus begin imposing concepts on data before it has a chance to speak. This often involves extracting fragments of data (such as brief quotes) for analysis, shorn of the broader context which underpins their meaning. In this study,

Chen began declaring specialization codes, peppering descriptions of data with LCT annotations of 'ER+', 'SR−', etc. When Chen eagerly sought confirmation of her analysis from Maton, much to her initial disappointment he refused to agree or disagree, arguing that these conceptual proclamations were unsupported by and obscuring the data. As Chen's supervisors emphasized, the rich qualitative data had stories to tell that were being smothered by concepts. They argued that only by immersing herself in the data and then moving slowly from within that data towards theory, and even then via categories that emerged from the data itself and not from the internal language of the theory, could Chen enable those stories to be heard. The analysis thus became staged into a thematic analysis of data, arrangement of that coded data into a descriptive account using the organizing frameworks, and analysis of this descriptive data using LCT. We discuss each in turn.

Empirical thematic analysis

Bernstein suggested that in evolving external languages, the 'first step' is 'to ignore the theory and model…. Crucial to the procedure is that it is constructed independently of the L^1, that is, independent of the theory and the derived model' (2000: 137–8). Accordingly, Chen began by simply coding the raw data with labels based on simple empirical descriptions, without using any concepts. The purpose of this thematic analysis was to establish a series of basic categories with which the data could begin to be organized. Initially, the analysis generated more than 300 categories, such as 'quantity of knowledge' and 'teacher control', which became eventually pared down to 26 as overlaps, similarities or overarching categories emerged. While not theory-determined in the sense of explicitly employing concepts, such analysis is theory-laden, thanks to the researcher's gaze. For example, when explaining how Chinese students' fear of 'losing face' prevented them from expressing their thoughts in class, a student stated:

> If today you are studying, say, lesson five, the teacher will expect you to know everything in the previous four lessons before you come to class. And they will give you a tongue-lashing if you ask a question about lessons 1–4. So you gradually lose confidence in asking simple questions.
>
> (Focus group 1)

Rather than labelling this comment as simply ‘losing face’ or ‘reluctance to speak’, Chen also categorized it as concerning ‘the collective pace of learning’, reflecting an issue – pacing – raised by her readings and discussions about code theory. While not always obvious to the noviciate, one’s specialized gaze is always active in research.

Organizational coding

Thematic analysis allowed Chen to concentrate on the potential meanings emerging from the data rather than attempting to fit data into pre-existing concepts. The resulting categories were then arranged in a second stage which we termed ‘organizational coding’. This more explicitly involved theory, specifically utilizing Berry’s acculturation model and Bernstein’s ‘message systems’ as organizing frameworks. They served to arrange data into three main issues of ‘heritage educational culture’, ‘host educational culture’, and ‘contact’ (students’ experiences), and three sub-themes of curriculum, pedagogy and assessment. Using this structure, Chen wrote three preliminary ‘chapters’ reporting the data in a highly descriptive manner, copiously including quotes from focus groups, teacher interviews, unit of study outlines, and student interviews. Indeed, her supervisors actively encouraged Chen to include far more data than could possibly be included within a completed doctoral thesis. For example, while one quote may eventually become exemplary for illustrating a theme, Chen was encouraged to include as many as possible and to not be concerned about including the same quotes in more than one place.

At the end of the curriculum, pedagogy and assessment sections of each ‘chapter’, Chen identified broad themes emerging from the section, discussing them descriptively and in non-LCT terms. For example, in the ‘chapter’ on ‘host educational culture’, the themes emerging from teachers’ accounts of their courses can be summarized as follows:

- Curriculum: emphasis on personal knowledge and experience; downplaying of content knowledge; personal interpretations of content knowledge.
- Pedagogy: emphasis on learning over teaching; beliefs in collaborative

learning; implementation of individualized learning.
- Assessment: implicit evaluative criteria; emphasis on helping students develop individualized knowledge; downplaying of students demonstrating content knowledge.

As this list of knowledge- and knower-related themes suggests, the nascent gaze Chen had begun to acquire through immersion in theory was already engaging with the specificities of the data. While remaining at the level of empirical description, the theoretical analysis that would later become more explicit can already begin to be discerned. Nonetheless, while Chen now had organized and 'thick descriptions' of students' educational dispositions, the courses, and students' experiences, she was not yet able to compare them in a systematic manner. The organizing principles underlying these dispositions, contexts and practices were not yet explicit. This formed the focus of a final main stage of moving further into theory.

Analytic coding

To explore these organizing principles Chen drew on the LCT concepts of *specialization codes*, comprising modalities of strengths of *epistemic relations* (ER) between knowledge practices and their proclaimed objects of study, and *social relations* (SR) between knowledge practices and their actors, authors or subjects (Chapter 1, this volume). Practices may more strongly (+) or weakly (−) emphasize each relation and these two strengths give four principal *specialization codes* (see Figure 1.2, page 12). At their simplest, these declare that legitimacy depends on 'what you know' (*knowledge codes*; ER+, SR−), 'who you are' (*knower codes*; ER−, SR+), both specialist knowledge and knower attributes (*élite codes*; ER+, SR+), and neither (*relativist codes*; ER−, SR−). As discussed earlier above, these relations are realized differently in different problem-situations. Thus, Chen interrogated each theme by asking:

1 what form do epistemic relations and social relations take here?;
2 what form do stronger or weaker epistemic relations and stronger or weaker social relations take here?; and
3 does this theme indicate stronger or weaker epistemic relations and/or

social relations?

Such questions are typically not answered definitively at first but rather involve repeatedly referring to data across the project, particularly given that strengths of relations are relative. An albeit much simplified example of this complex process can be given using the following excerpt from a teacher interview:

> The assignments try to be authentic. We try to situate the assignment in the context in which these people work and live. So if they are a teacher teaching cabinet-making, then they have to think about how their students are learning that task. If they're a university teacher teaching science, then they have to think about their students learning science.
>
> (Teacher E)

This quote was included in the 'curriculum' section of Chen's empirical description of the 'host educational culture', addressing the nature of the Australian online teaching practices explored in the project. It illustrates how teachers emphasized the need for students to make connections between knowledge they may learn at university and their own work contexts. Stronger social relations in knowledge practices are defined as reflecting an emphasis on the dispositions of actors, whether innate, cultivated or socially based. Chen thus tentatively judged the quote as reflecting stronger social relations realized as an emphasis on personal knowledge and experience. The teacher highlights that what is valued is the knowledge learners bring to the educational context by virtue of their existing experiences. Conversely, stronger epistemic relations are often realized as an emphasis on principles or procedures. Here, however, such specialized knowledge or skills are absent. Taken in concert with numerous other teacher statements and course materials echoing this theme, Chen thus judged the quote to exhibit relatively weak epistemic relations (realized as downplaying specialist content knowledge) and relatively strong social relations (realized as the notion of students as already legitimate knowers by virtue of personal experience).

However, these strengths of epistemic relations and social relations for curriculum were not realized empirically in the same ways when the same participants addressed pedagogy or assessment. In discussions of pedagogy,

teachers focused not on ‘personal knowledge and experience’ but rather on individual learners’ preferred ways of learning and downplayed their own teaching practices. For example, one teacher explained that she expected students to ‘negotiate to learn in a way that suits them … it’s constructing your own learning in a way that is helpful for you’ (Teacher B). This and many other examples suggested that social relations in discussions of pedagogy were realized as personal dimensions of the learning process and epistemic relations as principles and procedures for teaching content knowledge. In discussion of assessment, social relations were realized in terms of students evaluating their own learning – for example: ‘What’s valid for you and what’s valid for me are two different things, aren’t they?’ (Teacher C) – and epistemic relations were realized as explicit evaluative criteria for judging student performances. In summary, though the same concepts were used to analyse these participants’ beliefs and practices concerning curriculum, pedagogy and assessment, each theme was analysed in its own terms.

Chen conducted similar analyses on the themes from her ‘chapters’ on the ‘heritage educational culture’ and ‘students’ experiences in the host culture’. Each time the forms taken by relations were explored and their relative strengths discussed and compared. Gradually, the different realizations of specialization codes in the three message systems of curriculum, pedagogy and assessment came to light for the three principal themes. Over time this evolved into the external language of description represented in Table 2.2 (further below).

As we emphasized at the outset, this process was not as simple or linear as the above examples might suggest. The evolving external language and emerging analysis were repeatedly refined. Often coding began from a hunch or ‘sense’ based on Chen’s understanding of the concepts and data. One of the benefits of the immersion we have described is a ‘feel’ for the data, an ambient sense of its semantic potential. A search for supporting and disconfirming data would follow, leading to adjustment of initial judgements and further returns to data for support or disconfirmation. In this process one writes the analysis in pencil, as it were, always ready to erase and rewrite, leaving open the possibility that one’s judgement may be wrong. It thus moves through repeated shifts between initial thoughts, the data, and what the concepts themselves suggest. This process also involves recurrent movements

between *wide-angle* and *soft-focus* analysis of the entire problem-situation in fuzzier analytic terms and *telephoto* and *hard-focus* analysis of more delimited instances with greater precision (see Chapter 5, this volume). By offering a descriptive account of the data as a whole, a wide-angle and soft-focus analysis enables a general sense of the codes involved to emerge and provides a context for more detailed explorations. Through rigorous studies of specific examples, telephoto and hard-focus analysis enables more precise understanding of the diverse realizations across the data of the codes and concretizes the more holistic picture. Chen was encouraged to repeatedly shift between these mutually-informing forms in her analytic coding. Her supervisors asked for any specific instances, such as the examples given above, to be contextualized within a general account of the study or compared to other examples, and for broader claims to be exemplified concretely. In this way, both the wood and the trees remained in view.

These iterative and recurrent movements between theory and data and between general and detailed analyses were thus situated within a social context of discussions with other researchers. Chen repeatedly refined her judgements after feedback from her supervisors, until a kind of equilibrium was reached between the data and conceptual redescriptions. Through these processes of shifting between data and theory, zooming between wide-angle and telephoto visions, and refocusing between soft- and hard-focus analyses, one's image of the problem-situation becomes sharper and one's 'feel' for the codes becomes codified, culminating in a completed (though always conjectural) analysis and an external language of description.

A translation device

The external language for Chen's study is recreated in Table 2.2 and comprises: the forms taken by epistemic relations and social relations in discussions of curriculum, pedagogy and assessment; indicators for whether data exhibits stronger or weaker relations; and quotes from data as examples. It includes sections for epistemic relations and for social relations. Each section is structured so that when read from left to right it translates theory into data, and when read from right to left it translates data into theory. The former shows how concepts are enacted in this particular object of study; the latter shows how data can be conceptualized as exemplifying strengths of

epistemic relations and social relations. For example, in the curriculum row of ‘epistemic relations’, the quote ‘The information in the textbook – decided by the teacher – was what a study unit was all about’ suggests content knowledge is being highlighted as the determining form of legitimate knowledge, which represents stronger epistemic relations, and so is coded as exhibiting ‘ER+’. Conversely, the quotes exemplify the kinds of data coded as differing strengths of relations, giving insight into how further data should be conceptualized.

Though there is no single form external languages can take, a simple table offers a more portable and synoptic instrument than a prosodically scattered prosaic description of conceptual enactment. Nonetheless the form taken by such a table or figure is not set in stone. Other external languages for LCT are simpler than Table 2.2, with columns for: code concepts (such as ER/SR or ‘semantic gravity’), indicators for a range of relative strengths, forms these take in the specific data, and examples from data (see Maton 2014b). In Chen’s case, the need to distinguish curriculum, pedagogy and assessment makes the table slightly more complex, with two sections. There is also work to be done in developing innovative forms of presentation that can, for example, relate data to the Cartesian planes used to embody LCT concepts. However, what is crucial is less the precise form of external languages than their capacity to act as translation devices between concepts and data.

Table 2.2 An external language of description for specialization codes (Chen 2010: 83)

	EPISTEMIC RELATIONS (ER)				SOCIAL RELATIONS (SR)			
	Concept manifested as emphasis on:		Indicators	Example quotes from empirical data	Concept manifested as emphasis on:		Indicators	Example quotes from empirical data
Curriculum	content knowledge	ER+	Content knowledge is emphasized as determining form of legitimate educational knowledge.	The information in the textbook – decided by the teacher – was what a study unit was all about.	personal knowledge and experience	SR+	Personal experience and opinions are viewed as legitimate educational knowledge.	[Students] actually come with a whole range of background and experience … what they need is a framework to download that.
		ER–	Content knowledge is downplayed as less important in defining legitimate educational knowledge.	We … show them … digital repositories that they need to go to in order to access those readings that are relevant to their context.		SR–	Personal experience and opinions are downplayed and distinguished from legitimate educational knowledge.	Online discussion is chaotic, and is like you conduct a survey and everyone tells you their opinions. That's all. It's different from a class.
Pedagogy	the teaching of content knowledge	ER+	Procedures for learning content knowledge are explicit to learners and emphasized as determining form of pedagogy.	[The teacher] extracts the best things from what he or she knows and gives this to you in class, and then offers you instructions on the tasks you need to complete.	personal dimension of the learning process	SR+	Individual learners' preferences are explicitly emphasized as determining form of pedagogy.	So negotiate to learn in a way that suits them … it's constructing your own learning in a way that is helpful for you.
		ER–	Procedures for learning content knowledge are implicit to learners and downplayed as not significantly shaping form of pedagogy.	The teacher only points out the things you need to read.… But as to how to think, how to read and understand, it's your own business.		SR–	Individual learners' preferences are downplayed as not significantly shaping form of pedagogy.	Even if your question is brilliant, the teacher still might not answer you because he or she wants to teach something else first.
Assessment	explicit criteria	ER+	Explicit evaluative criteria are emphasized in judging student performances.	When a Chinese child paints the moon blue, the teacher will correct the child, saying that the moon shouldn't be blue.	self-evaluation	SR+	Evaluation of legitimacy of student performances resides in beliefs of individual learners.	What's valid for you and what's valid for me are two different things, aren't they?
		ER–	Explicit evaluative criteria are less significant in judging student performances.	It's not like learning medicine, you've got to get it right [otherwise] the patient will die. It's not like that. It's more open to interpretation.		SR–	Student performances are judged against shared criteria external to the learner.	I am a 'test-taker.' If the teacher doesn't give me a standard, I don't know what to do.

Crucially, an external language is neither evolved for its own sake nor the only product of the process we have described. As a translation device, an external language is primarily intended to serve the analysis of the problem with which the research is concerned. Chen's aim was to explore the effects of online constructivist pedagogy on Chinese international students. Concomitant with evolving the external language, Chen generated a substantive theory concerning these effects, one which both attends to the specificities of the object of study and reaches beyond them.[4]

The 'heritage culture' of Chinese educational practices was conceptualized as exhibiting a knowledge code (ER+, SR−): in short, content knowledge, teaching procedures and explicit evaluative criteria were emphasized as the bases of legitimacy. In contrast, the 'host culture' of constructivist pedagogies encountered by these students in Australia exhibited a knower code (ER−, SR+): learners' personal experiences, learning preferences and self-evaluation were constructed as significant to achievement. This downplayed everything Chinese education had socialized the students to value, and valorized what they had previously learned to consider as unimportant. The 'code clash' that resulted from 'contact' between these dispositions and practices shaped the students' experiences. With their knowledge-code dispositions (ER+, SR−), the students did not recognize the stronger social relations of these knower-code practices (ER−, SR+) as legitimate. They did not, for example, view personal experience as valid educational knowledge. Given these practices also exhibited relatively weak epistemic relations, the students thereby experienced them as a relativist code (ER−, SR−), a kind of 'anything goes'. This is to say they could not recognize the stronger social relations and keenly felt the lack of stronger epistemic relations, such as the absence of sufficient content, explicit teaching and clear assessment criteria. The result was a felt lack of legitimacy: students described being 'in a vacuum', 'no one cares what I'm doing', 'lonely', and feeling inferior, insecure, anxious, frustrated, helpless, guilty and depressed (Chen 2010). A typical response was to continue their knowledge-code practices, such as synthesizing 'personal experiences' from the literature they read.

Space precludes extensive discussion of this substantive theory (Chen 2010; Chen *et al*. 2011), but the summary above highlights several features

relevant to our focus. First, as mentioned, evolving an external language was not the principal aim of the research; rather, the key issue was to explore the effects of constructivist pedagogy on these Chinese students. The external language helped clarify, systematize and codify the analysis that generated the explanation of these effects. Second, as a translation device, the external language makes explicit the basis of this explanation. The device thereby makes research more accountable to other researchers in the field: they can use it to critically inspect and recreate the analysis. The external language acts a kind of a key or decoder to the analysis. Third, the device makes the outcomes of the study more available to other researchers in the field: not only can they build on the findings and the substantive theory, they can also adopt or adapt the external language for their own studies. Though likely to need modification, it provides a valuable starting point that enables work to feed into one another.[5]

Last, the translation device, combined with the capacity of LCT concepts to explore the organizing principles underlying dispositions, practices and contexts, gives the study relevance beyond the specific topic. One can condense a key conjecture arising from the thesis as: knowledge-code learners are likely to experience knower-code practices, where this code is not made clear, as a relativist code, leading to a felt loss of legitimacy and deleterious educational and psychological outcomes. While the study is rich with empirical detail and deeply immersed in the concrete particularities of its object of study, this conjecture reaches beyond such specificities as ‘Chinese learners’, ‘online education’, ‘constructivist pedagogies’ and ‘Australian universities’ to offer a starting point for comparative study of similar or contrasting cases, such as learners with knower-code dispositions entering educational contexts characterized by knowledge-code practices. The external language thereby helps provides a gateway to a wider range of research, enabling more integrative and cumulative forms of knowledge-building.

Conclusion

Anxieties felt by scholars when enacting a theory in collecting and analysing data are often well founded. Most approaches do not possess a conception of

‘external languages of description’. They often deny or admit defeat to what Bernstein termed the ‘discursive gap’ between theory and data. Put bluntly, most theories fudge the issue, offering little insight into how to negotiate these relations in research. By building on Bernstein’s notion of ‘external languages’, LCT aims to help overcome these issues; by describing how an external language was evolved within a substantive study, this chapter aims to help shed light on the process and the product.

As we have discussed, evolving an external language defies the false dichotomy of theory/data that bedevils research into education and society. Against this ‘either-or’, LCT posits more than a ‘both-and’: it emphasizes *both* theory *and* data *and* relations between the two. Put another way, enacting LCT involves immersion in and getting a ‘feel’ *both* for the theory *and* for the data that then enables them to be brought together through a translation device. It thereby enables both thick description and thick explanation, both empirical fidelity and explanatory power. Rather than ‘either-or’, LCT thereby enables studies to trace a series of *semantic waves* or recurrent movements between context-dependent and simpler meanings and context-independent and complex meanings, between minute particulars and condensed abstractions (Chapter 1, this volume). The resultant translation device then extends the *semantic range* of the framework to not only reach from descriptions to theorizations but also explicitly reveal how to move between them, in both directions. Studies of research using LCT suggest these characteristics are critical for enabling the building of cumulative and epistemologically powerful knowledge (Maton 2014b: 125–47).

Evolving an external language is, however, not easy. As Brown (2006: 130) highlights, it is ‘a time-consuming process that requires extensive, and thus expensive, engagement with empirical texts’. This is one reason why evolving external languages is often the province of postgraduate research or major projects. Nonetheless, as we discussed, extant external languages can be adopted or adapted and existing models, taxonomies and typologies can often be recruited to serve as the basis for developing translation devices (Maton 2014b: 210–12). Not every study need begin again from scratch.

As well as requiring effort and energy, it is also risky. Enabling others to see the basis of one’s analysis is to open up one’s explanations and conjectures to critical discussion. Where most approaches play it safe by using vague, ill-defined and woolly concepts, this is to put one’s analytic

cards on (and literally in) the table. However, the prize is worth the risk. Making explicit the basis of one's analysis enables more scholars to engage with one's work and allows the possibility of expanding the sphere of debate and extend the community. Moreover, creating and refining external languages is a key contribution to research. To quote Basil Bernstein:

> L^2 is equally an imaginative act as L^1 but is rarely constructed to warrant that adjective. It is essentially what research is about. The rest can be done in an armchair. Armchairs do not change one, only accommodate. Research is the means of change.
>
> (Personal letter to Karl Maton)

Put more specifically:

> Though the term 'external' may appear to suggest a secondary role, such languages of description represent a crucial catalyst to development. An external language provides a means for translating between theory and data that other studies can adopt or adapt – to develop an external language is to extend the framework into a new problem-situation.
>
> (Maton 2014b: 206)

The evolution of external languages is thus a crucial means for bringing together studies of a growing range of disparate problem-situations – they enable not only dialogue between theory and data but also dialogue between studies of diverse phenomena by translating among different data through the theory. In short, such translation devices are central to cumulative knowledge-building. No theoretical framework should be without translation devices.

Notes

1 See Maton and Doran (2015a, 2015b) for a mediating language for analysing English discourse with semantic density; mediating languages for enacting semantic gravity in analyses of English discourse and images will be available in future publications (see LCT website at www.legitimationcodetheory.com).

2 In Chapter 12 of this volume, Maton (page 243) defines several kinds of *translation device* or 'means of relating concepts to something beyond a

theoretical framework':

> external languages of description for translating between theory and empirical data within a specific problem-situation; external languages of enactment for translating between theory and practice; and mediating languages for translating between theory and all empirical forms of a phenomenon (i.e. a non-specific external language).

Our concern in this chapter is with enacting concepts in substantive research studies of specific problems-situations; our focus is thus external languages of description.

3 It was the impression upon a younger colleague of magical intuition when analysing data which motivated Maton to develop examples for workshops in LCT that explicitly illustrate a series of stages. Each comprises: a 'raw' transcript of classroom practices; the transcript annotated with concepts; an 'analytical narrative' that describes the practices, lightly using LCT concepts wherever appropriate; and a 'conceptual redescription' that rewrites the narrative as a synoptic theoretical explanation, with minimal reference to empirical content, and generates conjectural explanations. The key point of these examples is to make more visible different stages of the cooking process whereby raw data becomes theoretical explanation.

4 On relations between substantive theories generated by empirical studies and explanatory frameworks such as LCT, see Chapter 1, this volume.

5 Similarly, because LCT extends and integrates Bernstein's code theory, existing external languages developed for inherited concepts, such as 'classification' and 'framing', can be extended to develop external languages for specialization codes (which include 'classification' and 'framing').

3 LCT in mixed-methods research

Evolving an instrument for quantitative data

Karl Maton and Sarah K. Howard

Transcending the divide between quantitative and qualitative methodologies.

Introduction

A mantra of social science declares a fundamental divide between the quantitative and the qualitative that involves more than methods. According to this depiction, the two methodologies are intrinsically associated with a range of ontological, epistemological, political and moral stances. Each of these constellations of stances is strongly integrated, such that choice of method is held to involve a series of associated choices. Each constellation is also strongly opposed to the other, along axes labelled positivism/constructivism, scientism/humanism, conservative/critical, old/new, among others. These 'binary constellations' (Maton 2014b: 148–70) offer a forced choice between two tightly-knit sets of practices that are portrayed as jointly exhaustive and mutually exclusive. So widespread is this methodological binarism that many scholars 'are left with the impression that they have to pledge allegiance to one research school of thought or the other' (Johnson and Onwuegbuzie 2004: 14).

A competing mantra disclaims this divide. Distinctions underpinning the picture of binary constellations have been regularly dissolved. Arguments that one deals with numbers, the other with words, one studies behaviour, the other reveals meanings, one is hypothetico-deductive, the other inductive, one enables generalization, the other explores singular depth, among others, have been repeatedly undermined (e.g. Hammersley 1992). Indeed, the death of the divide is frequently declared. Calls for 'transcending' (Salomon 1991)

or ‘getting over’ (Howe 1992) the quantitative–qualitative debate and arguments for mixed-methods research (Brannen 2005; Johnson and Onwuegbuzie 2004) are recurrent. These calls highlight how the methodologies offer complementary insights for research and demonstrate that eschewing either methodology on principle is unnecessarily renouncing potential explanatory power. However, the call to mixed-methods research remains more breached than honoured. Methodological monotheism remains dominant – studies of education and society typically adopt *either* quantitative *or* qualitative methods. As we shall discuss, the former is typically associated with the influence of psychology and the latter is often claimed as emblematic of sociology. Studies utilizing the sociological frameworks on which Legitimation Code Theory (LCT) builds have echoed this pattern by overwhelmingly adopting qualitative methods. Accordingly, Part I of this volume begins by exploring how LCT concepts can be enacted in qualitative research (Chapter 2). However, LCT is not limited to one methodology and a growing body of mixed-methods research is engaging with both qualitative and quantitative data. In this chapter we illustrate how this research works and the gains it offers.

For resolutely qualitative researchers, the prospect of reading anything quantitative, even in mixed-methods research, may be unenticing. However, it would be a mistake to pass over this chapter, for several reasons. First, we offer insights into research practice that might surprise such scholars. As Bourdieu argued, ‘methodological indictments are too often no more than a disguised way of making a virtue out of necessity, of feigning to dismiss, to ignore in an active way, what one is ignorant of in fact’ (Bourdieu and Wacquant 1992: 226). Our aim is to contribute towards removing this reason for one-sidedness. We show, for example, how quantitative methods confound their common portrayal as neat, straightforward and procedural; they are complex and involved and require craft work and judgement. Our focus is, therefore, more practical than metaphysical. We shall not enter seemingly endless debates over whether the ‘quantitative–qualitative divide’ refers to paradigms, epistemologies or methods and whether these are complementary or incommensurable. Rather, we discuss the development of an instrument for enacting LCT concepts in quantitative methods and ground this account in real examples of mixed-methods research. Specifically, we trace the evolution of an instrument for embedding *specialization codes*

within questionnaires through its creation for research into school music and then its development within studies of educational technology. Given that mathematics can be off-putting to the noviciate, we minimize discussion of statistics and explain measures in lay terms.

Second, this is much more than a story of quantitative methods. The evolution of the instrument both shaped qualitative methods and was shaped by the data they generated, offering insights into how qualitative research can more fully engage with LCT. Its development also involved intimate dialogue with theory that shed fresh light on LCT itself, making explicit the 'gaze' embodied by the framework (Chapter 1, this volume). We shall highlight wider lessons learned about the craft of enacting LCT in research, lessons of direct relevance for studies using any methods.

Third, we shall illustrate the explanatory power offered by using quantitative and qualitative methods together, such as providing a robust basis for detailed findings, identifying wider-scale trends typically inaccessible to qualitative methods that provide a context for their data, and facilitating knowledge-building through greater replicability across contexts and over time. For example, the technology studies built directly on the music studies to cumulatively develop the instrument and generated probably the largest data set in code sociology: 97,386 responses (83,937 student and 13,449 staff surveys) on the organizing principles of academic subjects, alongside 20 in-depth qualitative case studies of secondary schools. This offers a foundation of substantial breadth and depth for making claims about knowledge practices across the disciplinary map and a firm basis on which future research into disciplinary differences can build. Moreover, the quantitative instrument itself can be adopted or adapted in new studies, further enabling cumulative knowledge-building. Given these substantive, methodological and theoretical gains, it is perhaps surprising there exists any temptation to skip past discussion of mixed-methods research. This reflects the methodological character of the fields in which LCT emerged. We thus begin by briefly illustrating how the sociological frameworks on which the theory builds have become distanced from quantitative methods.

A methodological divide

A qualitative lack of the quantitative

In educational research the binary constellations of 'quantitative' and 'qualitative' are often associated with the influences of psychology and sociology. Approaches inspired (often unconsciously or at third hand) by psychology or aspiring to the appellation of 'sciences' have often favoured the quantitative and portrayed the qualitative as 'soft' and subjective (Moss *et al*. 2009). Conversely, among sociological approaches the quantitative has come to be negatively viewed and the qualitative valorized. The 'new sociology of education' of the early 1970s, for example, declared existing work to be old, positivist and conservative, and in its place announced a new, constructivist and critical field (Moore 2009). Among the stances constellated and renounced as 'old' were quantitative methods, in contrast to the association of 'critical', 'new' or even 'sociological' with qualitative methods. Accordingly, despite numerous theoretical differences, studies using Gramsci, Foucault, Deleuze, Butler and many other thinkers have overwhelmingly addressed the qualitative and neglected if not denigrated the quantitative.

Tellingly, this methodological sectarianism holds even for sociological approaches whose key protagonists were not antipathetic to quantitative methods. The frameworks on which LCT most directly builds are Pierre Bourdieu's 'field theory' and Basil Bernstein's 'code theory' (Maton 2014b; Chapter 1, this volume). Both theorists embraced methodological pluralism. Bourdieu employed quantitative approaches, especially multiple correspondence analysis; indeed, it is often referred to as 'Bourdieu's statistical method' (LeRoux and Rouanet 2010: 4). As Bourdieu stated, to 'think in terms of field is to *think relationally*' and correspondence analysis 'is a technique which "thinks" in terms of relation' (Bourdieu and Wacquant 1992: 96; original emphasis). At the same time, Bourdieu's studies are replete with qualitative data, including ethnographic observation, interview quotes and discourse analysis. For Bourdieu, 'field theory' was most effectively conducted through a continuous interplay between quantitative and qualitative data in mixed-methods research (Bourdieu *et al*. 1963). Similarly, Bernstein described his framework as 'capable of exploration by diverse methods at the empirical level' (1977: 112) and employed statistical methods in his often overlooked *Volume II* collection of studies (1973). In describing

his methodology, Bernstein emphasized the role of 'principles of description' whereby a model can engage with something beyond itself (see Chapter 2, this volume), adding that some 'principles may be quantitative whilst others are qualitative' (2000: 126). Bernstein (1977: 148) also critiqued assumptions underlying the dominant picture of methodologies, highlighting the invasive and invisible nature of qualitative methods in comparison to the privacy afforded by and visible criteria of quantitative methods.

In short, the principal architects of field theory and code theory cut across the binary constellations of methodology that dominate research into education and society. Yet, there remains a disjunction between this methodological pluralism and the majority of empirical research employing their frameworks. Most studies utilizing Bourdieu's concepts have adopted a wholly qualitative approach.[1] Moreover, this methodological choice is typically made without discussion – it goes without saying. This is particularly the case for studies using individual concepts, such as 'habitus' or 'cultural capital', decontextualized from Bourdieu's wider framework, indicating perhaps that, when not thinking in terms of 'field', methods appropriate to thinking relationally do not come to mind. Similarly, studies using Bernstein's theory have been predominantly qualitative. This is not simply a lack of statistics but rather a matter of relations between theory and data: the 'principles of description' advocated by Bernstein remain restricted to the qualitative. Where quantitative data are cited they typically represent demographic information for selecting participants for further (qualitative) study, freestanding statistics whose meanings are interpreted in terms of separate concepts, or qualitative data that have been quantified to enable counting of occurrences.[2] Quantitative data thereby remain distanced from theory. For example, studies may include means for translating between concepts and *qualitative* data which is then quantified for frequency analysis (e.g. Morais *et al*. 2004) but not for directly relating theory to quantitative data.

Qualitative and *quantitative*

As yet, the possibilities afforded by quantitative methodology remain under-utilized by field theory and code theory, reflecting the sociology of education

more generally. As Chapter 1 (this volume) describes, LCT enables false dichotomies to be denied, including a forced choice between methodologies. To quote Bourdieu's exhortation, LCT enables researchers 'to mobilize all the techniques that are relevant and practically usable, given the definition of the object and the practical conditions of data collection' (Bourdieu and Wacquant 1992: 227). In this chapter we illustrate how research enacting LCT is taking advantage of the affordances of both qualitative and quantitative methods. In doing so, we show how LCT also reconfigures dichotomies of theory/data and researcher/researched. First, the studies we discuss bring theory and quantitative data into closer relations. Rather than simply using theory to *interpret* separate statistical data, we explore how concepts can be enacted within an instrument to *generate* statistical data. This is to embed concepts *within* quantitative methods, bringing theory into the heart of data collection. Second, where typically the researcher has employed concepts to interpret data concerning the practices or beliefs of others, the quantitative instrument additionally enables the researched to demonstrate the organizing principles of their practices or beliefs through the choices they make.

Specifically, we describe the creation and evolution within research projects of a quantitative instrument for embedding concepts in questionnaires. The projects comprise studies of, first, the unpopularity of music as a qualification in secondary schooling and, second, the differential integration of information and communication technologies across the secondary school curriculum. These studies differ in terms of problems (subject choice and technology integration), topics (music and educational technology) and geographic locations (UK and Australia). However, the projects are connected: the final version of the instrument developed in the music studies (2004–2005) formed the basis for its first iteration in the major studies of educational technology (2010–2013). They thus offer a cumulative account of methodological development.

Chapter 2 (this volume) highlights the significance of dialogue between theory and data. Mixed-methods research additionally requires dialogue between the data generated by quantitative and qualitative methods. Both projects employed documentary analysis and qualitative methods alongside the quantitative instrument. Thus, its development through these studies was stimulated from three principal directions: the evolving theoretical framework

of LCT, the quantitative data generated by the instrument, and complementary data generated by qualitative methods. These stimulants overlap with three challenges for methodological development: theoretical fidelity, reliability, and validity. In short, the story of the instrument's evolution is one of numerous, recurrent and iterative adjustments to its form and content that aim at creating a tool consistent with the conceptual framework, reliable enough to generate dependable results, and sufficiently valid to ensure those results accurately reflect its object of study. Moreover, these challenges are themselves embedded in the aim of addressing tangible problems – the value of the instrument is its contribution to explanatory power. These aims serve as touchstones through our account.

Creating a quantitative instrument

Unpopular music

The studies that occasioned the creation of the instrument addressed school music and specifically its low take-up rate as a qualification in England. Existing research showed that music is popular with primary and secondary school students until, in year 9 (age 14), they have the option of selecting subject areas for examinations at GCSE level (to be completed by the end of year 11). At that point, uptake of study for the qualification is low. At the inception of these studies, 7 per cent of students chose music, considerably lower than comparable subjects, such as 38 per cent for art and design and 15 per cent for drama (Lamont *et al*. 2003). Existing explanations of this phenomenon remained undertheorized, piecemeal and ad hoc and research neglected the potential role played by the knowledge practices of school music (Lamont and Maton 2008).

In this context Alexandra Lamont (Keele University, UK) and Karl Maton undertook a series of studies in 2004–2005 aimed at exploring the organizing principles underlying knowledge practices in school music and their role in shaping its low uptake. These studies drew on Specialization, the most developed dimension of LCT at the time (e.g. Maton 2000a, 2000b, 2004). Specifically, they enacted *specialization codes*, comprising modalities of strengths of *epistemic relations* (ER) between knowledge practices and their

proclaimed objects of study, and *social relations* (SR) between knowledge practices and their actors, authors or subjects (see Chapter 1, this volume). Practices may more strongly (+) or weakly (−) emphasize each relation and these two strengths give four principal *specialization codes* (Figure 1.2, page 12). Put simply, these declare that legitimacy depends on what you know and how (*knowledge codes*; ER+, SR−), who you are (*knower codes*; ER−, SR+), both specialist knowledge and knower attributes (*élite codes*; ER+, SR+), and neither (*relativist codes*; ER−, SR−).

In three iterative studies Lamont and Maton explored the specialization codes underlying:

1 definitions of achievement in curriculum documents and syllabi;
2 school students' perceptions of self-ability in, the significance of, and the basis of achievement in a range of academic subjects including music; and
3 perceptions of university students of the significance of, and basis for success in a range of subjects.

The research design was sequential exploratory mixed-methods, including documentary analysis, questionnaires and focus groups. Some results were discussed in Lamont and Maton (2008, 2010) and Maton (2006, 2007, 2014b: 75–85). Here we summarize relevant issues for the creation of the quantitative instrument.

The first study analysed policy and curriculum documents for the period 2000–2005: National Curriculum attainment targets and programmes of study for primary school and secondary school, GCSE syllabi of major examination boards, and Qualifications and Curriculum Authority criteria for GCSE examinations. The analysis generated a translation device (see Chapter 2, this volume) for revealing the four principal specialization codes in curriculum documents (Lamont and Maton 2008: 273). Simply put, documents were analysed in terms of whether they foregrounded as the basis of achievement: skills, procedures, techniques and knowledge (*epistemic relations*); and/or dispositions of learners, such as aptitude, attitude and personal expression (*social relations*). In summary, the analysis suggested the basis of achievement in school music underwent two main 'code shifts' (Maton 2014b: 77). From being dominated by a *knower code* in primary schooling (such as emphasizing personal expression), school music shifted first to a

knowledge code in the early years of secondary schooling (emphasizing musical skills and knowledge) and then to an *élite code* in studying for GCSE examinations in later secondary schooling (requiring both technical skills and personal expression). Document analyses thereby generated the hypothesis that one reason for low uptake of school music qualifications may be that GCSE syllabi and examinations are characterized by an élite code: success requires both musical skills and musical dispositions, both knowledge and 'talent'.

In analysing curricular discourse this first study is not atypical. Research using social realist approaches has tended in recent years to focus more on knowledge than knowers (Maton 2014b). However, LCT emphasizes the problem-situation as a key driver of research. The issue animating the music studies concerned the subject choices of school students, highlighting the significance of views of knowers. Thus, the next step was to explore student perceptions. In sociology this would often be addressed through such qualitative methods as interviews and focus groups (which were utilized in the third study; see below) rather than the quantitative methods associated with psychology. However, as Chapter 5 (this volume) highlights, the capacity of LCT to be enacted in interdisciplinary contexts can perturb the taken-for-granted, opening up obscured possibilities. In this case, the research involved scholars from psychology and sociology and utilized both kinds of methods, raising the issue of how the concepts could be translated into a questionnaire item.

A first attempt and lessons learned

The second study comprised a questionnaire completed by 912 students from years 4 (n = 163), 5 (n = 180), 7 (n = 292) and 9 (n = 277) of four schools in England (Lamont and Maton 2008). The questionnaire included three questions about five school subjects (English, History, mathematics, music, and science) that asked students: how important it is to be good at the subject; how they rate themselves at the subject; and what makes someone good at the subject. The last question represented the first attempt to translate LCT concepts into a quantitative instrument and is our focus here. The question offered a forced-choice of one of four options:

[A] Anyone can do it, nothing special is needed.
[B] You need to learn special skills or knowledge.
[C] You need to have ‘natural ability’ or a ‘feel’ for it.
[D] Only people with ‘natural ability’ can learn the special skills needed.

As Lamont and Maton (2008: 275) put it, ‘we believed [these] might capture relativist, knowledge, knower and élite codes, respectively’. However, they immediately add: ‘Henceforth, we refer to these as options (e.g. “knowledge option”) rather than as codes’ (2008: 276). We return to what prompted this change of terminology shortly.

In summary, the modal response for all students for music was the knowledge option B, echoing the knowledge code of secondary school curriculum revealed by the first study. Nonetheless, results suggested that ‘the longer pupils are at school and the closer they are to GCSE (and, in particular, to taking GCSE music), the greater the likelihood that they will choose the élite option for music’ (Lamont and Maton 2008: 276). There was a significant increase through years of schooling in the proportion of students choosing the élite option D: 7.5 per cent in year 6, 11.6 per cent in year 7, and 18.8 per cent in year 9, compared to a maximum of 3.6% for other subjects in year 9. Among students who had chosen to study GCSE music, this figure rose to 35 per cent. Results generated by the questionnaire thereby offered tentative support to the conjecture of the first study.

Crucially, the questionnaire item embraced a larger population of respondents than typically possible using qualitative methods, providing a more robust basis for conjectures concerning specialization codes. It also allowed a range of age groups to be analysed, providing insights into changing perceptions of subject areas as students progress through the curriculum. These attributes chime with the gaze embodied by LCT: to think in terms of legitimation codes is to think temporally – the issue of change over time is always in play. Further, the compact nature of the item (taking up little space in a questionnaire) afforded the possibility of asking students about a range of subject areas, enabling comparative analysis. This also resonates with the gaze embodied by LCT: to think in terms of legitimation codes is to think relationally. All positions in the planes are relational; all strengths are relative to other possibilities. In this case, the specialization code characterizing a specific subject area comprises strengths of epistemic

relations and social relations (ER+/−, SR+/−) relative to those of other subject areas. Analysing a range of subjects allows for comparison, enabling these strengths to be established.

Lessons learned from theory and data

However, this first attempt was flawed. Both data and theory 'spoke back' to the instrument, highlighting limitations. Findings raised such questions as why music was not decisively viewed as an élite option by year 9 and why English and History were viewed as requiring 'nothing special', a finding incommensurate with conventional portraits of the subjects. The theory highlighted that while compact questionnaire items might *enable* relational analysis, the instrument itself did not yet *embody* relational thinking. Maton (2007) highlights several key issues raised from both directions. First, the wording of options was problematic. The knower option C offered only 'natural ability' or 'feel', reflecting the obsession of existing studies of music with genius and natural talent. This neglects notions of cultivated judgement found in discussions of humanities subjects such as English and History, potentially accounting for their 'relativist' results. Thus, the item did not embrace a sufficiently broad conception of possible realizations of social relations. Second, the élite option D included unnecessary priority by making 'natural ability' the prerequisite for 'special skills' rather than bringing together equal emphases on dispositions and knowledge. This formulation was theoretically unfounded and potentially lowered respondent numbers for that option, thereby affecting results for music.

Third, and most significantly, in offering a forced-choice the instrument design failed to enact a realist and relational gaze. The four options were originally intended to operationalize four specialization codes. However, they could not, which was the reason for Lamont and Maton (2008) changing their description from 'codes' to 'options'. Such a categorical scale design suits ideal types comprising discrete empirical characteristics. However, specialization codes are not ideal types. They conceptualize organizing principles: strengths of epistemic relations and social relations, where the strength of each relation for specific stances is relative to the strengths of that relation for other stances. Put another way, any specific position in the *specialization plane* (Figure 1.2, page 12) involves a strength of epistemic

relations located along its continuum (*y*-axis) and a strength of social relations located along its continuum (the *x*-axis). Together, these two locations generate the position in the plane and thus the code. Therefore, to enact the concepts one should begin not with the codes but with the two relations whose relative strengths generate the codes. By offering four discrete boxes of empirical features the forced-choice design failed to capture the constitutive relations that generate specialization codes and the relational nature of those codes. A more continuous scaling approach was required that addressed the two relations separately.

This lesson has wider import than a questionnaire item. By trying to directly operationalize the four codes the study had begun from the wrong place in the framework. Qualitative methods, whether in observation protocols or interview questions, can succumb to the same reductionism. This temptation to 'shortcut' to codes can also be felt when analysing data, generating erroneous readings. For example, describing one practice as a 'knowledge code' and another whose epistemic relations are weaker as a 'knower code' may seem intuitively correct, but upon closer inspection they could be found to exhibit the same code; they may simply occupy different positions within that code's quadrant of the specialization plane. This tendency towards seeing all differences in strengths of epistemic relations or social relations as categorical code shifts can be avoided by focusing on those relations. Such a focus aids *relational* and *topological* thinking, emphasizing the *relative* nature of strengths. To exemplify the case just given, consider natural science and psychology in Figure 3.2 (further below): psychology exhibits weaker epistemic relations than natural science but these are still relatively strong in relation to most other practices. This lesson also highlights the dialogic nature of relations between theory and the instrument: addressing problems raised by this first attempt underscored the significance of conceiving specialization codes topologically, bringing features of the theory into sharper relief.

A reconfigured instrument

A revised version of the instrument was enacted in a third, mixed-methods study of the perceptions of students who had already made a series of subject choices. The study comprised two parts: a questionnaire survey of 93 first-

year university students and six focus groups with 20 students, both exploring their conceptions of six subject areas (English literature, History, mathematics, music, natural science, and psychology). As shown in Figure 3.1, the revised instrument comprised the question 'In your opinion, how important are these things for being good at [subject area]?' and three four-point Likert scales.

In Figure 3.1 epistemic relations are addressed by the 'skills' scale and social relations are addressed by the 'talent' and 'taste' scales. The latter aimed at exploring the notion of a cultivated gaze as the basis of achievement ('taste, judgement or a developed "feel"'). The division of 'talent' and 'taste' into separate scales was driven both by pragmatic considerations (concision of the items) and by theory (they equate to two sub-dimensions of social relations: *subjective relations* and *interactional relations*, respectively; see further below).

In your opinion, how important are these things for being good at [the subject]?

	Not at all	Not very	Quite	Very
Skills, techniques and specialist knowledge	☐	☐	☐	☐
Natural-born talent	☐	☐	☐	☐
Taste, judgement or a developed 'feel' for it	☐	☐	☐	☐

Figure 3.1 Scaled quantitative instrument from music studies.

Originally, findings were presented as a bar chart (Maton 2007: 102). For this chapter we have replotted results on a specialization plane as Figure 3.2. Questionnaire responses were numerically coded from 1 for 'Not at all' to 4 for 'Very'. The mean of the 'skills' item is used to calculate epistemic relations, ER = ∑a. The combined means of 'talent' and 'taste' items provide the social relations, SR = ∑b + c/2. Mean scores were calculated for each of the six subject areas. A grand mean, averaging all six subject areas, was then calculated for the *x*-axis (SR) and *y*-axis (ER). For each subject area, X and Y plots were determined by subtracting individual subject area ER and SR means from the grand means. The X and Y plots for each subject area identify their location on the specialization plane.

Figure 3.2 shows that responses characterized psychology and natural science as knowledge codes, English literature as a knower code, History as a relativist code, mathematics as close to the centre of the plane, and music as

an élite code. These findings were triangulated with data from focus groups with university students that provided more insights into the reasoning and experiences behind these perceptions. The findings provided further support for the conjecture that music at higher levels of secondary schooling (which respondents had very recently completed) is characterized by an élite code and that this code is unusual for subjects at this level. Moreover, other questionnaire findings and focus group data (Maton 2007) highlighted that, while music involves two measures of success (musical knowledge and musical dispositions), students viewed themselves as less capable in music and music itself as less significant than other subject areas. In short, music was perceived as more demanding and offering less potential gains than other subjects – a relatively unattractive subject choice.

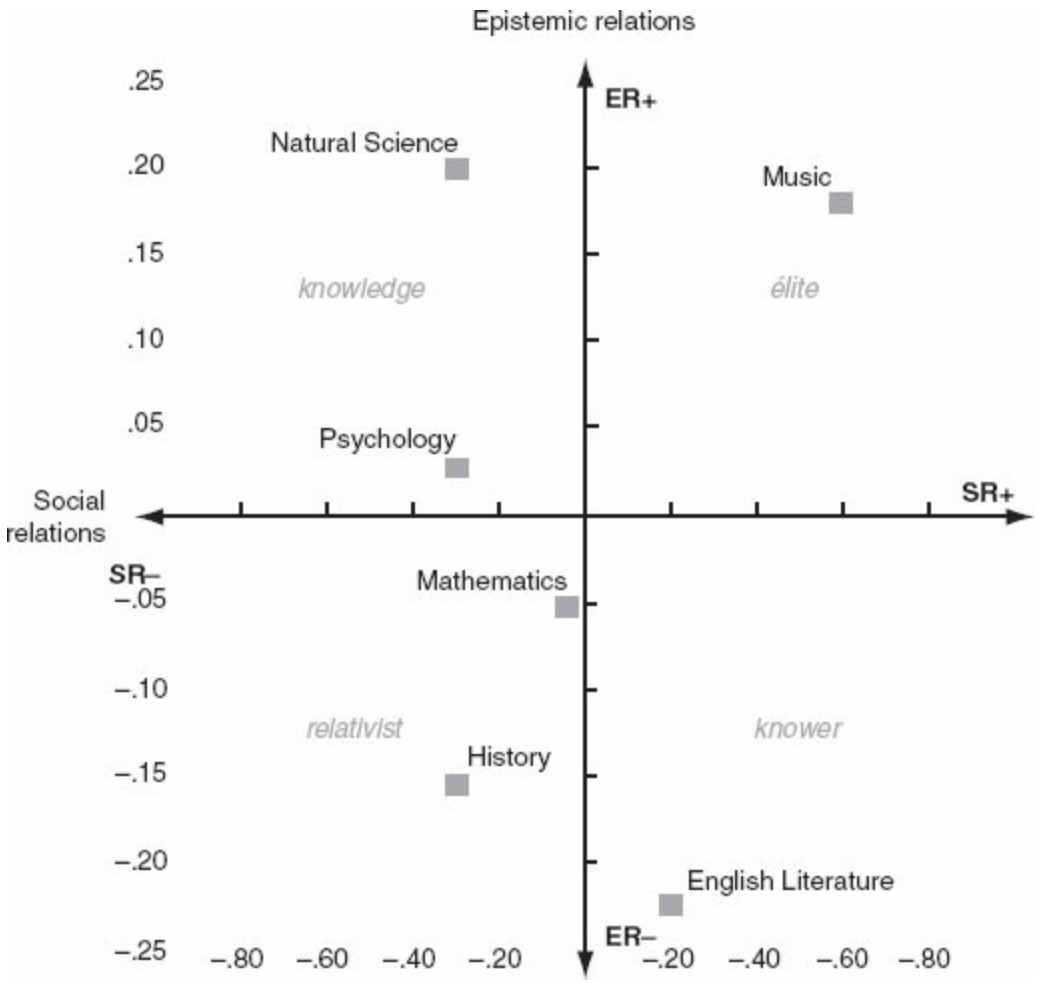


Figure 3.2 University students' perceptions of bases of achievement.

In terms of the instrument, the findings suggested, first, that adding 'taste' and 'judgement' helped capture the cultivated knower code held by advocates to characterize study of English literature (Maton 2014b), though not yet that associated with History (e.g. Martin *et al*. 2010). Second, they highlighted the instrument's greater capacity to capture nuanced differences among subjects, such as between the knowledge codes of psychology and natural science, in which the latter involves considerably stronger epistemic relations (see Figure 3.2). Third, delineating scales for epistemic relations and social relations separately enabled the emphasis on both relations in music (élite code) to become clearly evident. Nonetheless, the results still posed challenges to the instrument, such as the uncertain position of mathematics. Methodologically, the next task was to explore how the instrument might fare in studies of larger and more diverse populations and for different problem-situations. This stage of evolution took place in the largest research project yet conducted in code theory.

Evolving the instrument

Educational technology integration

The studies which developed the quantitative instrument addressed technology in secondary education and specifically its differential integration across the curriculum. Existing research has shown that, in some cases, proliferation of information and communication technologies (ICTs) has been accompanied by integration within classroom practices, but that this is highly variable and inconsistent (Perrotta 2013). In particular, studies highlight significant variation across the curriculum – degree and form of technology usage depend on subject area (Howard *et al*. 2015). Yet, existing research has neglected the role played by differences in the knowledge practices of academic subjects (Howard and Maton 2011).

In this context of knowledge-blindness, Sarah Howard undertook a four-year, mixed-method, longitudinal series of studies during 2010–2013. These studies explored the organizing principles underlying knowledge practices across the secondary school curriculum and their role in shaping differential integration of educational technology. The research was embedded within a

wider-ranging evaluation of how a major federal policy, the ‘Digital Education Revolution’, was enacted in the state of New South Wales, Australia. This initiative comprised a state-wide one-to-one laptop programme, the largest of its kind, in which all students in government schools were provided with their own specialist educational laptop computer in year 9 to keep until year 12. The full design and results of annual evaluations are reported in Howard and Mozejko (2013). Here we focus on how these studies helped advance the quantitative instrument.

In each year of the research, Howard utilized qualitative and quantitative methods in three phases:

1 analyses of state-level documents and videos relating to policy and curriculum;
2 online questionnaires of teachers, students and parents that explored ICT access, capabilities, beliefs about their use in teaching and learning, conceptions of learning outcomes when using ICTs, and (for teachers and students) bases of achievement in technology and a range of academic subjects; and
3 case studies of five schools that explored emergent findings from phase 2 in greater depth, including 7–8 teachers and 7–8 students at each school and involving interviews, focus groups, and documentary analysis of school policy and curriculum.

The resulting data set is substantial. For example, phase 2 online questionnaires involved over 600 secondary schools and responses from up to 25,000 secondary teachers and up to 89,000 students each year. All three phases were designed around the concepts of specialization codes: versions of the quantitative instrument were included in all teacher and student questionnaires and adapted for interviews and focus groups.

Annual policy analyses (phase 1) explored intended outcomes of the Digital Education Revolution. Nationally, a principal aim was to ‘enable school users to discover, access and share collaborative education materials and information’ (DEEWR 2008). In New South Wales, the laptop programme was viewed by the state education department as enabling a fundamental change in classroom practice, one encouraged through its provision of online support materials, such as teacher training videos.

Analyses of policy documents and videos identified this desired change as embodying a code shift ‘from an instructivist emphasis on knowledge to a constructivist emphasis on the knower’ (Howard and Maton 2011: 200). Teachers were urged to no longer focus on the ‘transmission of knowledge’ and instead become ‘co-constructors of learning’, ICTs were presented as enabling students’ personal creativity and expression, and teachers were expected to adopt practices associated with student-centred learning. These encouraged changes, emphasized throughout the lifetime of the policy, did not differentiate among subject areas. In short, knower-code practices were expected to be implemented across the curriculum as a consequence of the programme. Such expectations are not unusual: the field of educational technology research is dominated by the association of ICTs with constructivist or ‘student-centred’ approaches (Howard and Maton 2011).

Building on existing studies using LCT, Howard conjectured that the specialization codes dominating academic subjects may differentially shape both how technology was integrated and resultant pedagogic outcomes. Simply put, the desired policy outcomes of knower-code practices were more likely to be enacted in subjects dominated by a knower code and less likely in those dominated by other codes. Accordingly, phases 2 and 3 analysed the practices and beliefs of teachers and students, as well as school and state curriculum, to determine the specialization codes characterizing seven academic subjects and thus code matches or clashes with the policy aims.[3]

In terms of the quantitative instrument, these studies involved different populations of respondents to previous research. As Chapter 2 (this volume) emphasizes, new problem-situations may require fresh means of translating between code concepts and the specificities of objects of study. Accordingly, the instrument was developed in response to findings from each annual study. A series of changes were made to the wording and structure of the questionnaire item to create a more sensitive and robust instrument. Qualitative versions enacted in interviews and focus groups were updated to match these changes to the quantitative instrument, enabling triangulation and dialogue between these forms of data. We shall discuss these iterative changes in terms of: first, developing reliability, to attain an instrument that generated consistent and dependable results about this object of study; and, second, improving validity, to ensure those results accurately reflected the

'realities' and intentions, so to speak, of respondents. We shall also draw out the wider lessons these developments offer for the craft of enacting LCT concepts in research.

Developing reliability

To build on existing findings, the research began from the most recent iteration of the quantitative instrument from the music studies (Figure 3.1, above). The three Likert scales were retained with two minor revisions of wording to accommodate a younger population of school students. Nuanced words ('specialist', 'techniques' and 'judgement') were removed or replaced ('taste' with 'experience') for accessibility and appropriate 'action' words ('learning', 'having', 'getting') added to emphasize foci. The resulting item is illustrated in Figure 3.3. This version was answered by 43,657 respondents (39,012 students and 4,663 teachers). Full results are reported in Howard and Carceller (2011). For brevity, we shall here illustrate our discussion with analyses of teacher surveys for three subject areas – English, science, and mathematics – that between them exemplify key issues driving the instrument's evolution.

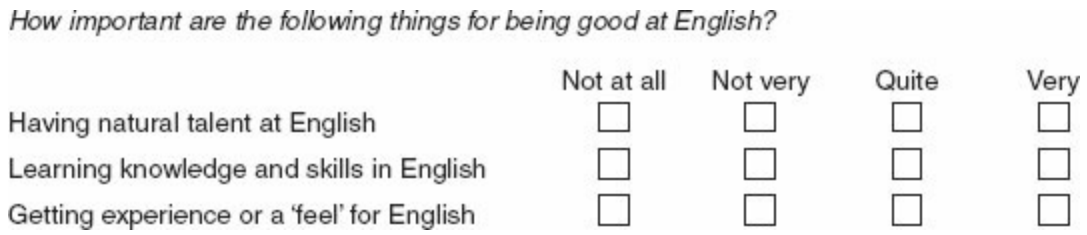


Figure 3.3 Example of 2010 instrument (student survey) from technology studies.

In the 2010 study, 80.2 per cent of the 4,663 teachers who participated in data collection responded to the item (n = 3,740). Such a large data set (and student responses were considerably more numerous) lent itself to statistical testing of the instrument using well-established quantitative techniques. Analysis of findings demonstrated that the three scales addressed the same overarching issue rather than disparate topics and were not overlapping in their focus. In statistical terms, variables were significantly correlated (r < .401, p < .001) and confirmatory factor analysis showed the three items load

as one component, $\chi^2(3, N = 3685) = 1513.84, p < .001$. Simply put, the general focus of the instrument was sound. However, its reliability was less satisfactory. A standard measure (Cohen's alpha) revealed lower reliability (.56) than generally accepted as a benchmark (.7); i.e. if this data collection had been repeated there was only a 56 per cent likelihood of attaining the same results. Quantitative tests thus showed this version to be insufficiently reliable for generating dependable findings about this population of respondents. As emphasized above, each problem-situation may require its own means of enacting concepts; for this object of study, the instrument needed development.

Potential causes of such low reliability are manifold. A common reason can be providing insufficient opportunities for gathering data on a specific issue. The instrument attempted to capture epistemic relations in one scale ('knowledge and skills') and social relations in two scales ('natural talent' and 'experience or a "feel" for …'). This allowed each question to be extremely compact, so more questions could be included in a survey (capturing a greater range of academic subjects) and the survey length minimized (increasing the likelihood of completion). As discussed earlier, such concision enables the relational thinking central to enacting LCT. However, it also raises the pressure on each point of data collection to accurately capture its target information. Here, greatest pressure lay on the single scale for epistemic relations, which the developing theory also suggested was not enough.

LCT is a dynamic framework in productive dialogue with research. The development of the '4–K model' of Specialization (Maton 2014b: 171–95) in response to issues raised by substantive studies highlighted that epistemic relations and social relations are more complex than might appear. The 4–K model distinguishes social relations into *subjective relations* that specialize kinds of knowers and *interactional relations* that specialize ways of knowing by actors. The realizations of these relations as teaching and learning practices in secondary schooling were expressed by the quantitative instrument as separate scales addressing 'natural talent' (for subjective relations) and 'experience or a "feel" for [the subject]' (for interactional relations). Similarly, the model distinguishes epistemic relations into *ontic relations* that specialize the known and *discursive relations* that specialize the

discursive practices whereby it is known. However, the instrument collapsed pedagogic realizations of these two relations into one scale, as ‘knowledge and skills’. Thus, it only partially grasped the complexity highlighted by the 4–K model, potentially undermining its reliability. To improve sensitivity and create more balance within the instrument a second line exploring epistemic relations was added to create two scales that addressed ‘knowledge’ and ‘skills’ separately. (Refining these measures would become an issue for validity, to which we return below.)

A second common reason for low reliability concerns wording – the meaning of an item may not be interpreted consistently. Triangulation with interview data suggested that ‘experience’ (see Figure 3.3) was understood differently by teachers across the curriculum. For example, mathematics teachers typically construed ‘experience’ as embodied by repeated practice at mathematical procedures – practical application of mathematical principles. Thus, what was intended to explore social relations across the disciplinary map was understood by some respondents as expressing epistemic relations. This issue has wider import for research. It is easy to assume the meanings of non-technical words are widely shared. This illusion of transparency highlights the significance of testing the validity of wording (which we discuss below), whether for questionnaires or qualitative interviews. Here, to avoid confusion and increase sensitivity of the scale, the term ‘procedures’ was added alongside ‘skills’ to the new ‘epistemic relation’ scale, and the ‘social relation’ scale for ‘experience’ was reworded to foreground the notion of ‘getting a “feel” for’ the subject area.

The instrument was thus extended from three to four scales and reworded, as illustrated by Figure 3.4. This form was used in 2011 and 2012. In the 2011 study 4,227 teachers participated in data collection, 83.5 per cent responding to the item (n = 3,529); in 2012, 2,806 teachers participated and 84.0 per cent responded (n = 2,355). Analysis of the findings showed that the new instrument addressed the same overarching issue and scales were not overlapping. Statistically put, variables were significantly correlated in both years (2011, $r < .486$, $p < .001$; 2012, $r < .515$, $p < .001$) and confirmatory factor analysis indicated the four items loaded as one component: 2011, $\chi 2(6, N = 3529) = 4827.62$, $p < .001$; 2012, $\chi^2(6, N = 2355) = 3293.86$, $p < .001$. This time, though, reliability improved significantly to an acceptable level

(alpha = .71). In short, thanks to dialogues with both theory and qualitative data the quantitative instrument was now suitably reliable. This was not, however, the end of the story.

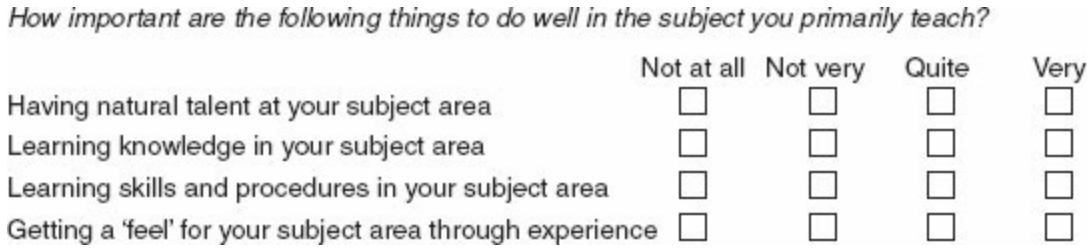


Figure 3.4 Example of 2011 instrument (teacher survey) from technology studies.

Improving validity

Achieving reliability meant the instrument now generated consistent findings but not that those findings were faithful to the object of study. Indeed, the specialization codes suggested by the quantitative data contradicted those revealed by qualitative data. For example, analyses of interviews, focus groups and curriculum documents in the phase 3 case studies of New South Wales secondary schools showed mathematics to be characterized by a knowledge code and English as dominated by a knower code but including knowledge-code activities, such as learning technical skills (structuring texts, spelling, grammar, etc.) required for composition (Howard and Maton 2011). In contrast, quantitative analyses described both subjects as élite codes. Given the questions employed in qualitative data collection mirrored the quantitative instrument, something was awry. However, integrating the methods in research helps achieve fidelity to an object of study by enabling triangulation of data. The quantitative instrument helped shape the focus of qualitative methods and, in turn, qualitative findings helped reshape the quantitative instrument. Here interview data highlighted and helped resolve a problem of validity concerning 'epistemic relations'.

As discussed earlier, the instrument had been restructured to address two kinds of epistemic relations highlighted by the '4–K' model: *ontic relations* to that which is known and *discursive relations* to discursive practices whereby it is known. In Maton (2014b: 175–84) these concepts are introduced in analyses of intellectual fields, where ontic relations describe

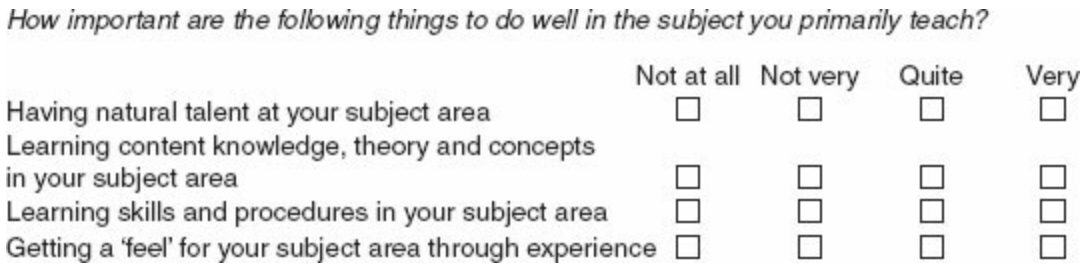
how knowledge practices emphasize legitimate objects of study and discursive relations describe how knowledge practices emphasize legitimate procedures for constructing objects of study. However, how code concepts are realized depends on what one is analysing. They thus require translation to explore the beliefs of secondary school teachers and students concerning bases of achievement in subject areas.

The first attempt at this translation for the technology studies comprised scales for 'knowledge' (ontic relations) and 'skills' (discursive relations). However, qualitative data suggested this was flawed. In interviews teachers were asked to discuss 'skills' and 'knowledge' in their subject area. The term 'skills' was consistently used to refer to discursive practices students must enact to demonstrate successful mastery of a knowledge domain, such as expression and comprehension skills in English, measuring and graphing in science, and using fractions and decimals to solve mathematical problems. In this object of study, 'skills and procedures' consistently captured issues highlighted by discursive relations. In contrast, 'knowledge' was employed more fluidly by teachers to refer to specific content, a process of understanding, application of content, and students' dispositions for acquiring content and skills, among other meanings. Not only was 'knowledge' construed in diverse ways, these included forms of knowing associated with social relations rather than epistemic relations. The scale was thus potentially compromising validity of the instrument.

This offers lessons for all forms of research. As with 'experience' earlier above, it is tempting to assume meanings of words are transparent and shared among participants. Part of the craft of LCT is maintaining scepticism about what Bourdieu *et al*. (1991) called 'preconstructed' notions whose meanings appear self-evident. This often includes words central to the practices of a social field, such as 'teaching', 'learning' and 'knowledge' in education. (See Chapter 4, this volume, for examples from the field of design.) In this case, 'knowledge' could refer to objectified forms that realize epistemic relations or to mental processes of knowing that realize social relations (cf. Maton 2014b). For research practice wording matters – 'knowledge' is not self-evident. To resolve this general issue Bourdieu emphasized vigilance. As discussed in Chapter 1 (this volume), LCT additionally suggests a gaze can be converted into theory or, in this case, methodology. Here, vigilance can be supplemented by validity testing. In these studies, participants were asked in

interviews and focus groups to discuss what they understood by key terms used in the instrument. Moreover, the qualitative data also provided a corpus within which the context revealed associated meanings. This helped reveal not only the problem but also a solution. Teachers across the curriculum consistently used ‘content knowledge’ in interviews to refer to that which students must demonstrably know for success, such as quotes from texts in English, chemical reactions in science, and ratios in mathematics. This connotation was particularly consistent when associated with terms such as ‘concepts’ and ‘theory’, suggesting a cluster of terms that realize discursive relations in a more valid manner for this population of respondents. Accordingly, the instrument was amended by replacing the term ‘knowledge’ with ‘content knowledge, theory and concepts’.

The resultant questionnaire items are illustrated by Figure 3.5. This form was used in the 2013 study, in which 2,776 teachers participated, 85.4 per cent responding to the item (n = 2,373). The revised instrument remained robust. Confirmatory factor analysis indicated that items loaded as one component: $\chi^2(6, N = 2373) = 2676.77$, $p < .001$. Reliability of the measure was also appropriate (alpha = .7). Now, though, the instrument also exhibited validity: responses were in tune with the findings of qualitative and documentary analyses.



How important are the following things to do well in the subject you primarily teach?

	Not at all	Not very	Quite	Very
Having natural talent at your subject area	☐	☐	☐	☐
Learning content knowledge, theory and concepts in your subject area	☐	☐	☐	☐
Learning skills and procedures in your subject area	☐	☐	☐	☐
Getting a ‘feel’ for your subject area through experience	☐	☐	☐	☐

Figure 3.5 Example of 2013 instrument (teacher survey) from technology studies.

Code clashes, code matches, and technology integration

Having achieved theoretical fidelity, reliability and validity, we can now return to the impetus for refining the instrument – differential technology integration across the curriculum – to illustrate the power of mixed-methods research. As discussed earlier, the use of digital technologies in the laptop

programme was expected to shift teaching and learning across the secondary curriculum towards knower-code practices. The instrument established the specialization codes of seven subjects which, triangulated with findings from case studies, were related to quantitative and qualitative data on a range of beliefs and practices among teachers and students concerning the use of technology in classrooms.

Here we can but touch on results (see Howard *et al*. 2015). Continuing our illustrative focus, a total of 933 teachers of English (n = 335), mathematics (n = 296) and science (n = 300) responded to the item in 2013. Responses are plotted on the specialization plane of Figure 3.6: English exhibits a knower code, mathematics realizes a knowledge code, and science represents a relativist code. Crucially, the beliefs and practices of teachers concerning digital technologies reflected relations between the specialization codes of the laptop programme and their subject. English teachers demonstrated significantly more agreement (M = 2.54, SD = .74) than mathematics teachers (M = 2.32, SD = .59) with the belief that ICTs support positive student learning outcomes (p < .001). English teachers also reported more use of laptops in classroom practices (M = 5.71, SD = 2.94) than mathematics teachers (M = 5.03, SD = 3.05; p < .05). Moreover, English teachers reported more of a shift towards ‘student-centred’ practices (M = 2.79, SD = .80) than mathematics teachers (M = 2.53, SD = .68; p < .001). In sum, the knower-code subject of English dovetailed with the aims of the laptop programme more closely than did the knowledge-code subject of mathematics.

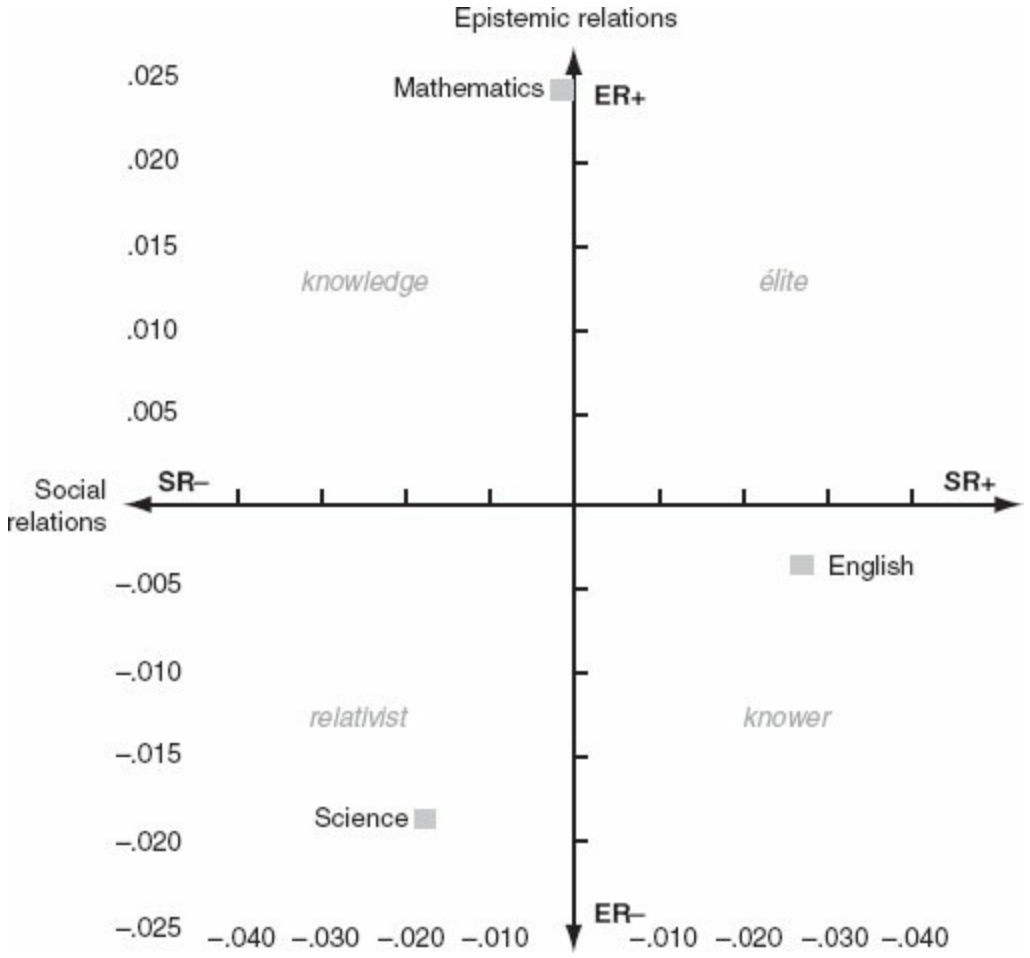


Figure 3.6 Specialization codes of English, mathematics and science – 2013 teacher survey.

This code match/clash was also reflected in how technology was used. Relating qualitative findings to specialization codes established by the instrument helped explain practices resulting from the policy. For example, mathematics teachers judged technology's usefulness in terms of teaching and learning mathematical knowledge, skills and procedures (emphasizing epistemic relations) and viewed uses typically constructed as expressing learners' creative dispositions as inessential (downplaying social relations). Accordingly, they often adapted the technology in knowledge-code ways, such as using visualization software originally designed for student-centred practices for 'traditional' teaching of skills such as graphing. In contrast, English teachers used laptops for the kinds of knower-code practices, such as creative writing and creating movies, envisaged by the policy. However,

technology use reflected not each academic subject *tout court* but rather the specialization codes of practices comprising that subject. While the instrument revealed English to be dominated by a knower code, the subject also includes knowledge-code practices, such as structuring texts, grammar and spelling. For these skills, teachers stated that ICTs were of limited value and even deleterious, such as encouraging students to neglect grammar and spelling. This suggests a future direction for research: using the instrument to explore the constitutive practices of academic subjects. It also illustrates the value of a mixed-methods approach: having established a subject's *dominant* code with the quantitative instrument, qualitative methods provided insight into the diversity of practices comprising the subject. Together, they revealed that teachers engaged with knower-code technology practices where these served knower-code pedagogic purposes but viewed them as less valuable for teaching and learning knowledge-code practices. Thus, different patterns of integration of technology among and within academic subjects reflected their specialization codes.

The findings also revealed an unanticipated twist. Though science is typically portrayed as a knowledge code (Maton 2014b), findings generated by the instrument characterized the construction of science *in secondary schooling in New South Wales* as a relativist code, a result affirmed by documentary analyses of curriculum and qualitative data from interviews. This helps explain an otherwise anomalous engagement with the laptop programme. Science teachers believed in the capacity of ICTs to support positive student learning outcomes as strongly as English teachers ($p = 1.00$) and reported even greater usage of laptops in classroom practice ($p = 1.00$). Their patterns of usage were also far more diverse than other teachers. Where the principles of selection, adaptation and enactment of technology by mathematics teachers were guided by the stronger epistemic relations of its knowledge code (ER+, SR−) and those of English teachers by the stronger social relations of its knower code (ER−, SR+), for science teachers the weaker epistemic relations and social relations of its relativist code (ER−, SR −) appeared to create a vacuum such that the use of technology was less systematically principled. This conjecture requires further research. Nonetheless, it illustrates how the quantitative instrument contributed to not only exploring this problem-situation but also revealing the unexpected, generating further questions.

Conclusion

An image of methodologies as binary constellations dominates social science. By enabling concepts to be embedded in both quantitative and qualitative methods, LCT defies this false dichotomy. Research can thereby take advantage of the affordances of both methodologies. This creates more than the sum of its parts: complementary methods contribute not only to explanatory power but also to developing each other. As we discussed, the quantitative instrument both shaped qualitative methods and was shaped by the data they generated. Our account also reveals the falsity of the portrait of quantitative methods as neat, linear and semi-mechanical that accompanies their disavowal by sociological approaches. As part of mixed-methods research, the evolution of a quantitative instrument can be as complex, iterative, and involved as qualitative analysis. Whatever the methodology, developing theoretically-appropriate, reliable and valid research tools is a craft requiring judgement, dialogue, and immersion in the object of study. Nonetheless, such hard work offers substantive and theoretical rewards.

Substantively, the studies illustrate how quantitative data – triangulated with qualitative data and tested for validity and reliability – provide a robust basis for describing the organizing principles of knowledge practices. We can rely on more than intuition, commonsense, or singular examples when conjecturing that, for example, in secondary school English is likely to be characterized as a knower code or mathematics is likely to exhibit a knowledge code. We can now refer to reliable and valid analyses of an enormous data set. Of course, nothing is definitive – our use of 'likely' is significant. The technology studies do not conceptualize the specialization code of subject areas always and everywhere. We have repeatedly emphasized the specificities of objects of study – thus our use of italics in describing science in *New South Wales secondary schooling* as a relativist code. However, accepting such caveats, the size, scope and detailed triangulation of the data set generated by the technology studies represents an unprecedented basis for considering disciplinary differences, as well as the specific issue of differential technology integration. Future research, whether qualitative, quantitative or mixed-methods, need not start from scratch but instead can begin from the findings of these studies, enabling cumulative

knowledge-building about substantive issues.

Theoretically, developing an instrument for enacting LCT concepts in quantitative analysis both augments the framework's capacity to engage with objects of study and provides a way for data to 'speak back' to the framework. Developing the instrument shed fresh light on the theory, such as the significance of relational and topological thinking and the value of foregrounding the constitutive relations of codes when conducting analysis. As we emphasized, the instrument itself also evolves in relation to the specificities of each problem-situation, such as differences among populations of respondents. This may require significant development but, crucially, such development need not start from scratch. New studies of different issues can adopt or adapt the existing instrument, enabling cumulative knowledge-building of the framework. For example, in a study discussed in Chapter 4 (this volume), Carvalho (2010) used the instrument to explore the specialization codes characterizing fields of design. In the research we discussed, the final iteration of the instrument developed by the music studies provided the basis for the first version used in the technology studies. The baton was passed on, the instrument further evolved.

Naturally, this is not the end of the story – answers to questions beget new questions. Methodologically, the instrument was designed to explore actors' perceptions of academic subjects; analyses of actors' practices (producing 'new' knowledge, constructing curriculum, teaching, learning, etc.) are likely to require different phrasings of the questionnaire item. The studies above focused on perceptions of each subject as a whole – studies of their constitutive practices would provide a more fine-tuned understanding of the diverse codes at play in each field. Moreover, other dimensions of LCT await. For example, quantitative instruments enacting the concepts of 'semantic gravity' and semantic density' would provide powerful complements to qualitative tools that are being developed (see Chapter 1, this volume). Nonetheless, the specialization instrument represents a significant first step towards realizing the potential offered by transcending the methodological divide.

Notes

1 Notable exceptions include Grenfell and Hardy (2007) and studies collected in

Robson and Sanders (2009) and Grenfell and Lebaron (2014).

2 For example, in volumes arising from the International Basil Bernstein Symposia (Morais *et al*. 2001; Muller *et al*. 2004; Moore *et al*. 2006; Singh *et al*. 2010; Ivinson *et al*. 2011), only eight of 67 papers involve any quantitative data and of the eight, seven embody the uses listed here; the eighth (Maton 2006) introduces the instrument discussed in this chapter.

3 Respondents were asked about academic subjects of which they had direct experience. Student surveys explored the specialization codes of seven subjects: mathematics, English, science, History, geography, music, and visual arts. Teacher surveys explored the specialization codes of using technology and the subject area in which each respondent principally taught.

4 LCT in praxis

Creating an e-learning environment for informal learning of principled knowledge

Karl Maton, Lucila Carvalho and Andy Dong

Transcending the divide between theory and practice.

Introduction

It is a commonplace in social scientific research to argue that theory and practice should be related. The frequency with which proclamations recur, however, attests to how far the rhetoric outreaches reality. Theory often remains separated from the practice it purports to explain and transform. As this volume highlights, Legitimation Code Theory (LCT) enables false dichotomies to be overcome, whether between concepts and data (Chapter 2), quantitative and qualitative methods (Chapter 3), theories from different disciplines (Chapter 5) or, as we illustrate in this chapter, 'the canonical opposition between theory and practice' (Bourdieu 1996: 179). That LCT is a 'practical theory' (Chapter 1) manifests in myriad forms. Principally, an ever-growing body of research attests to its capacity to provide practicable solutions to practical problems. Such studies typically bring theory to bear on the analysis *of* practice or articulate the implications of analysis *for* practice. This chapter, however, explores an arguably closer relation: embedding theory *within* practice or (to distinguish this focus) what we shall refer to as 'praxis'. Specifically, we explore a form of praxis where theory is invisibly integrated into action.

To clarify our focus we shall distinguish between *explicit praxis* where theory is voiced and *tacit praxis* where theory is silent. Consider as an

example different uses of the LCT concept of *semantic waves*, which describes recurrent movements between simpler, concrete meanings and more complex, generalized meanings, and vice versa (Maton 2013, 2014a). Macnaught *et al*. (2013) describe a pedagogic intervention in which the concept of 'semantic waves' was explicitly taught to schoolteachers as part of shaping the knowledge they express in classroom discourse. In this training the concept was voiced – *explicit praxis*. However, though it informed their subsequent teaching, the teachers typically did not explicitly discuss 'semantic waves' in the classroom. In this teaching the concept was significant but not made manifest – *tacit praxis*. The use of LCT concepts to generate explicit praxis is growing rapidly, particularly in academic development and academic literacy programmes.[1] However, this form is not always feasible or welcomed. In education, possibilities may be limited by a perceived lack of time or capacity to teach and learn both content knowledge and a meta-language for understanding the nature of that knowledge. Beyond education, explicit use of technical concepts may be viewed as militating against informal learning. In such contexts tacit praxis offers an alternative where actors need not learn the theory – they may engage in practices based on a theory without being fluent in or even knowing about the framework itself.

Tacit praxis thus offers the potential for theory to guide practice on a large scale. However, the means whereby theory can be systematically transformed into praxis remains underexplored. This is a particularly pressing issue for tacit praxis as concepts must be translated into the discursive practices that characterize the context without losing their integrity. Basil Bernstein (2000) provided a starting point by distinguishing between 'internal languages of description' or how constituent concepts of a theory are interrelated, and 'external languages of description' or how concepts are related to their referents. What he termed 'strong external languages of description' that translate between theory and the specificities of different data are crucial for knowledge-building by bringing disparate phenomena within the purview of an integrating theory. Chapter 2 (this volume) describes the creation of a 'translation device' for relating theory and data. However, integrating theory with practice has been less discussed. Maton (2014b: 209) extends Bernstein's ideas to describe 'external languages of enactment' for translating

between theory and actions and suggests that each kind of practice requires its own language of enactment. Continuing our example above, the concept of 'semantic waves' can be enacted within a range of practices in education (classroom practice, student assessments, research publications, etc.) as well as beyond the field (legal proceedings, parliamentary procedures, etc.). Accordingly in the pedagogic intervention (Macnaught *et al*. 2013), enacting semantic waves in secondary school classrooms in History and Biology required translation of the concept into specifically pedagogic terms that, moreover, were appropriate to this level of education and these subject areas. To this end, genre-based pedagogies developed by the 'Sydney School' of systemic functional linguistics were drawn upon to translate semantic waves into pedagogic practices. Thus an *external language of enactment* is a means for embedding theory into practice in ways appropriate to the concrete particularities of that situated and contextualized action. It is a *translation device for praxis*. This raises the question of how such a device can be developed.

In this chapter we discuss the process of creating external languages of enactment through a case study of a mobile e-learning environment embedding the LCT concepts of *specialization codes* into learning activities within a museum. In doing so, we also demonstrate the flexibility and functionality of the framework. First, we illustrate its capacity to embrace diverse contexts. Thus far, this volume has focused on studies of universities (Chapter 2) and schools (Chapter 3); here we venture beyond formal education to explore informal learning. Second, we show how LCT enables not only the analysis but also the generation of practice. Maton (2014b: 210) distinguishes 'organizing frameworks' that highlight issues for analysis and 'analytic frameworks' that provide means for analysing those issues. To this we add 'design frameworks' that enact the findings of analyses within praxis. Here LCT serves both as analytic framework, revealing the organizing principles of knowledge practices, and as design framework, embedding those principles within an e-learning environment.

The case study is a mobile e-learning environment called 'Design Studio' that was created by Lucila Carvalho as part of her doctoral research at the University of Sydney under the supervision of Andy Dong and Karl Maton.[2] The study is reported in Carvalho (2010) and selected findings published in

Carvalho and Dong (2007) and Carvalho *et al*. (2009). Here our concern is less the product of the study than its production. In particular we focus on how external languages of enactment were developed to create a translation device between theory and tacit praxis. This represents a retrospective *re*-analysis of that process. In the case study in Chapter 2 (this volume) of how an 'external language of description' was developed within a qualitative study, the concept preceded the research. Here the concept of 'external language of enactment' emerged after the research, enabling a fresh understanding of the process and its methodological principles to be explicated. Thus, one wider insight into the 'craft of LCT' (Chapter 1, this volume) offered by this re-analysis is that not everything may be evident, intended or conceptualized prior to or even during research. Sometimes the logic underpinning a study becomes more explicit upon completion or when new concepts emerge that allow the gaze shaping the work to be converted into theory (see Chapter 1).

The chapter discusses the research process in five stages. First, we outline how the problem-situation occasioning the development of the e-learning environment shaped the choice of tacit praxis and LCT. We highlight how the specific theatre of social action and form of practice created a need for what we term *informal learning of principled knowledge* that, in turn, required a framework for enabling tacit praxis that embodied organizing principles of design practice. Second, we discuss how LCT concepts, specifically specialization codes, served as an *analytic framework* both for identifying the diverse organizing principles of design disciplines and for couching those principles in non-technical language suitable for museum visitors. Third, we describe how specialization codes served as a *design framework* for the e-learning environment by embedding organizing principles of design disciplines within an informal learning experience. We illustrate the external languages of enactment that underpin the architecture of Design Studio. Fourth, we briefly discuss the resulting tacit praxis enabled by the environment. Finally, we stand back from the case study to consider the characteristics of external languages of enactment and their wider potential for informing practice.

The problem-situation: informal yet principled learning

Design Studio was developed and implemented in conjunction with the Powerhouse Museum in Sydney, Australia. The museum addresses topics such as history, science, technology, design, industry, decorative arts, music, transport and space exploration (Powerhouse Museum 2015). Its collection comprises approximately 385,000 objects and its exhibits aim at engaging visitors with a variety of learning experiences. At the time of this project (2005–08) there were 22 permanent and a varying number of temporary exhibitions which involved a range of experiences using touch-screen computers, audiophones, science experiments, virtual reality 3D theatres, performances, films, lectures, and public programmes. One section of the museum, the SoundHouse & VectorLab (subsequently renamed 'Thinkspace'), comprised an educational space that offered structured workshops to groups of students and/or teachers. VectorLab programmes focused on using computer systems in image production and manipulation through 2D, 3D, video and motion graphics. In 2008 a new programme was introduced at VectorLab that aimed to integrate design learning experiences into the various collections, exhibitions and online resources offered in the museum. The research re-analysed in this chapter began with the brief of creating an e-learning environment installed on a mobile computer to accompany visitors through the processes involved in designing an object. The aim was for visitors to engage with and learn about design by choosing an object to design and exploring their emerging design ideas through interactions with the mobile e-learning environment and museum surroundings. This remit shaped decisions about the kind of practice Design Studio would enable and the theoretical framework drawn upon to do so.

Choosing tacit praxis

Different problem-situations require different forms of relations between theory and practice. In this case, the specific theatre of social action and forms of practice created two potentially contradictory sets of demands on the e-learning environment that necessitated tacit praxis. These demands concerned the intellectual context of design knowledge and the social context of the museum.

First, design is a specialized field of knowledge practices. As with all such fields, to learn about design is to engage with principled constellations of

concepts, procedures, skills and ways of thinking that are different to commonsense understanding. Thus, to enable participants to engage with and learn about design, the e-learning environment needed to incorporate principles of design practice. This is more complex than might at first appear. Design comprises a series of diverse fields (including engineering, fashion, digital media and architecture) that in turn comprise a series of specialisms (such as mechanical and civil engineering, textiles and haute couture in fashion, and landscape and urban architecture). As research on the project soon showed, actors in each field view 'design', and what is valued as meaningful or valuable within 'design', in different ways (Carvalho and Dong 2007; Carvalho *et al*. 2009). Questions of what knowledge one needs to design, what are legitimate kinds of 'design knowledge' and who can be described as a legitimate 'designer' are hotly contested in the field. Thus, the e-learning environment needed not only to incorporate principles of design but to embrace the varied range of these principles that underlies the diverse knowledge practices of its constituent fields.

Second, a museum is an informal learning context. Museums typically emphasize relatively self-driven experiences – visitors usually have a high degree of freedom to wander around. In such settings, visitors select the exhibition rooms they wish to enter, the exhibits with which they wish to engage, and the extent of curatorial information they wish to access. A museum experience is thus characterized by opportunities to experiment, interact and choose where to go and what to do. The mobile e-learning environment for the Powerhouse Museum needed to reflect this freedom of choice. Another feature of such informal learning contexts is that specialized prior knowledge of participants cannot be assumed. In this case, visitors to the museum were unlikely to be familiar with either formal design knowledge and practices or the diverse criteria of meaningfulness and value characteristic of specialized fields of design. Thus, the e-learning environment needed to be couched in language accessible to the uninitiated, rather than specialized terminology, and capable of offering guidance, if elicited, regarding participants' emerging ideas as they proceeded through the collections and interactive activities offered by the museum.

In short, the remit with which Carvalho and Dong began the project was to develop a mobile means of enabling a flexible and accessible learning experience of the principles of design practice within the specific setting of

the museum's collection and exhibits. This can be understood as informal yet principled learning. Such a formulation may appear contradictory: it involves both opportunities for learner choice and structured principles of knowledge. Moreover, the technological affordances of mobile e-learning environments, such as portability and interactivity, do not by themselves resolve this apparent contradiction, for they do not capture the nature of that which is to be learned. They offer informal but not necessarily principled learning. To embrace both sides of this equation required, therefore, a means of enabling *tacit praxis*: a theoretically-informed understanding of specialized knowledge practices (to enable the resulting practice to be principled) but one that is not itself an explicit aspect of the experience (to facilitate the informal nature of learning).

Choosing LCT

Tacit praxis presupposes a means of determining the organizing principles of practice and a means of embedding those principles within new practice. In this case study, it required a theoretical framework for exploring the diverse knowledge practices of design and embedding their organizing principles within an e-learning environment. Given the proclaimed significance of both knowledge and e-learning to contemporary society, one might expect a surfeit of theories to choose from. We are said to be living in 'knowledge societies' (Stehr 1994) in which 'lifelong learning' is not restricted to formal educational institutions and childhood. Accordingly, commentators on e-learning (Spector 2013) and 'learning on demand' (Allen and Seaman 2010) anticipate a proliferation of e-learning environments to enable learning anywhere at any time. Yet neither the sociology of education nor educational technology research adequately addresses these environments.

On the one hand, 'education technology has managed to largely escape the sustained critical attentions of sociologists of education' (Selwyn 2006: 418). A sociology of educational technology barely exists. Where technology is addressed, research typically sidelines issues of designing e-learning environments to explore how pre-designed environments are used and implications of their use (e.g. Selwyn 2010). Crucially for the project discussed here, studies overwhelmingly suffer from sociological reductionism that creates 'knowledge-blindness' (Maton 2014b). They

typically treat knowledge practices as reflections of the interests of social categories of knowers, obscuring the forms taken by knowledge practices mediated or enabled by technology.[3]

On the other hand, educational technology research typically suffers from a different form of 'knowledge-blindness'. Under the influence of psychology, approaches construe 'knowledge' as subjective states of consciousness and mental processes or, in 'social' versions, as aggregates of individual minds or communities of practice. Knowledge is thereby understood in terms of knowing and the focus becomes generic processes of 'learning'. Knowledge itself represents a 'missing piece of the puzzle' (Howard and Maton 2011). This also holds for accounts of the design process. Instructional designers and professionals who produce the functionality, content, and interactive activities of e-learning environments tend to focus on technical matters of instructional design and view pedagogic encounters as primarily constituted by rules of human-computer interaction (e.g. Clark and Mayer 2011). The forms taken by the knowledge practices to be learned in the e-learning environment remain largely obscured.

Thus, faced with thoroughgoing knowledge-blindness in education research, Carvalho and Dong perceived a pressing need for a theoretical framework that could capture the principles of design practice with which museum visitors could engage through the e-learning environment. As extensively shown elsewhere (Maton 2014b), LCT provides a multidimensional framework for revealing the organizing principles of knowledge practices. When the research began in earnest during 2006–07, Specialization was the most elaborated and empirically illustrated dimension of LCT (e.g. Maton 2000a, 2000b, 2004, 2007) and it was to this that Carvalho and Dong turned. Specifically, the study focused on *specialization codes*, comprising modalities of strengths of *epistemic relations* (ER) between knowledge practices and their proclaimed objects of study, and *social relations* (SR) between knowledge practices and their actors, authors or subjects (see Chapter 1, this volume). Practices may more strongly (+) or weakly (−) emphasize each relation, and these two strengths together give four principal *specialization codes* (see Figure 1.2, page 12). Simply put, these codes declare that legitimacy depends on: specialized knowledge, skills, principles or procedures (*knowledge codes*; ER+, SR−), subjective attributes

of actors (*knower codes*; ER−, SR+), both specialist knowledge and knower attributes (*élite codes*; ER+, SR+), or neither (*relativist codes*; ER−, SR−).

In creating Design Studio, Carvalho (2010) used these concepts in different ways within an exploratory phase and a developmental phase. First, the concepts provided an analytic framework for exploring the organizing principles of knowledge practices in four illustrative design disciplines (architecture, engineering, fashion, and digital media). As well as highlighting the specialization codes of these fields, this exploratory phase generated a non-technical vocabulary for describing these organizing principles. Second, the concepts served as a design framework for building a series of external languages of enactment of the specialization codes in learning activities. This developmental phase embedded the organizing principles within an e-learning environment to facilitate informal learning of principled knowledge. We now turn to discuss these two phases, before exploring the tacit praxis arising from the use of Design Studio by museum visitors.

Creating a vocabulary for languages of enactment

In the exploratory phase Carvalho employed a mixed-methods approach, comprising: ten interviews (two experienced professional designers each from architecture, engineering, fashion and digital media, and two museum staff); a card sorting activity (with nine participants from design and non-design backgrounds); and an online survey (139 respondents, comprising professionals, academics, and students from tertiary design institutions). As outlined above, the first aim of this phase was to identify the specialization codes characterizing four design disciplines. Results of this aim are discussed in Carvalho (2010) and Carvalho *et al*. (2009). In summary, the research characterized engineering as a knowledge code, fashion as a knower code, architecture as an élite code, and the nascent field of digital media as including both knowledge codes and knower codes. However, reflecting the principal concern of this chapter with relating theory and practice, our focus here is on a second aim: developing a non-technical vocabulary to translate these specialization codes into terms accessible to non-specialists in tacit praxis.

The need for such translation reflects the nature of knowledge practices.

Changing technical terms into everyday language is not straightforward. As highlighted in Maton (2014b), the meanings of practices within a field depend on the *semantic structure* of relational meanings constituting that field. Thus, the same practice or term may have divergent meanings depending on the relational networks within which it resides. Failure to recognize semantic structures leads to confusion, such as assuming the word 'gravity' in 'semantic gravity' has the same meanings in LCT as it does in other intellectual fields. This is the case not only for technical concepts but also for everyday words woven into the semantic structure of a field. Studies by Sarah Howard, for example, show that for schoolteachers the meanings of words such as 'experience' and 'knowledge' depend upon the subjects they teach (see Chapter 3, this volume). Similarly, in the exploratory phase Carvalho found that designers used 'everyday' words differently. For example, when discussing 'originality' and 'creativity' in interviews, an engineering designer referred to the application of physics and mathematics to solving practical problems in new ways, while a digital media designer emphasized the significance of an individual's background and personal experiences (Carvalho 2010: 76–84). Where the former emphasizes the creative application of specialized knowledge and practices from design, the latter foregrounds the subjective attributes of the designer. These reflect different organizing principles; in LCT terms, they represent a knowledge code and a knower code, respectively. Thus even non-technical language is infused with the specialization code dominating a field.

Directly rendering academic language into everyday language is, therefore, problematic and Carvalho could not simply ask designers to describe their practice in non-technical terms. To recontextualize practices from field A into tacit praxis within field B without compromising their integrity, one needs to determine the organizing principles of practices in field A and then translate those organizing principles into the practices of field B. This involves two moments of translation: from practices into legitimation codes and from legitimation codes into practices. As we shall discuss, these moments may be simultaneous and mutually informing. In the case study, field A comprised the languages of design and field B equated to everyday language. The first translation thus involved determining the specialization codes of design fields, translating their practices into LCT concepts. However, this alone is not enough; employing LCT terms within the e-learning environment would

simply replace design terms with sociological concepts. Carvalho also needed to translate the specialization codes into everyday language. A key part of the exploratory phase thus became the development of a non-technical vocabulary that could serve as the basis for external languages of enactment. This involved the creation of what Carvalho (2010) called the 'Controlled Vocabulary List' or 'CVL'.

A language for enactment

To create the CVL, Carvalho employed a mixed-method approach through a series of qualitative and quantitative studies exploring possible terms for describing professions and professionals in design. For a fuller discussion of its evolution, see Carvalho (2010: 50–8). The final study, which we shall focus on here, involved nine participants from both design and non-design backgrounds and used two sets of flash cards. One set contained words for describing a profession (e.g. 'systematic', 'social', 'empathic'), the other set contained words for describing a professional (e.g. 'a methodical person', 'a tasteful person', 'a sensitive person'). Participants effectively used the flash cards to classify words according to their emphasis on epistemic relations, social relations, both, or neither. First, Carvalho introduced participants to the notion that some professions and professionals may emphasize skills, techniques, procedures or specialized knowledge and others may emphasize the attributes of the actors involved. Second, participants were asked to read the words on each flash card from the 'professions' set and assign the card to one of four categories, according to whether it characterizes a profession emphasizing specialized skills and/or knowledge (Category 1), a profession emphasizing a person's dispositions or attributes (Category 2), either of these (Category 3), and neither of them or is unsuitable for describing a profession (Category 4). Third, participants performed the same exercise for 'professionals'.

As discussed in Chapter 3 (this volume), to reflect the relational mode of thinking embodied by LCT, empirical analysis should begin not from the four principal codes but rather from the two relations that generate those codes. Though the number of categories used to develop the CVL may tempt the reader into viewing them as reflecting four codes, Carvalho's CVL method began from the two relations: Category 1 words express stronger epistemic

relations and Category 2 words express stronger social relations. Table 4.1 shows the final list of words in these two categories for ‘profession’ and ‘professionals’, in descending order of agreement (e.g. ‘scientific’ and ‘technical’ were placed in Category 1 by nine participants and ‘driven by knowledge’ by five participants). In further stages of the project (including the survey and e-learning environment), Carvalho used these two categories to generate descriptions reflecting different specialization codes. Knowledge-code descriptions (ER+, SR−) drew on Category 1 and avoided Category 2; knower-code descriptions (ER−, SR+) drew on Category 2 and avoided Category 1; and élite-code descriptions (ER+, SR+) combined words from both groups. The other two categories comprised words subsequently avoided in the project. Category 3 words (‘clever’, ‘difficult’, ‘stimulating’, ‘forward thinking’, ‘innovative’, and ‘interesting’) were ambivalent, expressing stronger epistemic relations and/or stronger social relations, and so excluded from the project. Category 4 words (‘average’, ‘old-fashioned’ and ‘boring’) were deemed unsuitable by participants and thus similarly avoided.

Table 4.1 Controlled vocabulary list (adapted from Carvalho 2010: 58)

ER+ (Category 1)		**SR+ (Category 2)**	
job or profession	worker or professional	job or profession	worker or professional
scientific	a scientific person	social	a social person
technical	a technical person	empathic	a tasteful person
methodical	a procedural person	driven by taste	an empathic person
systematic	a methodical person	fancy	a glamorous person
objective	an objective person	glamorous	a sensitive person
procedural	a problem solver	individual	an individualist person
skilful	a systematic person	influential	
driven by knowledge		elegant	

The CVL provided a starting point for translating the specialization codes

characterizing design fields into ordinary language within the e-learning environment. It was built on further by the online survey (Carvalho 2010: 59–65), such as through questions asking respondents to use three words from the CVL to describe design disciplines, three words to describe designers, and further words of their own. Moreover, the CVL also helped provide a basis for further exploration of the organizing principles of design fields. One item asked participants to read 14 short profiles of fictitious designers and decide which, if any, of the four design disciplines (architecture, engineering, fashion and digital media) they associated with each profile. Words from the CVL, alongside emerging themes from interviews, were used to compose and inform these profiles, such as: 'X is a very technical and methodical person. That is why s/he chose this sort of work' and 'X is a sensitive person and knows when her/his work is completed because it just feels right'. The survey also explored the degree to which respondents associate a host of different strategies (such as drawing from personal experience and following methodical procedures) with their own field and included the quantitative instrument for determining specialization codes discussed in Chapter 3 (this volume).[4] Thus, the two moments of translation mentioned above – from empirical description in the language of one field to conceptual redescription and from conceptual redescription to empirical description in the language of another field – may be mutually informing and developed together rather than separate and discrete. In the exploratory phase, Carvalho combined qualitative interviews, card sorting tasks, and the online survey to develop both an account of the specialization codes of fields of design and the basis for a language of enactment embedding those codes within the e-learning environment.

Creating languages of enactment

The developmental phase comprised the creation by Carvalho of Design Studio, an e-learning environment for installation in a mobile digital device. Upon entering the environment, museum visitors are greeted by a host, who introduces them to the general field of design and the design experience. As illustrated by Figure 4.1, the host invites visitors to choose an object to design from eight options. The host then invites visitors to select a 'virtual design

advisor' to guide them through the design experience in the form of short films or written text. Visitors may choose one of four male and four female advisors, have an advisor assigned to them, or proceed without an advisor. Having also chosen the degree of support they wish to receive, visitors engage with three learning tasks based on phases of the design process: understanding the problem, creating a plan, and developing a design concept. Throughout these tasks the advisor can provide information about each learning task, explain why designers perform that kind of activity, suggest strategies for completing each task, and highlight issues for reflection about the design process upon its completion. As they proceed through the tasks, visitors interact with both Design Studio and the museum's collection to learn about the process of designing the kind of object they have chosen.

As outlined earlier, the remit of engaging museum visitors in learning about design practice meant Design Studio needed to embrace *both* the diverse organizing principles of design *and* the freedom associated with informal learning contexts. We now discuss these issues in turn, focusing on how external languages of enactment embedded outcomes of the exploratory phase into the e-learning environment to meet these needs.

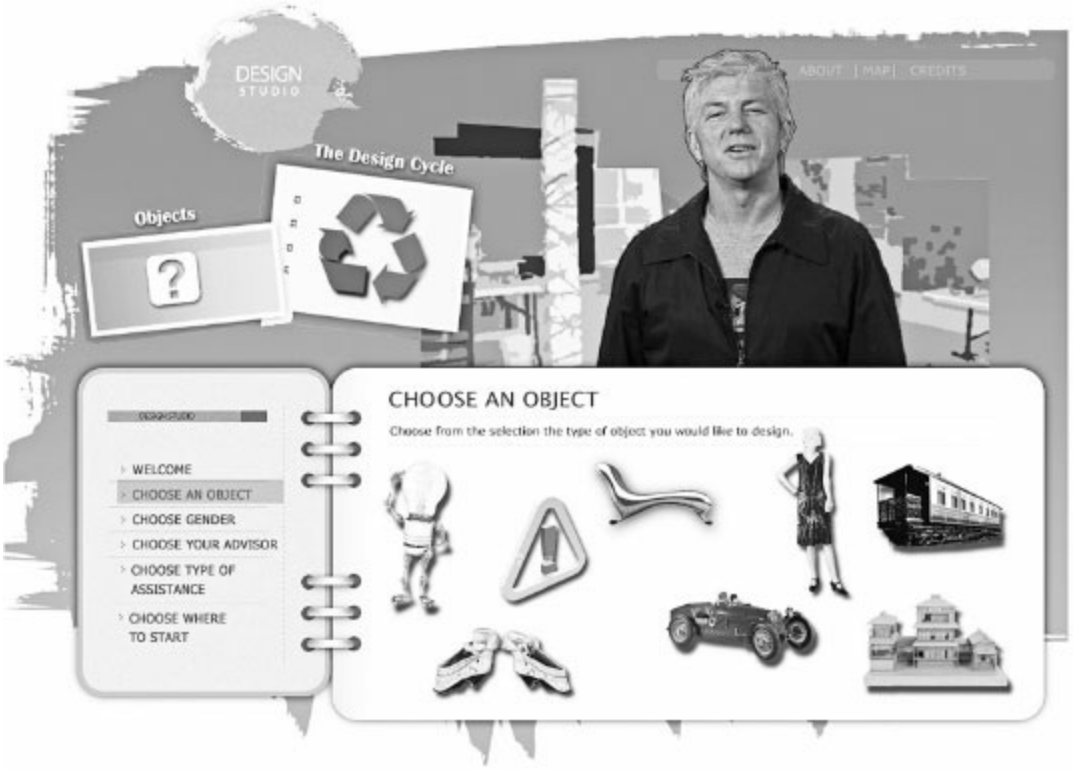


Figure 4.1 Screenshot from Design Studio: choosing an object to design.

Principled knowledge

The exploratory phase revealed one set of organizing principles (specialization codes) underlying fields of design and generated the basis for a vocabulary in which to express those principles in everyday language. To embed the specialization codes within Design Studio, a series of external languages of enactment were developed by Carvalho (2010) to express design ideas and practices in four different ways, reflecting a knowledge code, knower code, élite code, and relativist code. These translation devices for embedding theory in tacit praxis provided the screenplays and written materials featured within the e-learning environment. Thus, Design Studio comprises five different 'design studios' or pathways through the learning experience, four hosted by a virtual advisor embodying a specialization code and offering a differently principled way of learning about design. (The fifth pathway allows participants to eschew a virtual advisor.)

As summarized above, visitors are first offered a choice of objects to design (Figure 4.1). Each object tacitly represents a discipline analysed in the exploratory phase: car and train for engineering, chair and house for architecture, dress and shoes for fashion, and 3D character and icon for digital media. Visitors then choose the gender and kind of designer they wish to serve as an advisor. As Figure 4.2 illustrates, learners are offered four advisors who, when clicked on, give a short speech introducing how they view design and their characteristics, practices and beliefs, including personal likes and dislikes. Though each advisor reflects a specialization code, the presence of these concepts remains tacit: what the learner encounters is only the fictional name and a film of the speech. For example, the introductory speech of the knowledge-code advisor begins (with the name depending on which gender has been previously chosen):

Figure 4.2 Screenshot from Design Studio: choosing an advisor (Carvalho 2010: 146).

> Hi, my name is Rachel/Roger! I believe there is always a right way of doing things. I am a very practical kind of person! … People say I am very clever and skilful, but my brilliant ideas just come out of being methodical and careful in designing, and of course being interested in stuff and reading a lot. There is a lot of knowledge developed in design, so if you just follow the rules and procedures that have been tried and tested you are guaranteed to be successful. I like doing puzzles, crosswords, following manuals and instructions, reading scientific magazines. I don't like big parties, and people who talk about feelings all the time.
>
> (Carvalho 2010: 203–4)

As this illustrates, each script incorporates language gleaned by Carvalho from the interviews, survey data and CVL (Table 4.1) of the exploratory phase. For example, the speech above positively endorses 'skilful', 'methodical', 'knowledge', and 'procedures' and disavows being social and discussing feelings. In short, Rachel/Roger tacitly emphasizes epistemic relations and downplays social relations as the basis of legitimacy: a

knowledge code (ER+, SR−).

Table 4.2 outlines an external language of enactment for introductory speeches, comprising the specialization code of each advisor, summaries of their characteristics, and brief extracts from scripts. In addition to the knowledge code of Rachel/Roger, Table 4.2 illustrates that: Christine/Christopher valorizes personal expression, intuition and developing an 'eye', and dislikes rules and methodical people, embodying a knower code (ER−, SR+); Alexandra/Alexander emphasizes both technical knowledge and talent or intuition, embodying an élite code (ER+, SR+); and Nicola/Nicholas argues that anyone can do design and that it is neither special nor different to other work, embodying a relativist code (ER−, SR−). (Figure 4.2 shows a fifth option, labelled '?', which enables participants to ask Design Studio to suggest an advisor. The suggestion depends on the object chosen, matching the specialization code of the field associated with that object according to the findings of the exploratory phase. For example, for the dress, Alexandra/Alexander, the knower-code advisor, would be suggested, reflecting the code dominating fashion design).

This briefly illustrates one external language of enactment for one part of the environment: introductory speeches by advisors. The full screenplay (Carvalho 2010: 202–44) shows that the specialization codes of the advisors underlie activities throughout the e-learning environment, shaping which parts of the museum's collections and exhibits learners are advised to interact with, the nature of the learning tasks and suggestions on how to achieve them. As we stated earlier above, different problem-situations require different languages of enactment for translating between theory and practice. This holds not only for the overall project but also, fractally, for each part of the design experience. Thus, each kind of advice (goals of the task, reasons for undertaking the task, strategies for completion, suggestions for reflection) for each of the three tasks in the design process (understanding the problem, creating a plan, developing a concept) required its own external language of enactment tailored to that specific action. As with the introductory speeches, these drew on the vocabulary developed in the exploratory phase to generate scripts in which LCT concepts were only tacitly expressed.

Table 4.2 An external language of enactment: advisors' introductory speeches (adapted from Carvalho 2010: 203–7)

Specialization code	Summary of advisor characteristics	Extract from script: ‘Introductory speech’
ER+, SR− (knowledge code)	Methodical, practical, careful, follows procedures and impersonal rules. *Likes*: puzzles, crosswords, manuals, instructions. *Dislikes*: socializing, talking about feelings	Hi, my name is Rachel/Roger! I believe there is always a right way of doing things. I am a very practical kind of person! … People say I am very clever and skilful, but my brilliant ideas just come out of being methodical and careful in designing, and of course being interested in stuff and reading a lot. There is a lot of knowledge developed in design, so if you just follow the rules and procedures that have been tried and tested you are guaranteed to be successful.
ER−, SR+ (knower code)	Design as personal expression, learning through intimate inter-personal relationships, intuition, developing an ‘eye’. *Likes*: looking at art, talking to talented people. *Dislikes*: rules, ‘technical	Hi, my name is Chris! I believe the basis to good design is one’s own personal expression. Each design piece says something about the person who creates it. There is not a set way of doing things and I definitely don’t believe in rules. The best way to learn design is from a master-apprentice sort of relationship, which means ‘learn by doing’ rather than from a book. I like chatting and exchanging ideas with others … I think that if you want to be a good designer, you will need to use your own intuition and develop a certain ‘eye’ for it.

	stuff', methodical people.	
ER+, SR+ (élite code)	Combines technical knowledge and talent or intuition, following procedures and 'refined eye'. *Likes*: scientific programmes, creative art, original movies. *Dislikes*: anything average or commonplace.	Hi, my name is Alex! I believe a good designer needs to follow a process with specific procedures but at the same time the designer also needs to put him/herself into their work. Basically you need a combination of great sensibility with a refined eye for designing, as well as skills and technical knowledge…. I can successfully mix knowledge and talent within my design practice. I think that to be a good designer you will need to learn how to use your personal abilities and intuition in addition to skills and knowledge.
ER−, SR− (relativist code)	Average person, anyone can do design, nothing special needed, work not specialized. *Likes*: sports, beach, spending time with friends. *Dislikes*: philosophy, rules, 'nerds', sensitive	Hi, my name is Nic! I am what you would call an 'average common person'! I got into design because I was curious about innovative stuff. I quickly picked up some design skills and knowledge without too much effort. I believe anyone can effectively do the type of design work I do, because nothing really special is needed. My work is no different from the work other people do.

people.

For example, a key role of advisors is to suggest strategies for completing learning activities, including visiting specific objects in the museum, approaching other people for ideas, and conducting research online. Table 4.3 illustrates how specialization codes were enacted by Carvalho in advice concerning the task of understanding the design problem. Here Rachel/Roger (knowledge code) suggests that designers must be aware of 'standard practices in their field', conduct reading and research, and goes on (not included in Table 4.3 for reasons of space) to offer procedural, step-by-step guidance and templates to be completed by the user. Throughout these strategies epistemic relations are emphasized and social relations downplayed; for example, when suggesting ideas to ask other people the advice states 'Make sure you ask the same question to at least three people' and offers a template for questions. In contrast, Chris (knower code) suggests the visitor 'imagine how people would experience the object they are designing' and 'what feelings such an object would evoke', an empathy task emphasizing social relations. Other suggested knower-code strategies include reflecting on their past experiences or personal likes and dislikes, and asking other people to describe their favourite house (for example). Chris does not emphasize methodological consistency or offer templates (downplaying epistemic relations) but instead provides exemplars and models, such as interviews with designers (emphasizing social relations). Thus, specialization codes tacitly underpin every aspect of the forms taken by the pathway through the design experience.

Informal learning

In addition to engaging visitors in learning principles of design practice, the e-learning environment also needed to embrace the freedom and flexibility associated with museum contexts. Accordingly, Design Studio incorporates multiple opportunities for learners to experiment and choose their own pathways through the design experience. To achieve this, Carvalho developed external languages of enactment that drew on a concept integrated within specialization codes: 'framing'.

Table 4.3 An external language of enactment: advisors' introduction to strategies for understanding the design problem (adapted from Carvalho 2010: 140)

Specialization code	Summary of advisor characteristics	Brief extract from script: 'Understanding the design problem – How?'
ER+, SR− (knowledge code)	Methodical, practical, careful, follows procedures and impersonal rules.	Designers must always be aware of standard practices in their field. They need to keep up to date with what is going on and they often do that by reading and researching the topic, and exchanging ideas with their peers.
ER−, SR+ (knower code)	Design as personal expression, learning through intimate interpersonal relationships, intuition, developing an 'eye'.	Designers often need to imagine how people would experience the object they are designing. Designers need to think about what feelings such an object would evoke. It is also important to consider that different people like different things and have different ideas. By talking to others and researching on the topic you can be reminded of things you didn't think of.
ER+, SR+ (élite code)	Combines technical knowledge and talent or intuition, following procedures and 'refined eye'.	Designers must always be aware of standard practices in their field. They need to keep up to date with what is going on and they often do that by reading and researching the topic, and exchanging ideas with their peers. Designers also often need to imagine how people would experience the object they are designing. It is important that designers think about what feelings such an object would evoke.

ER−, SR− (relativist code)	Average person, anyone can do design, nothing special needed, work not specialized.	Different people have different ideas. By talking to others or having a look at similar objects you can be reminded of things you didn't think of.

Bernstein (1977) defined 'framing' as the degree of control available within any specific context or category. For example, in educational contexts the strength of 'framing' refers to the degree of control over *selection*, *sequencing*, and *pacing* of educational knowledge, where 'strong framing' (+F) indicates greater control by a teacher, and 'weak framing' (−F) indicates greater apparent control by students. In LCT the concept of 'framing' is integrated, alongside its sister concept of 'classification' (C), within 'epistemic relations' and 'social relations'. 'Framing' forms part of their inner structure – for example, 'ER+' (stronger epistemic relations) condenses 'ER(+C, +F)' (stronger classification and stronger framing of epistemic relations) – and can be made explicit when required. Expanding on these conceptual relations is beyond the scope of this chapter (see Maton 2014b). Here we shall just highlight that, to embrace the openness and flexibility required for informal learning contexts, Carvalho brought this integrated concept to the fore to shape the e-learning environment.

As illustrated by the left-hand menu in Figure 4.1, Design Studio offers learners a choice of: gender for their advisor, four advisors or being assigned an advisor (or having no advisor), the 'type of assistance' they desire, and where in the design process they wish to begin. Moreover, there are opportunities to change advisor pathway or skip tasks. Thus, drawing on 'framing', learners are offered opportunities to choose what guidance to receive (selection), where in the design cycle their experience will begin (sequencing), and when to receive advice (pacing), according to different strengths of framing. The options for 'type of assistance' offer three choices that enact stronger, medium and weaker framing through the experience, tacitly expressed as 'full guidance', 'guidance as required' and 'no guidance'. Subsequently, four kinds of advice are available to learners, concerning: goals of the task, its purpose, strategies for completion, and reflection. With

‘full guidance’, all information is made available as part of the proposed learning activities; with ‘guidance as required’, each kind of advice is available separately for accessing in a new screen, if desired; and with ‘no guidance’ just the task is displayed. Thus, while offering principled pathways through the design process, the external languages of enactment were intended by Carvalho to enable visitors considerable freedom to choose how these were experienced. Enacting theory need not constrain a sense of agency in praxis.

Enacting tacit praxis

The research project was intended to explore the *possibilities* of creating an e-learning environment capable of embodying design practices. Thus, considerable weight was given to its exploratory and developmental phases. Practical limitations of time and budget restricted opportunities to explore in depth experiences facilitated by Design Studio. Nonetheless, a suggestive pilot study was undertaken by Carvalho that examined the praxis enabled by the environment. A group of 13 students from year 10 of an inner city private school participated in the study at the Powerhouse Museum in Sydney. This began with an interactive demonstration by Carvalho of how to use Design Studio, after which participants were grouped into pairs and each pair given a MacBook containing Design Studio. The pairs were allowed to choose to begin from any location within the museum, and given one hour to explore as they wished. Afterwards participants completed an online survey into their perceptions of design disciplines, the museum experience, and interactions with Design Studio, and engaged in an unstructured focus group discussion. Carvalho (2010: 149–65) offers a fuller account of results from the study. Here we briefly focus on the environment’s capacity to enable tacit praxis by negotiating the potentially competing demands posed by informal learning of principled knowledge.

In terms of informal learning, Carvalho (2010) concluded that an informal experience was facilitated by Design Studio. Participants enjoyed the combination of support and freedom to wander. In both the survey and focus group, they described finding its content useful and appreciating suggestions of which exhibits and objects to visit. They also described the approach of using the museum’s collection to obtain insights for their own designs as

offering a sense of purpose but without constraint. Participants also claimed to have learned about defining ideas to work with, organizing thoughts about design, and considering perspectives to include in the process.

In terms of principled knowledge, the participants appear to have engaged in practices reflecting the specialization codes of the four design disciplines. The majority of participants (eight) selected an advisor that matched the dominant organizing principles of the associated discipline of their chosen object. However, understanding of these principles remained tacit. When relating their choice of advisor (and thus specialization code), participants tended to highlight appearance (six), chance (four), or personality (two). Ontological and epistemological issues were downplayed: two participants described their advisor selection as related to design ideas and only one highlighted their design object as the key factor. Thus, while reflecting the organizing principles of design fields, their praxis only tacitly articulated these principles. Nonetheless, their given reasons reflected the design object they chose. Participants highlighting the appearance or personality of the advisor, a knower-code emphasis, had overwhelmingly chosen to design a dress (eight), an object associated with the knower-code field of fashion.

As emphasized above, Carvalho's pilot was necessarily limited in scope. A study of a wider demographic of participants would reveal more about the capacity of Design Studio to appeal to a broad spectrum of museum visitors. Tracking movement of participants within the museum and their engagement with exhibits would also enable insights into the organizing principles underlying visitors' experiences of the design process. Moreover, the study raises further questions, such as how the dispositions of visitors relate to their choice of objects, advisor codes and degrees of guidance, what visitors learn about the principles of design practice … among many others. However, this chapter aimed not to address such questions but rather to illustrate how external languages of enactment can be developed to facilitate tacit praxis, which they appear to have achieved in Design Studio.

Conclusion

To paraphrase Theodor Adorno (1998), theories draw credit from a praxis that has yet to begin and no one knows whether anything backs their letters of credit. Indeed, most fail to ever pay out. Too often theory and practice remain

distanced. A growing number of studies are using LCT to overcome this dichotomy by analysing and informing practice. In this chapter, we focused on illustrating how the framework can be embedded within praxis through external languages of enactment, realized in the case study as the architecture and contents of an e-learning environment.

A key characteristic of such languages is making explicit relations between theory and practice. All practices are informed by a theory of some kind, though the degree to which that theory is articulated differs; we all employ principles of enactment, but some are more explicit than others (see Chapter 2, this volume). External languages of enactment make those principles explicit and thereby available for feedback or criticism, enabling practice to be improved, and for adoption or adaptation by actors in other contexts of social action, enabling cumulative experiences. For example, Tables 4.2 and 4.3 are structured so that when read from left to right they translate theory into practice, and when read from right to left they translate practice into theory.[5] This echoes the form taken by 'external languages of description', discussed in Chapter 2 (this volume). Where the latter offer translation devices between theory and data, external languages of enactment represent translation devices between theory and praxis. Thus, the right-hand columns of the Tables here contains not data collected in a study but rather creative *enactments* of the concepts within specific theatres of social action.

Comparing the Tables also highlights how each unit of action requires its own means of translation from theory, to maintain the integrity of the situated practice being addressed. In short, one does not impose a single realization of the concepts across all contexts. Thus their right-hand columns comprise scripts tailored to informing the acts of choosing an advisor (Table 4.2) and engaging with the design problem (Table 4.3). Nonetheless, both relate to the same concepts (left-hand columns), ensuring that the organizing principles of different kinds of activities can be compared and, in this case, aligned to ensure a consistently principled experience. Moreover, the realizations need not be as extensive as in this case study. Design Studio comprised five distinct pathways through a design experience, four reflecting a specialization code, with multiple options for a wide range of kinds of advice. We have touched on but brief excerpts of lengthy written materials (see Carvalho 2010: 149–65). However, external languages of enactment may vary from

brief, broad-brushed indicators couched in general terms to lengthy and detailed descriptions of precise actions. They can thus be tailored to the needs and affordances of the problem-situation.

That languages of enactment make explicit the means whereby theory informs practice does not necessitate making the theory itself explicit within the resulting praxis. In the case of Design Studio, the external languages built on Carvalho's 'CVL' method to translate theory into terms comprehensible to noviciates to design practice but without explicitly voicing LCT concepts. One need not learn or even know of LCT to successfully engage in praxis using Design Studio. Thus, theoretically-informed practice does not require the practitioner to be theoretically informed. This has implications both within and beyond education. As highlighted at the outset of this chapter, a common argument in education against enacting theories in classroom practice is that time constraints or the aptitudes of students render teaching and learning additional ideas unfeasible. Languages of enactment abrogate such obstacles without sacrificing the potential visibility of the principles involved. They offer the possibility of *both* explicit translation between theory and practice (manifested in external languages of enactment) *and* tacit praxis. Beyond education, teaching the theory itself would likely be deemed inappropriate in informal learning contexts. However, by embodying tacit praxis, informal learning need not be unprincipled, and principled learning need not be formal. In Design Studio, these ostensibly contradictory demands were negotiated through embedding specialization codes through the entire pathways, thereby enabling principled design experiences, while avoiding technical language and offering the flexibility expected of such contexts.

In enabling informal yet principled learning, the environment also illustrates how the knowledge-blindness characterizing much educational technology research and instructional design can be overcome. In bringing knowledge into the picture, LCT helps recast thinking about educational technology, enabling 'what is to be learned' to play a key role in instructional design. In the case study, LCT functioned as both an analytic framework for revealing the diverse organizing principles of knowledge practices, and as a design framework for embedding those principles within a mobile e-learning environment. Thus, against knowledge-blindness, using LCT as an analytic framework brings it into view, and against beliefs that including knowledge may restrict actors' freedom, using LCT as a design framework enables

informal learning of principled knowledge through tacit praxis.

The ways in which LCT can enable praxis have only begun to be explored. Methodologically, the creation of a CVL offers a means for enabling the theory to remain tacit, but its form here raises questions for further study. For example, as discussed in Chapter 3 (this volume), it is not easy to determine single words or short phrases that evoke the same specialization codes for everyone. However, creating a CVL represents a potentially valuable method, when triangulated with other methods, such as interviews and surveys. It is also suggestive for researching other academic and professional fields. Using specialization codes to explore how the same words may express different organizing principles, in the ways 'creativity' does in design fields, could provide a valuable indicator of boundaries around and interplay between different fields. Theoretically, the framework offers more than we have illustrated here. For example, the dimension of Semantics (Chapter 1, this volume) illuminates issues, such as moving between everyday understandings and formal knowledges, that would be invaluable for understanding and enabling informal learning (e.g. Carvalho and Goodyear 2014). Nonetheless, the preliminary case study we have discussed suggests that the framework represents a fecund basis for further projects that bring theory and practice into fruitful relation. LCT offers a means to not only interpret the world but also to change it.

Notes

1 See the LCT website (www.legitimationcodetheory.com) for information on pedagogic enactments; see also Blackie (2014), Clarence (2014), Macnaught *et al*. (2013), and Quinn and Vorster (2014).

2 The study was part of a Linkage Project (LP0562267) funded by the Australian Research Council and the Powerhouse Museum.

3 Exceptions using LCT include Carvalho and Goodyear (2014), Chen *et al*. (2011), Howard and Maton (2011), and Howard *et al*. (2015).

4 Carvalho (2010) adopted the final iteration of the questionnaire item from the music studies, the most developed version at the time (Chapter 3, this volume).

5 In Table 4.2 'likes' and 'dislikes' are summarized in the middle column for brevity of presentation. As shown by the introductory speech of Rachel/Roger quoted earlier above, these form part of each speech, as sentences of spoken prose, directly following the extracts quoted in the right-hand column.

5 LCT and systemic functional linguistics

Enacting complementary theories for explanatory power

Karl Maton, J. R. Martin and Erika Matruglio

Transcending the divide between disciplines in research.

Introduction

Interdisciplinarity is the future. Such is the thrust of pronouncements repeatedly heard across the social sciences and humanities. Interdisciplinarity is often equated with intellectually and socially progressive stances and greater responsiveness to business and workplace needs. Yet such axiological and economic benefits are more often assumed or proclaimed than evidenced or demonstrated (Moore 2011). Moreover, what is declared to be 'interdisciplinary' often comprises the appropriation by literary or philosophical discourses of ideas from other fields rather than genuinely *inter*disciplinary dialogue. Nonetheless, to highlight the vacuity of much written in its name is not to dismiss the potential of interdisciplinarity itself. There are serious ontological and epistemological arguments for bringing disciplines together in substantive research (Bhaskar and Danermark 2006). Simply put, the social world comprises more than the phenomena addressed by any one discipline. Education, for example, involves at least knowledges, knowers, knowing, and the known, implicating insights from, among others, sociology, linguistics, psychology, and philosophy (Maton 2014b: 212–13). This is not to suggest a single study must encompass the disciplinary map in order to recreate reality in its entirety. Rather, it highlights that drawing on more than one disciplinary approach may offer greater explanatory power

when exploring a specific problem-situation.

This chapter illustrates how such gains can be made by research using Legitimation Code Theory (LCT) and systemic functional linguistics (SFL) together. A rapidly growing number of studies are enacting both LCT and SFL within research into social fields of practice as varied as education, law, art, and politics. Such studies are utilizing these sociological and linguistic approaches to offer complementary insights into their objects of study. They are also stimulating advances in the theories themselves, as each framework poses new questions to its companion or sheds fresh light on its concerns. In this chapter we illustrate how such interdisciplinary research can be conducted to offer explanatory power and drive theoretical innovation. There is a long history of dialogue between these traditions but few accounts of the processes of working together, particularly in the kind of intensive collaboration characterizing recent encounters. Thus, rather than delineating ontological, epistemological or discursive features of the frameworks that enable their fruitful relation within research, our aim is more practical: to describe processes whereby they can be articulated through the course of a substantive study. To ground our discussion, we focus on a recent major project that brought together LCT and SFL to explore cumulative knowledge-building in school classrooms.

We begin by placing this project in context by briefly summarizing the evolving history of encounters between the two traditions. We highlight how the emergence and development of LCT is reshaping the concerns of established phases of interaction, opening up new areas of exchange, and stimulating close collaboration. Second, we introduce the research project on classroom practices, summarizing key findings. Third, we discuss the ways of working that evolved through the project to achieve those findings. We argue that interdisciplinary collaboration necessitates maintaining ‘essential tensions’ between the theories in their encounters with data. We then describe the practical strategies for negotiating these tensions developed during the project in terms of three dynamics: *zooming* between the bigger picture and specific issues, *refocusing* between fuzzier and more precise analyses, and *alternating* between parallel analyses by each theory and joint analyses using both frameworks. Finally, we illustrate how interdisciplinary research offers greater explanatory power and stimulates advances by highlighting how each theory has perturbed existing ideas and provoked new thinking in its

companion.

We should emphasize this chapter is neither a definitive methodological guide nor a restrictive template for enacting LCT and SFL within research. As we shall discuss, the specificities of our example – object of study, forms of data, selected concepts, personnel, time, and budget – mean the strategies we outline may require adaptation for other projects. We were also often feeling our way through issues raised for the first time by collaborative analysis of shared data using LCT and SFL. As more studies using both theories in this manner come to fruition it is likely that further lessons learned from those experiences will lead to improved ways of working that enable even more productive collaboration. Here, to shed light on the often hidden craft of inter-disciplinarity, we simply offer methodological reflections on our experiences of research practices that enacted LCT and SFL together to build knowledge.

An evolving relationship

Current collaboration builds on a long tradition of intellectual exchanges between the code theory created by Basil Bernstein and SFL. Space precludes discussing this rich past in detail. Here we limit ourselves to briefly drawing on a recent account of these relations. Maton and Doran (2016) build on Martin (2011) to discuss five principal phases of exchange between code theory and SFL, each phase adding new points of contact to ongoing conversations. Table 5.1 outlines when each phase began and the concepts most engaged in these dialogues. As Maton and Doran (2016) emphasize, this represents a heuristic schema of encounters between the frameworks rather than an intellectual history of each theory. However, given our focus on LCT, it is pertinent to note that the first three phases involve Bernstein's framework and the most recent two phases involve LCT. Thus, to place our case study in context, we shall briefly summarize, first, the tradition of dialogue on which LCT builds and, second, the role it is now playing in generating the kind of intimate and intensive collaboration we discuss in this chapter.

Phases I–III: Coming together

The first phase began by the 1960s with discussions among Basil Bernstein,

Michael Halliday and Ruqaiya Hasan. These exchanges centred around Bernstein's conceptualization of actors' socialized dispositions as 'coding orientations' (1971) and the social distribution of these orientations to meaning (Hasan 2009), or what later became known as 'semantic variation'. This phase involved mutual influences on ways of thinking. For example, Bernstein (1995: 398) later stated: 'It became possible for me to think about linguistics in sociological terms and sociology in linguistic terms' (cf. Halliday 1985). Dialogue also fundamentally shaped empirical studies. Halliday's emerging meaning-based grammar provided a means for enacting code theory in studies of language undertaken at Bernstein's Sociological Research Unit during the late 1960s (see Bernstein 1973). Conversely, concepts developed in these code theory studies (particularly semantic networks) formed the basis for theoretical elaborations of SFL in substantive research by Hasan and colleagues from the 1980s onwards (Hasan 2005).

A second phase of exchange involved Bernstein's account of 'pedagogic discourse' (1977, 1990) and genre-based literacy programmes of the 'Sydney School' of SFL (Martin 2000). From the early 1990s onwards educational linguists developed forms of pedagogy capable of enabling learners from a wider range of social backgrounds to succeed. Bernstein's theorization of social struggles over pedagogic discourse were drawn upon by the Sydney School to help interpret why their democratizing pedagogies were subjected to vitriolic contestation within and beyond education. In this phase, the interaction was less dialogic. Most code sociologists were not fully acquainted with Sydney School work due to the geographic distance of principal players in each approach and a withdrawal from interventionist educational research by British sociologists of education during the 1990s in response to political attacks on the field. Nonetheless, this work productively continued within SFL (Martin 2011) and has become integral to more recent exchanges.

Table 5.1 Summary of principal phases of exchange between code theory and systemic functional linguistics

		Concepts central to phase of exchange from:	
Phase	**Period began**	**code theory**	**systemic functional linguistics**

I	1960s, 1980s–	coding orientation	linguistic variation, semantic variation
II	1990s–	pedagogic discourse	genre-based literacy
III	early 2000s–	knowledge structure	field
IV	mid-2000s–	LCT: Specialization dimension (specialization codes, knowledge–knower structures, insights, gazes, etc.)	individuation/affiliation, field, appraisal, and many others …
V	2010s–	LCT: Semantics dimension (semantic gravity, semantic density, semantic profiling, etc.), constellations and cosmologies	mode, field, appraisal, grammatical metaphor, technicality, individuation/affiliation, literacy, iconography, and many others …

During the 2000s a third phase of exchange centred on the nature of intellectual fields as different kinds of 'knowledge structure' (Bernstein 2000) and their semiotic resources, particularly the register category of field. Here encounters became more dialogic. Interdisciplinary conferences in Sydney in 2004 and 2008 brought code sociologists and systemic functional linguists into closer personal contact and resulted in two collections that included discussions of relations between the approaches (Christie and Martin 2007; Christie and Maton 2011). These events laid foundations for the invigoration of these relations that followed.

Phases IV–V: Working together

Throughout the history of their dialogue developments *within* each theory have been a major impetus to developments of exchanges *between* the theories. Not all new ideas become involved in dialogue and decades can lapse after inception before a concept becomes active (see Maton and Doran 2016). However, the development of code theory into LCT since the turn of the century has proven a major and rapid inspiration to engagement with

SFL.[1] By the mid-2000s the development of the Specialization dimension of LCT had energized a fourth phase and by the 2010s the Semantics dimension was catalysing a fifth phase. Extensive discussion of these concepts is beyond the scope of this chapter (see Maton 2014b; Chapter 1, this volume). The wide range of concepts implicated in these exchanges also precludes summarizing phases here (see Maton and Doran 2016). As Table 5.1 suggests, Specialization concepts are resonating with many aspects of SFL, including field (Martin *et al*. 2010) and individuation (Martin 2012), while relations between Semantics and concepts across the metafunctions and strata of SFL are reshaping both frameworks in ways only beginning to be understood. We illustrate these ongoing developments shortly. Before doing so, two characteristics of these interactions that help contextualize our case study are worth noting.

First, these newest phases of exchange are touching on issues from across the history of dialogue. This partly reflects the way in which LCT concepts build upon concepts inherited from Bernstein's framework. They not only reveal new aspects of phenomena, sparking new issues for dialogue with SFL, but also shed fresh light on established concerns. For example, the notion of 'knowledge structure', central to phase III, is retheorized within Specialization as 'knowledge–knower structures' (Maton 2014b). The extended concept both explores new issues (such as the basis of achievement in the arts and humanities) and, by integrating the inherited concept, recasts the focus of work in phase III using that notion. Similarly, LCT concepts extend and integrate existing theorizations of 'coding orientation' from phase I and 'pedagogic discourse' from phase II (see Maton 2014b). In short, by both opening up new areas of dialogue and rejuvenating the focus of established encounters, these new phases are characterized by more of each theory coming into contact with its companion.

Second, exchanges have again become intensive and dialogic, with influence flowing both ways. Renewed intimacy has been encouraged by geographic proximity among participants; for example, our case study emerged from a sustained engagement between Karl Maton and a productive group of linguists associated with J. R. Martin that was made possible by Maton's emigration to Sydney in the mid-2000s. Crucially, such engagement is engendering intensively collaborative research. Rather than distanced

interactions between scholars engaged in distinct analyses of different data, recent phases are characterized by research that enacts both theories in complementary analyses of the same data. Bringing the theories into 'creative dialogue and tension' (Bernstein 1995: 398) is thus becoming increasingly common *within* studies, including research into academic writing (Chapter 6, this volume), music education (Chapter 10, this volume), restorative justice (Martin *et al*. 2012), and sociology (Luckett 2012). Moreover, a new generation of theoretically 'bilingual' scholars is emerging, illustrated by a growing number of successful and ongoing doctoral theses using both LCT and SFL (e.g. Meidell Sigsgaard 2013; Vidal Lizama 2014; Weekes 2014).

In short, the emergence of LCT has contributed to evolution of the focus, form, and dynamic of exchanges with SFL: concepts implicated in dialogue are proliferating, collaboration is intensifying, and influence is mutual. This forms the context for our case study, a project that brought scholars from LCT and SFL together to explore knowledge-building and which formed the basis for a range of further studies.

The DISKS project

The DISKS project into 'Disciplinarity, Knowledge and Schooling' was a nationally-funded, three-year research study (2009–11) based at the University of Sydney.[2] Peter Freebody, J. R. Martin and Karl Maton were chief investigators; Erika Matruglio, a former teacher undertaking doctoral study using SFL and LCT, was research associate through the project; and Lucy Macnaught assisted with stage 3 (see below). The overarching aims were to analyse the bases of knowledge-building in secondary school classrooms, explore their variation across different kinds of subject areas, and develop pedagogic practices that could enable such cumulative progress. The study comprised three principal stages: data collection, data analysis, and a pedagogic intervention.

Data collection gathered curriculum documents, student work products, and video-recordings of 100 lessons in years 8 (ages 13–14) and 11 (ages 16–17) of six secondary schools in urban and rural New South Wales, Australia. Lessons were in Science (year 8) or Biology (year 11) and Ancient History or Modern History (depending on school). Analysis of classroom data focused

on phases in which knowledge was actively transformed, such as unpacked, repacked, recalled from the past, built on, elaborated, projected into the future, and so forth. The analysis drew on the LCT dimensions of Specialization and Semantics and on myriad areas of SFL focused on construal of uncommonsense discourse, including IDEATION, APPRAISAL, PERIODICITY, and grammatical metaphor in relation to field and mode. The considerable array of ideas this stage generated were then winnowed down for the intervention to those with direct implications for pedagogic practice that could be conveyed to teachers in a short period of time. Specifically, the intervention focused on the ideas of 'semantic waves' from LCT and 'power trio' from SFL.

The notion of 'semantic waves' arose from analyses of classrooms using concepts from Semantics (see Maton 2013, 2014b; Chapter 1, this volume). *Semantic gravity* refers to the degree to which meaning relates to its context; *semantic density* refers to the degree of condensation of meaning within practices. Each can be independently stronger or weaker along a continuum of strengths. Tracing these strengths over time (such as through a school lesson) generates a *semantic profile* that reveals how the knowledge expressed is changing in terms of its context-dependence and complexity. Several profiles were revealed in analyses of classroom data (see Maton 2013), including *semantic waves* that trace recurrent movements between relatively decontextualized and context-dependent meanings and between simpler and more complex meanings (see Figure 1.4, page 17). This waving pattern of changes in the strengths of semantic gravity and semantic density enables the knowledge expressed in practices to be transferred beyond any specific context and to connect up with other meanings over time. Simply put, generating semantic waves aids knowledge-building. SFL analyses highlighted how these movements in knowledge practices are associated with the appropriate employment by actors of complexes of linguistic resources. Of the wide array of such resources, control of technicality, grammatical metaphor and periodicity were highlighted as central to creating semantic waves, selected as teachable in a short period of time, and more accessibly described in terms of 'power words', 'power grammar', and 'power composition', respectively (Martin 2013a).

These LCT and SFL concepts formed the basis for the pedagogic intervention. Six teachers from four schools were trained to model semantic

waves and bring to students' consciousness the 'power trio' of linguistic resources enabling these transformations of knowledge (see Macnaught *et al*. 2013). To do so, the intervention drew on the 'Teaching and Learning Cycle' developed in Sydney School literacy programmes and, specifically, the notion of 'joint construction' in which teachers and students work together to construct meanings (Rose and Martin 2012). After an initial training day, researchers worked closely with the teachers in preparing classroom materials and supporting them in a total of 14 lessons enacting the pedagogic strategies over one school term (approximately ten weeks).

A growing number of studies and pedagogic interventions (e.g. Blackie 2014; Clarence 2014) are being influenced by the outcomes of this project, which we have but touched upon here (see Martin and Maton 2013). A second major project (named 'PEAK') involving LCT and SFL has also directly built upon DISKS to explore knowledge-building in detail across whole units of study.[3] This burgeoning body of work suggests that generating semantic waves is a key not only to knowledge-building but also to achievement across a variety of practices, such as student assessments (Maton 2014a). It is also revealing the elaborate assemblages of linguistic resources mastered by actors to build knowledge (Martin 2015). Here, though, our concern is not the product but the process. Specifically, we focus on the data analysis stage of the project to discuss, first, how the two frameworks were related together and, second, how this interdisciplinary approach stimulated theoretical innovation.

Essential tensions: three dynamics

Close encounters between theories can take different forms (Maton 2014b: 210–13). One kind is where a theory operates as an *organizing framework* that highlights what needs to be analysed and another theory is used as an *analytic framework* for analysing those issues. The theories thus serve different purposes within a single analysis. Chapter 2 (this volume), for example, discusses how Berry's 'acculturation' framework provided a means of organizing a study of constructivist pedagogy in which LCT concepts served as the analytic tools. A second kind of close encounter is where a conceptual framework is used to operationalize another framework in

empirical research. For example, in phase I of exchanges (above), studies at the Sociological Research Unit enacted SFL concepts to translate between code theory and empirical data (Bernstein 1973). Here again theories serve different purposes within a single analysis: one provides an 'external language of description' or translation device for the other (Chapter 2, this volume). In contrast, close encounters of the third kind occur where theories are brought together to provide *complementary* analyses. That is, each framework is enacted to explore the same data and the resulting analyses are related to explain a shared problem-situation. This form of collaboration has grown in recent interdisciplinary dialogue between LCT and SFL. It describes the DISKS project, in which, to put it simply, LCT was enacted to analyse knowledge practices and SFL was used to explore linguistic practices.

Most major studies take a long and winding path. Chapter 2 (this volume) describes a qualitative study as involving innumerable movements between theory and data. Research using complementary theories is even more complex, as it involves at least two sets of relations between a theory and data, as well as relations between the theories. In our case study, pragmatic strategies for negotiating these relations were evolved through the course of the research rather than being established in advance. However, three overarching dynamics can be distinguished that came to structure the research process:

- *zooming* between the bigger picture and more delimited phenomena;
- *refocusing* between fuzzier and more precise analyses; and
- *alternating* between parallel analyses using each theory and joint analyses using both theories.

These three dynamics aimed at maintaining essential tensions between each theory and the data, and between the two theories. By 'essential tension' we mean an equilibrium between too much and too little distance. As discussed in Chapters 1 and 2 (this volume), too much distance between theory and data creates a disconnect, while too little distance can lead to either theoretical imposition or empiricism. Our principal focus here is a further essential tension: between two frameworks. If too much distance opens up between analyses enacting different theories they can drift apart and lose touch; if too

little distance is maintained, each theory is in danger of losing its integrity and being consumed by its companion. Maintaining an equilibrium between contact and integrity is thus necessary to enable productive dialogue rather than silence or monologue. As we shall discuss, the three dynamics of zooming, refocusing and alternating helped maintain this essential tension in the DISKS project.

Like walking along a high wire, such an equilibrium is not a fixed state but rather a moving and always tentative sense of balance that must be constantly negotiated throughout the research process. Enacting each dynamic is thus a matter of judgement that does not lend itself to being described as a simply sequenced recipe. Moreover, the distinctions between zooming, refocusing and alternating are analytic: in the project the three dynamics could be simultaneous, overlapping, and enacted in various combinations. A narrative of the DISKS project as it unfolded is, therefore, beyond our scope here. The large number of concepts involved also precludes extensive illustration. Instead, we draw on experiences from the project (using surnames for protagonists) to outline the rationale for each dynamic and refer to publications as examples of their outcomes that can be explored alongside this discussion.

Zooming

'Zooming' describes movements in either direction between *wide-angle* analysis of the bigger picture and *telephoto* analysis of a more limited phenomenon, such as a specific instance. The DISKS project began with a wide-angle analysis before zooming between telephoto analyses of selected examples and the bigger picture. At the outset Martin and Maton discussed together a series of video-recordings of secondary school lessons collected by Peter Freebody for a previous project. These wide-angle analyses explored issues that might be encountered in the study and so were open in terms of phenomena under consideration. As described in Chapter 2 (this volume), beginning with such 'bottom-up' analysis can help avoid theory prematurely overwhelming data. It can also contribute to balancing complementary theories. Unsurprisingly, features initially highlighted in discussions, such as the presence of technical language (Martin) or different ways knowledge claims were valorized (Maton), reflected the theoretical background of each

researcher. However, to enable another approach to shed fresh light on one's concerns requires ensuring neither theory races into the vacuum represented by raw data to construct the problem-situation in its own image. By beginning from a wide-angle view of the object of study, Martin and Maton aimed to establish that open space at the outset.

When examining data collected for the DISKS project, analysis then zoomed into detailed explorations of delimited phases of classroom interaction. For example, Maton and Martin each explored in depth a year 11 biology lesson dedicated to the role of 'cilia' as a biological line of defence (e.g. Maton 2013). These telephoto analyses ensured the conceptual frameworks engaged directly with data rather than remaining metaphorical or allusive. As we discuss in 'alternating' below, such close engagements with shared data are crucial to interdisciplinary dialogue by providing extra-theoretical points of contact. Each telephoto analysis was then followed by zooming out again to wider contexts. For example, the biology lesson was situated within a discussion of 'cilia' in curriculum, textbooks, and research (see Martin 2013a). Using LCT, such wide-angle analyses helped reveal the *relative* strengths of semantic gravity and semantic density of classroom discourse which could have remained concealed if focusing solely on the lesson data. Using SFL, they highlighted linguistic resources, such as grammatical metaphor, not necessarily enacted in classroom discourse but required for achievement in the subject area. Returning regularly to a bigger picture also ensured telephoto analyses did not remain segmented fragments of the whole problem-situation. For example, placing analyses into the wider contexts of years 8 and 11 helped generate the conjecture that semantic waves in lessons form part of larger semantic waves through the years of secondary schooling (Martin 2013a; Maton 2013), an issue being explored in PEAK, the successor project to DISKS.

In terms of maintaining an essential tension between the frameworks, zooming helped temper temptations towards more macro (LCT) and micro (SFL) levels of analysis that would have cast the approaches adrift. Determining legitimation codes of practices can often require more than a short extract of text, potentially pushing analysis using LCT towards exploring larger units of data. Conversely, the elaborate toolkit offered by SFL for fine-grained study makes possible the endless exploration of smaller units of data. In contrast, through repeatedly zooming in and out, the DISKS

project helped encourage the creation of new LCT concepts capable of exploring discourse down to the word level and new SFL concepts that pursue phenomena across strata (see further below).

Refocusing

'Refocusing' describes movements in either direction between *soft-focus* analysis that sketches a fuzzier outline of key issues and *hard-focus* analysis that commits to a sharper, more precise conceptualization. As mentioned above, Martin and Maton began the DISKS project by examining previously collected videos of secondary school lessons. In these discussions the use of concepts from either theory was minimized. Such soft-focus analysis was intended (like its accompanying wide-angle approach) to allow data to speak in its own terms rather than become recast in the language of either theory (cf. Chapter 2, this volume). It also aimed at creating a space for dialogue between initial insights from the researchers. At this preliminary stage, Martin and Maton found that ideas requiring extensive conceptual definitions soon restricted free-ranging discussion and led to the theories constructing the object of study in ways that quickly diverged. Thus, to maintain an essential tension between the frameworks, discussion was couched in simpler terms, employing metaphors, similes, figures and body gestures to describe issues in relatively fuzzy ways. For example, one feature of knowledge-building in classroom practice was expressed by a snaking hand gesture or a wavy line and characterized as involving 'heavier' or 'lighter', 'tougher' or 'easier' and 'familiar' or 'unfamiliar' language. Such shared fuzzy categories, equidistant from either theory, could then be recontextualized into the specialized languages of each framework to explore their nature as either knowledge practices or language practices in (parallel) hard-focus analyses.

Beginning with a soft-focus (and wide-angle) view may seem obvious, but this starting point is typically obscured in published works, as they present the product rather than describe the process of research. Moreover, it is tempting to quickly refocus into theoretical terrain. LCT and SFL are complex frameworks that offer insights unavailable to commonsense. The explanatory gains on offer make their conceptual tools tempting to employ and thereby 'harden' analysis as quickly as possible. This is also seductive on a personal level. Mastering sophisticated theories requires considerable

investments of time and energy. It can feel frustrating to seemingly eschew such hard-won knowledge by returning to less precise discourse. However, ‘soft-focused’ is not ‘unfocused’ – it does not negate a disciplined gaze. As noted above, during their soft-focus discussions Martin and Maton still viewed the data with sociological and linguistic gazes, whether or not they explicitly enacted concepts. Moreover, this was a starting point, not the final destination.

Analyses progressively refocused to become more precisely theorized. In the detailed exploration of passages of classroom discourse, for example, fuzzy descriptions of weight became conceptualized in LCT terms as semantic gravity, notions of difficulty and familiarity were transformed into semantic density, and the snaking hand gesture was echoed in the profile of semantic waves (Maton 2013). Similarly, SFL analyses refocused such fuzzy categories into more precise descriptions of linguistic resources, such as from unfamiliar words to identifying ‘technical’ and ‘specialized’ language or distinguishing types of grammatical metaphor such as ideational and interpersonal metaphors, and thence within ideational metaphors between logical and experiential metaphors, and so forth (e.g. Martin 2013a). Such separate hard-focus analyses increased the distance between accounts generated by the frameworks as they became couched in distinctive conceptual languages. However, such distance enabled the analytic precision required for each theory to reveal facets of the phenomenon unseen by its companion that could then be productively brought together (see ‘alternating’, below). Moreover, the project did not represent a one-way ascent into theoretical precision. When sharing the results of hard-focus analyses, Martin and Maton found it useful to occasionally return to fuzzier terms (such as the snaking hand gesture) to articulate between conceptual ideas generated by the two theories in relatively unspecialized terms. In addition, such simpler terms were invaluable for teacher training in the pedagogic intervention – they provided a non-technical shorthand.

Both forms of focus thereby contributed to productive collaboration. In addition, the process of refocusing itself helped maintain an essential tension between the frameworks by avoiding temptations to either fudge empirical referents or engage in theoretical fetishism. Hardening focus by sharpening precision helps identify concepts whose relations to referents were ambiguous and which could thereby confuse dialogue because of their

fuzziness, while softening focus opened up each theory to input from beyond the framework. In DISKS these movements encouraged the creation in LCT of multi-level typologies for determining more precise distinctions of strengths for semantic gravity and semantic density and the development of new concepts in SFL for grappling with the implications of these concepts from LCT (see further below).

Alternating

A third dynamic informing the project comprised *alternating* or recurrent movements between parallel analyses of data by each theory separately and joint analyses using both frameworks. As discussed, DISKS began with joint discussions of existing data. Analysis of newly collected data similarly began with Martin and Maton jointly deciding which data to examine in greater detail and discussing (in soft-focus) the phenomena those selections exhibited. Joint analyses of data thereby established shared problem-situations and goals for parallel analyses. For example, phases of lessons were collaboratively selected to explore the snaking phenomenon (later conceptualized as 'semantic waves') using each theory separately.

Coming together in this way was crucial in establishing an essential tension between the frameworks in the project. Interdisciplinary conversations between scholars working on similar general problematics may mutually inspire ideas but cannot directly relate their insights, for they remain too distanced by differences in objects studied, forms of data analysed, and specific issues addressed. This can then lead to misguided attempts to overcome the resulting distance by translating directly between concepts from each theory, such as wrongly identifying 'semantic density' with 'field' or reducing 'semantic gravity' to 'mode' (or vice versa). Such reductionism wrenches each concept from its constitutive position within the constellation of ideas comprising a theoretical framework and thereby fails to grasp its meaning. In contrast, by establishing common data and questions in joint analyses, Martin and Maton provided shared referents beyond the province of each theory through which the findings of their separate analyses could be integrated. Though each framework constructs objects of study in its own way, sharing clearly-defined referents in this way enables those constructions to be articulated. Thus, questions decided upon by Martin and Maton for their

parallel analyses concerned not general topics, such as the nature of knowledge-building, but rather sharply defined substantive issues, such as how a specific phase of classroom interaction builds on what had been previously discussed in the lesson (Martin 2013a; Maton 2013), how actors and terms are related together in History lessons on war in Indochina to create different values (Martin *et al*., 2010), or how a History teacher shifts between the present and the past to connect knowledge through time (Matruglio *et al*. 2013).

Having jointly discussed these examples (and others yet to be published), analyses using LCT and SFL separately provided the space for each framework to explore its distinct facet of the shared problem-situations. Parallel analyses provided sufficient distance between frameworks to enable the zooming into detailed examination and refocusing into precise theorization discussed above. Time apart is necessary for such analyses. When using SFL it may not be immediately apparent which systems – PERIODICITY, TRANSITIVITY, IDEATION, APPRAISAL, etc. – might be relevant. In the DISKS project, analyses of a wide range of different linguistic features were conducted by Martin and Matruglio that varied in their fruitfulness according to the specific case. When using LCT it may not be immediately apparent how concepts are realized within the specific data being studied and developing 'translation devices' for making visible code concepts is intensive and time-consuming (see Chapter 2, this volume). In short, space was required for each theory to engage in its own distinctive dialogue with the data. Parallel analyses thereby protected their integrity to ensure the project embraced 'bilingualism rather than pidginization' (Martin 2011: 53). Distance is also valuable for considering the implications for each framework of insights generated by its companion theory. As Martin (2011: 56) argues, interdisciplinary engagement requires 'breathing room: time to stop talking, take stock and develop knowledge on one's own terms'. We return to discuss such perturbations and provocations below.

However, alternating involves separation in order to come together again. In the DISKS project, emergent results of these parallel analyses were regularly articulated in joint analyses. Moreover, Matruglio worked with both Martin and Maton, providing an additional channel of communication. This coming together comprised more than the addition of two separate accounts: genuinely interdisciplinary research is more than the sum of its parts. For

example, through these joint discussions it became increasingly evident that diverse linguistic features came together in complexes that accompanied specific changes in knowledge, such as upshifts and downshifts in semantic gravity and semantic density, and that these further differed according to, *inter alia*, the specialization code characterizing the subject area. For example, Maton (2013: 16–17) includes a discussion of a semantic wave in a brief passage from a year 11 History lesson that SFL analyses reveal involves unpacking live grammatical metaphors, generic forms of participants and processes, nominalizations, technicalizations as dead metaphors, and many other linguistic resources. Reducing distance between them thereby helped reveal the ways in which, *for the purposes of this project*, the two frameworks offered complementary views. In the case of DISKS, enacting LCT provided analysis of changes in knowledge practices and enacting SFL revealed the linguistic resources by which actors achieved those changes. This relationship and those insights are not intrinsic to the frameworks but rather emerged from articulating parallel analyses of this specific object of study – other projects are likely to feature different relations. Maintaining an essential tension between the approaches through alternating offers a means of allowing these relations to become evident.

Doing the work

This brief summary of three dynamics characterizing the craft work of the DISKS project necessarily simplifies a messier process. Typically, analyses of several sets of data were ongoing simultaneously, progressing at different speeds, and requiring different degrees of collaboration. Throughout the project Martin and Maton adopted a flexible and pragmatic approach. Zooming, refocusing and alternating were based on judgement and involved trial and error, breakthroughs and false starts, and constant negotiation. Encouraging precedents offered by the existing history of dialogue between the frameworks (earlier above) suggested fruitful collaboration was possible. So questions of whether or why they could work together were set aside in favour of exploring how they could be put to work.

In all this, the problems addressed by the project – both the overarching concern with knowledge-building in classrooms and specific issues in particular phases of lessons – were the guiding light. This centrality of

problems is important to emphasize because of the temptation to delay enacting theories to analyse empirical data, which is typically chaotic, messy and complex, in favour of meta-analysis of those theories, which is neater and more stable. Such meta-theorizing can also feel more profound, particularly when couched in terms of establishing firm ontological and epistemological foundations. However, exploring such conditions for productive interdisciplinary collaboration requires evidence of productive interdisciplinary collaboration that can be analysed. Without actually doing the work, all else is speculation. Such issues were, therefore, not a primary focus of the DISKS project, though its fruitful outcomes offer a basis for further exploration.[4]

Turning the tools of LCT back onto itself does, however, reveal a theoretical basis for the methodological strategies we have outlined. ‘Zooming’ can be understood as maximizing the range of semantic gravity embraced by a project, from stronger for delimited cases to weaker for the bigger picture. ‘Refocusing’ can be conceptualized as maximizing its range of semantic density, from weaker for fuzzier descriptions to stronger for precise theorizations. Enacting these two dynamics thereby encourages research to reach across a greater semantic range, which studies are suggesting represents a key condition for cumulative knowledge-building (Maton 2014a). As such, both dynamics are valuable not just for interdisciplinary projects but for all research studies. ‘Alternating’ then provides the methodological framework within which two theories can be articulated while each is zooming and refocusing. It provides spaces for shared goals, individual contributions, and combined findings that maintain the essential tension between frameworks that underpins genuine dialogue.

Power, perturbations and provocations

The complexities of interdisciplinary research raise the question of whether it is worth the effort. The host of projects using LCT and SFL as complementary frameworks are demonstrating how such ‘close encounters of the third kind’ offer fresh insights into objects of study and encourage theoretical innovation. In short, together they generate greater explanatory power, perturb existing ideas, and provoke new thinking.

In productive interdisciplinary research each approach offers insights its companion may not have revealed by itself. In DISKS enacting LCT and SFL uncovered complementary facets of knowledge-building. As summarized earlier, LCT explored the organizing principles of knowledge practices to reveal the significance of semantic waves (Maton 2013) and SFL both showed the detailed resources that, as complexes, linguistically realize these changes in knowledge practices (Martin 2013a) and offered a pedagogy that enables students to master these resources (Macnaught *et al*. 2013). These outcomes have stimulated studies of curriculum, textbooks and student assessment across the disciplinary map – including cultural studies (Chapter 6, this volume), design (Chapter 7), physics (Chapter 9), and music (Chapter 10) – as well as underpinning pedagogic initiatives in schools and universities. Key here, though, is that each framework contributed something distinctly its own, such that enacting them together generates greater explanatory power than using either alone.

These distinctive contributions are at the same time a source of perturbations and provocations. Each can reveal new issues that raise questions for the other framework. Each can also make demands on the other framework to help generate further insight into those issues. Martin (2011: 37) argues that interdisciplinary dialogue is fostered by the 'possession of a discursive technology which can make visible things the other discipline wants to know'. Conversely, what scholars using the other framework want to know can encourage the development of concepts that make new things visible. Crucially, collaborative analysis of shared data raises questions with an immediacy unknown in dialogue at a distance. 'That to be explained' is in plain sight – there is less space for uncertainty or ambiguity, less opportunity to obfuscate or fudge. Under such circumstances, questions can quickly reveal the limits of concepts – they put them to the test. If, as Maton (2014: 207) argues, 'for catalysing intellectual advance…. Data changes everything', then for interdisciplinary collaboration analysing *shared* data can change everything. Though theoretical developments are influenced by more than interdisciplinary dialogue, such collaboration has certainly helped shape advances within LCT and SFL.

Catalysing code theory

The capacity of SFL to zoom into fine-grained detail of discourse encouraged LCT prior to the DISKS project. During phase III of exchanges (see earlier above), attempts by educational linguists to enact Bernstein's 'knowledge structures' in research helped perturb belief that concepts from the inherited framework exhibited 'strong grammar' (Bernstein 2000) or relatively unambiguous referents. As Chapter 1 (this volume) outlines, in contrast to 'classification' and 'framing', much of the framework remained suggestive ideas whose empirical referents were unclear. The need to develop these ideas was already one impetus behind the development of LCT; SFL scholars contributed to bringing that need into sharper relief.

The resulting concepts in LCT enabled a greater grip on the empirical and revealed new facets of phenomena. However, they were not intended for analysing discourse at the level of detail often found in SFL. This is difference rather than deficit: LCT concepts were generated from and for studies of social practice rather than designed for analysing language. Working collaboratively across disciplines, however, can perturb precisely because of differences between approaches. As mentioned above, SFL analyses by Martin and Matruglio in DISKS revealed the detailed and complex linguistic choices associated with shifts in the strengths of semantic gravity and semantic density. These analyses were experienced by Maton as not only a complementary resource for explaining knowledge-building but also a challenge. They broached the question of how the properties conceptualized by semantic gravity and semantic density are realized within discourse down to the level of wording. In addition, close collaboration gave greater salience to longstanding questions. For example, having identified 'grammatical metaphor' as crucial for constructing uncommonsense knowledge, educational linguists had been asking code sociologists, since at least phase III (e.g. Martin 2011), how it is realized in knowledge practices. These challenges and questions in the DISKS and PEAK projects encouraged the development of 'mediating languages of description' (Chapter 2, this volume) that comprise a series of multi-level typologies for separately calibrating the strengths of semantic gravity and of semantic density in English discourse at the level of wording, clausing, and sequencing (e.g. Maton and Doran 2015a, 2015b). They thus significantly increase the capacity of these concepts for telephoto and hard-focused analyses and, because they embrace any forms of data expressed in English, enable the

integration of research into diverse objects of study.[5] Finally, they enable longstanding questions to be addressed; for example, the tools highlight the role grammatical metaphor can play in moving between strengths of semantic density (Maton and Doran 2015a, 2015b).

Stimulating systemicists

The capacity of LCT concepts to capture organizing principles associated with complexes of linguistic practices has stimulated SFL scholars into rethinking such fundamental concepts as the register variables field and mode. Moreover, that these complexes cross-cut strata and metafunctions perturbs the existing architecture of the theory. In DISKS, Maton's analyses of shared data using 'semantic gravity' encouraged Martin to reconsider the notion of context-dependence in ways that resonate across the linguistic framework. In SFL 'context' has been used to refer both to the concrete, material, sensible physical and biological environment of a text and to the more abstract web of cultural assumptions and understandings shaping discourse. To describe a text as 'context independent' makes sense in the first use of the term but not in the second use, as all texts manifest their cultural context. The challenge of interpreting 'semantic gravity' in linguistic terms when analysing data led Martin to develop a metafunctionally differentiated account of the relation of a text to its material environment in terms of the new concept of 'presence'. Martin and Matruglio (2013) factor 'presence' textually as degrees of implicitness, interpersonally as degrees of negotiability, and ideationally as degrees of iconicity. This conceptualization calls into question the typical association of material 'context dependence' with the register variable mode, since much more than textual meaning is involved. Rather, 'presence' is explored in relation to the coupling of meaning across metafunctions and as a dimension of instantiation rather than realization (see Martin 2010). Put simply, in interdisciplinary analyses of data the concept of 'semantic gravity' highlighted how context-dependence embraces linguistic resources from across the framework of SFL in ways that required new concepts capable of embracing this diversity.

The concept of 'semantic density' has stimulated similar rethinking of the register variable field. Martin (1992) had characterized field in terms of a set

of activity sequences oriented to some global institutional purpose, including the taxonomies of entities involved. This ideational perspective helped capture the linguistic nature of what Bernstein (2000) referred to as 'knowledge structures' by exploring the distillation of knowledge into technical terms (Martin 2007). However, working closely alongside LCT concepts in DISKS highlighted new features for analysis. Put simply, Martin's previous conceptualization mirrored Bernstein's focus on explicit features of knowledge; however, LCT extends Bernstein's framework to additionally embrace knowers. The concept 'semantic density' highlights that meanings condensed within practices may be not only epistemological but also axiological (Maton 2014b: 125–47). This was reflected in DISKS: Martin *et al*. (2010) illustrates how the teaching of wars in Indochina in a secondary school History lesson involves axiologically-charged sets of terms. Such a seemingly simple issue resonates across the framework of SFL. It means that the linguistic analogue of 'semantic density', which Martin (2015) terms 'mass', has to be explored in relation to the coupling of ideational with interpersonal meaning, which again must be modelled as a dimension of instantiation, because two metafunctions are involved. This in turn raises the question of how such couplings of ideation and appraisal naturalize readings which align students in communities of shared values, bringing the hierarchy of individuation into the picture, since that is where SFL interprets communality as bond complexing (here a bond is defined as a shared coupling of ideation and attitude). The result is a reinterpretation of social practice not just in terms of what you know or know how to do (field) but in terms of fellowship (how you bond around the value of what you know or know how to do). Martin (2015) factors 'mass' textually as degrees of aggregation, interpersonally as degrees of iconization, and ideationally as degrees of technicality. These new concepts of 'presence' and 'mass' thereby identify the diverse ranges of resources at play in linguistic realizations of semantic gravity and semantic density, respectively.

In short, working closely with LCT has perturbed SFL to the point where more than five decades of work erecting its extravagant realization hierarchy (comprising axis, rank, metafunction and stratum, and the descriptions these concepts afford) must be reconceived as a first step towards an understanding of users in uses of language, and supplemented in the future with comparably populated hierarchies of instantiation and individuation, hierarchies with very

little conceptual superstructure in the SFL that first began to engage with LCT. Fortunately, two decades of research on APPRAISAL and multimodality (Bednarek and Martin 2010) provide a strong base on which to meet this challenge.

Conclusions

Interdisciplinarity suffers from a rhetoric–reality gap. Arguments proclaiming its necessity outnumber examples of its actuality. In contrast, LCT is increasingly being enacted in research studies alongside theories from other disciplines. As we summarized from Maton and Doran (2016), there is a successful history of dialogue between the tradition developed by LCT and SFL. Henry Ford is credited as saying: 'Coming together is a beginning; keeping together is progress; working together is success'. The history of exchanges between these approaches reflects this adage as dialogue has become increasingly engaged, intense and intimate. Crucially, interdisciplinary research is bringing together LCT and SFL *within* research projects to analyse and articulate their complementary findings into the same data. These close encounters offer greater explanatory power by exploring different facts of meaning-making in its myriad guises and their social effects.

In this chapter we outlined some of the research processes whereby LCT and SFL can be used together productively – the craft work of interdisciplinary research. Dynamics of *zooming*, *refocusing* and *alternating* are, we suggested, valuable for maintaining an essential tension between theories that enables their complementary insights to be generated and articulated. However, their realizations within our case study are not the only forms they can take. The DISKS project engaged with specific objects of study, forms of data, and concepts, and was characterized by specificities of personnel, time and budget. Forms taken by the dynamics within other studies are likely to differ. For example, 'alternating' in DISKS typically involved *simultaneous* analyses using each theory, something made possible by a division of labour among the project team. For an individual researcher such parallel analyses are likely to be sequential (thereby also alternating between LCT and SFL analyses). Similarly, for individual researchers joint analysis is likely to involve an introjected form of the dialogue between

scholars we described in this chapter; alongside discussions with peers and mentors, one may ‘talk to oneself’, as it were, in the tongue of each theory.

Intellectual developments may also reshape the forms taken by research collaborations. Typically, when reporting findings from DISKS, Martin and Maton began with LCT analysis of changes in knowledge practices before describing SFL analysis of the linguistic resources actors marshalled to achieve those changes. This ordering partly reflected historical characteristics of the theories: SFL is typified by exploration of more micro-level textual phenomena than was typical of code theory. However, the conceptualization of linguistic complexes as ‘presence’ and ‘mass’ and the development of tools for enacting LCT concepts in finer-grained analysis render these characteristics less significant. Indeed, these developments offer exciting possibilities for other forms of close encounters. They enable concepts from one theory to act as translation devices for operationalizing concepts from the other theory. ‘Presence’ and ‘mass’ offer a means of exploring the linguistic features associated with strengths of semantic gravity and semantic density; mediating languages for calibrating semantic gravity and semantic density in discourse offer means for enacting linguistic analyses of knowledge practices. While one must always remain mindful of slipping from bilingualism to pidginization, for the theories are complementary because rather than in spite of their differences, these developments may inspire further advances that enable the approaches to work closer together. However, whichever form relations between the theories take, a key constant to the craft of interdisciplinary research is that the problem-situation remains central. Foregrounding the issues being addressed is crucial to productive interdisciplinary collaboration. As we have argued, talking through shared data and questions that lie beyond the exclusive reach of each theory offers a joint anchorage that enables grounded discussion rather than freely-floating speculation, and promotes dialogue rather than turn-taking monologues.

Such interdisciplinary collaboration on a shared problem-situation is exciting, energizing and engaging. Studies of research, curriculum, and pedagogy in education, as well as research into other social fields, such as law (Martin *et al*. 2012) or the armed services (Thomson 2014), are bringing LCT and SFL together to reveal the bases of achievement in meaning-making and their social effects. This burgeoning body of work is also pushing forward both theories in previously unanticipated ways. Of course, this may

lead to less productive perturbations and provocations. It may perturb actors whose status rests on a fixed corpus of theory and are thus invested in reversion to a status quo ante. New ideas stimulated in part by interdisciplinary dialogue may thus provoke claims of being insufficiently (or overly) 'sociological'/'linguistic' or become labelled with such hybrid (and tacitly impure) appellations as 'sociolinguistics'. Ironically, such border policing can overplay the significance of interdisciplinary dialogue and ignore intra-disciplinary influences, such as the intrinsic logic of a theory or the impact of empirical studies on its development. It also fails to grasp the breadth of each framework. LCT is not restricted to the study of knowledge practices; SFL is not restricted to analysing language. Their increasingly multimodal reach – images, mathematical symbolism, physical movement – reflects their potential to provide social semiotic theories of practice. As Bernstein argued in response to 'purists' taking issue with the inclusion of 'sociology of language' in the subtitles of his first two volumes (1971, 1973), it is not merely the phenomena but also 'the conceptual system' being used that makes something 'sociological': 'There is no one particular which is unworthy of sociological study: what gives it its worth is an imaginative transformation which allows us a view of the latent and changing structure of society' (1973: 7). Similarly Halliday later stated that 'we've drawn disciplinary boundaries on the whole far too much' and that, rather than the object of study, a 'discipline is really defined by the questions you are asking. And in order to answer those questions you may be studying thousands of different things' (in Martin 2013b: 128–9). In short, both Bernstein and Halliday emphasized that sociological and linguistic approaches may ask different questions of shared objects of study. Scholars using LCT and SFL are still doing so today.

The limited vision of counter-evolutionary reaction is, however, unlikely to hold sway. A new generation of scholars with direct experience of enacting both theories in empirical research is placing explanatory power into problem-situations at the centre of legitimacy. This rapidly growing body of work demonstrates what Bernstein (1977) called dedication to a problem rather than allegiance to an approach. Through dynamics such as zooming, refocusing and alternating, studies are articulating the complementary insights of different theories without losing their constitutive complexity of meanings. They are bringing together theories from different disciplines to

provide greater understanding of their objects of study. They are thereby demonstrating how the reality can live up to the rhetoric. Such genuine interdisciplinarity may well be the future.

Notes

1 This is not to suggest developments in SFL, such as the appraisal system and individuation hierarchy, were not crucial to recent phases of exchange; our principal focus is situating the role of LCT.

2 DISKS was funded by an Australian Research Council Discovery Project grant (DP0988123).

3 The ‘PEAK’ project is led by Karl Maton, J. R. Martin, Len Unsworth and Sarah Howard, and is funded by an Australian Research Council Discovery Project grant (DP130100481).

4 See Bernstein (1995), Hasan (2005), Martin (2011), Maton (2012a), and Maton and Doran (2016) for insights into the ontological, epistemological, discursive and sociological conditions for exchanges between the two traditions.

5 Further mediating languages are being developed to engage with images (see LCT website at www.legitimationcodetheory.com).

Part II

Knowledge-building in education and beyond

Studies enacting Legitimation Code Theory

6 Ethnographies on the move, stories on the rise

Methods in the humanities

Susan Hood

Introduction

Ethnographic research practices are increasingly favoured in the humanities and social sciences. They may be proposed as essential to research design or even the only legitimate means for making claims about the social world. Claims for legitimacy focus on the privileging of an 'emic' perspective of first-hand observation or what Geertz (1973) refers to as 'first order constructs of reality'. However, what constitutes legitimate ethnographic practice is contentious. In recent decades ethnographic research has fractured into a proliferation of 'ethnographies' – traditional, realist, critical, contemporary, institutional, classroom, visual, walking, micro, auto-, etc. – with further sub-categorizations, such as evocative auto-, analytic auto-, critical-micro-, sound-walking-, etc. Bases of legitimation vary; in some cases they appear to be field oriented (institution, classroom, self) but most frequently suggest variations in means and/or gaze. In this chapter I consider what is at stake in this ongoing segmentation of 'ethnography' by exploring a common and privileged component of written accounts of ethnographic research: stories. The research draws on Legitimation Code Theory (LCT) to interpret storytelling as knowledge practices that vary with the nature of the intellectual field that shapes and is shaped by them. Detailed analyses of the discourse of stories draw on systemic functional linguistics (SFL) as a 'translation device' (Chapter 2, this volume) or means of relating LCT concepts and data. The chapter concludes with reflections on directions of change in ethnographic research and the role of storytelling in the humanities.

The privileging of stories in ethnographies

To the extent that ethnographers regard an insider or 'emic' perspective on the social world as bestowing legitimacy on their research practices, the observed 'world of everyday experience and knowledge' (Smith 2005: 45) must retain a place in written accounts of research. The inclusion of stories is one means by which this is achieved. Stories are said to provide a connection to local, lived, social practices and a space for subjective voices. They are also celebrated as challenging the hegemonic power of academic discourses. Stories are said to constitute 'an intervention into the "factual turn"' (Schlunke 2005: 413), represent a 'post realist' challenge to an 'objectivity' guilty of 'standing over against individual subjects and subjectivities, overriding the idiosyncrasies of experience, interest and perspective' (Smith 2005: 43), and offer 'discursive spaces' for 'the exchange of narratives' that has 'the power to transform the crushing, impersonalized schooling that often characterizes "rigorous" scientific inquiry in a research institution' (Brandt 2008: 719). Indeed, 'the process of retrieving one's own stories' (or auto-ethnography) 'allows us to think beyond the narrow and deadening influences of economic rationalist objectives and Western theoretical frameworks' (Ryan 2008: 664).

Stories are thus widely regarded as a powerful knowledge practice. The research discussed in this chapter explores how they function in written accounts of 'ethnographic' research and, specifically, how 'ethnographers' employ story genres to move between an observed everyday world of commonsense and an academic world of uncommonsense knowledge. What happens to meanings in the re-instantiation of events from one world into the other? Do stories provide spaces for those who cannot speak for themselves? Does storytelling enable scholars to avoid 'overriding the idiosyncrasies of experience, interest and perspective' (Smith 2005: 43)? Are there differences in how stories are told that reflect differences in their informing intellectual fields? Making visible how storytelling functions as a knowledge practice has important implications. Pedagogically, it has significance for interventions in the development of relevant academic literacies. Intellectually, it can help clarify the bases of confusion, if not animosity and vilification, in struggles over legitimacy in research practices, and contribute to a more critical appreciation of the potential for interdisciplinary studies.

Analytic framework

LCT: Theorizing research writing as knowledge practices

The study enacts two theories from different disciplines: LCT and SFL. From LCT the study draws on the dimensions of Specialization and Semantics (see Maton 2009, 2013, 2014b; Chapter 1, this volume). Specialization conceptualizes the organizing principles underlying practices in terms of *epistemic relations* (ER) and *social relations* (SR). Epistemic relations concern legitimate objects of study and principles for generating knowledge; and social relations concern legitimate kinds of knowers and ways of knowing (Maton 2014b). Each set of relations may be more strongly (+) or weakly (−) bounded and controlled, and these strengths together generate *specialization codes* (ER+/−, SR+/−). The *specialization plane* models intersecting clines of ER+/−, SR+/− (see Figure 1.2, page 12) that generate four such codes. This allows variations across practices to be plotted in both categorical and relative terms. Categorically, an intellectual field such as physics constitutes a *knowledge code* (ER+, SR−), while that of cultural studies constitutes a *knower code* (ER−, SR+). Relatively, each relation may also be strengthened and weakened (ER↑/↓, SR↑/↓), charting a topological space of infinite positions.

Specialization codes provide a means for analysing similarities and differences in research practices collectively described by proponents as 'ethnographic'. To begin with one can say that ethnographic methods (such as participation, observation, unstructured interviews, reflection) constitute relatively weakly specified procedures for establishing knowledge claims, while who can legitimately claim to know (participants and first-hand observers with specific dispositions) is relatively strongly bounded and controlled: a *knower code* (ER−, SR+). However, there are differences among ethnographies – they may be knower codes, but they are not homogeneous. Specialization allows for not only a typological but also a topological mapping of differences, enabling such variations across ethnographic studies to be embraced. Such variations might be explored diachronically, as drifts over time within intellectual fields or (in this chapter) as synchronically differentiating intellectual fields. Storytelling in written research is here

interpreted as constituting a knowledge practice. It represents a privileged means by which ethnographers appropriate events from an everyday observed world to be recontextualized as stories within written academic accounts of research. Differences in the practices of storytelling are therefore explored in terms of their strengthening or weakening of epistemic relations and social relations (ER↑/↓, SR↑/↓).

A second dimension of LCT drawn on here is Semantics, and specifically the concept of *semantic gravity* or the relative degree of context dependence of meaning. As outlined by Maton (Chapter 1, this volume), semantic gravity (SG) can be stronger or weaker (SG+/−) and strengthen or weaken (SG↑/↓). I use the concept to analyse the stages of story genres, especially in differentiating accounts of events from interpretations of their significance. I shall explain the concept further at those points in the analysis.

SFL: Identifying and differentiating stories

To determine detailed variations in the ways in which stories are told, I turn to linguistic theory. From SFL the key concept is *genre*, defined as cultural configurations of meaning (Martin and Rose 2008). Analyses of genre necessarily implicate other dimensions of the theory, in particular concerning kinds of representations of the world (IDEATION), and kinds of evaluative meanings (APPRAISAL). Each concept will be explicated when applied in the analyses (see also Martin 1992; Martin and Rose 2007). A theorization of genre, including story genres, in SFL originates from the late 1970s and early 1980s – Hasan (1984), Rothery (1990), Martin (1992), and Martin and Plum (1997) – and is documented most recently in Martin and Rose (2008). The theory offers a framework for mapping story genres in relation to other kinds of genres and for differentiating kinds of story structures.

Some clarification of terminology is necessary. In narrative studies generally, the terms ‘story’ and ‘narrative’ are often used synonymously. However, SFL distinguishes between them to provide more delicacy of analysis: ‘story’ is the super-ordinate term for a family or taxonomy of genres that includes ‘narrative’ as one kind of story. Story genres collectively are genres which:

> reconstruct real or imagined events and evaluate them in terms which enact

> bonds of solidarity among participating interlocutors…. key social functions of stories include maintaining and shaping social relationships, particularly at the level of local communities and kin, through evaluation of events and behaviour.
>
> (Martin and Rose 2008: 97)

Common to all story genres is telling and evaluating events, but how the events are told and evaluated differentiates one story genre from another. Systematic variations in configurations of these meanings can be represented as system networks. Figure 6.1 shows a network of story genres that hold in common a chronologically sequenced representation of events but vary in terms of evaluation. Reading Figure 6.1 from left to right, a first distinction is made between stories in which events unfold as expectant and without disruption – constituting the genre of recount – or as counter-expectant and disruptive of the mundane. In the latter case a story may offer a resolution to the disruption, constituting a narrative. Alternatively it may remain unresolved, in which case the story may be concluded with an evaluative response to the told events. This response may be: an emotional reaction, realizing an anecdote; a judgemental interpretation, realizing an exemplum; or a personal comment on some thing or event, realizing an observation. Anecdotes, exemplums and observations are therefore 'differentiated according to the "point" of the story' (Jordens 2002: 68).

The current study draws on storytelling encountered in random searches of ethnographic studies in journal articles from anthropology, linguistics, cultural studies, intercultural studies, history, and education. Stories may appear in different sections of articles and may be a singular occurrence or form part of a collection or sequence of stories. In all cases the stories are representations of happenings in the lived experiences of actors. The analyses of stories in this study involves: identifying the kind of story presented, its structuring and function; analysing meanings construed within its stages; and exploring how stories are integrated into the surrounding discourse of the article. Throughout, the aim is to consider the ways stories are recruited as different kinds of academic knowledge practices whose organizing principles are analysed in terms of specialization codes and semantic gravity.

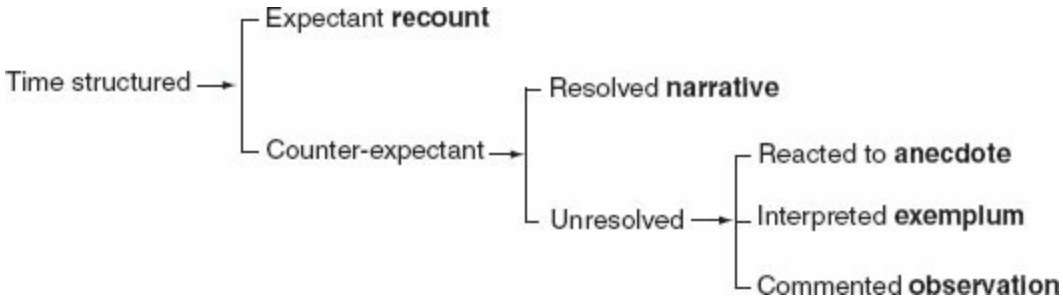


Figure 6.1 A system network of time-ordered story genres (Martin and Rose 2008: 81).

Findings

An initial analysis reveals a range of story genres. Interestingly, these stories are rarely constructed as narratives with an unfolding complication–resolution structure (Labov and Waletsky 1967, cf. Martin and Rose 2008). More common are instances of anecdote, exemplum, and especially observation. All three kinds constitute stories in which a disruption or significant event remains unresolved around the participants in the events, and completion is realized instead in an evaluative response stage. The favouring of unresolved story genres over narratives in the academic texts is significant. Such stories require a response as a comment or interpretation by the research writer, in other words they require the writer to establish the point of the telling of the event(s). The last voice in such stories is therefore not that of the subjective participant(s) but rather that of the academic writer. In that sense the focus shifts from participants and events in an observed world to an abstracted issue in an academic world. The writer assigns relevance to events beyond the field in which they took place to make them relevant in a given field of academic knowledge production.

The question then arises as to how writers of ethnographic studies might differ in how they make the telling of the story relevant to the larger project of their academic research paper. In other words, how does the storytelling relate to the specialization code of its informing intellectual field? To explore this, I shall discuss in detail two instances of storytelling from written accounts of ethnographic studies in different intellectual fields. Story 1 (Taylor and Bain 2003), from the social sciences, was published in a journal of organizational studies. Story 2 (Simpson 2010), from the humanities, was

published in a journal of cultural studies of education. As will become evident, the writers reveal two different strategies for recontextualizing events from the observed world as stories in their academic papers. The question is whether the differing strategies can be interpreted as revealing variations in the knower code within which ethnographic studies are generally positioned.

Storytelling from the social sciences: building knowledge in organizational studies

As noted above, stories located in ethnographic research papers are typically *not* narratives. Rather they are stories in which some significant or disruptive event remains unresolved and so requires a response to achieve completion. Story 1 is of this kind. It constitutes an anecdote and appeared in an article in a social science journal of organizational studies. The methodology employed is described as ethnographic, involving prolonged on-site engagement with significant periods of observation and extensive interviewing, resulting in an accumulation of accounts of subversive practices by participants. The article as a whole focuses on humour as a strategy for subversion of managerial authority in call centres. Anecdotes are often associated with humour, and in this case the occurrence of that genre connects to the particular object of study. The written anecdote recontextualizes events from a workplace as told to the researcher by agents from a French language section of a call centre in which the manager was unable to speak French. The wording of the written story is reproduced below (in *italics*), framed within the stages of the genre arrived at through linguistic analysis (in **bold**). These stages are labelled according to SFL conventions. An analysis of the story then explores the means by which, and ultimately the functions for which, academic writers recontextualize people and events from an everyday world into an academic one.

Story 1: genre of anecdote

Abstract

On one celebrated occasion, the manager sat beside an agent in order to

monitor calls, asking him to translate customer queries and his responses. Months later the memory of this farcical incident induced wholesale derision of both the hapless manager and the company (Observation, 19 March 2000).

Remarkable event

Two agents, Diane and Saul, described how, after the failure of this monitoring exercise, the manager continued to hover near the French team, clearly within earshot of agents' conversations. Saul recollected that after a call had ended and the customer had hung up, he continued talking, pretending it was still live. He finished by saying, in French, 'Thank you very much for calling. We will send someone round to kill your wife and family.'

Reaction

Agents at adjacent workstations were scarcely able to contain their laughter. The manager's humiliation was complete when Saul reported, in English, how successful the call had been.

Coda

It matters little that this story was embellished in the retelling. What is significant is that it continued, months afterwards, to be a source of great amusement and had come to symbolize managerial incompetence.

Anecdotes are stories which 'involve some remarkable disruption to usuality, which is not resolved, but [is] reacted to' (Martin and Rose 2008: 51) with an affectual response of some kind. The Remarkable Event and the Reaction are the obligatory stages of the genre with the Remarkable Event stage forming the nucleus of the story. Here we are presented with an account of what specific people were saying and doing; in this case the participants are recalling an earlier incident. However, of more concern are stages that precede and follow the events. In the anecdote that is Story 1, this means a preceding Abstract and a concluding Reaction and Coda. These stages are crucial as it is here the writer connects the story to the broader context of the research paper and, accordingly, here that strategies of legitimation become most evident.

The initial Abstract provides a summary account of what happened, evident in the linguistic abstractions *occasion* and *incident*. It also primes us for the remarkable-ness in the pre-emptive evaluations of *celebrated* and

farcical. Interestingly it is in the Abstract that the function of the story as a knowledge practice is first alluded to, in the minimal bracketed note (*Observation, 19 March 2000*). This insertion references the ethnographic method with the suggestion of a larger data set of accumulated observations over time. This reference hints at the potential for strengthening knowledge claims through the accumulation of supporting evidence and thus implies, however minimally, strengthening of epistemic relations (ER↑).

Following the Remarkable Event is an obligatory Reaction that provides the response. In Story 1 this is expressed as a reported response (*laughter*). It is assumed that the participants themselves referred to their laughter. However, the writers are responsible for the abstracted representation 'were scarcely able to *contain their laughter*' (in contrast to a likely more congruent response such as 'we could hardly *stop laughing')*, and for the abstracted claim that 'the manager's *humiliation was complete*'. In these representations the writers insert an academic voice into the Reaction and in the process shift the significance of events from one world, where the shared reaction is about affiliation amongst a group of workers (see Knight 2010), into another in which it has quite a different significance. As readers, we may well join in an emotional reaction to the extraordinary events as we are positioned to. However, this account is recast from the context of a call centre into that of the research article for a purpose beyond our amusement and group alignment.

The concluding stage of the anecdote is a Coda, an optional stage that if present ends the story by returning the orientation to the here-and-now (Martin and Plum 1997). In this case the here-and-now that the Coda returns us to is no longer the observed world of a specific group of workers interacting and responding, but rather the world in which the story is written, that is, the field of research and knowledge in organizational studies. The values reflectively assigned to the events in the Coda bestow significance in the context of an academic study of humour (*a source of great amusement*) and subversion of authority (*a symbol of managerial incompetence*). The world of everyday experiences of workers in their workplace has been transformed into the role of evidence towards an abstracted academic knowledge claim. As such the story plays a role in strengthening what can be known about the observed world, that is to say, in strengthening epistemic relations (ER↑).

Waves of semantic gravity in Story 1

Within LCT the flow of the discourse can also be viewed as shifts in strengths of semantic gravity (SG), which is defined as 'the degree to which meaning relates to its context. The stronger the semantic gravity (SG+), the more meaning is dependent on its context; the weaker the semantic gravity (SG−), the less meaning is dependent on its context' (Maton, Chapter 1, this volume, page 15), where the context may be social or symbolic. Using this concept we can trace profiles of stronger or weaker context-dependence in the telling of the story as it moves from the workplace to the academic paper. As represented in Figure 6.2, the stage of the anecdote that records the Remarkable Event *(… Diane and Saul, described … the manager continued to … Saul recollected … a call … ended … he continued talking, pretending … saying, in French …)* represents the point of strongest semantic gravity with people and their actions tied to a specific location. The Reaction stage *(Agents … scarcely able to contain … laughter … The manager's humiliation was complete …)*, while still relatively context-dependent, is constructed as reflective on the events and so standing somewhat apart from them, weakening semantic gravity. As we move to the optional surrounding stages of the initial Abstract (*one … occasion … farcical incident … derision*) and the concluding Coda (*… retelling … source of great amusement … symbolize managerial incompetence*) specific events and consequences become kinds of events and kinds of consequences, weakening semantic gravity still further. Within the story itself we thus find the semantic profile illustrated in Figure 6.2, with the stages connecting to the surrounding academic paper representing the points of weakest semantic gravity.

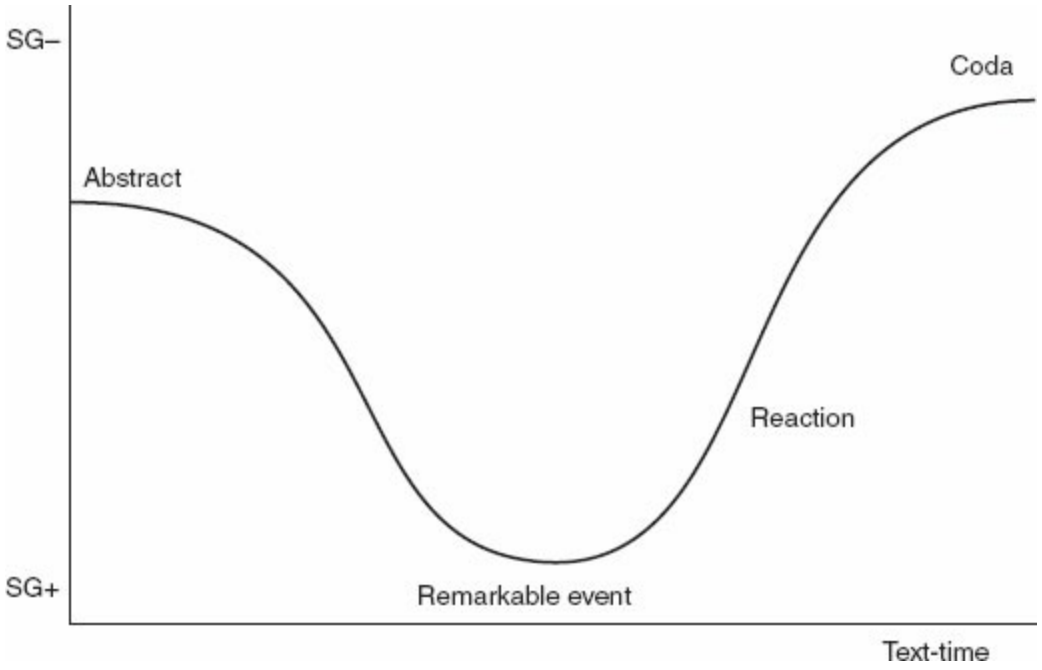


Figure 6.2 Story 1 as a semantic gravity profile.

Story 1 in its surrounding co-text: Specialization and Semantics

From an analysis of the internal structuring of the story, I move to the surrounding text, or co-text, to consider the way in which the entire anecdote (Story 1) is positioned such that events from a world of everyday interactions can come to function in an academic knowledge practice. Here the anecdote is prospectively and retrospectively positioned in its immediately surrounding discourse:

Prospective positioning

Astonishingly, the manager of a French language section was unable to speak the native tongue of the majority of team members. Inevitably, this generated operating problems and undermined supervisory authority.

Story (anecdote)

On one celebrated occasion, …

Retrospective positioning

The French speakers constituted a work group with a high degree of self-organization, and their scathing humour served to widen the gap between themselves and the company.

Immediately preceding the telling of the anecdote is a claim about the incompetence of a particular manager and its consequences. The story that follows provides evidence for this generalized claim by exemplifying the manager's incompetence and the erosion of authority. On completion of the story the writers step back from the specific events to make retrospective and generalized claims about the specific group of workers, their humour, and their relations with the company. While the prospective positioning foregrounds the manager's incompetence, the retrospective positioning shifts the focus to the workers and their subversive humour. The story sits between the two claims and exemplifies both. However, neither claim is tied exclusively to the events of the anecdote; each generalizes beyond those events. Contextualized in this way, the anecdote contributes evidence for a set of more generalized claims about the manager and the workers. This construction of claims based on evidence indicates some strengthening of the boundaries around procedures for building knowledge. This reflects a relative strengthening of epistemic relations (ER↑), albeit in an ethnographic study that functions overall as a knower-code knowledge practice (more accurately, ER−↑−).

Tracking back further into the preceding co-text (roughly two pages in length) we find a hierarchy of knowledge claims that stand above any specific workplace, participants or practice. These contextualizing claims, represented below, reflect a progressive strengthening of semantic gravity as they move from abstract claims that are thoroughly decontextualized (SG−) towards progressively higher levels of specificity and so context-dependence (SG↑) until the story itself appears.

1 Section heading: high-level abstract claim (implied): SG−

Humour and the Erosion of Team Leader Authority

2 Some minimal unpacking of claim: SG↑

joking … becomes a means of conducting a satirical attack on management

(…)

3 Generalized claim for specific location: SG↑

The joking practices of agents at 'T' confirm these insights, … that humour was directed at undermining team leaders' authority.

(…)

4 Further specifying claim in prospective positioning: SG↑

> *Astonishingly, the manager of a French language section was unable to speak the native tongue of the majority of team members. Inevitably, this generated operating problems and undermined supervisory authority.*
>
> *(…)*

5 Story

> << anecdote >> [functioning as evidence]

6 Reiterative claim in retrospective positioning: SG↓

> *The French speakers constituted a work group with a high degree of self-organization, and their scathing humour served to widen the gap between themselves and the company*.

At the highest level, in (1), is a sub-heading of the section in which the story appears. From a linguistic perspective this represents an abstract claim of causality. Further into the section, in (2), the writers introduce a sub-section of discussion. Functioning at a somewhat lower level in the hierarchy, *Humour* is now unpacked as the practice of *joking*, and *Erosion of Team Leader Authority* becomes *a means of conducting a satirical attack on management*. Further into this subsection, in (3), we encounter a claim at a specific level, specifying a particular workplace (*T*) and participants (*agents at 'T'*), and this is further specified in (4). It is at this point, (5), that Story 1 appears, representing the strongest point of context dependency. It is followed by a reiterating claim in (6) that then weakens the semantic gravity somewhat. The dominant direction of shift in semantic gravity is SG↑ as claims that stand above specific instances are progressively grounded in the events of the story. (For the semantic profile of the contextualizing discourse, see Figure 6.4, further below, where it is contrasted with that of Story 2).

The hierarchy of claims and an associated accumulation of evidence in the flow of discourse around Story 1 reveal the means by which the story is given a point in the context of an academic paper. In its immediate co-text the story grounds a specific epistemological claim through exemplification, constituting evidence from a specific location involving specific people and activities. This epistemological claim sits within a hierarchy of knowledge claims, each enhanced with layers of evidence. The dominant pattern is one of claim–evidence–reiteration of claim. The entire section of the article

functions to progressively strengthen epistemic relations (ER↑).

Storytelling from the humanities: building knowers in cultural studies

A contrasting instance of storytelling comes from the humanities in a journal of cultural studies of education (Simpson 2010). The article focuses on the values and challenges in enacting principles of 'critical pedagogy and cultural studies'. The writer describes her methodology as 'auto-ethnography' where analysis is interpreted as a reflexive focus on one's own lived experience. The writer makes clear that she is a participant in the context in which the event of the story occurred. Versions of a specific incident are told in several iterations throughout the paper as the role of protagonist progressively shifts from one specific student to the writer herself. I focus here on the first account in the article, represented as Story 2. As with Story 1, the writer's wording is in *italics* and the stages and phases (sub-stages) of the genre are in **bold**.

Story 2: genre of observation

Orientation

During the last course meeting of a class I taught in the fall of 2004,

Event description

a group of students presented on the ways in which the mainstream media had used fear as a way of garnering support for the U.S. occupation of Iraq. Immediately following their presentation, a young woman stated, 'I'm more afraid of the four of you than I am of the terrorists.'

Comment: (Phase 1, witnessed reaction)

A charged conversation ensued,

Comment: (Phase 2, symbolizing reflection)

one that seemed to displace 'the space of shared responsibility … [with] the space of shared fears' (Giroux 2005, 214). While clearly an expression of agency,

Comment: (Phase 3, problem recognition)

the student's statement, however earnest, seemed to also be a rejection of

all critique related to the war.

Story 2 constitutes an observation, a story genre in which some disruption or problematic happening remains unresolved and is responded to in terms of the significance of the event (see Figure 6.1, earlier above). Jordens, with reference to Rothery and Stenglin (1997) summarizes the nature and function of observations thus:

> Observations … are … a symbolizing genre: the 'snapshot frozen in time' gathers up preceding meanings into a symbolic image, and in doing so creates a critical distance that is somehow useful in the process of making one's experience meaningful to one's self and to others.
>
> (Jordens 2002: 104)

Story 2 and specialization codes

For Story 2 (as for Story 1) two layers of analysis are undertaken, each providing insights into the function of the story as an academic knowledge practice. First the discourse is analysed at the peripheral stages of the story genre itself, that is, in the opening and closing stages that intersect with the surrounding discourse, and then attention is given to surrounding discourse of the article. Additionally, as we move from the social sciences (Story 1) into the humanities (Story 2), we can also explore variations in storytelling strategies as indicators of variations in underlying specialization codes.

Story 2, as an observation, begins with an optional Orientation stage that establishes the setting in place and time. However, in this instance it additionally explicitly places the researcher as a participant in the field in *a class I taught*. This move immediately indicates a legitimating strategy in which first-hand interactional relations with subjects are deemed relevant, constituting a strengthening of social relations (SR↑). This contrasts with the opening stage of Story 1 where a suggestion of multiple observations, in *Observation, 19 March 2000* implies not only a witnessing of events but also an accumulation of evidence as a basis for legitimacy, suggesting a minimal strengthening of epistemic relations (ER↑). Once again these variations across the stories can be interpreted as functioning within an overall knower code of specialization (or: SR+↑+ and ER−↑−).

The first obligatory stage of an observation is the Event Description. Here happenings are represented as a snapshot rather than an elaborated sequence of activities. In Story 2, the image of a challenging encounter in a classroom provides minimal detail of specific actions, and this relative vacating of content leaves little potential for the story to function as evidence for a generalizing claim about phenomena in the observed world. It simply does not say enough in those terms. However, it does suggest a symbolic significance, an incident around which bonds of shared values can be forged. The evocative references to *terrorists* and *the U.S. occupation of Iraq* in this short stage indicate that values rather than actions are to be foregrounded.

The second obligatory stage of an observation is the Comment, which responds to the disruption in the Event Description by establishing a point to the telling. In Story 2 the Comment is the concluding stage that intersects with the subsequent discourse of the article. It links two distinct fields, that of the classroom (in *conversation, statement, student, the war*), and that of academic theory (in *the space of …; Giroux 2005, 214; agency*) and thus bridges from one world into the other. The critical question to ask is what constitutes the nature of this bridge. How is the single incident, in this case in a classroom, given significance in the world of academic research? In Story 1 it was in epistemological terms as supporting evidence for more generalized and abstracted knowledge claims. In Story 2, however, a different strategy is evident. Here, the retrospective evaluative response to the incident assigns significance in terms of values. In other words it functions axiologically rather than epistemologically; the event symbolizes a set of values rather than exemplifies a set of knowledge claims.

The observation stories encountered in this study conform to the expectations of the genre in that Event Description stages are typically brief, unelaborated snapshots. The Comment stages, by contrast, tend to be more extended and complex than is anticipated, suggesting an evolution of the genre in this context of academic writing. The function of the Comment in Story 2 is represented above as a sequence of phases, and is further explored here for its role in the transformation of specific events to symbolic status.

The sequence of Comment phases reflect a shift in what is being evaluated and how, analysed with reference to the system of APPRAISAL in SFL (see Martin and White 2005 for a detailed account of that system). In the first phase the writer assigns feelings and emotions to the participants in the event

as she witnessed them. The conversation is evaluated attitudinally as *charged*, as one of heightened feelings and emotions. These evaluations are limited to the here-and-now of the observed world. It is the writer's co-presence that gives the evaluative interpretations their legitimacy. In this sense it is a commonsense interpretation that anyone observing might be expected to agree with. This phase of *witnessed reaction* assigns values in a here-and-now field from the perspective of a *participating observer*.

Phase 2 of the Comment represents a dramatic shift in stance as the event is elevated from the classroom to take on significance in an entirely different field. The evaluation is no longer about how participants felt; it is now about relevance of the event to an existing abstract body of theory and its associated values. In this move the event has come to instantiate a valued principle; it takes on the status of exemplar or symbol of those values. These values, as we shall see shortly, are explicitly articulated in the preceding discourse as those of critical pedagogy and cultural studies, constituting what Maton (2010, 2014b) refers to as a 'cultivated gaze'. In Story 2, as in many other stories from the humanities, the cultivated gaze that enables the move to exemplarize an incident is identifiable in a syndrome of choices. Typically reference is made to one or more high status knowers of the field, in this case *Giroux*. Typically too we find axiologically charged terms (Martin *et al*. 2010: 451) – here in *agency, space of shared responsibility, space of shared fears* – which provide essential referents for what the event is said to symbolize. Rather than functioning as condensations of knowledge, they subsume and stand for the values or dispositions of a field. They remain unelaborated, assuming a readership of a shared recognition, one that rests on access to the espoused values of particular intellectual fields. This phase of *symbolizing reflection* assigns symbolic status to the event from the perspective of a *cultivated observer*.

Phase 3 of the Comment in Story 2 constitutes the recognition of a problem, a necessary step in a story located in an introductory stage of a research article. Here the evaluative response returns to the stance of first-hand observer, but now extends beyond the specific actualized incident, *the student's (earnest) statement*, to query a potential, more generalized and problematic significance, a crisis in the conflict of positively charged student *agency* with negatively charged *rejection of all critique related to the war*. Recognition of a problem rests now on an observer with sufficient insight

into both the observed world and that of the values of cultural studies and critical pedagogy. It requires the stance of a *participating observer* with a *cultivated gaze*.

Kinds of knowers and ways of knowing, conceptualized in LCT as kinds of social relations (Maton 2014b), are privileged at each phase in the Comment as the writer moves from insider/knower of the observed field, to insider/knower in the intellectual fields of critical pedagogy and cultural studies, and it is the potential to fulfill these dual perspectives that constitutes the basis for legitimacy. The stage, as a whole, functions in the service of strengthening social relations (SR↑).

Observation story genres displaying this kind of phased response occur frequently in ethnographies from the humanities. The phased response represents a typical trope as writers re-instantiate observed incidents then elevate them to symbolic status in their written accounts. In some cases the symbolizing is withheld to subsume a number of incidents. In all cases this kind of storytelling privileges a strengthening of the social relations (SR↑) and contributes to the building of a hierarchy of knowers.

Story 2 and semantic gravity

As with Story 1, we can map a wave of semantic gravity as degrees of context-dependence at different stages of Story 2. As represented in Figure 6.3, a short Orientation sets the scene in time and place, leading into a specific incident as the point of strongest semantic gravity (SG+). Subsequent to the incident, in the Comment stage, semantic gravity is weakened somewhat as the writer evaluates the event first as a *participating observer*, then markedly weakened as events are made symbolic from the stance of *cultivated observer*. In the final phase of the Comment the semantic gravity is strengthened as the values of the field are reconnected to the events as an emerging problem.

In both Story 1 (Figure 6.2) and Story 2 (Figure 6.3) the stages of the genre that connect to the surrounding academic discourse of the article, especially those that conclude the storytelling, represent their points of relatively weakest semantic gravity. The decontextualized academic role of the stories intrudes most evidently at these points.

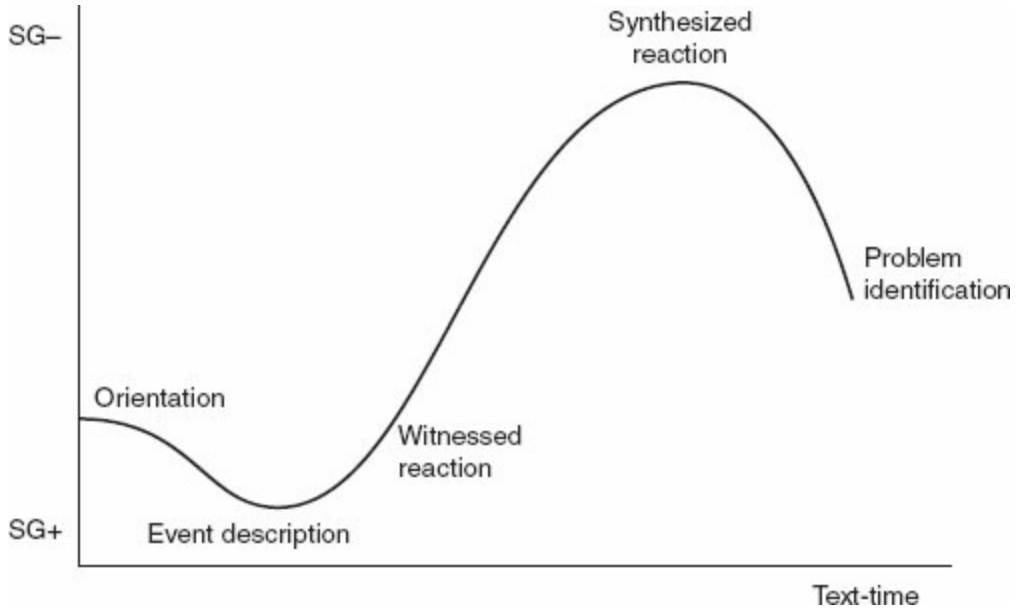


Figure 6.3 Story 2 as a semantic gravity profile.

Story 2 in its surrounding co-text: Specialization and Semantics

What of the discourse that immediately precedes the telling of Story 2? As was the case with Story 1, the discourse preceding 2 plays a significant contextualizing role, but in ways that differ from the first story. Story 1 is positioned as evidence in a hierarchy of knowledge claims about the object of study, contributing to a relative strengthening of epistemic relations (ER↑). In Story 2, the prospective positioning is in terms of values and dispositions. These are the lenses through which the incident must be viewed to be recognized as having symbolic status. The text that precedes Story 2 is presented below, segmented (by this writer) into three phases that are then explained further.

Phase 1:

> *Scholarship in cultural studies and critical pedagogy has played a particularly important role in higher education since the events of 9/11. Relying on long-held commitments to a critique of dominant ideologies, scholars have insisted on academic freedom (Ivie 2005b, Giroux and Giroux 2006), the patriotic aspects of dissent (Ivie 2005a), and the importance of tackling complex social problems (Carlson and Dimitriadis*

2003; Glass 2004; Alanís 2006).

Phase 2:

In the classroom, issues including 9/11 and the occupation of Iraq often bring affective and cognitive investments among students and teachers to the forefront. Dialogue, conflicting viewpoints, and critical questioning, all central components of healthy democracies, become fraught with allegiances to long-held and frequently unseen norms.

Phase 3:

Issues such as 9/11 and the U.S. occupation of Iraq hold all that is difficult and promising about critical pedagogy and cultural studies: the necessity of looking plainly at the uses and consequences of power, and the possibility of seeing and acting differently. This article grapples with the often-charged field that exists between the difficulty and promise of seeing differently, particularly related to issues such as 9/11.

The discourse that precedes Story 2 begins with an articulation of the values of the informing intellectual fields. *Scholarship in cultural studies and critical pedagogy* is associated with *long-held commitments to a critique of dominant ideologies … academic freedom … patriotic aspects of dissent tackling complex social problems*. As the focus shifts in the second phase to issues of social concern (*the events of 9/11 … the U.S. occupation of Iraq*) and classrooms in which they arise, the values of the intellectual fields are recontextualized as good and bad practices in classrooms. On the side of good are *affective and cognitive investments … dialogue, conflicting viewpoints … critical questioning … healthy democracies*. On the side of bad are *long-held and frequently unseen norms*. In the third phase these valued practices are recontextualized back into intellectual fields as *all that is difficult and promising about critical pedagogy and cultural studies … the consequences of power, and the possibility of seeing and acting differently*. We are positioned to interpret the incident not in the light of a hierarchy of epistemological claims (as in Story 1) but in the light of clusters of axiologized abstractions (see Maton 2014b: 148–70). We are being compelled to align with the writer as a kind of knower who is committed to a *critique* of *dominant ideologies*, to exposing *unseen norms* and who can readily recognize *critical questioning, healthy democracies*, and the *possibility of seeing and acting differently* in classrooms. The discourse that

precedes the telling of Story 2 strengthens the boundaries around and control over legitimate knowers, i.e. those who have acquired the cultivated gaze of cultural studies and critical pedagogy. Here too the writer works to strengthen social relations (SR↑).

We can also consider the three movements in the contextualizing discourse from the perspective of semantic gravity. As shown in the profile on the right in Figure 6.4, the text begins at a point of relatively weakest semantic gravity in the abstract realm of *[s]cholarship in cultural studies and critical pedagogy*. In the second phase semantic gravity is strengthened somewhat through location in the generic *classroom* and associated generic phenomena, *dialogue*, *viewpoints*, *questioning*, *democracies*, *norms*, as well as in references to abstract issues and events, 9/*11 and the U.S. occupation of Iraq*. In the third phase semantic gravity is again weakened as generic practices and abstract issues are elevated into the abstract realm of the values of an intellectual field. From this height there is then a disjunctive drop to the relatively strongest point of semantic gravity in the specific incident, an incident that initiates the body of the paper, as indicated in the disconnected waves for Story 2.

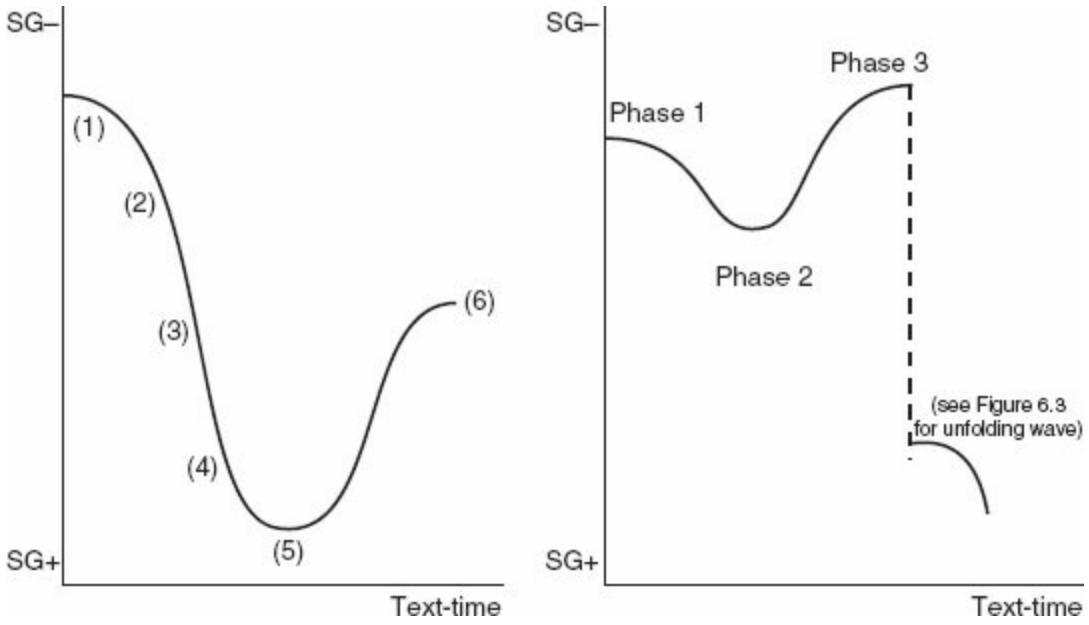


Figure 6.4 Semantic gravity profiles of surrounding co-text of Story 1 and of Story 2.

The profile of semantic gravity that encapsulates Story 2 reveals how the

story is given a point in the context of the academic paper. In this case, the story as symbol is the catalyst for an elaboration of the values and attitudes of the intellectual fields that structure the research. It functions to legitimate those values, in the service of a hierarchy of values. The contrasting profiles of contextualization, as waves of semantic gravity around each story in Figure 6.4, are indicative of the ways they function differently: Story 1 as *exemplification* in a hierarchy of knowledge claims; and Story 2 as *exemplarization* of a set of abstract values.

Consolidating and concluding

The term ‘ethnography’ has come to describe a loose set of methodological practices associated with a broad spectrum of intellectual fields. Within its home discipline of anthropology it was understood to involve detailed longitudinal observations and interpretations of the systems of meanings at work within the observed communities. It is this meaning to which the term ‘emic’ was first assigned by Kenneth Pike in the field of linguistics, and it is this notion of ethnography that characterized the linguistic ethnographic work of Dell Hymes. The term ‘ethnography’ has since entered into the practices of many other disciplines in the social sciences and humanities. Along the way names assigned to ‘ethnographies’ appear to differentiate practices along several dimensions including the nature of the object of study (e.g. institutional, auto), the procedures by which a field is explored (e.g. analytical, walking), and the values and dispositions that are brought to bear on the observed world (e.g. critical, post-structuralist). The intention in the study reported here is to question the extent and means by which different kinds of ethnographies represent different kinds of knowledge practices.

The study excavates beneath surface naming to focus on variation in one particular feature of written accounts that is common across diverse kinds of ethnographies, that of storytelling. The detailed analyses of kinds of stories, their structures, and the meanings construed in their telling and in their positioning in the wider article, draw on dimensions of SFL. Variations in the telling of stories as knowledge practices are interpreted with reference to the dimension of Specialization in LCT as constructing knowledge practices with different strengths of epistemic relations and social relations. The concept of semantic gravity also informs an understanding of the means by which

participants and activities in an observed material world are elevated to a place of significance in a world of academic knowledge and knowers.

To the extent that ethnographies share a privileging of first-hand observation and 'first order constructs of reality' (Geertz 1973) as the basis for legitimate claims about social practices, then all ethnographic studies can be said to correspond to knower codes of specialization (ER−, SR+). Typologically they are positioned in the bottom right quadrant of the specialization plane (see Figure 1.2, page 12). The issue of differences in kinds of ethnographies explored in this chapter is not about categorically different codes but rather about differences within a code, topographically represented by relative differences in strengths of epistemic relations and social relations, and the extent to which these differences within a knower code relate to the nature of the underlying intellectual field.

In the instances of storytelling explored in this study, the events and participants that constitute the basis of the story are observed within a field of practice, an everyday world of some kind, then re-instantiated into a different field, an uncommonsense world of academic research writing. As proposed by many ethnographers, the events of the observed world and the subjective perspectives of the participants who enact them may be given space within the uncommonsense discourse of the research writer. In other than a metaphoric sense this might mean transcription and direct quotation, although this has not been widely observed. More often participants appear to be paraphrased or summarized, without evidence of transcription. Significantly, in neither of the stories analysed in this chapter, nor in those of the broader study to date, can it be said that the voices of participants are assigned a dominant position. The stories are overwhelmingly of the kind that requires the writer to respond to an unresolved event in order to assign a point to its telling. The final word in all instances is that of the academic writer. This is not simply, as Wolf (1992) suggests, that the subjective voices are filtered through the researcher. The point of writing is, after all, to speak to an academic world in an academic voice and to establish the significance of observations in that world. Neither, then, is the ultimate word in the story that of subjective knowledges or commonsense ways of knowing the world. The writers' responses that give point to the tellings encode a higher level of abstraction, whether in epistemological or axiological terms, and often symbolization. In this sense storytelling in accounts of ethnographic research

is not such a radical departure from dominant modes of academic discourse. It is, in this context, an academic knowledge practice. On these grounds claims that the telling of stories counters the objectivity that overrides 'the idiosyncrasies of experience, interest and perspective' (Smith 2005: 43) of participants in the world of everyday knowledge may need to be tempered or questioned.

Beyond the commonality of storytelling, some significant differences have been found in the ways stories are told. Stories may function as evidence for knowledge claims, contributing to a relative strengthening of epistemic relations (ER↑). Stories may function as symbols of values in a hierarchy of knowers, contributing to a relative strengthening of social relations (SR↑). Differences nonetheless are relative, reflecting differences within an overriding knower code. Within the specialization plane of 1.2, page 12, they remain within the knower-code quadrant (bottom right) and the movements represent shifts upwards and rightwards, respectively. In other words, while sharing an overall basis of legitimation, there are significant differences among storytelling practices.

While the focus of this chapter is on current practices in ethnographies, the study also points to how analyses of storytelling can map the evolving nature of 'ethnographic' knowledge practices over time, exploring trends in dominant legitimation codes in the humanities and social sciences. Given the fragmentation of ethnography to date, continuing segmentation is expected, but along what kinds of fault lines? The examples analysed in this chapter, as well as recent literature in the field, give strong indications of a kind of fractal fragmentation. That is, differences *between* the specialization codes of intellectual fields are echoed by homologous differences *within* those codes. Although all 'ethnographies' appear to be knower codes, those situated within knowledge-code intellectual fields (such as many social sciences) are likely to be homologously characterized by stronger epistemic relations and weaker social relations than 'ethnographies' situated within knower-code intellectual fields (such as humanities subjects). On Figure 1.2, a top-left/bottom-right distinction between code will thus be echoed by top-left/bottom-right differences *within* the knower-code quadrant. Hornberger (2009: 335), for example, refers to Hymes' critique of 'all too commonly encountered' ethnographic practices that are 'absurdly reductionist'. For Hymes ethnography constitutes 'descriptive theory' and an approach to

description that is ‘in specific methodologically epistemologically grounded ways’ (Blommaert 2009: 262), that is ‘comparative across space, cumulative across time, and cooperative between analyst and practitioner’ (Hornberger 2009: 335), in other words ethnography that displays relatively stronger epistemic relations than most forms. In contrast, VanSlyke-Briggs (2009: 335), in discussing the ‘dichotomy’ of ‘the literature and the science of ethnography’, associates the former with notions of creativity, evocation, transformation, accessibility, and the latter with notions of tradition, rigidity, limiting, and narrowness.

Significant is the quote from Gallagher (2011: 52) who proposes ‘[s]tory telling not as a place at which to arrive, but as a place to begin inquiry’. At this point storytelling, rather than ethnography, becomes the overarching knowledge practice. The shift from ethnography to storytelling can be traced across a handful of new descriptors noted in recent literature. These include ethnographic fiction, the ethnographic novel, ethnofiction (at which point ‘graphy’ is lost), ghost-writing, literary tales, imaginings, and creative writing (Rhodes 2000; VanSlyke-Briggs 2009; Gallagher 2011). Having reached the position of ethnographer as writer of creative fiction, inspired perhaps but not necessarily constrained by any observation of an observed world, the fractal divisions continue. There is good and bad creative writing. For Gallagher (2011: 51) an ‘*anaemic version of storytelling’ … devoid of imagination*’ will not do. This direction of change in the naming of knowledge practices signals a distancing from any espoused connection to knowledge. It completes the shift of ethnography from social science into the humanities, where it must eventually be discarded in the continued quest for the new that underlies these highly segmented intellectual fields.

7 Enabling knowledge progression in vocational curricula

Design as a case study

Suellen Shay and Diane Steyn

Introduction

By 1994 the legislative barriers that prevented access to higher education for the black majority of South Africa's qualified school leavers had been dismantled. However, from the early days of political transformation it was clear that social and legislative access were necessary but not sufficient conditions for success. In addition success in higher education requires 'epistemological access' (Morrow 2009); that is, students need to gain access to and become participants in an academic practice with its requisite forms of knowledge and methods of inquiry. Thus epistemological access is fundamentally about giving students access to what Young (2008) refers to as 'powerful knowledge'. The concern of this chapter is how vocational curricula can give access to powerful knowledge.

The focus is on a Design Foundation Course (DFC) situated in the extended first year of a Diploma offered by the Faculty of Informatics and Design at the Cape Peninsula University of Technology (CPUT) in Cape Town, South Africa.[1] The Diploma is a three-year, vocationally-oriented undergraduate qualification which sits at entry level of South Africa's higher education qualification framework. This extended first year course offers foundations for students in Interior, Industrial, Graphic, Fashion, Surface, Jewellery Design and Architectural Technology. At the end of the course, students progress to the first year of one of these design disciplines.

The official purpose of the DFC is redress; that is, widening access to

talented and qualified school leavers who, due to the legacy of apartheid education, would have had limited, if any, exposure to design at school. This chapter discusses the studio-work component of the curriculum. This component has two aims: first, to introduce students to foundational or core design knowledge common to the different design disciplines it serves; and, second, to provide students with a clear, experienced-based understanding of disciplinary difference. In spite of its redress purpose, the tacit nature of design pedagogy may in fact disadvantage learners who have not been socialized into the particular forms of knowledge and dispositions required for design. Thus we set out to make more explicit this curriculum's basis of legitimation; in other words, we aim to explore the organizing principles constituting legitimate knowledge.

We take as our starting point the principle that designing curricula which enable epistemological access requires an understanding not only of who students are, their levels of academic preparedness and the pedagogical interventions which facilitate learning but also of disciplinary knowledge and its recontextualization into curricula. In particular we are interested in the challenges of enabling epistemological access to vocational curricula that meet the external demands of vocational or professional practice. If students are to 'crack the code' to success, curriculum designers need to know what that code is. What makes this knowledge special? What is its basis of insight, status and identity?

The studio work component of the DFC curriculum comprises several drawing projects and a series of 17 design projects which students work through over the course of a year. The analysis seeks to expose what principles underpin the selection and sequence of the written briefs of these design projects. For this purpose we construct an analytical framework by bringing together research into design expertise and Legitimation Code Theory. The result is a conceptual framework that accounts for progression in levels of expertise, forms of knowledge, and the cultivation of a designer gaze.

Conceptual framework

The key question that the framework seeks to address is what makes vocational curricula special. Another way to put this is: what constitutes

powerful knowledge in vocational curricula? Conceptions of ‘powerful knowledge’ have been strongly shaped by Basil Bernstein’s metaphors of ‘vertical’ and ‘horizontal’ (2000) and their redescription in terms of ‘verticality’ and ‘grammaticality’ (Muller 2007). Powerful knowledge is associated with ‘verticality’, conjuring images of an upward movement rising ‘beyond the present and the particular’ (Moore 2009: 247) to higher and higher levels of generality and abstraction. Our argument is that while this may be helpful for conceptualizing powerful knowledge in some intellectual fields it may not be the most appropriate characterization of knowledge progression in vocational fields. Central to this argument is the conceptualization of ‘context’ and its relationship to knowledge practices.

The conceptual framework takes as its starting point Bernstein’s model (2000) of the arena created by the ‘pedagogic device’ which theorizes relationships among the field of production (where ‘new’ knowledge is produced), the field of recontextualization (where ‘new’ knowledge is recontextualized into curriculum), and the field of reproduction (where educational knowledge is taught and learned). The model of the pedagogic device alerts us to the transformation of knowledge as it moves across these different fields; for example, how design knowledge produced in the field of professional practice is recontextualized for the purpose of a specific design curriculum. While there is clearly a relationship between the knowledge practices of these different fields, according to Bernstein, recontextualization always involves ‘the transformation of a real discourse into … an imaginary discourse’ (2000: 33). The basis of specialization for these different knowledge practices – their organizing principles and bases of achievement – is not the same. The focus of this chapter is in the field of recontextualization and the basis of achievement in the design curriculum.

In further development of his work Bernstein (2000) sets out to describe forms of knowledge in the field of production. He begins by distinguishing ‘horizontal discourse’ from ‘vertical discourse’, or ‘everyday knowledge’ from ‘coherent, explicit, systematically principled’ knowledge (2000: 157). Within vertical discourse he distinguishes between ‘horizontal’ and ‘hierarchical knowledge structures’. Horizontal knowledge structures characterize intellectual fields where knowledge grows through the accumulation of new approaches, such as literary criticism or much of sociology. Hierarchical knowledge structures characterize fields that grow

through the integration or subsumption of previous knowledge into more general propositions and theories, such as physics.

A further distinction that Bernstein makes for characterizing intellectual fields is that of ‘singulars’ and ‘regions’. Singulars refer to fields that are ‘on the whole oriented towards their own development, protected by strong boundaries and hierarchies’ (2000: 52). The horizontal and hierarchical knowledge structures noted above would be examples of singulars. In contrast to singulars, ‘regions’ are recontextualized singulars ‘which operate in the intellectual field of disciplines and in the field of external practices’ (2000: 52). Regions – medicine, engineering, architecture – face both ways: inwards towards disciplines and outwards towards fields of practice.

One issue central to Bernstein’s distinctions – between the everyday and the systematic, between different knowledge structures of intellectual fields, between singulars and regions – is the relationship of the knowledge practice to its context. There are, however, different notions of context at work in these distinctions and teasing these notions out is necessary for conceptualizing progression in vocational curricula. In Bernstein’s descriptions, horizontal discourses are characterized as context-dependent and vertical discourses as context-independent. The horizontal and hierarchical knowledge structures are characterized as having varying degrees of context-independence. ‘Context’ here is the domain of the empirical: that is, the specific experiences that constitute individuals’ and communities’ day-to-day practices. Bernstein argues that horizontal discourse is ‘segmentally organized’ (2000: 157); in other words, its meanings are context-dependent. In contrast vertical discourses, particularly hierarchical knowledge structures, are related not segmentally but ‘by the integration of their meaning by some coordinating principle’ (2000: 158). They are specialized or legitimated not by experience but by their capacity to integrate experiences ‘to create very general propositions and theories, which integrate knowledge at lower levels, and in this way show underlying uniformities across an expanding range of apparent different phenomena’ (2000: 161). Thus the crucial movement here is from context-dependent to context-independent meanings, from empirical to theoretical generalizations. As noted above this movement has been central to notions of ‘powerful knowledge’ and its importance for vocational curriculum has been highlighted by numerous authors (Barnett 2006; Grubb 2006; Wheelahan 2010; Young 2008).

However, this movement from context-dependence to context-independence is not sufficient to explain progression in vocational curriculum. Progression must also account for its relationship to the contexts of application, of *practice*. Vocational curricula are recontextualized regions. Like their parent regions, vocational curricula 'face both ways'–they have dual allegiances. They look inwards towards the specific academic practices of the discipline and outwards towards the occupational practices of the profession. Bernstein notes that regionalization is likely to entail a 'change of identity towards greater external dependency' (2000: 52). One way in which this external dependency is mirrored in the curriculum is through assessment: that is, the tasks, projects or briefs that attempt to simulate the kinds of things professionals do in the field of practice. Typically in the early stages of the curriculum students encounter tasks that are decontextualized and well-defined, that is, stripped of the complexities of real-world problems. At more advanced levels the tasks become increasingly authentic and ill-defined. Ill-defined problems are open-ended and capable of generating a number of potentially successful solutions. In some cases students are required to solve actual real-world problems. In the case of design this might entail a real client seeking a design solution to a very particular problem. This suggests that progression in vocational curriculum may involve a movement from knowledge practices that are context-independent (that is, simplified and stripped of real-world complexities) to increasingly context-dependent (where solutions are highly specific to a particular problem). We propose that to understand the logic of vocational knowledge practice is to grasp both of these movements: its capacity for increasing conceptual complexity and its capacity to engage with increasingly specialized problem-situations.

To recap, this 'facing-both-ways' phenomenon (Barnett 2006: 153) has three important implications for vocational curricula. First, since these curricula draw from a wide range of disciplines, they may be integrating across different knowledge structures. Friedman (2003) identifies six 'knowledge domains' for design. These reach from the horizontal knowledge structures of, for example, the fine arts, the humanities, the social and behavioral sciences, to the hierarchical knowledge structures of, for example, engineering and the natural sciences. Second, it involves a double recontextualization process. It involves the translation of disciplinary knowledge into curriculum, what Barnett (1996) refers to as 'pedagogic

recontextualization'. Vocational curricula also require that disciplinary knowledge be translated for the purposes of solving particular work-based problems. Third, vocational curricula are explicitly about the formation of a particular kind of knower, a particular 'projected identity' (Bernstein 2000), such as becoming a designer. While Bernstein was clear that knowledge specializes consciousness, the link between knowledge and knower identity was never adequately developed in this work. However, his notion of 'gaze' highlights the acquisition of a particular perspective, a 'particular mode of recognizing and realizing what counts' (2000: 164).

In order to analytically explore the design briefs we draw on Legitimation Code Theory (LCT). LCT extends and integrates Bernstein's code theory, among others, by exploring the organizing principles of knowledge practices (Maton 2014b). This chapter draws on the Semantics dimension of LCT, and specifically the concepts of *semantic gravity* and *semantic density* (see Chapter 1, this volume).

Semantic gravity (SG) conceptualizes knowledge practices in terms of:

> the degree to which meaning relates to its context. Semantic gravity may be relatively stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic gravity (SG+), the more meaning is dependent on its context; the weaker the semantic gravity (SG−), the less dependent meaning is on its context.
>
> (Maton 2014b: 129)

As Maton (2014b: 130) emphasizes, the nature of the context for establishing the strengths of semantic gravity may take a variety of forms depending on the object of study (see also Chapter 2, this volume). For the purposes of exploring the Diploma in Design the 'context' for establishing semantic gravity comprises the context of the practices that give meaning to vocational curriculum. Thus, a move from weaker to stronger semantic gravity is here a progression from context-reduced tasks (SG−) to context-embedded tasks (SG+). Thus, strengthening of semantic gravity is illustrated by the progression of tasks from general to simulated to authentic and finally to the ill-defined problems of professional practice.

Semantic density (SD) is defined as:

> the degree of condensation of meaning within socio-cultural practices (symbols, terms, concepts, phrases, expressions, gestures, action, clothing, etc.). Semantic density may be relatively stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic density (SD+), the more meanings are condensed within symbols; the weaker the semantic density (SD−), the less meanings are condensed.
>
> (Maton 2014b: 129)

As this suggests, the nature of the meanings condensed depends on the object of study. In this research 'semantic density' refers to the degree of condensation of the meanings of terminology, concepts and principles, and means of representation referred to in the briefs. It also refers to the level of visual abstraction required from students' responses to these briefs. The move from weaker to stronger semantic density is progression from the purely descriptive (SD−) to the more symbolic (SD+). This is illustrated, as we shall see below, in the four stages of a visual representation of an insect: from a detailed naturalistic description to a stylized graphic image capable of communicating meaning in a condensed form, for example, a logo which uses analogy to communicate corporate identity.

In Figure 1.3 (Chapter 1, this volume) semantic gravity and semantic density are conceived as axes of the 'semantic plane' that forms a field of semantic possibilities. Each of the quadrants represents a different 'semantic code' or set of organizing principles for knowledge practices. The quadrants of particular interest in this study are *rarefied codes* (SG−, SD−) and *worldly codes* (SG+, SD+), as described by Maton in Chapter 1 (this volume), or top-left and bottom-right, respectively, in Figure 7.1, below. We propose that progression in vocational curricula will be characterized by strengthening semantic gravity and strengthening semantic density. In other words, the curriculum progresses from context-reduced projects to increasingly authentic, complex and occupationally-specific problems. This progressive strengthening of semantic gravity enables the integration of increasingly complex design concepts: that is, concepts with more densely compounded meaning and descriptive power.

We offer the teaching of colour theory as an example of how both semantic gravity and semantic density are strengthened as students move through the briefs of the DFC curriculum. The basic scientific rules of colour theory

(colour mixing and colour contrasts) are introduced early on in context-independent project briefs, allowing for the transfer of these concepts to later projects dealing with colour theory. These later projects are increasingly discipline specific; in other words, they have more complex simulated problems to solve. The aim is to introduce students to the contextual, historical and semantic significance of colour in design. The stronger semantic gravity of these simulated projects provides students with conceptual and experiential understanding of how colour can be used to communicate mood, express emotion, evoke historic styles and define space. The curriculum culminates in a self-portrait project that requires a nuanced understanding of how colour is able to express identity. In this manner the project-based curriculum first introduces and then incrementally compounds layers of meaning into colour theory concepts, thereby strengthening the semantic density of these concepts. Thus, LCT offers a conceptual language to describe the basis of achievement in social fields of practice. This language of description can now be used to analyse the different levels of design expertise, to which we now turn.

Methodology

In order to prepare students for the world of work, studio curricula are traditionally project driven and learning is largely by doing. The intention of these projects is to simulate the kinds of design problems likely to be encountered in the real world of design practice. These simulated projects create opportunities for students to practice visual design by engaging in the creative design process. During this process, different kinds of design knowledge are synthesized to conceptualize and visually communicate solutions to design problems of varying degrees of complexity.

In total 17 studio-work project briefs provided the data for this study. These documents and their sequence make up the material form or ‘public face’ (Barnett and Coate 2005: 33) of what is understood as curriculum by the lecturers involved with its design and implementation. Written project briefs serve the same purpose as instructions for a written academic assignment: they describe the project requirements in a condensed, summary fashion. Written briefs are customarily supported by more expansive verbal and visual presentations that explain the brief in more detail, provide visual

examples and explain or demonstrate new terminology, procedures and techniques. The briefs use a standard template that provides a written description of the project's purpose, the assessment criteria and the suggested procedures. They may also contain images and diagrams to aid understanding.

In order to analyse these briefs a 'translation device' was developed for enacting the LCT concepts within this specific object of study (see Chapter 2, this volume). This brought together levels of design expertise (Cross 2004; Lawson 2004; Dorst 2008) with semantic codes. The full study (Steyn 2012) also included the use of specialization codes to analyse the development of different designer identities, though that analysis is not included here, for brevity. Nonetheless, given the importance of the designer identity, throughout the analysis we note (without further elaboration here) the cultivation of the designer's 'gaze'; i.e. that what Maton (2010) refers to as a 'cultivated gaze' where 'legitimacy arises from dispositions of the knower that can be inculcated' (Maton 2014b: 95).

Design researchers (e.g. Cross 2004; Lawson 2004; Dorst 2008) have adapted and extended Dreyfus' (2004) work on expertise to describe how the designer's capacity to practice design by solving design problems develops in the following stages or levels: novice, advanced beginner, competent, expert and master. While their work seeks to identify and describe distinct approaches to problem solving at each of these levels, the kinds of design knowledge required at these levels remain largely implicit. For the purpose of the analysis these levels are redescribed accounting for the design knowledge required for projects at each of the levels. Figure 7.1 visually illustrates the levels as a progressive strengthening of the semantic gravity and the semantic density of design knowledge. It also illustrates the gradual cultivation of a design gaze.

Since the focus of this study is the project-based curriculum of a foundation course, our analysis will be restricted to these first two levels, the novice and advanced beginner. However, other levels warrant brief mention because they describe the trajectory of the development of design expertise and gaze that have implications for curriculum planning. Awareness of features of more advanced levels would also enable the identification of ill-sequenced projects which are cognitively too advanced and consequently not level-appropriate for a foundation curriculum.

Naïve

This level, introduced by Dorst (2008) and not part of Dreyfus' original model, recognizes that design is not the preserve of professionals but is employed by ordinary people as part of what Bernstein (2000) termed horizontal discourse. This level is distinguished by mimicry of existing design solutions and is the one students return to when they fail to engage with the creative design process. It falls outside the scope of this study but is relevant since it marks the start of the process of developing design expertise and cultivating a specialized gaze.

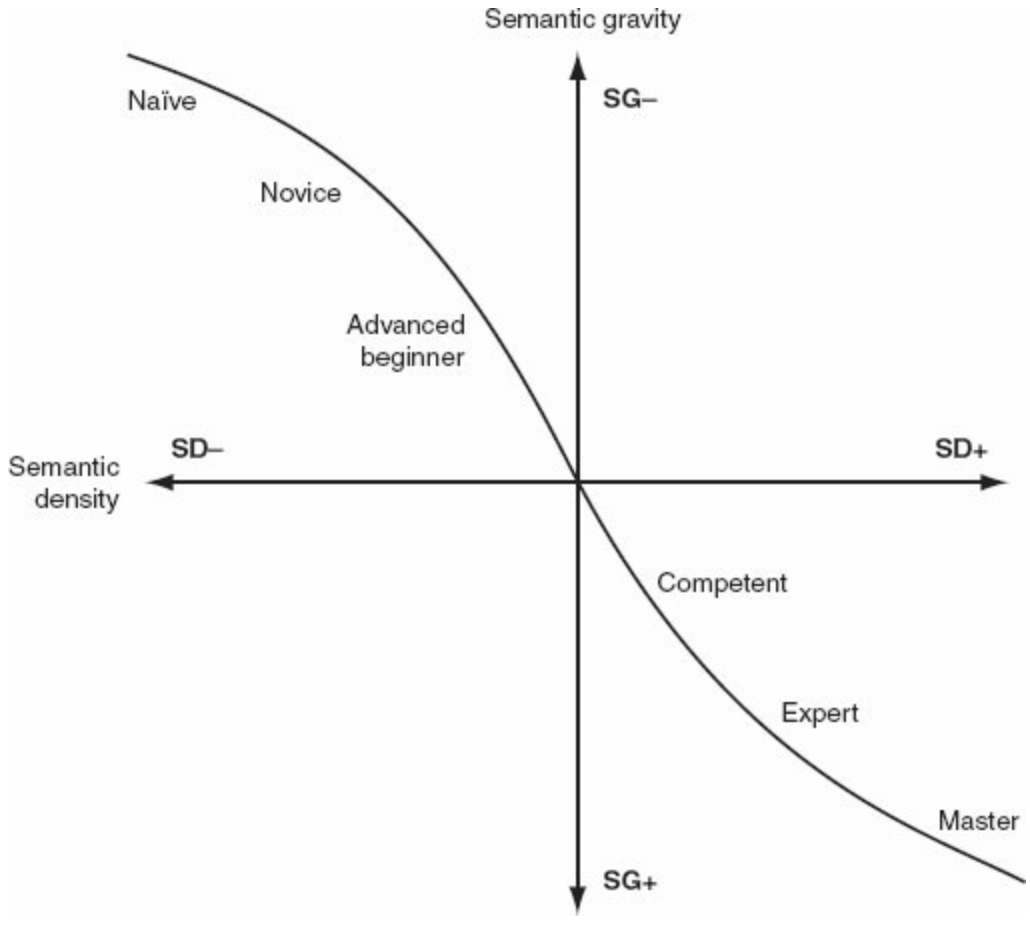


Figure 7.1 Progression of levels of design expertise across the semantic plane.

Novice

Unlike naïve designers, novices engage with the design process. Problem solving requires no prior knowledge, is largely rule-based and involves reflecting on *how* to use specified techniques and methods of representation (Dorst 2008). At this level students begin to acquire what Lawson (2004: 456) refers to as the 'design domain schemata': core disciplinary knowledge related to aesthetics, semantics, function, technology, the design process, and various techniques and methods of visual representation and communication.

Projects best suited to novice-level problem solving appear to be those which favour well-defined, context-independent problems. These problems allow students to focus on the acquisition of core disciplinary knowledge and basic techniques of representation. The focus or intention of these briefs is thus to facilitate the acquisition of design knowledge characterized by weaker semantic gravity and which is thus transferable between different design contexts.

Advanced beginner

Problem solving at the advanced beginner levels is situation-based (Dreyfus 2004; Dorst 2008). Designers at this level are increasingly able to recognize both the contextual significance and complexity of design problems. They are able to grasp how parts relate to a whole and how these parts both structure and are structured by the whole. Here the concern is not just with *how* to apply knowledge and methods but with *when* and *which* methods to apply to solve situated design problems (Dorst 2008).

Projects suited for advanced beginner problem solving appear to require the possession of some prior design knowledge to build on (Dorst 2008). Prior knowledge may include knowledge of design principles, processes and precedent. According to Lawson (2004: 456), developing a 'growing pool of precedent' is one of the primary requirements of this level. Precedent refers to examples of existing design solutions, for example consecrated work from the canon that can be used as points of departure, or scaffolding, for creating original work.

The external constraints and affordances provided by the simulated contexts of advanced beginner projects generate increased opportunities for strengthening the semantic density of design terminology and concepts. The greater authenticity of simulated design problems also calls for knowledge of

more specialized materials, techniques and methods of representation and fabrication. The more ill-defined nature of situated advanced beginner problems opens up more opportunities to exercise choice and creative imagination. These problems offer a wider range of potential design solutions than would be possible for rule-based novice-level problems. At this level designers start to develop their own experience-based 'design prototypes' (Dorst 2008: 9): more distinctively personal ways of responding to design problems. In short, advanced beginner project provide more opportunities to evoke and cultivate a specialized gaze.

Competent

At this level, design problem solving shifts significantly from reactive to increasingly strategic and reflective (Dorst 2008). Designers are able to strategically select and order information by drawing on their own embodied prototypes and experience of design practice, as well as their knowledge of relevant precedent. This capacity to discern a hierarchy of importance in design situations suggests considerable development of a specialized gaze. Projects requiring this level of self-directed problem solving would be the norm in third year design curricula since achieving competence, under supervision, is a prerequisite for postgraduate studies or for graduating and entering the world of work.

Expert

The seemingly intuitive problem solving ability of experts is based on embodied knowledge gained through experience of sustained practice. Rather than solving problems, experts simultaneously recognize the familiar patterns or 'problem types' (Cross 2004: 432) of their domain and match these problems with suitable, frequently routine solutions (Dorst 2008). Expert designers are often sought out for *who* they are and for the distinctive 'guiding principles' that inform their work (Lawson 2004: 456).

Master

The master is an expert who creates innovative as opposed to routine

responses to the typical problem types of their domain. Masters use their guiding principles to initiate and oversee the creation of work which represents new knowledge in the field, gets published and/or establishes new precedents for other designers to learn from – a form of 'practice-based research' (Dorst 2008: 9).

As Figure 7.1 illustrates, we argue that the development from novice to master represents at each level an incremental progression towards context-dependent discipline-specific briefs – strengthening semantic gravity – and an incremental condensation and compounding of meanings in design concepts and principles – strengthening semantic density. This condensation of meaning is the result of the experience of practice and a growing knowledge of precedent, which can be drawn on to inform increasingly self-directed and value-driven design choices. Unlike the intuitive, untrained gaze of the naïve designer, the seemingly intuitive gaze of the expert requires conscious cultivation through sustained exposure to and experience of disciplinary knowledge and practice.

Analysis

Against the backdrop of this analytical framework, we have selected four of the seventeen projects to demonstrate the progression of knowledge and the cultivation of a design gaze. The four projects are: Less is More (P1), the Tile (P5), the Bag (P6) and Jewellery (P15). The project numbers indicated in brackets refer to their sequence in the curriculum. Figure 7.2 reveals the sequence of the projects in terms of their level of expertise and increasing semantic gravity and semantic density. The findings reveal a mismatch between the sequence of the projects in the curriculum and the progression of knowledge and the cultivation of gaze. We now turn to the analysis of the projects. All quotations in the analysis below are excerpts from the project briefs. For a fuller report of the analysis, see Steyn (2012).

Less is More

The Less is More (P1) project introduces the core design principle of visual abstraction. This entails translating 'a naturalistic drawing of an insect', rendered tonally in pencil, into three 'graphic images' by means of three

processes of visual abstraction: simplification and stylization, the use of positive and negative shape and the selection of a part to stand for the whole. These graphic processes are all a form of visual précis that incrementally transform a descriptive image of an insect into a graphic image able to communicate information about the characteristic appearance of the insect in a visually condensed form.

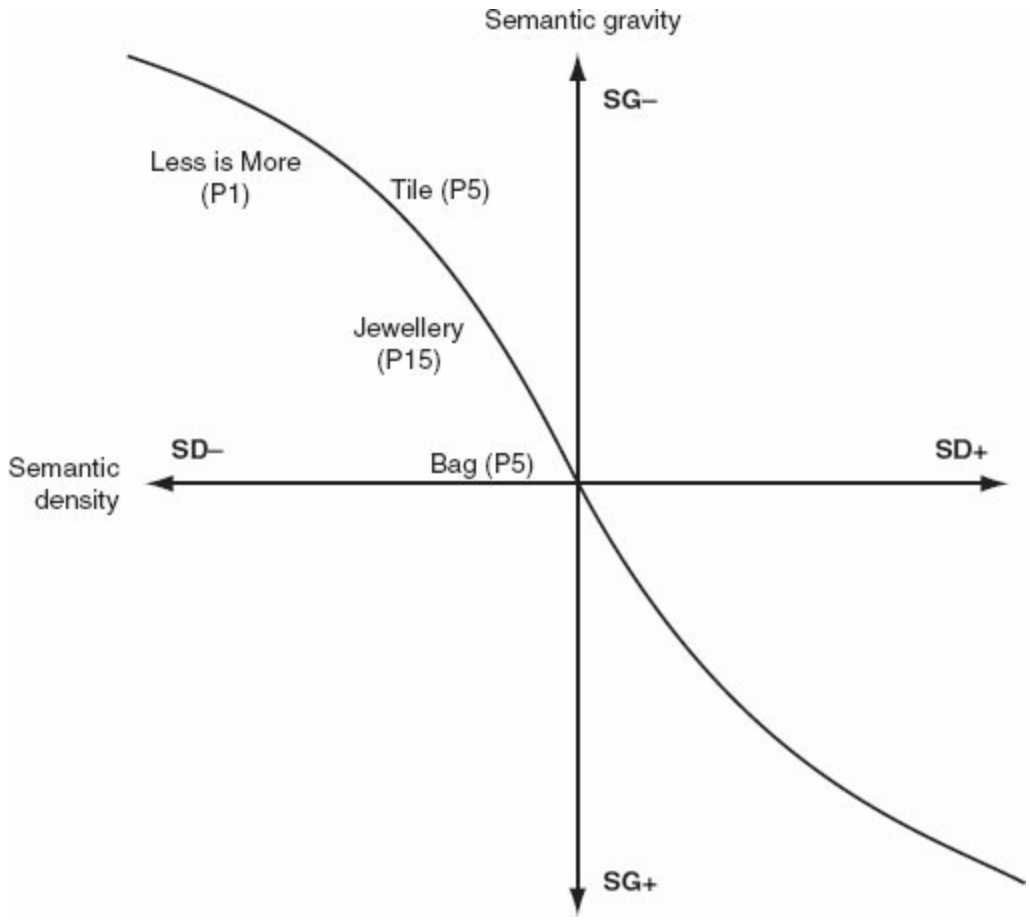


Figure 7.2 Progression of projects across the semantic plane according to their required levels of design expertise.

Although this is a graphic design project, it introduces core concepts and terminology of design shared by all design disciplines. Knowledge of the elements and principles of formal visual language and their potential to communicate meaning, provide designers with the vocabulary to communicate about, reflect on and evaluate both their work and the work of others. Figure 7.3 is an example of the four steps of the Less is More project

and is used here to support the analysis.

The first step of this project requires a ‘carefully rendered pencil drawing’ of a black and white photograph of an insect. This calls for careful observation and recording of form, of proportion, of part–whole relations, of different tonal values, of line and texture. The brief furthermore introduces the concept of the figure–ground relation by requiring students to ‘pay special attention to composition’ by being ‘aware of how the image is placed within the (square) format’. The second step of the project requires translating the pencil drawing into a ‘graphic image by simplifying the forms of the insect’ and ‘extracting essential information from the carefully rendered pencil drawing working in black khoki, using contour line’. The resulting simplified image is then further simplified in step three by ‘focusing on the negative shapes in black’, leaving the positive shape of the insect white. The final step requires selecting a small part of the preceding image to represent the whole whilst ‘retaining the essence of the insect’.

Considering the graphic design project as a whole, the main purpose of the project is to introduce core terminology and principles of formal visual language by means of a series of exercises in visual abstraction. These exercises do not lead to the design of a particular product with a specific purpose or end-user in mind. Rather, the content and purpose of the project remains general and relatively context-independent; in other words, its semantic gravity remains relatively weak. The intention is to enable the core design principles to be transferred to subsequent projects irrespective of their disciplinary specialism.

Figure 7.3 Example of the ‘Less is More’ project.

Although the four steps of the project provide evidence of increasing semantic density as meaning moves from detailed description to a visually condensed graphic image, the semantic density of the project itself is

relatively weak. These images are not required to communicate additional layers of meaning related to an external context. For example, at a later stage these generic principles of stylization and simplification could be put to work to create a logo. Logos are graphic images of potentially stronger semantic density that use analogy to represent multi-layered brand identities of companies or organizations, such as a bee to represent the efficient service of a courier company, an elephant to signify the strength of cement, or an umbrella to represent insurance cover.

The project thus appears to be appropriate for the novice level: it does not require prior knowledge to complete. It requires adherence to strictly prescribed steps and procedures, suggesting the completed projects would be similar but not identical in appearance. It requires the capacity to *see* – to observe and record accurately and to simplify and condense visual form. Having an 'eye' is a prerequisite for acquiring the cultivated gaze of a professional designer. However, the primary intention of this first project of the curriculum is making the tacit process of perception, selection and visual abstraction more explicit. The project provides the students with some of the vocabulary and principles of design knowledge required to communicate their design intentions, both visually and verbally, to themselves and to others.

The Tile

The Tile (P5) is an Industrial design project and the first to move from two into three dimensions. It is also the first to provide students with a simulated real world problem to solve. It requires that students design and make a positive for producing monochromatic, low relief ceramic tiles intended for use as a decorative border pattern. A positive is required for making a 'negative' or hollow mould for producing multiple identical forms. The Tile project consists of two interrelated parts. The first uses prior knowledge of repeat pattern 'as a point of departure for designing a low relief border pattern'. The second requires understanding the principle and purpose of a positive. Figure 7.4 illustrates three identical low relief units constructed out of card to simulate what these tiles may look like when placed alongside one another to create a directional border pattern.

The project brief requires the design of a directional, mono-chromatic

border pattern which is loosely based on a previously completed, multi-coloured repeat pattern. The brief stipulates the format and dimensions of the identical units which constitute the low relief pattern. The project's intention is that form be defined by 'the skillful use of different levels and the transition between these levels'. In doing so, the projects provide students with another opportunity to use their prior knowledge of design principles of 'contrast, harmony, balance and rhythm' and so to deepen their understanding of these design concepts.

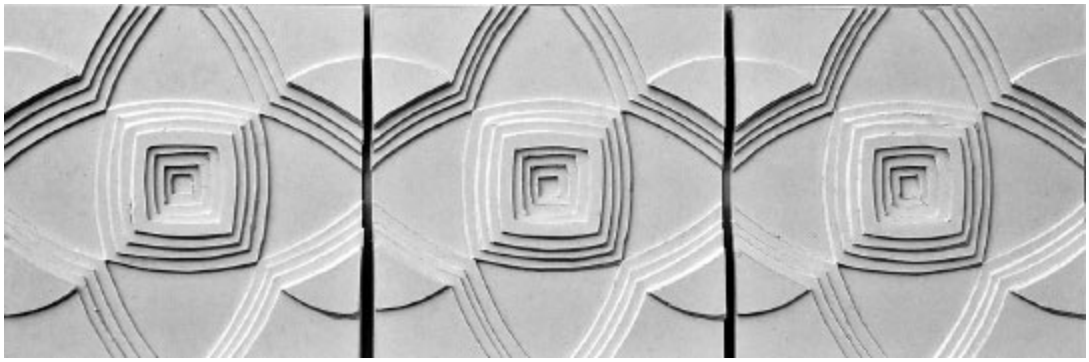


Figure 7.4 Example of the Tile project.

The simulated nature of the problem also requires consideration of the constraints and affordances provided by additional design elements such as form, light and shallow space. Both the acquisition of new and the reiteration of prior knowledge of design elements and principles extend the descriptive power and conceptual reach of formal visual language by layering and compounding their meaning. The intention of this reiteration is to further strengthen the semantic density of these design principles and terminology. Furthermore, the more ill-defined nature of the Tile project provides increased opportunities for generating potential design solutions. Designing the low relief border pattern requires aesthetic judgement and imagination, but cultivating a specialized gaze is not the only basis of achievement of this project. What matters equally is the acquisition of more discipline-specific technical knowledge of the explicit principles governing the production and use of positives.

The second part of the Tile project introduces more context-dependent knowledge related to positives and the use of moulds for producing three-dimensional objects in multiples. Moulds can be used for manufacturing

anything from plastic toothbrushes to the giant brass propellers that power ocean liners. Understanding the principles that govern the design and making of positives requires knowledge of part–whole relations as well as knowledge of more specialized materials and procedures. For example, the brief suggests working ‘from larger to progressively smaller layers’ to prevent undercuts and reminds students that ‘the design is for a ceramic tile and that design elements that could structurally weaken the tile should be avoided’.

The simulated design problem and the knowledge of specialized materials and procedures required by the brief result in a design situation which is more complex and discipline specific than one primarily concerned with solving general, context-independent problems. The project requires aesthetic judgement and imagination to complete, signalling further cultivation of a gaze. Its primary intention, however, is to enable acquisition of the general principles governing the production and use of positives. So while semantic gravity is strengthened it remains weak enough to enable transfer to other similar design contexts, as will be illustrated below by the Jewellery project. Again, as with the Less is More project, this appears to be appropriate to a novice-level project.

Jewellery Design

The Jewellery Design project (P15), like the Tile, is an example of a simulated real-world project, but one that differs in its degree of ‘authenticity’. Unlike the card representations of ceramic tiles, this project requires the manufacture of actual artifacts, strengthening semantic gravity considerably. The project requires the design and manufacture of earrings, a pendant and a ring, examples of which are illustrated in Figure 7.5.

The first part of the project calls for the design, illustration and fabrication of a ‘pair of [chandelier] earrings and a pendant’ with a ‘chain’, for a ‘client’ who ‘loves pattern and stained glass windows’ and whose ‘only requirement is that it has some movement and some beads (colour) in it’. The requirement to use examples of precedent from the canon (stained glass and pattern) and the discipline (chandelier earrings and pendant necklaces) as points of departure for original work strengthens semantic gravity and situates this project firmly within the disciplinary context of Jewellery design. The second part of the project calls for creating a design for a signet ring that contains ‘a

letter from the Latin alphabet’. Fabricating the ring requires carving a three-dimensional positive of the ring out of wax for casting the ring in solver, ‘which will then be cast in silver’.

Figure 7.5 Examples of the Jewellery project.

Both parts of the Jewellery project introduce students to a range of specialized materials and techniques of fabrication for the first time. These techniques include piercing and cutting sheet metal, bending wire to make components of chains, earring sections and jump rings, incorporating colour by means of beads and carving a positive out of wax for casting a ring in silver. Creating wearable, comfortable jewellery furthermore entails considering size, weight and proportion in relation to the human body. This context-dependent knowledge strengthens semantic gravity considerably. At the same time the creative design of the earrings, pendant and ring rely on and reiterate conceptual and procedural knowledge introduced in previous projects: principles of formal visual language relating to part–whole relations and the concepts of a positive, low relief and simplification and stylization. This reiteration of prior design knowledge of fundamental design principles

strengthens the semantic density characterizing this knowledge by extending their descriptive reach and compounding their meaning.

The Jewellery project requires the use of specialized materials as well as context-specific historical and disciplinary precedent to complete successfully. In other words, finding aesthetically pleasing and technically sound solutions to the brief requires a degree of insight into the situated nature of the design problem. As the fifteenth project of the curriculum, it also relies on prior knowledge of design principles and concepts to complete. As such it appears to be well-suited for the advanced beginner level. Finally, the project is ill-defined enough to allow for many potential design solutions. It provides ample opportunities to evoke gaze by requiring the imaginative integration of all these design knowledges into original pieces of jewellery, in accordance with the stylistic and aesthetic criteria provided by the 'client'.

The Bag

The Bag project (P6) is a Fashion design project and the first in the curriculum requiring the fabrication of an artifact from start to finish. As can be seen in the example provided in Figure 7.6, the project entails constructing a satchel-like bag from fabric and designing and making a personalized cover for it. This process requires knowledge of specialized procedures and techniques particular to fashion design, such as understanding how to use a pattern, an industrial sewing machine and decorative hand stitching techniques to construct and embellish a bag. The specialized nature of these knowledges strengthens their semantic gravity considerably.

The cover of the bag has to be rendered using a choice of 'different forms of applied decoration' and fabric embellishment techniques such as 'appliqué, beadwork, embroidery, quilting' or 'found objects, stencils and photo transfers'. The cover's design provides an opportunity to apply prior design knowledge, calling for students to 'apply the element and principles you have already worked with in previous projects'. However *how* students apply this knowledge is not specified and left for them to decide; for example, the use of colour and the number and type of embellishment techniques are a matter of personal choice. The ill-defined context and content of the cover's design, that requires only that it be 'inspired by [their] own interests', calls for a level of strategic problem-solving capacity

associated with that of the advanced beginner bordering on the competent. The open-ended nature of the design problem assumes prior knowledge of the design principles, the discipline-specific techniques and the problem types of fashion design briefs. As such the project calls for a relatively developed cultivated gaze to complete successfully.

However, the positioning of this project so early (sixth) in the curriculum sequence is problematic given that there has been little opportunity for students to acquire the requisite problem-solving capacity, disciplinary knowledge and gaze. The design of the bag's cover effectively requires students to rely on their untrained visual aptitude and/or their prior knowledge and experience of design to successfully complete the first complex composition project of the curriculum. Students with such prior knowledge and a more cultivated gaze, gained through prolonged experience in design in other contexts, would probably enjoy the wide choice of potential solutions offered by this project. They might respond to it with creativity and imagination. However, those students lacking the requisite experience and prior knowledge may have difficulty grasping the largely tacit criteria of the project.

Figure 7.6 Example of the Bag project.

This analysis suggests that the Bag project is not level-appropriate: it is positioned too early in the curriculum sequence. The project demonstrates what Maton (2009) refers to as a clash between curriculum aims and means, where achievement depends largely on a student's pre-existing gaze and design knowledge rather than on taught design principles. This mismatch may inadvertently privilege some students over others. It may even set some students up for failure. This is why sequence matters in design curricula.

Conclusion

Analysis of the project briefs confirms that the content of novice-level projects is general and independent of discipline-specific contexts. The purpose of these projects is to introduce core design knowledge and procedures and to begin the process of cultivating a design gaze. Figure 7.2

shows that although the projects are strengthening in semantic gravity and in semantic density from the novice to the advanced beginner levels, the organizing principles of the curricula still exhibit relatively weak semantic gravity and semantic density. This potentially enables core (but as yet not complex) design knowledge to be transferred between projects.

The analysis also confirms that projects suited to advanced beginner level provide content of varying levels of specialization and discipline-specificity. The specialized contexts of these briefs have the capacity to generate simulated design problems with more complex and context-dependent affordances and constraints. This in turn calls forth more specialized disciplinary knowledge and a cultivated gaze to solve these situated design problems. These more complex design problems provide opportunities for abstract design concepts and principles to be unpacked.

As illustrated in Figure 7.1 the levels of design expertise progress from a *rarefied code* of weaker semantic gravity and semantic density into a *worldly code* of stronger semantic gravity and semantic density as they reached 'competent'. Undergraduate students in this Diploma are unlikely to progress beyond competence since considerable time and experience is required to acquire the expert's capacity for intuitive problem solving. However, we predict that the conditions suitable for advanced beginner level will equally apply for all subsequent levels of design knowledge progression. In other words, the strengths of semantic density and semantic gravity will progressively both increase, culminating in self-directed, practice-based research. Thus the conceptual framework enables not only description and explanation but prediction of the code conditions for different kinds of curricula.

We began this chapter with a concern for how curricula can give students epistemological access to powerful knowledge. This study reveals not only the kinds of knowledge and cultivated gaze that are valued by the DFC curriculum but the conditions for progression. The findings demonstrate the significance of sequence and illuminate how potential mismatches between curriculum aims and means can be prevented through careful sequencing of level-appropriate briefs. The findings also have significant implications for assessment as they bring to light the often implicit values which inform the recontextualizing gaze of curriculum planners. This can in turn translate into clearer, more explicit criteria for what kinds of knowledge matter most in

particular design contexts. The ultimate goal is for students to grasp the realization and recognition rules (Bernstein 2000) of design discourse, thus empowering them to become part of a new generation of visually literate, productive design innovators.

What can we generalize from this design case about what makes the knowledge of vocational curricula special? From this case we shall draw out four principles that represent conjectures to be explored in further empirical research. First, not only do vocational curricula require conceptual knowledge (Wheelahan 2010; Young 2008), but progression also entails increasing complexity of this knowledge. What this increasing complexity entails will vary by field and its underpinning knowledge structures. Given that vocational and professional curricula are recontextualized regions the conceptual knowledge base, as noted earlier, may span a range of different kinds of knowledge – from the hierarchical structures of natural sciences to the horizontal structures of social sciences. Thus complexity may entail increasing levels of integration across different kinds of knowledge. The analysis gave some insight into what increasing semantic density looks like in a design curriculum. The question for further exploration is what does increasing semantic density look like in the vocational curricula of other fields.

Second, the design case study highlights that curriculum progression involves engagement with problems of increasing contextual specificity. These are characterized as problems that move from general to simulated to authentic. General tasks are de-contextualized and well-defined: that is, stripped of the complexities of real-world problems. Increasingly authentic tasks are ill-defined, problems that are open-ended and capable of generating a number of potentially successful solutions. A question for further exploration is the extent to which this movement from context-independence to context-dependence – increasing semantic gravity – characterizes progression in other vocational and professional curricula.

Third, the design case illustrates a contextually coherent curriculum: that is, the tasks select and integrate across different forms of conceptual knowledge according to the demands of context-specific problems of different design disciplines. It is the demands of practice that inform the selection, sequence, pacing and evaluative rules. Furthermore it is the engagement with the particularity of the problem that enables, indeed

advances, the capacity for conceptual development. In theoretical terms this means that strengthening semantic gravity helps in turn to enable the strengthening of semantic density, rather than the other way around. An interesting question would be to explore the organizing principles underlying vocational and professional curricula which lie on different points of the contextual/conceptual continuum.

The fourth principle is only alluded to in this chapter but developed more fully in the study (Steyn 2012). The design case illustrates how different knowledge practices specialize consciousness or cultivate a particular cultivated gaze: the gaze for fashion is not the same as that of industrial design. The sequence of the curriculum and, perhaps more importantly, the forms of pedagogy need to ensure the development of this gaze, this professional identity. Further empirical work is needed to explore the relationship between knowledge progression and the cultivation of the gaze.

This chapter is a contribution to a growing body of scholarship that draws on the work of Bernstein and LCT to reveal what makes different forms of knowledge in curriculum special. There have been calls for research into the relationship between knowledge structures and 'curriculum structures' (e.g. Maton 2009; Maton and Muller 2007). Central to this debate is the metaphor of 'verticality', a term coined by Muller (2007) to describe how new knowledge is produced and how it grows. As noted above there are fields where knowledge grows hierarchically through higher-order generalities and those where knowledge grows horizontally through development of new 'languages' or theory. Either way, the argument goes, these 'vertical discourses' have their basis of legitimation in their rise above particularity to increasing levels of generality. As Moore (2009: 148) describes, it is abstraction that 'drives up the power of knowledge'. There is a notion in Moore's argument of competence that has as its condition rising 'beyond the present and the particular', and 'context transcending dialogue moving in the dimension of the vertical' (2009: 247). While this may be helpful for conceptualizing verticality in some intellectual fields, the design case provides evidence that this may not be appropriate for the characterization of verticality in all fields. What the design case illuminates is a different kind of 'verticality'. This is not a verticality that is 'powered up' towards greater abstraction only but rather knowledge growth that requires a deep engagement with its context, with particularity, with specific problems and in

the process transforms consciousness and identity. This is the powerful knowledge that our students will need to gain epistemological access into their chosen fields of study.

Note

1 This chapter is about the course at the time of study in 2010–2011. There have subsequently been a number of changes to the course including its name, scope and purpose.

8 Secondary school English literary studies

Cultivating a knower code

Frances Christie

Introduction

School English is compulsory in most English speaking countries up to the last years of schooling, providing evidence for its status as a subject of significance. In practice, school English has several components, for, like the university studies from which it derives, it exhibits a 'horizontal knowledge structure' (Bernstein 2000), with segmented and often incompatible areas of interest (Christie 2012; Christie and Macken-Horarik 2009, 2011). These include, for example, school English literary studies (henceforth SELS), essay writing about social issues, discussion of visual images including films, or producing speeches and other oral presentations about various topics. In addition, in many jurisdictions, such as the Australian state of New South Wales (NSW Board of Studies 2015), there are available units of study beyond compulsory units, for interested students to pursue an expanded range of literary texts or engage in creative writing of stories or poems. My concern here is with papers common to all students in the last years of secondary schooling and, specifically, the literary component examined in these papers. I explore SELS because, despite the range of areas now taught as subject English, literary studies appears to have enduring value. Curriculum documents on official websites across the Anglophone world reveal that, though often proposing a range of texts, what some call the 'literary canon' or 'literary heritage' remains well established. Why does SELS receive such continuing attention? What constitutes success in SELS? How can we characterize the knowledge practices of SELS?

I argue that a reading of questions set in SELS in senior years reveals that,

while students are apparently asked to develop ‘personal opinions’ about literature, in fact they are required to express judgements shared with the imagined examiner. A shared set of culturally-valued understandings about life and human behaviour is what is at issue. To express such understandings students must acquire an appropriate ‘gaze’ on the story. ‘Gazes’ vary in nature depending on the subject of inquiry (see Maton 2010, 2014b). With SELS the ‘gaze’ involves the cultivation of a particular attitudinal stance towards a literary text and a set of procedures for its expression. Successful adoption of this ‘cultivated gaze’ (Maton 2010) is expressed as a capacity to articulate moral positions and principles by reference to the literary text. The pedagogic discourse of the SELS classroom helps to construct the gaze, whose cultivation takes years of schooling.

In developing this discussion I draw on Legitimation Code Theory (LCT), specifically concepts from the dimensions of Specialization and Semantics (Maton 2014b), to examine the organizing principles of knowledge practices in SELS. First, I draw on *specialization codes* to explore the gaze underpinning achievement. Maton (2014b; Chapter 1, this volume) defines four principal specialization codes: *knowledge codes* (emphasizing specialized knowledge, principles or procedures and downplaying attributes of actors as the basis of legitimacy); *knower codes* (downplaying specialized knowledge and emphasizing attributes of actors, such as cultivated dispositions); *élite codes* (where legitimacy is based on both); and *relativist codes* (where ‘anything goes’). In this chapter I am concerned with exploring developmental trajectories in the cultivation of a knower code. SELS foregrounds personal attitudes and the expression of appropriate values as the basis of achievement. As students successfully adopt this knower code they learn to read and interpret contextual details found in literary texts, going on to establish a principle, an ethical stand or perhaps a human truth. The experience involved is in some sense transformative in that the aim is to discuss how the literary texts ‘reveal’ or ‘demonstrate’ truths about the human condition. To achieve this students must move between the immediate details in texts and their responses and interpretations, affording a more abstract significance as a moral position or principle. The shift in meaning is thus from the more situated to the more symbolic and such shifts are realized in changes in the language of the written texts students produce in responding to literature.

I thus explore the development of a cultivated gaze by tracing shifts in meanings along two dimensions: within texts in the flow of meanings across extracts of the writing of individual students; and across years of schooling in samples of texts from early, mid and late adolescence. To argue that there is developmental progress in the manner in which the texts are organized and meanings and attitudes are expressed, I draw on systemic functional linguistics (Halliday and Matthiessen 2004; Martin and Rose 2007). These findings are then interpreted with respect to concepts from a second dimension of LCT, Semantics, and specifically *semantic gravity* and *semantic density* (Maton 2013, 2014b). As defined by Maton in Chapter 1 (this volume), semantic gravity (SG) refers to the context-dependence of meaning, where stronger semantic gravity (SG+) denotes meaning is more dependent on its context and weaker semantic gravity (SG−) denotes meaning is less dependent on its context; and semantic density (SD) refers to the degree of condensation of meaning, where stronger semantic density (SD+) denotes more meanings condensed and weaker semantic density (SD−) denotes fewer meanings condensed. One can also describe strengthening and weakening both semantic gravity and semantic density (SG↑↓, SD↑↓).

Achieving mastery of the necessary language for successful participation in the knower code of SELS can be traced across years of secondary schooling and is an especially important aspect of schooling in the years of adolescence, not least because it is compulsory. A significant value attaches to the study of literature for its apparent role in development of ethically responsible persons. To demonstrate the point I shall consider several SELS questions set for students at the senior public examination level in different countries, drawing attention to how these actively elicit and cultivate culturally valued interpretations of, and judgments about, literary texts. I then consider extracts from three texts written by students from early to late adolescence and explore how, as students develop and mature, aspects of their language develop to achieve the necessary gaze for SELS.

Eliciting responses to English literature

Consider, for example, the following three questions on Shakespearean plays, all set in 2010, the first from the New South Wales Higher School Certificate Standard English paper, the second from the South African National Senior

English Certificate, and the third from the New Zealand Senior English paper. Any italicized text is from the original papers; I have underlined wordings that suggest the ways students' responses are invoked.

> *The Merchant of Venice* [extract removed]
> How does this extract from *The Merchant of Venice* introduce us to the *important ideas* in Shakespeare's play? In your response, make detailed reference to your prescribed text.
>
> (Reproduced in Dixon and Simpson 2011: 155)

> *Othello*
> Othello and Iago are more alike than most people imagine. If it were not so, Iago would not be able to manipulate Othello into becoming a bloodthirsty killer, obsessed with revenge. Discuss the extent to which you agree with this statement.
>
> (South African Department of Basic Education 2010: 18)

> *Othello*
> "The plays of Shakespeare move us because they present us with realistic depictions of what it means to be human." Use Othello to focus a discussion on the extent to which this is true. You may confine your discussion to Othello or include other Shakespearean plays you have studied.
>
> (New Zealand Qualifications Authority 2010: 3)

Finally, the following two questions are drawn again from the Australian state of New South Wales, where they both appeared in the Higher School Certificate Standard English paper in 2006 and 2009:

> *Wilfred Owen*
> In what ways does the poet Wilfred Owen draw you into the world of his poetry? In your response make detailed reference to at least TWO poems.
>
> (NSW Board of Studies 2007: 13)

> *Belonging*
> Understanding nourishes belonging…. A lack of understanding prevents it. Demonstrate how your prescribed text (i.e. the poem *Immigrant Chronicle*

by Strzynecki) and ONE other related text of your own choosing represent this interpretation of belonging.

(Dixon and Simpson 2011: 66)

Two general matters emerge from an exploration of these questions. The first is the constant requirement that students offer what is to be a personal response, where this is sometimes referred to in terms of what 'you' feel and elsewhere to what 'we' feel. A shared response is sought and a shared comprehension of the issues is assumed, indeed fostered. The second is that questions typically start with a reasonably categorical proposition about the selected text, where students are to elaborate on this in terms that endorse the values involved: 'Othello and Iago are more alike than most people imagine', 'The plays of Shakespeare move us because they present us with realistic depictions of what it means to be human', 'Understanding nourishes belonging'. All such statements are strongly assertive of their value positions and not readily open to qualification. Even the wording of the question concerning Owen's poems assumes general endorsement of the claim made about them: 'In what ways does the poet Wilfred Owen draw you into the world of his poetry?'. It would be a rare student who would argue a poet did not draw him or her into the world of his poems. Overall, SELS requires a personal response expressed by reference to literary texts, though a strong moral imperative applies, shaping the nature of that response towards adoption of the values represented in the texts.

As noted earlier, the cultivated gaze of a knower code is generally not explicitly taught, its nature more often hidden behind generalizations about the importance of developing personal or individual self-expression and opinion in dealing with literary texts. The gaze is, however, revealed in analyses of the wording of examination questions such as those above and in analyses below of a sample of students' written texts deemed successful. Furthermore, as the latter will show, the processes of cultivation last for some years of schooling as students learn to shape their responses, shifting between contextual details in literary texts and symbolic understandings achieved by reference to them.

The three student texts considered in this chapter were written respectively in early adolescence, mid adolescence and late adolescence. All deal with abstract experience and themes, the first to do with racism, the second with

the importance of an innocent child's love, and the third with the human need for belonging, all as expressed in different literary pieces (though the third also involves films). Though control of literacy commences in the primary years, it is in the years from late childhood through adolescence that young people achieve an appropriate control of mature written language, including control of a repertoire of expressions of evaluation. This involves moving from the relatively simple grammatical constructions of childhood used for building much commonsense knowledge towards mastery of an expanded set of grammatical resources used to create texts that enable the building of 'uncommonsense' knowledge (Christie and Derewianka 2008). The uncommonsense knowledge of SELS, I shall argue, concerns interpretation and evaluation of human behaviour as expressed in literature.

Learning the SELS gaze in early adolescence

Text 1, by a boy of 12–13 years of age, was written as a talk to be given to the class. He had been asked to present a book review and he chose Mark Twain's *Adventures of Huckleberry Finn*.[1] In the interests of space, I shall reproduce only extracts from the text. In quotations from texts that follow: a row of dots indicates where some original text has been removed for brevity; embedded clauses are shown as double square brackets [[…]]; and clause initial circumstances of place or time (referred to a 'marked Theme') are in italics. Embedded clauses are a key means by which information can be more densely packed into clauses and thus can signal strengthening of semantic density (see Maton and Doran 2015b). Marked Themes are a key indication of shifts in stages of phases of discourse that often accompany changes in the strengths of semantic gravity and semantic density. Reference is also made to the use of abstract lexis, and to the associated contrast between what are described as congruent and grammatical constructions and those that rely on grammatical metaphor, a linguistic resource often associated with shifts in semantic gravity and semantic density (Martin 2013a).[2]

Extract 1: Interpreting contextual experience

In the first extract, drawn from the opening part of the text, he offers a series

of observations that progress from reconstruction of relevant detail about the character Huck towards statements about what Huck *learns* from his adventures with Jim. In writing of Jim, the student writer re-uses the racist language adopted by Mark Twain, perhaps the better to underscore the contrast between the contempt with which black Americans were often viewed and the compassion and warm friendship that Huck comes to feel for Jim. This passage begins with relatively simple and context-dependent meanings (SG+, SD−) (in the form of contextual information) and moves to more generalizing and condensed meanings (lessons about life) that signal a weakening of semantic gravity and strengthening of semantic density (SG↓, SD↑):

> Huck is an uneducated young rogue [[who gets up to a lot of mischief and into a lot of trouble.]]…. *When he meets Jim on Jackson's Island*, he becomes a good friend to the 'runaway nigger'. He takes care of Jim, and doesn't turn him. They have great adventures working together and looking after each other as they travel down stream on the raft. Huck learns how powerful friendship is, and *for once in a long time, when he is with Jim*, he feels accepted and wanted, and learns about loyalty to other people.

This initial phase in Text 1 provides contextual information about the character 'Huck' who is identified in the opening Theme position. The attributive process 'is' sets up a substantial nominal group that includes an embedded material process 'gets up to'. The evaluation of Huck's character is thus typified in terms of actions, for he is 'an uneducated young rogue who gets up to a lot of mischief and into a lot of trouble'. Compression of information by means of expanded nominal group structures, such as used here, is an important linguistic tool and, where mastered, enables young writers to condense or 'pack in' a great deal of information, both experiential and attitudinal (Christie and Derewianka 2008). This is an essential step in enabling the move towards symbolizing events, as will become evident in later extracts of the text and more so in later adolescence.

Once Huck's general character is established the writer shifts to a new phase signalled by the marked Theme '*When he meets Jim on Jackson's Island*'. This suggests we are about to begin a phase that tells us more of what happened at the time of meeting, what they did, said, etc. Instead there

is a somewhat abrupt move from the specific event to a generalized state: ‘he becomes a good friend’. The shift is a little awkwardly managed, suggesting the young writer has some difficulty controlling how to reconstruct events over time. Learning to master relevant contextual details, organizing them into smoothly flowing discourse is a considerable challenge, and the young writer has yet to achieve complete control, though a better instance of such control appears below. Importantly, though, the writer introduces the concept of friendship here, albeit in a congruent form ‘becomes a good friend’. Subsequent clauses then serve to exemplify this state of friendship, generalizing Huck’s actions in a series of material processes: ‘[Huck] takes care of Jim, and doesn’t turn him in, working …, looking after …, travel …’.

From this relatively congruent phase there is a further shift into a phase where the student writer stands back from the events and attributes a reflective response to Huck. Grammatically there is a move from material to mental processes (underlined) to introduce explicit and abstracted values (bold), as in: ‘Huck learns how **powerful friendship** is …’. A subsequent marked Theme, ‘*for once in a long time*’, gives particular prominence to the unfamiliar state in which Huck finds himself, and the phase of evaluative reflection continues, realized again in mental processes and expressions of values, as in ‘he feels **accepted** and **wanted** and learns about **loyalty** to other people’. While values are attributed to the character Huck, this phase nonetheless introduces a significant value judgement on the events. The text thus represents a move from action to reflection and, in the process, from more congruent to more abstract and grammatically metaphorical language.

From the perspective of Semantics we can interpret the movement in phases across the extract as an upshift from relatively strong semantic gravity and weak semantic density in representing contextual details from the novel to weaker semantic gravity and stronger semantic density in expressing abstract understandings about life. Within this upshift, however, there are smaller shifts, as the student manages dynamic movements in context dependence and condensation of meanings within and across clauses. For example, the semantic density implicated in the first reference to ‘a good friend’ initially weakens in the elaboration of specific actions indicative of friendship, and then later strengthens as these meanings are repacked in a series of abstract feelings and values: ‘powerful friendship’, ‘accepted’, ‘wanted’ and ‘loyalty’. The choice of ‘rogue’ is interesting in this respect as it

condenses meanings of both antisocial behaviour and invoked sympathy. Semantic density is strengthened and then immediately weakened in a more congruent explanation: ‘gets up to a lot of mischief and into a lot of trouble’.

Extract 2: Interpreting themes

In a subsequent extract the writer develops his ideas further, this time by reference to the ‘major themes or ideas’ in *Adventures of Huckleberry Finn*:

> The two themes [[that I have selected from the novel]] are ‘friendship’ and ‘racism’. Huck and Jim both express friendship throughout the novel, being loyal to each other. *Despite the times* [[*when Huck has the opportunity to turn in Jim as a ‘runaway nigger’*]] he remains loyal to Jim. Jim also looks after Huck…. The novel tells us that friendship is powerful, and that you should be loyal to your friends and trust them.

Overall, this extract exhibits a dominant semantic wave, from relatively weaker semantic gravity and stronger semantic density (SG−, SD+) when introducing the theme, through more contextualizing and simpler information (SG+, SD−), and ending with a generalizing and condensed ethical principle (SG−, SD+).

To begin, the word ‘theme’ is itself an abstraction, one probably introduced to the writer by his teacher: he knows he is now standing back from the details of the story to offer judgement about their significance. The changes in the language are now quite marked; the meanings have become more abstract and symbolic, and a direct assertion is made about what the story ‘tells us’. Here the use of an inclusive pronoun ‘us’ involves the writer’s audience in accepting his interpretation of the story. This is reminiscent of the way, noted above, examination questions often seek to elicit shared interpretation of literary texts. In addition, note that young people in early adolescence often make use of processes that suggest what literary phenomena like literary texts ‘show us’, or ‘tell us’, or ‘reveal to us’.[3] I have no evidence that such expressions appear among younger children and their emergence is one important measure in adolescence of a developing capacity to ‘stand back’ from a text or an issue and consider its symbolic meaning (Christie and Cléirigh 2008; Christie and Derewianka 2008).

The opening sentence uses an identifying process to provide a definitional statement of a kind used quite sparingly in such pieces of writing: ‘The two themes that I have selected from the novel are “friendship” and “racism”.’ Such statements often carry considerable attitudinal force, as is the case here. They are a powerful resource for setting up whole phases of discussion. In the subsequent clauses the abstract notion of ‘friendship’ is elaborated a little. It is something people can ‘express’: ‘Huck and Jim both express friendship’ and it is equated with ‘being loyal to each other’. In the final phase, the events are repackaged and ‘the novel’ made agentive in a verbal process, revealing a moral truth to be derived from the events: ‘The novel tells us that friendship is powerful’. The abstract principle that ‘friendship is powerful’ is then repackaged as a kind of generalized dictum or ethical principle to live by in: ‘you should **be** loyal to your friends and trust them’.

Extract 3: Concluding interpretation of themes

The final extract from Text 1 is primarily concerned to interpret the themes of the novel and to make judgements about the values it represents. It moves through three phases of meaning beginning with a strong overriding claim about the significant principles or values addressed in the novel. Some reference is then made to generalized contextualizing information, and the extract concludes with a reaffirmation of principle and values.

> The novel also comments loudly on racism. Mark Twain uses the issue of slavery to focus on the evils of [[thinking that one race is superior to another]]. *In Huck’s society,* white people are accepted as the natural masters, while the black ‘niggers’ are regarded as things [[to be owned]]. As such, they have no rights at all, but must live and do exactly [[as their masters say]]. As Huck gets to know and love Jim, he becomes aware of the inhumanity of slavery and *by the end of the book* has decided to do the ‘morally right’ thing and not the ‘lawfully right’ thing and help Jim to freedom. Racism is a theme [[which runs right through the novel]] and it is clear that Mark Twain thinks it is deplorable.

This extract begins with an ethical principle that exhibits relatively weak semantic gravity and relatively strong semantic density, then strengthens

semantic gravity and weakens semantic density through providing contextualizing information, before returning to reaffirm an ethical principle, returning to weaker semantic gravity and stronger density. It thus exhibits a semantic wave.

Here the novel functions as the *sayer* in a verbal process, strongly asserting its theme: 'The novel … comments loudly on racism.' The novel is then recast as the writer (Mark Twain) and the condensation of meanings in the term 'racism' is teased apart and unpacked – 'uses the issue of slavery to focus on the evils of thinking that one race is superior to another' – thus constructing a minor semantic wave within a larger wave. The ethical principle or stance on these issues is encoded in the evaluation of 'evils'.

A marked Theme signals a shift back to the events of the novel, although these remain as generalized representations of participants, processes and circumstances: 'In Huck's society, white people are accepted as the natural masters while the black "niggers" are regarded as things to be owned. As such, they must live and do exactly as their masters say.' Semantic gravity is therefore marginally strengthened but not to the level evident in extract 2 of this text (earlier above).

A further marked Theme signals another shift in the discourse, this time out of generalized events into the realm of symbolized values and principles. Initially this movement is attributed to Huck and his processes of reflection and understanding, as represented in the mental processes of cognition, 'Huck gets to know and love Jim', and the writer goes on to attribute to Huck a recognition of an ethical position, in the notion of 'the inhumanity of slavery'. Paralleling the final movement from values to dictum in extract 2, here the student moves from Huck's ethical values to his decision to act on those principles, in: 'and by the end of the book [he] has decided to do the 'morally right' thing and not the 'lawfully right' thing and help Jim to freedom'.

The student completes the phase by reconnecting the issue of 'racism' to the task of discussing a major theme in the novel. He first asserts the significance of the theme – 'Racism … runs right through the novel' – then explicitly articulates the ethical stance that is to be read from the text, though attributing it to the author, in 'it is clear that Mark Twain thinks it is deplorable'.

Though Text 1 focuses a great deal on abstract ideas such as 'friendship',

‘racism’ and ‘the inhumanity of slavery’, the text is relatively congruent in its grammatical construction, as might be anticipated from a writer in early adolescence. Reflecting on the general orientation evident across the extracts of Text 1 from a writer in early adolescence, it is possible to identify a developmental trajectory of meanings: from *the immediate contextual detail* (e.g. ‘Huck is an uneducated young rogue’, ‘He meets Jim’, ‘He learns how powerful friendship is’) to *what ‘we learn’* (e.g. ‘The novels tells us’, ‘the inhumanity of slavery’, ‘racism is … deplorable’).

Learning the SELS gaze in mid adolescence

Text 2 was written by a girl aged 15 who was studying *To Kill a Mockingbird* by Harper Lee. The question given by her teacher drew on a quote from the novel, involving a scene in which the chief protagonist, Scout, went to be with her father, Atticus, who sat outside the local jail, protecting a black man wrongly held there for rape. A potential lynch mob had gathered around the jail, the significance of their presence not understood by Scout, who was both young and innocent. Her very innocence helped to defuse what was a serious situation, a matter the novelist was at some pains to develop. The student had been asked to discuss the significance of the events in this passage of the novel.

I shall use three extracts from a long essay, selected because they demonstrate how one young writer goes about interpreting themes in the literary piece, moving between abstract principles and contextual information. In fact, two fields are in play in this text (Christie 2002), one to do with the values of literary critique and interpretation, the other with the details of the novel’s story.[4] The former is evident in the use of such technical terms as ‘scene’, ‘passage’, ‘text’, which help shape the interpretation of the literary piece. The latter is evident in references to the story. Overall, the writer commences her essay on a very abstract note, establishing an important principle, going on to elaborate on this in rather more congruent terms, before turning to consider how the novelist has established the principle, again in relatively congruent terms. All this requires some detachment from the details of the novel in order to adopt an interpretive stance about it.

Extract 1: Interpreting contextual experience

The essay begins with an ethical principle that exhibits relatively weak semantic gravity and relatively strong semantic density, which is elaborated and then explained in terms of the text, strengthening semantic gravity and weakening semantic density though not much. Overall, as I shall explain, this extract represents what Maton terms a 'high semantic flatline' of SG−, SD+ (Chapter 1, this volume).

> This scene [from the question] in the book *To Kill a Mocking Bird* by Harper Lee is an excellent representation of the effects a child's innocent love can have upon others. *In this passage* Harper Lee is communicating her idea [[that a child's innocence leads to a love of everything and this love can overcome hate]]. This idea is expressed strongly in the text. *In order to explain this idea*, Harper Lee had to set up the idea of Scout's innocence. She did this particularly through describing Scout's behavior.

I noted above that adolescents learning to interpret literary pieces must learn to discuss what those texts 'communicate', 'reveal', 'demonstrate' 'show', 'represent', and so on. Verbal and causal/relational processes such as the examples just mentioned are often used at points where symbolic meaning is being established. The opening sentence is a case in point; the process is metaphorically realized as a nominal group (underlined) and positively evaluated (bold), in: 'This scene … is an **excellent** representation of the effects a child's innocent love can have'. Here the student brings together both the events ('this scene') and their symbolism, around which she can develop her discussion. The next sentence elaborates by developing the abstract notion of an 'idea': 'Harper Lee is communicating her idea that …'. The semiotic abstraction 'idea' encapsulates particular meanings from the text so that they can be further discussed and evaluated. Such terms are a valuable resource for student writers as they move between text and interpretation. In this case the terms that specify the 'idea' are in turn abstractions: 'love', 'hate' and 'innocence'. As summarized above, the extract thus far maintains a semantic profile of weaker semantic gravity and stronger semantic density.

A marked Theme, 'In order to explain this idea', then shifts the discussion

to the novelist's methods, in other words, to considering how the ideas came to be interpretable from the text. The movement is from what the novelist meant, as an abstracted mental process ('idea'), to what she did, as material and behavioural processes ('set up'; 'did'): 'Harper Lee … set up the idea of Scout's innocence', 'She did this …', 'describing Scout's behavior'. This final phase of more congruent representations of the novelist at work strengthens semantic gravity and weakens semantic density somewhat. However, there is relatively little movement across the extract as a whole. A semantic profile of SG−, SD+ approaches a flatline. One reason is that, while there are references to a 'scene in the book' and 'the text', the only reference to events or characters in the novel is in the abstraction 'Scout's behavior'. Being able to manage an extended semantic profile of this kind is an indication of considerable movement from the pre-adolescent writing of Text 1.

Extract 2: Interpreting contextual experience

In extract 2 the writer again refers to specific events from the novel, this time represented in a quotation. The quoted events are interpreted in terms of what 'we can see'.

> *In this quote* we can see that Scout didn't see the danger or feel the tense atmosphere. Instead she related everything back to [[what she had experienced]] … 'Atticus had said it was the polite thing to talk to people about what they were interested in, not about what you were interested in … so I tackled Mr. Cunningham in talking about his entailment once more in a last ditch effort to make him feel at home.' *In this quote* we are able to see that Scout was polite and kind, despite the situation and wished to make Mr. Cunningham 'feel at home'.

Scout's behaviour is both reported and interpreted in both: 'In this quote we can see that Scout didn't see the danger or feel the tense atmosphere' and 'In this quote we are able to see that Scout was polite and kind'. As in Text 1, the inclusive pronoun 'we' invites us to share the writer's interpretation of the events. However, this interpretation is limited to what we can learn about the character Scout. There is no move in this phase to more general principles or

values. In contrast to extract 2 of Text 2, the semantic profile here maintains a low semantic flatline (SG+, SD−).

Extract 3: Interpretation of symbolic significance in the novel's passage

In the final extract from Text 2, the writer has moved from talk of what 'we can see' (preceding extract) to talk of what the novelist's writing 'shows'.

> *Through this passage* Harper Lee uses language to show how the love of a child can overcome the hate of an adult. She does this through describing the actions of Scout and by using certain words and phrases which show that Scout's innocence and love were stronger than the hate [[felt by Mr. Cunningham]].

The initial representation of the symbolic significance of the events – 'Harper Lee uses language to show how the love of a child can overcome the hate of an adult' – requires resources of abstraction and grammatical metaphor, as underlined. The ethical position stands beyond the novel, reflecting relatively weaker semantic gravity and stronger semantic density. Some reference is then made in more congruent language to how the novelist has achieved her purpose in establishing symbolic significance, albeit as generalized actions, in 'through describing the actions' and 'using certain words and phrases'. The semantic profile moves minimally at this point in the direction of strengthening semantic gravity and weakening semantic density. In a final move the principle is reinterpreted back into the novel, grounding it in a character and stance, reaffirming the overall profile through this extract of stronger semantic gravity and weaker semantic density.

In summary, in Text 2 the writer in mid adolescence makes use of more resources for constructing context independent meanings, and for condensing information and values, including more instances of grammatical metaphor. Grammatical metaphor is used both to compress experiential information about character and events and assist in the expression of attitude and judgement. As such, Text 2 has a greater semantic range than Text 1. An idealized account of the developmental trajectory in mid adolescence can be represented as a move from *reflections on events* (e.g. 'This scene is an

excellent representation of the effects of a child's love') to *what 'we learn'* (e.g. 'In this quote we are able to see') to *what is shown* (e.g. 'Harper Lee … shows the love of a child can overcome the hate of an adult').

Learning the gaze in late adolescence

The language of late adolescence, at least among successful students, is relatively more grammatically metaphorical. Text 3 extracts are drawn from an essay written in answer to a question set at the Higher School Certificate English examination in 2009:

> *Belonging*
> Understanding nourishes belonging…. A lack of understanding prevents it. Demonstrate how your prescribed text (i.e. the poem *Immigrant Chronicle* by Strzynecki) and ONE other related text of your own choosing represent this interpretation of belonging.

In addition to the prescribed text by Peter Strzynecki (a contemporary Australian poet), the student chose the film *Babel*, directed by Alejandro Inarritu, as the second related text. As the student explained, it investigated 'issues to do with lack of understanding and belonging'. The terms of the examination question establish the abstract concepts around which the essay was to be written.

Extract 1: Abstractions re human experience

In this first extract, the writer moves between different fields: the field of literary and film critique, and the fields that are construed in the 'contents' of the poetry and the selected film. It comprises an assertion of an abstract principle, its elaboration, and identification of texts to exemplify the principle.

> A primary human need is the need [[to belong]] but belonging is not automatically conferred. Belonging implies an understanding of the individual and the group and negotiating a way towards acceptance of those needs. Conversely, exclusion emerges when the individual or the

> group fails to understand one another…. Peter Strzynecki's semi-autobiographical poetry … traces the lives of a migrant family in a new country. Similarly, the film *Babel*, directed by Alejandro Inarritu in 2006, investigates issues to do with lack of understanding and belonging.

The opening starts on a very abstract note, making broad generalizations about the concepts of 'A primary human need' and 'belonging', terms exhibiting relatively weak semantic gravity and strong semantic density. The writer then provides explanations of the concepts of 'belonging' and its converse 'exclusion', interpreting the terms as generalized actions, people doing or not doing things. However, rather than strengthening semantic gravity and weakening semantic density, the author employs much abstraction and grammatical metaphor packing meanings into a dense explanation, particularly in relation to 'belonging'. We find, for example, 'belonging implies an understanding of the individual and the group' … 'and a way towards acceptance of those needs, rather than the more congruent expression: 'If people belong, individuals and groups can understand each other and they can negotiate how to accept each other'. 'Exclusion' is unpacked a little more congruently, for it is said to emerge 'when the individual or the group fails to understand one another'. Reliance on nominalization and grammatical metaphor is a feature of the dense written language commonly found among successful senior SELS students. Nonetheless, to this point there is minimal strengthening of semantic gravity and weakening of semantic density.

There is then a shift in field introducing the two texts and establishing their relevance to the concepts at issue. In both cases the texts are represented as actors in material processes: 'poetry … traces', 'the film … investigates'. Strzynecki's text is represented as exemplifying the concept of 'exclusion' in a relatively congruent description of specific people and place, in 'the lives of a migrant family in a new country'. With 'Similarly', connection is made to Inarritu's film which is referred to in more abstract terms as an investigation into the key issues: 'to do with lack of understanding and belonging'. The extract begins and ends with specific reference to abstract ideas. The semantic profile thus begins and ends as weaker semantic gravity and stronger semantic density, with a small undulation but mostly tracing a high flatline.

Extract 2: Exemplifying abstraction by reference to the first text

In this second extract the writer provides more detail of character and events to reveal how the poet exemplifies concepts of 'belonging' and 'understanding'. At one point, incidentally, where text is removed a shorter version of what is said is substituted in the interests of clarity ('caused him to attract').

> Feliks, Peter Skrynecki's father, may have lived in Australia but he 'kept pace with the Joneses of his own mind's making'. He reminisced with his Polish friends…. He belonged to the world [[he grew up in, that he could understand]]. His disengagement with Australia ('causes him to attract') negative reactions such as the department store clerk [[who asked his son]], 'Did your father ever attempt to learn English?' *Even in these few lines* we see just how important understanding can be for belonging.

This extract focuses on the character, Feliks, father of the poet. He is referred to frequently in Theme position (He, His), as it is his difficulties in adjusting to life in Australia that the writer attends to. His generalized activities are initially represented relatively congruently in 'lived in Australia … kept pace with the Joneses … reminisced with his Polish friends … belonged to the world he grew up … he could understand'. The semantic gravity at this stage is therefore relatively strong and the semantic density relatively weak, although a brief shift occurs as the nature of Feliks's activities is condensed and minimally decontextualized as 'disengagement' and 'negative reactions'. The generalized and abstracted activities are then exemplified in a specific incident: 'the department store clerk … asked his son "Did your father ever attempt to learn English?"' This is a point of maximum semantic gravity and minimum semantic density. However, the marked Theme, 'Even in these few lines' initiates a last movement in which the student writer steps back from the specifics of the event to interpret its significance. A strong evaluative position on belonging is established by reference to the language of the poem, a position that it is assumed 'we' can readily 'see' and hence share: 'we see just how important understanding can be for belonging'. This return to the abstracted notions of 'understanding' and 'belonging' introduced in extract 1 shifts the semantic profile back towards weaker semantic gravity and stronger

semantic density.

Extract 3: Exemplifying abstraction by reference to the second text

Extract 3 turns to some discussion of the film *Babel*, and the general pursuit of themes to do with 'belonging' and 'understanding' is developed further. As the writer declares, in the case of the filmmaker, 'lack of understanding is at the core of his work'. This extract comprises a statement of an abstract principle, followed by contextualizing details from the text that exemplify the principle.

> *For Alezandro Inarritu, director of the film Babel*, culture is a significant aspect of the struggle for each individual's place in the world, in his multilayered plot in this film whose title conveys a strong Biblical allusion…. *In his director's notes* Inarritu emphasizes the theme of his film…. Lack of understanding is at the core of his work. The story of a Moroccan boy [[who accidentally shoots an American tourist]] is juxtaposed with the story of a deaf Japanese girl, Chieko, [[who wants to communicate but doesn't know how to]].

Two marked Themes indicate two phases in the extract that both foreground the film's director. The first, 'For Alezandro Inarritu, director of the film Babel' introduces an abstract generalization about the director's view of 'culture' in the relational clause 'culture is a significant aspect of the struggle for each individual's place in the world', while it is said 'the multilayered plot in this film conveys a strong Biblical allusion'.

The second marked Theme, 'In his director's notes', introduces a phase which 'emphasizes the theme of his film' and the fact that 'Lack of understanding is at the core of his work'. The relationship of the events in the film to the theme is managed in a single clause constructed as two substantial nominal groups (in bold) around a relational circumstantial process ('is juxtaposed'): **'The story of a Moroccan boy who accidentally shoots an American tourist** is juxtaposed with **the story of a deaf Japanese girl, Chieko, who wants to communicate but doesn't know how to'.** The semantic profile here thus moves from the weaker semantic gravity and

stronger semantic density exhibited by the opening principle and then moves to strengthen semantic gravity and weaken semantic density through the rest of the extract.

Extract 4: From abstraction re artists' achievements to ethical principle

Extract 4 constitutes the concluding paragraph of the student's text:

> Both Inarritu and Skrynecki have explored the processes of understanding [[which lead to communication and acceptance]]. [[What both composers have shown]] is [[that rejection results from the barriers of language, place and social structure]]. But when we understand those around us, we can gain a strong sense of [[what it means to belong]]. Understanding is like Feliks Skryneckis's garden: a place of nourishment.

Successful young writers at this level in SELS frequently refer to the author's/director's deliberate construction of their stories to exemplify abstract and generalized issues and values. This typically involves the use of material processes, such as 'trace', 'explore', 'investigate' or 'identify'. By such means the student writers can connect values about life and references to their literary texts (Christie and Derewianka 2008: 72–85). The young writer here commences the concluding paragraph with one such construction. It draws together observations about the two selected artists, beginning with a generalized account of what the two have undertaken in 'Both Inarritu and Skrynecki have explored the processes of understanding which lead to communication and acceptance'. The writer then moves to discuss what both poet and director have 'shown' in terms of ethical principles, constructing this as a forceful, even categorical statement, in 'What both composers have shown is that rejection results from the barriers of language, place and social structure'. Each participant around the process is constructed in an embedded clause, enabling a great deal of information, already discussed and examined in earlier paragraphs, to be packed into this summarizing conclusion. The text at this point displays relatively weak semantic gravity and relatively strong semantic density.

The writer then reinterprets what the poet and director have 'shown', to

what ‘we’ can learn from this. The position on ‘rejection’ is reconstructed as a positive principle related to ‘understanding’, in the process unpacking the meaning into the more congruent ‘when we understand those around us, we can gain a strong sense of what it means to belong’. This minimal move towards strengthening semantic gravity and weakening semantic density is then reversed again to conclude with a statement of the value of that learning. In another forceful evaluation of ‘understanding’, the writer concludes ‘Understanding is like Feliks Skryneckis’s garden: a place of nourishment’.

Across this extract the student has moved from what the composers did and what they showed, to what we learned, to what the value of that learning is. The semantic profile leads to a final position of relatively weak semantic gravity and relatively strong semantic density. The developmental trajectory in the writing of this student at late adolescence can be described as a move from *assertion of principle* (e.g. ‘A primary human need is the need to belong’) to *exemplification of the principle* (e.g. ‘Strzynecki’s poetry traces the lives … Inarriu investigates issue to do with belonging’) to a *final reiteration of the principle* (e.g. ‘Understanding is like Feliks Strzynecki’s garden: a place of nourishment’). This represents a semantic wave from SG−, SD+ to SG+, SD− to SG−, SD+ (see Figure 1.4, page 17).

Conclusion

Returning to my starting question of how to characterize the educational knowledge structure of SELS and what constitutes success in its study, I argue that the knower code of SELS involves a capacity to express values related to the human experience, established by reference to literary texts. Mastery of this code requires an ability to read and interpret the literary piece, and an ability to create a response to the text by moving between references to the literary piece and declarations about what that piece tells us, shows, represents, or reveals. The semantic shifts as students move from contextual detail to abstract understanding are clearly evident. The resulting semantic profiles vary depending on the individual writer and the text(s) discussed. However, we can argue that the tendency of younger writers is commonly to begin their discussions of literary texts with explicit reference to details of story and characters, expressed in relatively congruent language, thereby strengthening semantic gravity of claims and values. From this basis they

move to reveal what is ‘learned’ about characters, to considering what the literary piece ‘tells us’, typically values that stand beyond, but are exemplified by events of the text. This move relatively weakens semantic gravity. At the same time, initial discussions of phenomena and expressions of evaluation from the context of the literary work become condensed into general moral issues and positions, strengthening semantic density. It has also been noted that there are extracts in which a particular semantic profile is maintained over an extended phase of text. In the case of writers in early adolescence this may be at a lower level of SG+, SD−.

The tendency of writers in mid adolescence is to begin from an abstract principle said to be ‘represented’ in the literary text, then elaborate on the principle by reference to contextual details and writer means, thenceforth moving back and forth between contextual detail and principle. This introduces more of a semantic wave and greater semantic range. In late adolescence successful writers, at least, tend to establish abstract understandings or principles first, thus beginning at a point of weaker semantic gravity and stronger semantic density. They then go on to exemplify the principle with reference to the literary text, and perhaps its construction, strengthening semantic gravity and weakening semantic density. This is not to the same strengths as previously. Semantic gravity tends not to reach the strength of the texts by younger writers and the semantic density tends to remain stronger overall. There may often be movement back and forth between the two before a principle or symbolic value is reasserted in a concluding phase. The final movement returns to relatively weaker semantic gravity and stronger semantic density.

Close attention to semantic waves in student texts, the resources they use to manage this, and to how it changes over the years of adolescence can thus give us valuable insights into the processes of mastering a cultivated ‘gaze’ of a kind apparently valued in SELS in English speaking communities. In making this process more visible we hope to be able to devise more explicit means for its construction.

Notes

1 The author is Alaric Lewis, who kindly agreed to my use of his text in this analysis.

2 A congruent grammar occurs when linguistic items are used in their most immediate and ‘congruent’ sense, e.g. when nouns refer to entities, verbs express actions, and so on. In non-congruent grammar (grammatical metaphor) these relations are skewed. Young children use a congruent grammar, while grammatical metaphor emerges in late childhood to early adolescence. See Halliday and Matthiessen (1999).

3 They do in fact appear in other discipline areas, as in science, for example, when used to ‘show’ the significance of an experiment, and in history for ‘showing’ the results of some events (Christie and Cléirigh 2008).

4 Christie (2002) provides a longer discussion of the two registers said to function in the pedagogic discourse of the classroom. Here I allude only to two fields – one concerning the ‘content’ of the literary piece, the other concerning the overall pedagogic shaping of the text as literary interpretation.

9 Putting physics knowledge in the hot seat

The semantics of student understandings of thermodynamics

Helen Georgiou

Introduction

The study of students' ideas dominates efforts in science education research. Across the sciences and for all educational stages, more sophisticated approaches and methodologies have been developed which have helped result in improved instructional practices. Despite these significant developments, several fundamental issues remain underexplored, including questions surrounding the very nature of students' ideas, how they develop, and the values that should (or should not) be placed on them. Physics Education Research (PER) can be considered a specialism within the science education research agenda, comprising a relatively small but concerted initiative to support findings with theory in the hope of resolving these persistent issues. Mostly, theoretical frameworks utilized in PER have been based on cognitive science and aim to characterize the learning process, or what Maton (2014b) refers to as 'knowing'. This chapter instead turns the focus onto 'knowledge as an object' by looking at student ideas through the enactment of Legitimation Code Theory (LCT). In the first part of the chapter, limitations of current research on student ideas are discussed in the context of science education research. To illustrate the value of LCT as an potentially complementary approach, the chapter reports on a study conducted in a thermodynamics module in first year undergraduate physics which enacts the concept of 'semantic gravity' in analyses of student responses. Through this exemplar, the chapter illustrates how enacting LCT overcomes many limitations of existing studies to procure novel insights into the nature of

student understanding.

Conceptions research in science education

Science education research is strongly characterized by its intense focus on students' ideas or conceptions (Chang *et al*. 2010; Tsai and Wen 2005). The term 'conceptions' is the name given to students' understanding of units of knowledge; 'misconceptions' or 'alternative conceptions' therefore represent erroneous or incomplete understanding (Liu 2001; Vosniadou 2008). These terms appear within a research agenda whose principal concern is with students' evident failure to emerge from science instruction with a more sophisticated understanding of science (Shaffer and McDermott 2005). Current 'conceptions research' is driven primarily by relatively new tools that reveal student difficulties (Hake 1998). These tools have facilitated ongoing research that aims to improve the development and assessment of instructional practices to help students overcome these difficulties (e.g. Treagust 1988).

Such is the perceived success of this programme that there exists in the science education field a conspicuous rejection of the necessity for conceptual frameworks (McDermott 1990). The unique culture and position of physics education researchers further encourages atheoretical research. They are often employed as part of physics faculties, are typically practising physicists (or have been), and are commonly working with students or educational issues within their institution. Inevitably, such research is not easily reinterpreted in different contexts. Reif (in Cummings 2013) argues that for real significant progress to occur, a coherent theoretical framework must be developed. diSessa *et al*. (2004) concur, arguing that even in the most dominant research concern, conceptual change, focused argumentation is limited.

At the periphery of Physics Education Research (PER), a specialism within the broader science education field, there exists a small but influential group of researchers that insist that theoretical frameworks must be utilized if research is to be influential and constructive. The theoretical framework employed by this group is known as 'the Resources Framework'. Advocates of this framework argue it is intended to specifically address persistent issues in science education research, particularly with respect to conceptions, and to

provide a shared language through which disparate research findings may be grounded for greater explanatory power (Redish and Bing 2009; Sabella and Redish 2007). The relevant aspects of the Resources Framework are provided here as a way of exemplifying the need for a complementary approach (for a more comprehensive description, see Redish 2004).

The Resources Framework has its foundations in a view of learning based on cognitive science, one concerned with the content and structure of cognitive networks in the student's mind. The framework emerged from questions concerning whether students' knowledge was 'theory-like' or 'piece-like'. 'Theory theorists', such as Carey (1985) and Vosniadou (2002), believe students' conceptions are concrete manifestations of theory-like cognitive structures. However, it is the 'pieces' view that has come to dominate PER and which forms the basis of the Resources Framework. In this view, conceptions are 'nodes' (or pieces) that are embedded within a larger structure or network which in turn is organized and affected by more global influences such as motivation and context (more pieces). Questions for research include the examination of the structure of this network, how such a structure might develop, how the various nodes of this structure are activated and why, and how different contexts such as the subject studied, student background and motivational aspects affect the structure (e.g. diSessa 1993; Minstrell 2001; Sabella and Redish 2007).

The Resources Framework focuses on describing a range of possibly meaningful units of knowledge where different units may be interesting or relevant for different reasons. Two such units include 'facets' and 'p-prims'. Minstrell's 'facets' (2001) are discrete and independent units said to characterize a student's scientific repertoire. Such facets range from characterizing the 'scientific method' (e.g. experimenting is changing things and seeing what happens) to describing individual scientific ideas (e.g. heavier falls faster). The notion of facets allows for the identification of ideas in students' ideas that are common amongst groups of learners and may affect understandings. Another unit is diSessa's 'phenomenological primitives' or 'p-prims' (1993). These are characterized as pieces of knowledge in physics that students believe are an irreducible feature of reality, that is, requiring no further explanation. In general, p-prims are 'concept groups' that describe some aspect of a (supposed) physics mechanism. For example, if a student holds the p-prim 'closer is stronger',

this could result in the mistaken belief that the Earth is closer to the sun in summer. Because ‘closer is stronger’ is both intuitive and true in other contexts, a justification is often not considered necessary, so the idea is quickly substantiated and subsequently difficult to alter.

Although both ‘facets’ and ‘p-prims’ are theoretical constructs developed outside of the Resources Framework, Redish argues they are most useful when part of a subsuming structure and recontextualizes both as ‘resources’ within the Resources Framework. In this way, he describes ‘facets’ and ‘p-prims’ as serving different purposes, related or connected, and activated in certain contexts and at certain times. This need for a more encompassing theoretical structure arises from criticisms of cataloguing which continue to be charged at notions of ‘facets’, ‘p-prims’ and misconceptions in general, namely that these ideas are not fixed, discrete or easily characterized through labels but are instead manifold and extremely sensitive to context. Redish (2004) makes a further amendment to the notion of ‘p-prims’ within his Resources Framework by suggesting they have internal structures. He argues that a p-prim comprises a ‘reasoning primitive’ that is abstract and which ‘mapping’ relates to ‘facets’, that are concrete and describe specific phenomena. This distinction draws the discussion away from descriptive labels and categories to a slightly more subtle model that suggests one way physics knowledge works is by connecting the abstract to the concrete.

These theoretical concepts have demonstrated utility within physics education research, raising the question for the Resources Framework of why stop at this characterization. That the level of abstractness (or concreteness) of ideas is significant suggests one could characterize the spectrum between these two extremes with a conceptualized organizing principle, rather than settle for two contestable, ambiguous and often morally charged categories of ‘abstract’ and ‘concrete’. Maton (2013, 2014b) highlights this issue when discussing ‘knowledge-blindness’. He explains that where knowledge as an object of study in its own right is seen by research (rather than reduced to knowing processes and mental states), as is the case in science and physics education, it is typically theorized in a highly segmented way as simple categories or constituent elements. Such a theorization reflects a vision of disciplines as simply an aggregation of concepts, relations and processes rather than a complex series of evolving constellations of meanings. As Poincaré stated, science is no more a collection of constituent parts than a pile

of bricks is a house – it has an architecture based on organizing principles. From this perspective, it is apprenticeship into these organizing principles as much as specific atomic propositions that comprises the work of education.

More widely, Maton (2014b) highlights how 'knowledge-blindness' is endemic to educational research. Psychologically-influenced approaches, such as those employed in PER, typically focus on students' learning processes, while sociologically-influenced approaches typically foreground how students' experiences are shaped by power relations (whether with the teacher or the environment). Both largely obscure the nature of what is being learned, as if knowledge itself was homogeneous and neutral. However, a rapidly growing range of studies are showing that different kinds of knowledge take various forms and have different effects.

Types, categories, and a focus on the knower

As well as exploring the effects of knowledge, LCT is enacted to address several issues in science and physics education research. The general ambivalence toward theoretical reference has just been discussed. The following sections will focus on: limitations of available methodologies in physics education that result in typologies and categories of knowledge rather than exploring its organizing principles; and a tendency of existing theoretical frameworks to focus on knowers rather than knowledge.

Methodologies common in science education include survey research, quasi-experimental studies and evaluation studies. Many rely on some form of categorization (Otero and Harlow 2009). Multiple-choice surveys, for example, are largely used to identify misconceptions and assess conceptual understanding but have also been used to identify student attitudes, their learning to approaches and even their epistemologies.[1] The culture of categorization is also present in qualitative approaches. For example, one approach used widely for qualitative research of student conceptions is phenomenography (Marton 1981). Phenomenographic research involves the categorization of the content of student text (or speech) into groups of similar characteristics and has been useful in revealing the spectrum of student understanding under certain conditions (e.g. Sharma *et al*. 2004). A second example, The Structure of Observed Learning Outcomes or 'SOLO'

framework (e.g. Boulton-Lewis 1994) analyses the ‘quality’ of student responses rather than their content. Student responses are assigned a level based on how ‘relational’ their responses are, and, over time, developments in the student may be tracked.

While valuable starting points, these approaches are unable to capture the dynamicity of conceptions and heavily rely on the researchers’ interpretation of student ideas – what is in their minds. In the Resources Framework, for example, ‘development’ is conceptualized as a movement along the spectrum between ‘novice’ and ‘expert’. The expert–novice treatment involves the characterization of the novice learner, including how they approach and interpret problem-solving or how they understand a particular idea, and subsequent comparison to the expert’s characteristics. The ultimate goal is for the novice to develop as far as possible into expertise (Chi *et al*. 1981; Larkin *et al*. 1980; Wu 2009). This is not to say such characterizations are not useful. However, there are questions left unanswered by the approach, including why novices think in this way, why the development into expertise is more difficult in some contexts and for some students, what explains differences among experts, and which expert is more ‘expert’ and why. Wolf *et al*. (2012) ask, for example, how do we know which group the subjects belong to? Without reference to a ‘known’ novice or expert, an analysis of conceptualizations of knowledge is unable to identify the level of expertise in a group.

In summary, we have a body of work in science education research that speaks of ‘knowledge’ (concepts, p-prims) and some work that hints at the organizing principles of that knowledge (such as relations between general principles and concrete facts). The next stage is thus to advance beyond categorization and atomic classification by conceptualizing these organizing principles. The justification for exploring new frameworks thus includes addressing the following concerns:

- Can a theoretical framework that focuses on knowledge as an object (rather than conceptions imputed to knowers) be useful in informing the teaching and learning of science, and if so, how?
- How can we advance beyond typologies for characterizing knowledge?
- How can we account for concepts having various possible ‘types’ of context-dependence?

These questions emerged as key theoretical and analytical issues for a major research project which aimed at assessing student understanding of a new teaching practice in the context of a first year module on thermodynamics. They led to the adoption of concepts from LCT in the study. For more on this study as a whole, see Georgiou (2009), Georgiou and Sharma (2010), Georgiou *et al*. (2014). Here I shall briefly introduce the LCT concept drawn on in the study before describing its enactment to analyse student responses to a problem on thermodynamics.

Legitimation Code Theory: Semantics

As Maton outlines in Chapter 1 (this volume), LCT is an explanatory framework for analysing and changing practice. LCT forms a core part of social realism, a broad 'coalition' of approaches which reveal knowledge as both socially constructed and real, in the sense of having effects, and which explore those effects (Maton 2014b; Maton and Moore 2010). LCT is a 'practical theory' and designed to be an open-ended endeavour that

> foresees its own repeated refinement, deepening and extension through dialogues with concepts inherited from existing frameworks, substantive studies that reveal new issues to be addressed, and complementary frameworks that shed light on different facets of phenomena.
>
> (Maton, Chapter 1, this volume, page 22)

As illustrated by this volume, LCT is rapidly growing as a basis for empirical research into education. The framework itself comprises a multi-dimensional conceptual toolkit, where each dimension offers concepts for analysing different organizing principles underlying practices (Maton 2014b; Chapter 1, this volume).

In this chapter, to illustrate how LCT may offer a way of building on existing approaches, I focus on one concept from the dimension of Semantics: *semantic gravity* (Maton 2009, 2011, 2013, 2014a, 2014b). This concept specifically addresses an issue already raised above when discussing the work of Redish: the context-dependence of knowledge. As Maton defines it:

> *Semantic gravity* (SG) refers to the degree to which meaning relates to its context. Semantic gravity may be relatively stronger (+) or weaker (−) along a continuum of strengths. The stronger the semantic gravity (SG+), the more meaning is dependent on its context; the weaker the semantic gravity (SG−), the less dependent meaning is on its context. All meanings relate to a context of some kind; semantic gravity conceptualizes how much they depend on that context to make sense.
>
> (Maton 2013: 11)

Here I shall simply note that, unlike typological conceptions of knowledge, the notion of 'semantic gravity' is not a homogenizing category into which diverse and changing practices are to be reduced. Rather, all practices are characterized by semantic gravity and the difference lies in their relative strengths. Thus the concept represents a continuum allowing both for infinite gradation among practices and for tracing change within practices over time. Dynamizing the continuum captures *weakening semantic gravity*, such as moving from the concrete particulars of a specific case towards generalizations and abstractions whose meanings are less dependent on that context; and *strengthening semantic gravity*, such as moving from abstract or generalized ideas towards concrete and delimited cases (Maton 2013: 11; Chapter 1, this volume). One can also describe the *gravity range* of practices (the difference between their strongest and weakest strengths) and the *gravity profile* that changes in strengths trace over time (Maton 2014b: 106–24).

It should be emphasized that 'semantic gravity' is not the only concept in the dimension of Semantics, let alone in LCT as a whole. I focus on one concept for the sake of brevity. Nonetheless, this concept is being widely adopted in studies of education, including biology and History (Chapter 5, this volume), ethnographies (Chapter 6), design (Chapter 7), literary studies (Chapter 8), chemistry (Blackie 2014), law and political science (Clarence 2014), engineering (Wolff and Luckett 2013), and teacher education (Shalem and Slonimsky 2010). As this suggests, LCT concepts such as 'semantic gravity' have wide applicability, enabling research into knowledge practices in diverse contexts to cumulatively build on one another, as called for within PER and science education research more generally. Moreover, LCT reaches further than such calls would venture: within LCT studies of natural science inform and are informed by studies of the arts, humanities and social

sciences, as well as research into informal learning contexts, such as museums (Chapter 4, this volume) and freemasonry (Chapter 11).

This flexibility is, however, not at the expense of empirical precision. LCT includes the notion of developing a 'translation device' for moving between concepts and empirical data that shows how concepts are realized within the specific object of study being explored (see Chapter 2, this volume). For example, a translation device for 'semantic gravity' defines what is meant by 'context' and how relative strengths are determined in the data under analysis. Having defined 'semantic gravity', I now describe the data, including the sample and educational context, and the translation device developed to enact semantic gravity in this study.

Method, sample and translation device

The study took place in 2011 with a sample of 133 first year physics students at a large metropolitan university in Sydney, Australia. It was conducted in a thermodynamics module, one of three modules in a first semester course. Students generally find the topic of thermal physics difficult but little is known about why. The students participating in the study completed four physics problems posed to them through the thermodynamics module. Their responses to one of these problems were collected and analysed to characterize student understanding.

Question

The question was administered at the beginning of selected lecture classes, during time allocated for their completion. Lecture observations and evaluation forms show the students completed the question largely autonomously and reported investing serious effort, taking 10–15 minutes to write their responses. The average length was three or four sentences with some use of equations and limited use of diagrams. The students in this sample are mainly taking Bachelors of Science, Medical Science or Engineering, with very similar high-school leaving marks that place them in the top ten per cent of the state of New South Wales. Students volunteered to be interviewed at the request of the researcher and course coordinator, providing data useful for illustrating or substantiating claims made in the

analysis of written responses.

The question concerns a frosty cylinder:

> On a warm summer day a large cylinder of compressed gas (propane or butane) was used to supply several large gas burners at a cookout (the valve was open to release the gas). After a while, frost formed on the outside of the tank. In a few sentences, *explain at least one mechanism* associated with the frost formation.

The physics behind this scenario can be summarized as follows. The cylinder contains liquid fuel (propane or butane) and vapour fuel. As the gas exits the cylinder to supply the burners, some of the liquid fuel inside the cylinder evaporates to maintain constant vapour pressure (the same pressure that the vapour was at before it was released). Evaporation requires an energy input, which is achieved through heat transfer first from the cylinder walls to the liquid, then from the air outside the cylinder to the cylinder walls. Air contains water molecules and the heat transfer from the air is significant enough to result in the water condensing and freezing onto the outside of the cylinder.

This explanation assumes knowledge that the fuel inside the cylinder exists in a liquid-gas equilibrium state. However, failure to consider this assumption does not preclude a consistent response. For example, an explanation could instead state that an expanding gas does work and therefore requires heat transfer to it, the heat transfers from the cylinder, and consequently the surrounding air results in the condensation of the water molecules in the air and their ultimate freezing.

In their responses, students reveal both which concepts they deemed most relevant and an explanation of how those concepts applied to the provided scenario. The fact that the question assumed knowledge of the working of a gas cylinder that some students had and others did not, combined with the requirement to explain ‘at least one mechanism’, meant that there was an extensive range of physics content presented in the responses, providing rich data.

Analysis

Analysis of student responses to the ‘frosty cylinder’ problem occurred in a number of stages. Initially, LCT was not considered as a framework for the study. A collaborative attempt at coding using established methodologies, such as SOLO and phenomenography, ultimately failed. Although there was an attempt to code with respect to the different levels of quality that the SOLO framework offers (as determined by the relational structure of the responses), two senior researchers (S1 and S2) voiced concerns at the difficulty of doing so and produced highly conflicting analyses, agreeing on only 23 per cent of coding on responses. Alternative forms of ‘categorization’ suggested by the researchers included attempts to instead ‘look at the logical structures’ (S1) or attempt coding on the basis of the ‘various physical principles evoked’ and the ‘nature of assumptions used’ (S2).

The extent of the difficulty in coding necessitated a rethink of the theoretical approach being employed in the study. Cross-disciplinary consultations, including physics education researchers and scholars in both linguistics and sociology, resulted in the adoption of the LCT dimension of Semantics for the analysis of responses. I conferred with another researcher familiar with the physics in the question and the responses, physics education research in general, and the framework of LCT, to confirm the validity of the selection of three relative levels of semantic gravity. Coding was subsequently conducted primarily by myself. Validity, calibration and confirmation of coding were then achieved through a formal meeting with S1 and S2 followed by one-to-one correspondence. Agreement was reached at an inter-rater reliability of at least 90 per cent with alterations to coding characterization occurring where necessary. Such high agreement was unexpected given the complexity of the question and previous difficulties using the SOLO framework.

The translation device developed in order to enact the concept of semantic gravity in analysis of student responses is shown in Table 9.1. This describes three levels that represent relative strengths of semantic gravity. The most ‘abstract’ level (SG−) comprised general principles used to justify the reasoning made in the response. The most ‘concrete’ level (SG+) contained descriptions of the objects in the question, including tautology or repetition. The intermediate level (SG∅) comprised the causative reasoning of the student, often linking more abstract ideas to more concrete facts. Although responses were coded into categories of distinct levels of relative semantic

gravity, this is not to suggest responses within each category are homogeneous. For example, the sections coded in Table 9.1 within the 'SG−' category (discussed in the results section below) are all general principles, but some are clearly more general than others; for example, '(viii) (the first law of thermodynamics)' compared to '(iii) ($E = mc\Delta T$)'. Thus, enacting the LCT concept enables *both* categories to be employed *and* a more continuous and nuanced analysis of differences within categories.

Results

The findings of the study will first be situated within existing research on conceptions. Then, an illustration will be offered of how the concept of semantic gravity was able to reveal insights into how students approach a problem in physics and how and why they are successful or otherwise.

Table 9.1 Translation device for semantic gravity of student responses in thermal physics

Semantic gravity	Coding categories	Description of coded content	Examples of student responses (including original grammatical and spelling errors)
Weaker ↕ Stronger	SG–	Student is describing a physical principle, law, concept or theory, without reference to a specific situation	i an expanding gas absorbs energy ii as the state changes from liquid to gas; heat absorbed from surrounding iii $E = mc\Delta T$ iv the gas undergoes an adiabatic process v thermal equilibrium vi the second law of thermodynamics vii $PV = nRT$ viii the first law of thermodynamics ix the mechanism is pressure x the ideal gas law
	SGØ	Student is describing object(s) but referring to physical process(es), either explicitly or implicitly providing some explanation or embedding some cause. (Often 'links' SG– and SG+ levels)	i therefore it absorbs the heat from the surroundings, decreasing the temperature ii P stays the same. V decreases and therefore temperature decreases iii this causes the heat in the surrounding the cylinder to drop iv so heat flows into the surface, cooling the gas v it is expanding because the pressure outside the cylinder is less than inside vi and so the expanding gas removes heat from the nozzle of the cylinder vii work is done by the system – it loses energy in the form of heat viii in this situation, heat leaves the tank as the gas is released
	SG+	Student refers to the object or its characteristics, or rephrases or extends the question	i the gas is released from the cylinder ii when gas is released it meets a cool surface iii so it sticks to the wall of the tank iv there is a greater density of gas in the cylinder at the start v the formation of frost was a direct result of the gas leaving the cylinder vi frost formed vii propane and butane are gases at room temperature viii as gas is released the volume of gas decreases ix the pressure in the tank decreases, however, the volume remains constant

Augmenting conceptions research

Conceptions, alternative or otherwise, were identifiable in student responses. These conceptions were identified to reside in the SGØ level and revealed the reasoning of the student. It was where the student provided, implicitly or explicitly, the supposed mechanism which led to the frost formation. These mechanism(s) are termed 'emergent conceptions'.[2] Emergent conceptions are not necessarily wholesale statements from the students, although they have been summarized as such in the list below for illustrative purposes:

- Decrease in pressure leads to decrease in temperature
- Decreased temperature leads to frost forming
- Heat flows from warm to cold
- Increased disorder results in decreased heat which results in decreased temperature
- An expanding gas absorbs heat from surroundings, leading to a decrease in temperature
- Heat transfer from something makes that object colder
- Objects in contact reach thermal equilibrium with each other
- Heat transfer from air results in condensation and freezing
- Decreased order increases entropy and decreases temperature

Many of these emergent conceptions, particularly those identified as alternative conceptions (or misconceptions) are widely catalogued in the existing literature. Take, for example, 'decrease in pressure leads to decrease in temperature'. In general, this extensively reported idea has been associated with an over-reliance on algorithmic or inappropriate use of formulae (Boudreaux and Campbell 2012). The reports also reveal that holding such alternative concepts may impact further learning and are notoriously difficult to fully master (Lin *et al*. 2000; Meltzer 2004, 2005). However, Boudreaux and Campbell (2012: 710) also add that 'In reporting student difficulties, we do not necessarily imply that student ideas are stable and coherent, as a "misconceptions model" of student reasoning would suggest'. Through enacting the concept of 'semantic gravity', these emergent conceptions, 'residing' in the SGØ level, cannot easily be misconstrued as isolated and discrete. Using this concept, researchers are forced to consider the context of

the student's response. The rhetoric of a student 'holding' a specific conception can therefore be replaced with an emphasis on the conditions of its emergence. The next two sections discuss the significance of this reconceptualization.

Semantic gravity range of student responses

By moving beyond a focus solely on discrete categories, one can also explore further characteristics of the knowledge being expressed by students. With LCT one can analyse the range embraced by the relative strengths of each relation, their reach from strongest to weakest. Here one can explore the semantic gravity ranges demonstrated by students' responses. Most students' (85 per cent) responses employed at least two of the three strengths of semantic gravity being used here. This includes, in approximately equal measures, responses coded to both SG− and SG∅ and the SG∅ and SG+ level. Such responses indicate that students attempted to link general principles or use established physics mechanisms to explain a concrete physical phenomenon.

Although the employment by students of more than one level of semantic gravity in their responses sounds fairly obvious (or it would be to physics instructors and educational researchers), it is a distinct quality in response to a somewhat unique knowledge structure. According to the novice–expert literature, students begin to develop distinct characteristics as they become more expert learners; they are able to see past the surface features of a question, successfully link theory to examples and use the correct terminology. However, these characteristics are becoming increasingly ambiguous and difficult to confirm (Mason and Singh 2013). This first insight, therefore, provides a stronger theoretical basis to support part of these claims. The novice and the expert's approaches can be made explicit by referring to the presence of different strengths of semantic gravity in their responses. For example, students less exposed to physics, when asked to explain a physics phenomenon, are more likely to give concrete answers or answers resembling opinions, responses that reflect a narrower semantic range (Georgiou 2009).

Figure 9.1 presents a visual representation of different relative strengths of semantic gravity and therefore gravity ranges. Students lacking experience in

science present a very limited gravity range in explanations, often remaining at the very concrete levels of stronger semantic gravity (A1). Students with a strong background in physics, although not necessarily successful in the content of their explanations, appreciate that a broader gravity range is necessary (B1, B2), one that reflects the depth of different degrees of context-dependence across the knowledge structure of physics. As such, the analysis here makes transparent characteristics that would have been missed in an approach which focused instead on 'content' or 'correctness'. That is, the *structure* of the response is evidence itself and a valuable supplement to analysis of the content. The tangibility of using the concept of 'gravity range' facilitates the production of further questions, such as how the semantic range of responses changes with different levels of 'expertise' or, as will be discussed in the next section, how the range relates to the success of a response.

Moving beyond conceptions: the Icarus effect

Maton (2013: 18) draws attention to the importance of context-dependence for knowledge-building as the latter 'requires both upwards shifts from specific contexts and meanings, and downward shifts from generalized and highly condensed meanings'. In physics education, transfer of skills and knowledge is a priority; it is desirable for students to learn to apply a principle to a context outside of that which it was introduced. The frosty cylinder problem requires the appropriate selection appropriate and enactment of physics knowledge to answer successfully. In terms of semantic gravity, it is 'where the students reach', rather than solely what conceptions they portray, that determines how successfully they answer the question. Students that 'reach too high' or exhibit responses with weaker semantic gravity (range B1 in Figure 9.1) are more likely to fail to make the appropriate connections in their explanations. They have reached too high, into abstract principles that are not necessarily required for answering the specific question. A discussion of the explanation of the nature of the ideal gas equation as the students' understanding of it will evidence this assertion.

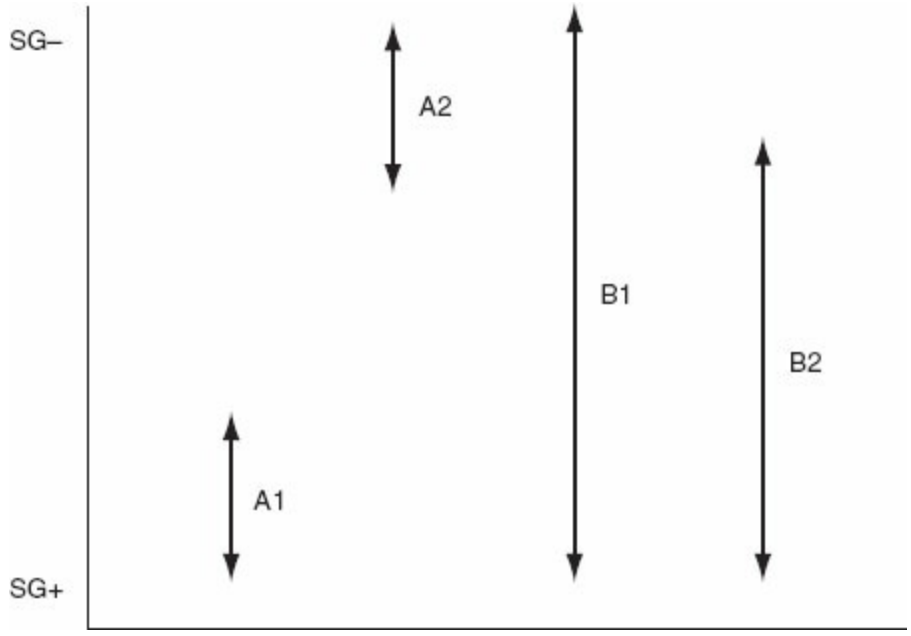


Figure 9.1 Examples of different ranges of semantic gravity in student responses.

Note
SG+ refers to stronger semantic gravity; SG– refers to weaker semantic gravity.

The ideal gas law is as follows:

$$PV = nRT$$

Where P = pressure, V = volume, n = number of moles of gas, R = gas constant 8.314 $J \cdot K^{-1} mol^{-1}$, T = temperature

This is a general law which applies to an ‘ideal gas’ and, like all physical laws, it involves a set of assumptions. Most real gases can be considered as ideal gases and so the ideal gas law can be applied to determine characteristics of interest for gases used in a wide variety of contexts. This law can help describe, for example, what might happen if you have a gas confined in a fixed volume and increase the temperature (the pressure will increase), or if you compress a gas at a fixed temperature (the pressure will increase). Although the idea gas law has great explanatory power, it has been reported that students often find the interpretation of this law difficult and are not successful in its application to different circumstances. Most commonly, the law is misunderstood as a two-variable equation, such as Ohm’s Law (*V*

= *IR*) or Newton's Second Law (*F* = *ma*), rather than a three-variable equation. It is therefore overlooked that only one variable will change in response to another; i.e. that the change of more than one variable, unlike the two-variable situation, will not result in predictable outcomes (increases or decreases in the dependent variable), at least without the specific quantitative information.

In the responses analysed for this chapter, all uses of the ideal gas law in response to the frosty cylinder problem, implicit or explicit, were scientifically inaccurate either by contradiction or by failing to account for the three-variable situation. Explicit mention of the ideal gas law occurred in 39 of the 133 responses, while 40 additional responses implied a reference meaning around 60 per cent of responses deferred to the ideal gas law as the mechanism explaining the frosty cylinder phenomenon. Here is the most common explanation for how the ideal gas law was used to explain the frost formation:

> Due to the pressure decreasing as a result of gas leaving the cylinder, the temperature decreases.

In and of itself, this explanation is a typical example of mistaking a three-variable problem for a two-variable problem. A strong causal link would depend upon a statement about the other variables. In this case, if the gas is leaving the cylinder, the number of moles of gas should also be affected. The number of moles, the pressure and the temperature cannot be related in this way without more information.

Therefore, students attempting to link changes in pressure, volume and number of molecules to a change in temperature in this way confirm the difficulty of reasoning attached to a three-variable problem. But it is more than that. Students were not provided with a question about an ideal gas under certain conditions, a ubiquitous question in first year thermodynamics; they had a choice. This result does not involve merely providing students with the content and asking them to work through it, it required a decision to be made by the student on which concept(s) they were going to use in their explanations. The question therefore becomes why they chose to use the three-variable problem in the first place. They did need to employ 'SG−' reasonings in their responses but in fact accommodated them by making

spurious or sometimes unreasonable assertions.

Interview data suggests students suppressed an impulse to ‘reach higher’ and apply the ideal gas law to the situation. The student’s justifications for these choices were compelling. Six students in total were given the question and asked to provide a verbal explanation. All but one explained the question using the ideal gas law. All students were asked why they drew upon the ideal gas law to provide an explanation for the frost formation. Answers included: ‘Because we saw it a lot’; ‘Equations are easier and more convenient to use compared to a conceptual understanding’; and ‘It’s one of the first things you look at when you look at gases and it has a lot of things in it and it uses the word gas in it’.

Students were then prompted to consider alternative explanations:

T:	Can you think of another way to explain this?
S:	When the gas is expanding … it’s doing work on its surroundings …
T:	So if a gas is doing work, how does it do this work?
S:	Well … the work … heat is equal to work…. So, if … the energy of the work has to come from somewhere. That comes from the container, so the temperature of the container decreases because the particles of the container are moving slower and gave lower energy.

A second student came to the same conclusion. When arriving at the explanation that an expanding gas requires energy the student commented that: ‘I’d say the second one [explanation] was clearer because like you can visualize it better … it’s less abstract’.

Although it is possible to use the ideal gas law to explain what is happening with the frosty cylinder, it is not actually necessary or appropriate in this case. Students were tempted by the equation to reach up to a higher level of abstraction than required and this may be a reflection of student attitudes toward physics or a consequence of the way that physics is taught throughout school and university (general principles first (A2), examples later (A1 in Figure 9.1), and not necessarily with an intermediate link).

In essence, the results showed there is an appropriate semantic range associated with successfully answering the frosty cylinder problem (B2) and that students who were not successful drew on explanations that were too

weak in semantic gravity (A2, B1). It was not only that students had problems understanding that three-variable equations could not be manipulated as two-variable equations, or that they were unable to successfully use the ideal gas law, it was also that they were compelled to reach up to a more general equation when it was not necessary.

Discussion

Research in concepts and conceptual development has helped make sense of students' understanding in science. However, many researchers are arguing that we must move beyond simply identifying and describing conceptions. The direction most scholars have taken thus far is to focus on the individual mind (the knower) and generic processes of 'knowing', leaving behind issues surrounding the nature of the knowledge itself. Yet, as Erduran and Scerri (2002: 22) put it, citing Schwab (1962):

> expertise in teaching requires both knowledge of a content of a domain and knowledge about the epistemology of that domain. Teachers develop the necessary capability of transforming subject into teachable content only when they know how the disciplinary knowledge is structured.

Context dependence is one aspect of disciplinary knowledge structure focused on in this chapter through the concept of 'semantic gravity'. The first step in the analysis identified the presence of combinations of different strengths of semantic gravity – the gravity range – in student responses and it was clear that students with more experience with physics produce answers with a definite structure. They are more likely to exhibit a larger gravity range.

Most significantly, when both the structure and content of responses are considered together, the conclusion is that, in this instance, students employing knowledge with relatively weaker levels of semantic gravity – signalled by use of the ideal gas law – were more likely to be unsuccessful, leading students down the wrong path. This result suggests that there is an appropriate semantic range for success. The chapter also examined why students were favouring concepts with weaker semantic gravity. Students are tempted by more abstract principles for a variety of reasons and often went to

extraordinary lengths to try to make them work.

Moving from the structure of responses to their content, and drawing on the conceptions literature, the concept of the emergent conception was also introduced. Emergent conceptions are conceptions, alternative or otherwise, that reside in the intermediate level of semantic gravity. This distinction emphasizes the need to consider the entire student response rather than identifying similar words or phrases and labelling them as ‘misconceptions’ or ‘alternative conceptions’. This is particularly important when comparing students of different levels of expertise and when taking into account whether responses are correct or incorrect is not illuminating.

While the primary purpose of this chapter is to show how a concept from the LCT dimension of Semantics offers an insightful approach for PER, it is also worth noting its potential contribution to teaching. The concept of semantic gravity provides a language with which to interpret institutional practice in thermal physics. For example, many of the questions that are designed for use in conceptual surveys and first year examinations in thermal physics that ask questions about the ideal gas already include various assumptions (e.g. consider a fixed volume cylinder). Effectively, such questions, popular because there is usually a unique and unambiguous solution, provide a scaffold which lifts the context-dependence away from the very concrete. That is, typical physics questions involve weakening semantic gravity and removing the need for students to discuss more concrete behaviours or practice selecting which more general principles are appropriate. Therefore, is it not surprising there are reports that students are unable to effectively transfer the learning of general principles to other, unfamiliar contexts (Atkinson *et al*. 2003). This is particularly salient when considering fundamental understanding, which can remain underdeveloped despite increasing in expertise in physics more generally (Meltzer 2005). Semantic gravity thus provides a valuable meta-language for instructors and course designers. For example, the instructor may wish to focus on strengthening the semantic gravity when presenting the concept during instruction, perhaps by introducing Boyle’s Law, Charles’ Law and Avogadro’s Law before the Ideal Gas Law, in order to strengthen the links across the gravity range. Alternatively, an analysis of the semantic gravity implied by the problems could help clarify certain objectives of instruction by exploring which semantic gravity range is being activated. The identification

of this structure could thus allow for greater understanding (or even prediction) of both successful and unsuccessful attempts in teaching these concepts. (Compare Blackie 2014 on using Semantics in chemistry teaching.)

Conclusion

This study showed how ‘semantic gravity’ conceptualizes an organizing principle of knowledge and reveals its consequences for research, teaching, and learning. Specifically, this example provided insight into student understanding: that it is not just a matter of whether students are providing correct answers, it is also a matter of whether they grasp that there is an appropriate range of semantic gravity for their answers, that learning physics includes learning how abstract and how concrete one needs to be. More generally, enacting the concept of semantic gravity also addresses limitations of science and physics education research. It addresses a methodological limitation that leads to an over-reliance on categorization and it enhances theoretical perspectives by turning the focus onto knowledge as an object. Given the discipline of physics is typically considered an archetypal knowledge structure, one can expect to understand more about the teaching and learning of physics if one also pays closer attention to knowledge practices. Physics does not just consist of physics content, and physics content does not reside solely inside a student’s mind, just as semantic gravity is not a piece of content – it is not inside physics – it is describing an organizing principle of physics as a knowledge structure.

Notes

1 A comprehensive selection with references to published papers may be found at www.flaguide.org/tools/tools_discipline.php.
2 They ‘emerged’ from the SG∅ level.

10 Musicality and musicianship

Specialization in jazz studies

Jodie L. Martin

Introduction

In 2012 my brother, a BMus (Jazz Performance) graduate with five years' experience playing in jazz ensembles and other bands, tweeted: 'I'm sick of being told by old non-musicians that I'm young therefore I don't understand "their" music.' In his tweet, Jeremy characterized music through possession, framed by scare quotes to indicate disagreement; sometimes music is defined not by its own qualities, nor by its relation to other types of music, but by whose music it is. He objected to people positioning him according to a social category (his age) and thereby dismissing his status as a legitimate music knower. He rejected the suggestion that to truly understand the music of an era, first-hand experience of that era is required. At the same time, Jeremy dismissed these people in turn as 'non-musicians', as not having the skills, experience or training to understand music the way he does. Both Jeremy's interlocutors and Jeremy himself emphasized something about their dispositions as musical knowers, but they were clashing over what kinds of dispositions are legitimate. One is marked as social positioning (age) and the other as experience (education and practice). Maton (2014b: 171–95) describes this distinction in terms of *kinds of knowers* and *ways of knowing*. This distinction is central to this chapter, which discusses how performance students write about music, the values they express, and what this reveals about the organizing principles of music studies. For this specific object of study, the distinction becomes one between *musicality* (kinds of knowers) and *musicianship* (ways of knowing).

As Maton (2014b) argues, subject areas have different ways of positioning

its knowledge and its knowers, and writing in each area reflects those. Success for students depends on demonstrating in their writing the capacity to position knowledge and knowers in ways that are seen as legitimate. Exploring this capacity is a key concern of work in educational linguistics, including academic literacies; it drives the effort to better understand disciplinary differences in writing and to develop forms of teaching to enable more students to achieve success. This chapter centres on such writing from a corpus of six research project reports written by jazz performance students at an Australian conservatorium. The projects were written in an Honours year, an optional fourth year for selected students that is required for entry into postgraduate research degrees. The focus of these projects was musicians, that is, musical knowers rather than musical artefacts independent of producers. The students were confident as skilled instrumentalists and working musicians. They sought through research and analysis to learn instrumental techniques that they could integrate into their own performances. They were far less confident, however, as academic writers.

The study drawn on for this chapter (J. L. Martin 2013) enacts both Legitimation Code Theory (LCT) and systemic functional linguistics (SFL). It thereby contributes to a growing number of studies in educational fields (for example Chapter 5, Chapter 6 and Chapter 8, this volume). The contribution of LCT in such studies has often (though not always) been to pose questions that can be explored through linguistic analysis and to provide a framework for interpreting differences that emerge from such analyses. In this kind of 'close encounter' (Chapter 5), SFL offers an 'external language of description' or 'translation device' (Chapter 2) that enables movement between the sociological concepts and the language data. This is the relationship between the theories that I utilize in this chapter.

From LCT I enact in particular the dimension of Specialization (Maton 2014b; Chapter 1, this volume) to frame my explorations of how the six jazz performance students represent various kinds of knowers in their research writing. Analyses using SFL explore how the students construed themselves and ways in which they evaluated their chosen musicians and themselves. In general, the texts exhibited the knower code that also shapes the general basis of legitimacy in jazz performance, emphasizing that who you are as a musician is more important than what is played. However, as my brother's tweet demonstrated, there are various ways in which a knower may be

specialized. In order to investigate the basis of knower-code specialization, I identify two key concepts in the evaluation and legitimation of musical knowers, those of *musicality* and *musicianship*.

The first stage of the analysis is to examine how students presented themselves, as well as how they represented their readers. In general, the students presented themselves as legitimate by virtue of a *cultivated gaze* acquired through immersion (Maton 2014b). In other words, their legitimacy derived from their own experiences of playing and performing and through their exposure to others' performances. They did not validate themselves on the basis of innate talent or musicality, which would indicate a *social gaze*. Second, focusing on a comparison of two students' texts and their portrayal of their chosen musicians, the chapter explores the distinction between musicality and musicianship and uncovers key differences in otherwise seemingly similar texts. This identifies variations within the knower code of jazz performance. The chapter thereby reveals how students write about jazz and, by extension, the values and organizing principles of jazz performance.

Context of study

The relationship of writing and music

Music enjoys an analogous and intertwined relationship with language: music coexists with lyrics; it is by its nature communicative and idiomatic (Van Leeuwen 1999); music notation developed in parallel to writing (Haines 2008); and language is often required to talk about music (Bohlman 1997). The investigation of the study of music and the creative arts by both local and international students demonstrates both the challenge and the importance of writing *about* music.

There are few studies into tertiary writing by music or creative arts students. Among them, Wolfe (2006, 2007) discusses the language use of international tertiary music students in Australia and highlights the difficulty of the metaphorical, technical and vernacular language involved in music. She concludes that 'words get you everywhere, especially in an academic community. But importantly, knowing the language of a discipline makes you feel like part of that community and is likely to lead to a more successful

study experience' (2007: 6). Similarly, Molle and Prior (2008) include music students in their investigation of genres in English for Academic Purposes and observe a hybrid discourse drawing on academic and poetic language. In a wider study, Starfield *et al*. (2012) describe the struggle for legitimacy faced by new doctoral awards in visual and performing arts, including music. Paltridge *et al*. (2012) also point to the challenge both supervisors and students encounter in shaping an accompanying text which contextualizes and provides a basis to claims of the creative work to originality and contribution to the field. The diversity of texts they found in their research is indicative of the diversity and shifting nature of writing practices in the creative arts at university.

While Wolfe (2006, 2007) and Molle and Prior (2008) studied non-native speakers of English, my research involves first-language writers. It explores how these students reveal in their language bases of legitimacy for themselves and for their objects of study within the musical community. The aesthetic characteristics Molle and Prior (2008) identified have been similarly observed, however the current chapter will focus on the evaluation of musical actors rather than of musical objects. While this research is focused on Honours year papers, at a stage prior to the postgraduate research degrees investigated by Starfield *et al*. (2012) and Paltridge *et al*. (2013), it similarly includes independent research and an extended piece of writing that describes creative work. Furthermore, the Honours year is intended to prepare students for postgraduate degrees and thus the investigation of values the students have internalized at this point, as well as the writing skills they demonstrate, is relevant for understanding what they bring from the undergraduate degrees and into the postgraduate degrees.

The cohort and the corpus

Honours students were chosen as the cohort for the study following the recommendation of the Head of Jazz as students who were acculturated into the practices of the conservatorium. They had completed a Bachelor degree in jazz performance the previous year and had been selected for the programme. They also had a significant written component to their studies, being required to complete a 5000-word research project as a mandatory element of their studies in addition to their individual and ensemble recitals. At the time the

current study was undertaken (2009–12), the student project was ungraded but it has subsequently become a graded thesis. The task descriptor of the research project was brief, stating length and due date but leaving the topic choice to negotiation with the programme coordinator. The relevant point for this study is the stated purpose of equipping students 'with the research and writing skills that are necessary for the progression to the postgraduate research degrees' (programme outline). The Honours year is thus key for preparing performance students for the writing associated with research degrees; in their undergraduate degree there were limited writing opportunities and only two to three writing tasks were of one thousand words or more.

Rather than provide generalizations across a large corpus based on only a few features, this chapter aims to provide a more in-depth exploration of a small number of texts, generating more detailed observations of the ways students can and do write about music and musicians. As an exploratory study it is thus useful for suggesting questions to ask, paths to pursue and for providing a point of comparison for future research. It provides a basis for future support, while demonstrating the values and language that students already use to write about music.

Specialization and music education

Enacting the LCT dimension of Specialization to explore music education is to explore why something (a piece, a technique, a repertoire, an instrument) or someone (a musician, a composer, an analyst) is valued as special or legitimate. As outlined by Maton in Chapter 1 (this volume), central to Specialization is the concept of *specialization codes*, based on the relative strengths of *epistemic relations* and *social relations*. Specialization provides one way of exploring the 'rules of the game' or organizing principles of practices that are subject to struggles among actors within social fields. As Maton explains:

> Specialization can be introduced via the simple premise that practices and beliefs are about or oriented towards something and by someone…. One can, therefore, *analytically* distinguish: *epistemic relations* between practices and their object or focus (that part of the world towards which

> they are oriented); and *social relations* between practices and their subject, author or actor (who is enacting the practices). For knowledge claims, these are realized as: epistemic relations between knowledge and its proclaimed objects of study; and social relations between knowledge and its authors or subjects.
>
> (Maton 2014b: 29; original emphases)

These concepts, first introduced in Maton (2000a, 2000b), have been widely used to explore education across a range of institutional and disciplinary contexts (see Maton 2014b and this volume). This chapter enters new territory by enacting them within research into tertiary music study. It also introduces more recent conceptual developments, specifically relating to *gazes* (Maton 2014b: 86–105), and enacts them to analyse the students' writings about music.

Specialization codes

Specialization codes in music education can be introduced with reference to the studies by Lamont and Maton (2008, 2010) of school music in English education.[1] (See also Chapter 3 of this volume for a valuable summary of this work.) Lamont and Maton (2010: 63) state that understanding 'the basis of attitudes and practices among learners, teachers and music education researchers towards music in formal education is crucial for enabling widening participation and the future success of a music curriculum'. They explore the study of music across primary and secondary schools in England in order to understand the comparatively very low rates of non-compulsory study of music for the GCSE school qualification (General Certificate of Secondary Education, ages 14–16).

In their studies they enact specialization codes to analyse curricula and the perceptions of teachers, school pupils and undergraduates to trace the changing values across years. In these studies epistemic relations are realized as an emphasis on skills, technique and the acquisition of musical knowledge and social relations are realized as an emphasis on musical dispositions and personal expression. These relations, when mapped as continua of strengths and weaknesses on the *specialization plane* (see Figure 1.2, page 12), delineate four principal specialization codes. Where the basis of achievement

in knowledge practices downplays possession of specialist musical knowledge (weaker epistemic relations) and emphasizes personal expression or musical dispositions such as aptitude and attitude (stronger social relations), it represents a knower code (ER−, SR+). Lamont and Maton (2008, 2010) describe this as characterizing the study of music in primary schools where students are encouraged to express themselves creatively. In contrast, where the basis of achievement emphasizes acquisition of musical knowledge and skills (stronger epistemic relations) and downplays musical dispositions (weaker social relations), it represents a knowledge code (ER+, SR−). Lamont and Maton describe a 'code shift' from a knower code to a knowledge code in lower secondary school, with a transition to formal elements of music. They identify a further code shift in upper secondary school towards an élite code, where students are required to demonstrate *both* musical knowledge *and* musical dispositions (ER+, SR+). They suggest that student perception of the doubly demanding nature of the élite code is one reason for low take-up rates of students for GCSE qualifications in music.

Lamont and Maton's studies indicate *code shifts* in the study of music, which can make success appear unattainable to students who approach with a different code (see also Chapter 3, this volume). This raises interesting questions for musical studies at tertiary level; in performance degrees the principal motivation may be the development of musical knowledge, the development of musical knowers, or both equally. While Lamont and Maton's research enables the identification of a knower code (ER−, SR+) enacted in the student research projects of the current study, it does not capture differences among musical knowers. As the tweet that opens this chapter demonstrates, these can be specialized according to different parameters. For this we can turn to more recent developments in Specialization relating to 'gazes'.

Gazes

Maton (2014b: 171–95) further distinguishes sub-dimensions of both epistemic relations and social relations in his '4–K model'. Social relations, the primary concern of this chapter because centred on the study of knower code texts, are distinguished into *subjective relations* (SubR) and *interactional relations* (IR). Subjective relations identify how strongly

practices bound and control relations to legitimate actors as *kinds of knowers*. They concern knowers from the perspective of who they are. Interactional relations identify how strongly practices bound and control ways of *knowing*, or how knowers come to be or are recognized as legitimate. The *social plane* displayed in Figure 10.1 is generated through the intersection of subjective relations and interactional relations.

The mapping of subjective relations and interactional relations in Figure 10.1 produces four principal modalities or *gazes* (Maton 2014b: 184–7) which can be described as follows:

- *social gazes* (SubR+, IR−) are possessed by those who belong to a specific category, such as a social group;
- *cultivated gazes* (SubR−, IR+) are possessed by those who attain the legitimate dispositions through interaction with a 'significant other', such as apprenticeship under a master or immersion in a canon of great works;
- *born gazes* (SubR+, IR+) are possessed by those who both belong to the right category and have the right dispositions; and
- *trained/blank gazes* (SubR−, IR−) are characterized by neither category nor dispositions (and instead either emphasize specialized knowledge, corresponding to the stronger epistemic relations of a 'trained gaze', or posit no basis for legitimacy – a 'blank gaze').

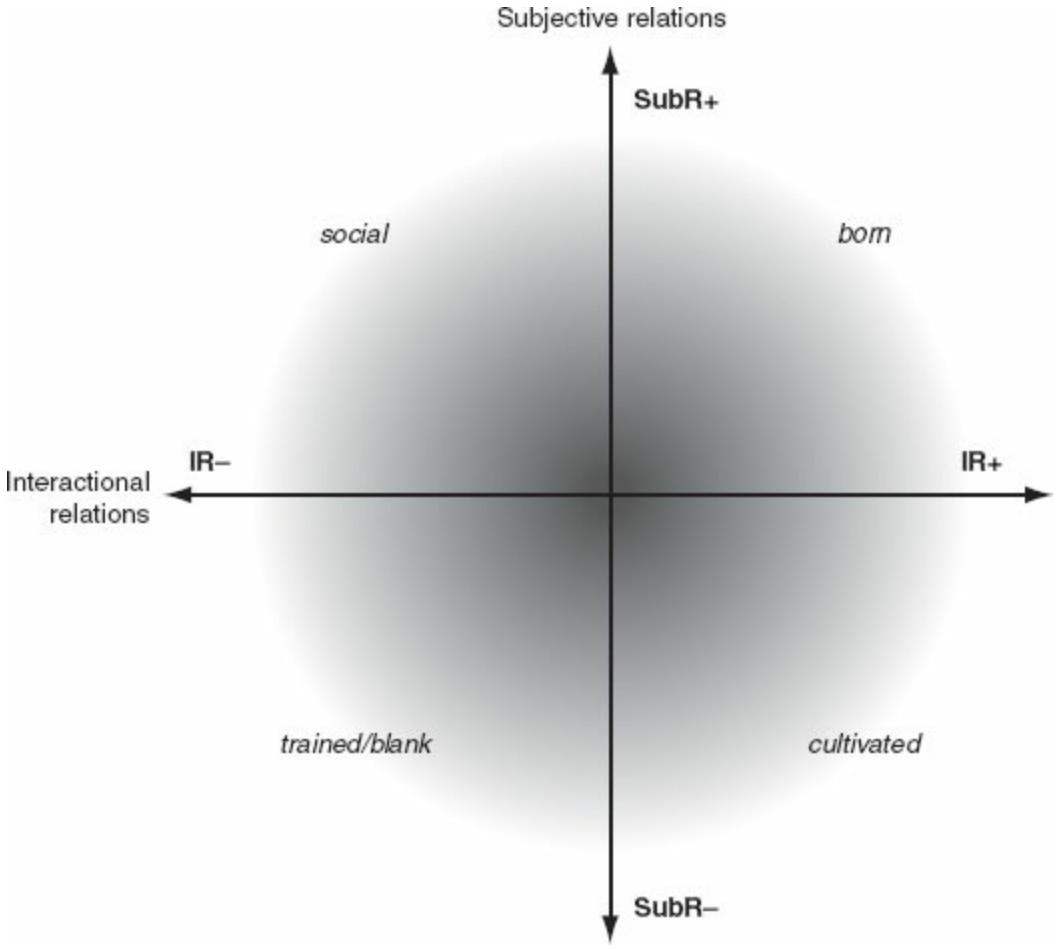


Figure 10.1 The social plane (Maton 2014b: 186).

Lamont and Maton (2008, 2010) identify social relations in music education as highlighting musical dispositions and/or aptitudes. On the basis of this further differentiation into subjective relations and interactional relations, it is possible to re-interpret the field of music education with respect to the developed model, as summarized in Table 10.1.

Subjective relations can be understood as expressing the relative *musicality* of actors, their musical dispositions, inherent qualities and personal expression. Stronger subjective relations in music (SubR+) emphasize the musicality of esteemed knowers, such as virtuosic musicians with innate talent. Weaker subjective relations (SubR−) are indicated by reference to anonymous or generalized musicians, who are constructed as interchangeable.

Interactional relations express relative *musicianship* and how musical

knowers learn about or enact music. Thus stronger interactional relations (IR+) emphasize experience through education, instruction from expert musicians, technique, analysis and participation in great works. When interactional relations are weaker (IR−), how one becomes a musician or performs music is downplayed.

Table 10.1 Social relations and musical application

Specialization concepts		4–K	Emphasis on:	4–M	Emphasis on:
social relations (SR+/–)	subjective relations (SubR+/–)	knowers	kinds of knowers	musicality	musical aptitude and sensibility
	interactional relations (IR+/–)	knowing	ways of knowing through interactions with 'significant others'	musicianship	musical knowing through performance in some sense – instrumental, analysis, listening, lessons

The terms ‘musicality’ and ‘musicianship’ have been widely used in music education as loosely defined labels for courses and course requirements, alluding to the differentiation of skills or characteristics. This chapter enables some clarification as it generates a conceptual basis for the ongoing use of the terms that relates them to a wider and more systematic theoretical framework.

Systemic functional linguistics and text analysis

In order to identify and interpret how students construed their experience of the world of music, and how emphases on musicality and musicianship manifested in the language they used, I employ aspects of systemic functional linguistics (SFL) as a theory of language as meaning. Meaning in SFL is interpreted metafunctionally as always and simultaneously construing human experience (ideational meaning), enacting personal and social relationships (interpersonal meaning), and constructing coherent messages (textual meaning) (Halliday and Matthiessen 2004).

From an ideational perspective SFL enables differentiation in the text between: the internal, personal world associated with musicality and subjective relations; and the external, impersonal world of activity and technique associated with musicianship and interactional relations. The TRANSITIVITY system in the grammar construes the world through the selection of verbs, or ‘process types’, in clauses representing processes of doing, sensing, saying, being, having or happening. The processes are associated with particular participant roles and with circumstances, for example of time, space, cause or manner (Halliday and Matthiessen 2004). By conducting an analysis using TRANSITIVITY of the clauses which refer to the student writers, we can see how they construed themselves as participants in the world of music, for example as Actors in material processes (in bold), as in ‘I have **analysed** transcriptions’, or as Sensers in mental processes, such as ‘three concepts that I **feel** are most prominent’.

However, ways in which students present themselves frequently differs from their representations of the musicians they study. To explore these representations further, we can draw on another aspect of SFL: APPRAISAL (Martin and White 2005). Here the focus shifts from the clause (TRANSITIVITY) to analysis of patterns of evaluative meaning across texts. As a system of interpersonal meaning in discourse it focuses on the

evaluative aspect of enacting relationships. The ATTITUDE system within APPRAISAL centres on whether things are evaluated as positive or negative and distinguishes between evaluations relating to emotion (affect), evaluations of humans and human behaviour (judgement) and evaluations of aesthetic qualities and values of things (appreciation). These categories of ATTITUDE are demonstrated in the examples below, indicated in square brackets after the relevant expressions; judgement is underlined, *appreciation* is italicized, and ***affect*** is both underlined and italicized:

> Of course, Mason is a technician [judgement: capacity] on the instrument, being an experienced [judgement: capacity] … player as well as an accomplished [judgement: capacity] improviser.
>
> The use of rhythmic devices can be extremely *valuable* [appreciation: valuation] when creating a bass line.
>
> I have become aware that his endless pursuit of deeper knowledge is fuelled somewhat by ***frustration*** [affect: dissatisfaction].

While inscribed attitude is encoded in specific wordings, the APPRAISAL framework allows us to account for the attitudinal meaning conveyed by patterns of prosody that extend beyond the wordings and clauses, such that an otherwise neutral word or phrase may invoke a positive or negative attitude. These invocations encode implicit attitude and will be indicated by 'inv' within the square brackets further below.

The analysis of ATTITUDE in the introductions of the six texts revealed that musicians are evaluated according to two main categories within judgement: *normality* or how special and unique they are; and *capacity* or how skilled they are. These judgements are important for constructing and conveying musicality and musicianship.

The SFL analyses identify how values are expressed in the language of the text and form a basis for interpreting which gazes are being enacted. This enables us to demonstrate how students represent themselves within the text as valid musical knowers due to their own musicianship and experience with music, musical instruments and musical artefacts. We can also show how the students position the musicians they study, how they evaluate them and

distinguish them according to their musicality, musicianship, or both.

Students as musicians rather than writers

During data collection I noted that the music students had a stronger sense of their own authority than Honours students in other disciplines. They attributed this to being practising professionals, having already worked for several years as hired musicians as well as instrumental teachers. They identified themselves as musicians *as well as* music students and were confident of their authority as such. However, as mentioned previously, they were less confident as academic writers.

To investigate how students represented themselves as knowers in the texts, all references to the students, explicit and implicit, were identified in the corpus. There were between five and twenty-one references to the writer in each text and they varied in form from first person pronouns to passive constructions and nominalizations. As illustrated in Table 10.2, the analysis of TRANSITIVITY revealed a consistent pattern: students (column 3) represented themselves primarily as the Sensers of mental processes and secondarily as Actors of material processes. Halliday and Matthiessen describe mental clauses as 'concerned with our experience of the world of our own consciousness' (2004: 197). These are processes which deal with types of sensing. Halliday and Matthiessen further distinguish between four sub-types: perceptive (I see), cognitive (I think), desiderative (I want) and emotive (I like). In the corpus, the students represented themselves as cognitive and perceptive Sensers.

Table 10.2 Participant types – student writer and reader (participants are underlined and processes are in bold)

Participant: Process	Example	Student writer	Reader
Senser: Mental	Here we **see** a very common progression	41	13
perceptive	Again we **see** strong melodic content supporting the use of the odd note grouping	12	9

cognitive	As the author **deems** compositional elements important to evaluation	25	4
desiderative	it **is hoped** that a better understanding of Stewart's style will be attained	4	0
Behaver: Behavioural	As I **listened** to Mason's solos over and over again	8	1
Sayer: Verbal	the author **would suggest** that the rhythms be taken as a guide	3	1
Actor: Material	I **have analysed** transcriptions of Allan's solos	19	6
Other:	It is vital that one **has** complete command of one's instrument	5	1

The references to the students include the first person plural pronoun (we), which potentially involves the reader in observations and analyses, as does the use of passive voice. The reader is also referenced in four of the six texts with the second person pronoun (you), and in imperative commands. They are similarly construed as sensing knowers (column 4 of Table 10.2), although primarily with mental processes of perception. Students thus constructed their audience as able to perceive the same things as they did in the notational examples. During interviews, students stated that they expected their examiners to be equally musically literate but not necessarily to have the relevant jazz or instrument-specific knowledge.

From an analysis of participant roles in relation to different process types we can make some initial interpretations about how the students represent themselves as knowers in the research projects. Students are seen to observe, to understand and to form opinions about the music, and these particular roles can be interpreted as enacting a particular gaze. They expect their readers to share this gaze and be equally able to make similar observations about the music.

The identification of subjective relations (SubR as *musicality*) and interactional relations (IR as *musicianship*) enables the basis of the gaze to be explored and thus reveals the kind of gaze demonstrated. Where the students refer to their own knowledge and contributions to the text, they affirm that immersion in musical artefacts, in terms of listening to recordings, attending

performances and conducting analyses, is of foremost importance. This immersion first underlies the knowledge claims of their research projects; as one student wrote, ‘much of this research project has been based on the many hours I have spent **listening** [process: behavioural] to and **studying** [process: material] his performances’. The material and behavioural processes present the students as active in the practices of making and understanding music. It is their interaction with exemplars – what Maton (2014b) calls ‘significant others’ – which has generated the musical knowledge. Second, this immersion is also held to be important in becoming a better musician; as another student wrote, ‘Throughout this study I **hope** [process: mental] to gain knowledge about Holdsworth’s sheets of sound ability with the intention [nominalized process: mental] of **incorporating** [process: material] this sound into my own playing’. Interactional relations with significant others are thus emphasized, distinguishing their legitimacy as musicians as a *cultivated gaze*. As Maton writes:

> Practices that base legitimacy on the possession of a *cultivated gaze* weakly bound and control legitimate categories of knower but strongly bound and control legitimate interactions with significant others (SubR−, IR+). These often involve acquiring a ‘feel’ for practices through, for example: extended participation in ‘communities of practice’ …; sustained exposure to exemplary models, such as great works of art; and prolonged apprenticeship under an acknowledged master.
>
> (Maton 2014b: 185–6)

Further support for the identification of a cultivated gaze is provided by the responses of students during interviews: they frequently referred to their musicianship as the source of their validity. For example, when questioned about his authority to make negative judgements of his fellow trombonists, one student replied:

> I have been playing trombone for seven years, played piano for eleven, have listened to countless recordings of trombone players and listened to many trombone students. I would argue that I did have the authority to say that trombonists are less technically able in general.

Another student used less explicit evaluation in his text and stated that he had made an effort to minimize his expressions of opinion. However, he was also of the opinion that as a musician his authority is legitimate:

> I've tried not to put too much of my personal opinion within this paper but I think that I do have some authority to use it. Not so much as a student but as a musician. I've been playing drums for 18 years now and there are many things that I have learnt from experience. Therefore I think what I say is valid. From a different perspective, music can be interpreted in many different ways.

It should be noted that this student began learning drums at the age of two and was 20 years old at the time of the interview, so the experience that legitimated his identity as a musician was substantial.

These music students thus consider themselves as *musicians* by virtue of their lengthy experience with their instruments, their university education, and their immersion as both participants and observers in engagement with great works of jazz. They see this basis of interactional relations with the 'significant others' of musical instruments and jazz music as legitimating their musicianship. It is this that reveals their cultivated gaze as musicians. As musicians, they are able to perceive and understand the music in a way that non-musicians cannot (as Jeremy's frustrated tweet suggested). However as *music students* and *writers*, they are less confident, as revealed by how they manifest themselves in their texts.

Specialization in jazz performance

Analyses of how students presented themselves in their texts reveal that the basis of their legitimacy is a cultivated knower code, achieved through immersion in exemplars, including the focal musicians and their performances. This section will examine two texts from the corpus that focused on guitarists, described by the students as different in some way from the majority of jazz guitarists. Both students explicitly set forth the intention to improve their own performance through their study of these musicians. Through analysis of sections of the two texts, the differing emphases on subjective relations and interactional relations can be observed and the

different gazes interpreted.

First, an analysis of IDEATION differentiates between the internal, personal world and individual qualities of a musician and the external, impersonal world of techniques, processes and actions. Emerging differences in this respect reflect the relative prioritization of musicality (subjective relations) and musicianship (interactive relations), respectively. Second, an analysis of ATTITUDE highlights the different emphases through the inscription or invocation of values. The gazes attributed to the guitarists can be compared, both with each other and with those of the students who write about them and who view them as successful musicians and worthy of emulation.

Both students focused on jazz guitarists' improvizations. The first, named here 'Fender', examined the 'sheets of sound' effect achieved by Allan Holdsworth, while the second, 'Gibson', studied Bill Frisell's use of harmony in comparison to two established jazz guitarists. In their introductions both give attitudinal emphasis to how special their focal guitarist is: Fender uses superlative judgements to write 'Allan Holdsworth is one of the greatest [judgement: capacity], yet most underrated [judgement: capacity] guitar players of our time'; while Gibson juxtaposes judgement of the primary and secondary focal musicians and asks 'why does [Frisell] sound so unique [judgement: normality] when compared to the acknowledged jazz guitar greats [judgement: capacity]?'

The guitarist with the social gaze

In both texts the significance of the work studied is predicated on the focal musician's exceptionality, emphasized with intensifiers and superlatives. In Fender's introduction he uses numerous judgements of both normality and capacity, to position Holdsworth as a famous virtuoso at the origin of jazz-rock who many do not appreciate because they lack the correct gaze (too rock for jazz, too jazz for rock). Holdsworth is therefore not positioned as core, authentic jazz. He does not adhere to established processes and techniques of jazz guitar improvisation. Rather it is his extreme skill and superlative musicality that distinguishes him and makes him a legitimate focus for research.

Fender's research project examines the techniques his guitarist used to create the 'sheets of sound' effect. Fender contrasts their use in Holdsworth's

solos to a generalized portrayal of ‘most’ jazz guitarists, relying on his own cultivated gaze and immersion in jazz guitar solos to validate his observations. The varying strengths of subjective relations and interactional relations is indicated in square brackets. Fender summarizes,

> There are three main techniques used by Holdsworth to execute the melodies that he desires: left hand legato, string skipping and sweeping [IR+]. When all of these techniques are applied they provide the quintessential economy that is required to create sheets of sound on the guitar in the style of Allan Holdsworth [SubR+].

The focal musician is therefore positioned as the validator of the technique. It is the qualities that he brings which make it worthy of study and adoption. Similarly, a section of the text on symmetrical scales begins with a list in which Holdsworth ordered the scales by how useful he found them, before the student explains what they are and their value in performance. It is therefore their importance *to Holdsworth*, his explicit valuing of them and who he is as a knower, which is the basis for their selection and investigation. Throughout the text, although the techniques are broken down and analysed, it is Holdsworth’s genius which underlies their use and importance, his engagement with the concepts and principles, and his explicit evaluation through instructional DVDs and interviews which provides a basis for legitimation.

Fender’s analysis shifts between generic techniques and characteristics of the guitar, and Holdsworth’s unconventional approaches and adaptations of technique. In the conclusion, he makes an effort to specifically emphasize Holdsworth’s musicality and his importance as a musical knower.

> It needs to be acknowledged that while the techniques [IR+] outlined within this text are some of the key aspects of the Allan Holdsworth sheets of sound model, they are just theories and examples [IR−]. The genius [SubR+] is in their application. From research conducted as part of this study [IR+] I have become aware that his endless pursuit of deeper knowledge is fuelled somewhat by frustration. In his mind [SubR+] his music will never be good enough; he always needs to improve. And so even now that he is in his sixties his life still revolves around striving to

become a better musician.

In this passage, Fender dismisses the content of the research project as ‘theories and examples’, weakening interactional relations and suggesting that once disembodied from the specific knower-practitioner the techniques lose their worth. In short, techniques alone do not make the musician, the musician utilizes techniques. Although techniques are frequently focused on in this text, and although interactional relations are at times strengthened, it is the musicality of the performer which provides the basis for legitimacy for the techniques.

An analysis of ATTITUDE highlights the primacy of Holdsworth, reflecting the emotions driving him, his own valuing of his music and his innate talent as a musician. These all strengthen the subjective relations by emphasizing the guitarist’s musicality, whether positioned as already accomplished or continually improving.

> It needs to be acknowledged that while the techniques outlined within this text are some of the key aspects of the Allan Holdsworth sheets of sound model, they are just theories and examples. The genius [judgement: capacity] is in their application. From research conducted as part of this study I have become aware that his endless pursuit of deeper knowledge is fuelled somewhat by *frustration* [affect: dissatisfaction]. In his mind his music will never be *good enough* [appreciation: valuation]; he always needs to improve [judgement: capacity]. And so even now that he is in his sixties [judgement: tenacity: inv] his life still revolves around striving to become a better [judgement: capacity] musician.

Although the judgement of tenacity could add to the emphasis on interactional relations by alluding to practices and processes of music, it is invoked rather than inscribed. It is downplayed in contrast to the inscribed attitude relating to musicality.

Fender bases his knowledge on a dawning awareness in his research, rather than on facts revealed in the course of the study. His immersion in the object of study enables the cultivated gaze required to understand and fully respect Holdsworth as a social knower. His use of the first person also frames his thesis as the product and the opinions of a visible subject (Hood 2011); as

reflecting a knower code. This knower code is corroborated in the following paragraph of the conclusion in which Fender reflects on the musician's role, that is, how a legitimate musical knower must act.

> Learning about Holdsworth and his understanding of his role as a musician [IR+] has both inspired and challenged me. It has exposed a great fault in my own philosophy of life and musicianship [SubR+]. I believe that many musicians spend a great deal of time trying to imitate the masters [IR+][;] once the imitation is 'good enough' we become complacent [SubR+].

Fender focuses on the processes involved in undertaking the research itself and then on enacting music. However, conclusions drawn relate to his personal response and the inadequacy of his own musicality. This is particularly highlighted through the analysis of ATTITUDE:

> Learning about Holdsworth and his understanding of his role as a musician has both *inspired* [appreciation: reaction] and *challenged* [appreciation: reaction] me. It has exposed a great fault [judgement: capacity] in my own philosophy of life and musicianship. I believe that many musicians spend a great deal of time trying to imitate the masters [judgement: capacity][;] once the imitation is '*good* [appreciation: valuation] enough' we become complacent [judgement: tenacity].

In encoding appreciation as *reaction* Fender evaluates the learning in terms of his personal emotional responses to the study. The appreciation of his and his fellow musicians' imitations as 'good enough' contrasts to Holdsworth's earlier dissatisfaction with his own music as 'never good enough'. Similarly the positive tenacity invoked on Holdsworth for continuing to improve contrasts to the negative tenacity the anonymous musicians exhibit, this time presented as an attribute of the musicians rather than something they do.

Fender questions imitation as a process of legitimate knowing and yet, in a concluding quote from *Guitar Player Magazine*, judges imitation and Holdsworth's musicality thus:

> Only the elite [judgement: capacity] musician *wishes* [affect: inclination] not to imitate. Originality [judgment: normality] and finding your own

> voice [judgement: normality: inv] are the only beacons the elite [judgement: capacity] musician follows. Allan is one of those musicians.

Holdsworth is therefore original, even in his imitation of John Coltrane's sheets of sound. It is not due to his imitation that he is worthy; it is not due to the techniques he uses that he is worth imitating in turn. Rather, subjective relations are very much the ruler by which everything in the research project is measured: Holdsworth's supreme musicality underlies and legitimates the text. Holdsworth is therefore positioned as possessing a social gaze (SubR+, IR−).

The guitarist with the cultivated gaze

While Fender's musician was described as superlatively talented, Gibson's introduction emphasizes the uniqueness of the guitarist by appreciating what the artefacts of his performance are not; his album is described as containing '*none of the instrumental pyrotechnics* [appreciation: complexity] found in the recordings of Frisell's jazz guitar contemporaries' and the improvisations are '*free of flashiness* [appreciation: complexity] and well-worn *clichés* [appreciation: valuation]'. However, the absent characteristics, with the exception of 'well-worn clichés', are not typically negative qualities for a jazz guitar as is indicated, for example, in Fender's praise for Holdsworth's virtuosic technique on the guitar. Gibson's evaluations therefore operate to counter expectations the reader may have. The overall effect is to invoke a judgement of normality for Frisell, emphasizing his idiosyncratic distinctiveness.

While Fender's research project focuses solely on his focal musician's performance, Gibson compares his focal musician's solos with those of two established jazz guitarists. He draws on explicitly evaluative quotes to introduce these musicians:

> These examples will be compared with examples taken from the solos of two of the most established masters [judgement: capacity] of Jazz guitar, Wes Montgomery, 'one of the most important [judgement: normality] guitar stylists [judgement: capacity] of the century' (Mathieson 1999: 68), and Joe Pass, 'regarded by fellow jazzmen as an incomparable soloist

> [judgement: capacity], a virtuoso [judgement: capacity] so totally in command [judgement: capacity] of the instrument that he has been called the Art Tatum of the guitar' [judgement: capacity inv] (Feather/Gitler 1999: 517).

This adds another layer of legitimacy to Frisell; by comparing him to musicians whose status as jazz guitarists is established and apparently unquestionable, he is therefore made a worthy target for research. The focus of the text is therefore specialized according to Frisell's exceptionality. However, subjective relations are not held as the basis of knowledge claims for while the musician is presented as exceptional, he defies all the normal parameters and controls for a jazz guitarist. His worth is not presented as due to innate talent.

Subjective relations therefore differ in the introductions of the two texts. While Fender positions his musician as legitimate according to innate skill, strengthening subjective relations, Gibson's guitarist does not demonstrate the typically valued qualities, weakening subjective relations.

Although the musicality of his focal musician is downplayed in the introduction of Gibson's research project, there is a shifting emphasis in the body of the text between subjective relations and interactional relations. It is not until the conclusion that the two values are positioned in relation to each other. The conclusion reiterates Frisell's individuality, emphasizing originality without appraising the resultant sound further. The evaluation of the guitarist includes numerous judgements of both normality and capacity:

> Being fortunate [judgement: normality] enough to attend Frisell's first concerts in this country I witnessed first-hand what a powerful [judgement: capacity] and unique [judgement: normality] performer he is. Part of this uniqueness [judgement: normality] I attribute to the way he presents harmony on the instrument [judgement: capacity: inv].

The basis for this understanding is explicitly attributed to Gibson's cultivated gaze, gained through first-hand experience of the music, as highlighted in the bolded mental process:

> Being fortunate enough to attend Frisell's first concerts in this country I

> **witnessed** [process: mental] first-hand what a powerful and unique performer he is. Part of this uniqueness I attribute to the way he presents harmony on the instrument.

Gibson positively evaluates the experience of conducting the research and invokes a positive judgement of tenacity of himself for his thorough experiencing of the music:

> Having to sit down and spend countless hours [judgement: tenacity: inv] with someone's recordings and learning not only the notes they play but also the nuances and feeling they put into the music is an *incomparable* [appreciation: valuation] learning experience that produces results unattainable by any other means.

By emphasizing the lengthy process of research, Gibson draws on interactional relations as the basis of legitimacy:

> Having to sit down and spend countless hours with someone's recordings [IR+] and learning not only the notes they play but also the nuances and feeling they put into the music [IR+] is an incomparable learning experience that produces results unattainable by any other means.

He also lists the 'practical benefits' of the study. The first two relate to his own understanding of musical techniques. The concluding sentences echo the earlier self-judgement of tenacity with his judgement of the guitarist:

> Lastly I discovered that Frisell's unique [judgement: normality] approach could only have come about through a highly developed [judgement: capacity] musical ear and a thorough knowledge [judgement: capacity] of the instrument. Which is doubtless a result of many years of study and hard work [judgement: tenacity], providing me with an insight and focus as to what is required to play at this level of mastery [judgement: capacity].

Thus the inner world of musicality and the 'musical ear' is effectively juxtaposed with the outer world of musicianship and instrumental knowledge:

> Lastly I discovered that Frisell's unique approach could only have come

> about through a highly developed musical ear [SubR+] and a thorough knowledge of the instrument [IR+]. Which is doubtless a result of many years of study and hard work [IR+], providing me with an insight and focus as to what is required to play at this level of mastery.

As was observed in Fender's text, Gibson at first emphasizes the focal musician's musicality, and thus subjective relations, by foregrounding the individual qualities of the musician applying the technique. However, he concludes that the 'musical ear' is the result of hard work and study, thereby strengthening interactional relations. This is, therefore, something that he too can attain. Frisell is thus positioned as uniquely talented, yet this talent is underwritten by hard work and practice. On this basis, Gibson's research project attributes a cultivated gaze to the guitarist (SubR−, IR+). This also positions Frisell as somewhat exceptional, for the musicians he is compared to are distinguished by both their musicality and their musicianship and are therefore legitimized as having a born gaze (SubR+, IR+). Nevertheless, Gibson's text presents his focal musician's performance as something attainable for a student. Fender, by contrast, despite explicitly stating his intention of appropriating the musician's technique, attributed it in part to the musician's individual genius and therefore beyond the bounds of achievement.

Both Fender and Gibson highlight the individuality of the guitarists they studied and accentuate their divergence from the majority of jazz guitarists. How they do so differs. While both focus at times on musicality or musicianship, they differ on the basis of the legitimacy of the guitarists. Fender emphasizes the social gaze of the focal musician (SubR+, IR−), who by virtue of his own subjective qualities is validated. The guitarist is presented as distinguished by innate qualities, whose experience with music was less important than the internal drive for perfection. He describes the inner frustration which drives the musician to keep working on his sound, suggesting that techniques are only legitimated by the performer and that the musical disposition compels the musical endeavour. Gibson's focal musician defies the emphasis of subjective relations, downplaying individual qualities and noting instead their absence. Rather, he credits the legitimacy of his guitarist as based on hard work, implicating stronger interactional relations. This is indicative of a cultivated gaze (SubR−, IR+), where innate qualities

are less important than processes of development. This focus on gazes demonstrates the value in an exploration of finer distinctions within a corpus of texts that are similarly identified as reflective of a knower code of specialization.

Conclusion

In the process of this research, it became clear that challenges initially thought to be peculiarities of the context of jazz performance studies were apparently ones faced by all students, as they are challenged to construct their own authority in their texts, position their readers to share their perspective, and evaluate in ways that appropriately legitimate knowledge and knowers in their fields. In the current context, LCT and the notion of ‘gazes’ has been explored with reference to meanings students construed in the language of their academic papers, when making claims about the world of jazz. The process has proved valuable in identifying the cultivated gaze students acquire through their education and instrumental experience. Both subjective relations and interactional relations (that is, relations to knowers and to ways of knowing) provided an analytic framework for notions within music education of musicality and musicianship. These concepts were useful in identifying the basis of students’ cultivated gaze and in viewing the positioning of focal musicians, as demonstrated by a comparison of two texts sharing a focus on exceptional jazz guitarists. While one focal musician was positioned as validating and developing techniques motivated by his own musicality, the other was presented as developing his musicality through the processes of musicianship. Thus the first was presented as a musician characterized by a social gaze, and the second as embodying a cultivated gaze. Those respective gazes did not necessarily correspond to how the students positioned themselves as cultivated knowers or whether they considered the success of their focal musicians as attainable.

Specialization, and specifically the distinction within social relations of subjective relations and interactional relations (Maton 2014b), has provided a framework for appreciating significant differences in students’ research writing in jazz performance studies. An analysis of the writing with regard to the interplay between musicality and musicianship reveals the different gazes that the students construct both for themselves and for their chosen

musicians. By such means we can demonstrate how writing functions to legitimate certain ways of enacting jazz performance. Writing is in itself also a way of acquiring, generating and demonstrating knowledge about creative practice. Increasing the visibility of these functions can facilitate students to meet the requirements of their specialist fields. In this case, a better understanding of the potential and the valued ways of writing about music can not only enable students to be more successful in their academic study, but also to more fully acquire musical knowledge and ultimately to generate new and original musical knowledge through their own research, composition and performance.

Note

1 This is not the extent of studies enacting LCT to study music education; see, for example, Weekes (2014).

11 Knowledge and knowers in tacit pedagogic contexts

Freemasonry in France

Célia Poulet

Introduction

From Basil Bernstein we take the notion of pedagogy as an anthropological means by which societies organize reproduction and change. Pedagogy involves the transmission, transformation and acquisition of knowledge and ways of knowing, doing and being (Bernstein 2000). From this perspective, pedagogy can be analysed in any social context where 'learning' is a means for constructing special kinds of persons, a definition that reaches far beyond formal educational institutions. However, as yet, studies in the sociology of education have mostly focused on schooling and universities or, put more generally, formal educational institutions. Few studies have engaged with contexts characterized by informal, tacit or implicit educational practices.[1] To help address this gap, this chapter results from a sociological study of public speaking in Freemasonry as a practice of apprenticeship. Though beyond the traditional foci of sociology of education, this unusual topic mobilizes questions about apprenticeship, democratization and learning of particular skills and procedures.

Freemasonry enacts a particular social form. As described by Bacot (2007), it emerged in eighteenth-century Great Britain as a fraternal society. It now constitutes an association in the French meaning of the term, that is to say it has a very specific legal status, legitimizing the union of people in order to 'improve society'. With the aim of improving mankind by improving some specific initiated and elected members, Freemasonry has some common

characteristics with other philanthropic associations. However, one of its distinguishing features is a very specific method employed in the process of transforming laypeople into masons. This masonic method requires members to ‘reveal’ something they were supposed already to have or to be but which remains until that point tacit (Poulet 2010). While there is a specific ritual to be practised, Poulet (2010) shows this ritual appears to be an ‘empty frame’ in terms of the knowledge to be demonstrated, one that is to be filled instead by characteristics of the knower. I will but briefly summarize this here (see Poulet 2010). What people do in Freemasonry is speak and write about abstract meanings, specifically about symbols. As learners, Freemasons across all different grades of apprenticeship have to produce some kind of dissertation, referred to as a ‘plank’. This comprises a text of roughly 5–10 pages on subjects that engage with symbolic issues, ‘ritual and liturgy’, philosophical issues, and disciplinary academic borrowings. Such subjects might include, for example, ‘Symbolism in the grade of master’, ‘The set square’, ‘What does learning mean in Freemasonry?’, and ‘What is rationality?’.

If the sociology of education, particularly that influenced by Basil Bernstein or Pierre Bourdieu, has shown that social background helps influence how people manipulate abstract meanings, Freemasonry is a paradoxical object of study. Although it has been strongly élitist during the bulk of its history, the current masonic population is characterized by social heterogeneity (Taguieff 2005). There are no official statistics on the masonic population and its social demographics. As declared in prefectures, the French lodges and obediences only give the number of members. However, available evidence on the masonic population indicates a certain social heterogeneity of membership, with a significant proportion from the middle classes (Galceran 2004). People in Masonry appear to come from different cultural and social backgrounds. While members do not all share the same levels of cultural, educational and symbolic capital, as Bourdieu would put it, they do share and enact together certain practices that one might have assumed to be the preserve of more privileged social classes. This is so, for example, in the practice of planks, that is, in the requirement to both write about abstract issues and to present these reflections in public. The planks and masonic works in general necessitate interpretative reasoning that draws on metaphors, symbols and analogies. As such the planks require the

manipulation of linguistic resources for making decontextualized and uncommonsense meanings. It is this issue that I examine in this chapter. I discuss the characteristics of the masonic form of 'pedagogic device' (Bernstein 2000) and show how it can be considered a tacit form. I enact concepts from two dimensions of Legitimation Code Theory: semantic density and semantic gravity from Semantics; and specialization codes from Specialization (see Maton 2014b; Chapter 1, this volume) to explore the structure of relations in the masonic lodge, as realized in the body of knowledge in planks.

The study

All federations of masonic lodges, or *obediences*, draw on symbolism as a universal tool in the expression of reasoning. Such symbolism is a defining feature of Masonry and relates more or less to the tools of 'real' building workers. However, the distance between this symbolic basis and the issues that are studied in a lodge can vary in relation to different obediences. While Freemasonry is often associated with social élitism, lodges in France are now characterized by a relatively heterogeneous social composition with representation from a large spectrum of social classes, although this diversity can depend on variables such as the locale and on the specific nature of obediences. However, what unites all the masonic traditions encountered in the study discussed here is the institutionalized practice of writing and public speaking or, more precisely, the 'planks' that the masons have to compose individually on a relatively abstract issue and then present publicly. The length of these documents is variable but they all constitute interpretative reasonings that draw on metaphors, symbolism, and analogical reasoning.

The research discussed here focused on two obediences: the Grande Loge de France and the Grande Loge Féminine de France, selected for their heterogeneous recruitment, relative stability around debates about initiating women and men separately, and concern with symbolic issues. All masonic obediences are based on the use of symbolism as a universal tool to work and express reasoning but some enlarge this reflexion to social issues, such as planks about socialism. In the study I chose to focus on more symbolic obediences in order to determine the founding of the masonic 'specialization'. The data collected for this study include official documents

(such as constitutions of lodges and obediences), forty interviews with freemasons, and fifty planks given by masons.

Significant work in the sociology of education has identified differences in the manipulation of tools of abstraction according to social origins and educational backgrounds (e.g. Bernstein 1977). The construction of abstract knowledge in planks leads to the question of the sociocognitive tools or sociolinguistic resources in Freemasonry that allow members from different backgrounds to engage in this masonic work. Understanding how the institution shapes the apprentice in this way can throw light on how the apprenticeship of writing and public speaking can transform people, creating and recreating 'common worlds' (Ramognino 2005). Specifically, this chapter focuses on the processes of decontextualization and recontextualization of knowledge in the development of planks. It thus relates to Bernstein's notion of the 'pedagogic device' (2000), or the ordering and disordering principles of the pedagogizing of knowledge, the means by which knowledge is transformed into pedagogic communication. Bernstein (2000) indicates that pedagogic discourse is a principle of recontextualization; thus, one has to describe the organizing principles dominating the pedagogic device to show how its discourse produces specific relationships between people and inside knowledge.

To do so I draw on Legitimation Code Theory (LCT), primarily on the dimension of Semantics and its principles of semantic gravity and semantic density. As Maton defines in Chapter 1 (this volume), *semantic gravity* corresponds to the degree of context-dependence of meaning and *semantic density* corresponds to the degree of condensation of meaning (see also Maton 2011, 2013, 2014b). Each can be stronger or weaker along a continuum of strengths. Exploring changes in the strengths of semantic gravity and semantic density in interviews and planks allows us to analyse processes of decontextualization and recontextualization of meanings, to better understand the role of knowledge in the masonic apprenticeship. Later in the chapter I also draw on the LCT dimension of Specialization and will briefly introduce relevant concepts at that point.

To begin I consider how masonic apprenticeship is to be understood as a kind of 'pedagogic device' and hence how it can be analysed with tools from the sociology of education, including LCT. I then focus on metaphors and analogical reasoning in the planks. Finally, I show how these discursive and

logical elements can lead to abstraction for members through an exploration of grammatical metaphor, a concept from systemic functional linguistics (see Halliday and Matthiessen 2004).

Freemasonry: a tacit pedagogic device

Tacit pedagogy

For Bernstein, education is an anthropological process constituting relationships for the reproduction of social order. Pedagogy is central because pedagogic modes are the realizations of symbolic control, production and cultural reproduction (Bernstein 2000). As a set of particular skills and knowledge to be transmitted, a 'pedagogic device' implies methods, knowledge, skills to learn, to know, to master. As a general social dimension this description not only concerns schooling but all social processes of disciplinarization, or the institutionalization of a pedagogic relationship in order to control the reproduction of a social order. As Bernstein (1977: 37) wrote in relation to schooling: 'The child's response to the school is likely to transform the way in which he thinks and feels about his friends, his community and society as a whole'. On this basis, one can consider every pedagogic relationship corresponds to a matrix of transformation, of operations leading to the modification and/or maintenance of social order. Pedagogy is thereby an anthropological institution of disciplinarization. In these terms, Freemasonry constitutes a 'pedagogic device' in that it considers the transmission of certain knowledge and skills to be the basis for people becoming/being revealed as masons. However, this raises the question of the kind of pedagogic device this entails.

In its official discourse Freemasonry is described as 'an apprenticeship' but it is not supposed to be 'a school' (Poulet 2010). The masonic institution of apprenticeship is considered as a tacit pedagogic device, to be differentiated from both implicit and explicit pedagogic devices. The main official object of evaluation is not knowledge but something more like 'ways of knowing' and above all 'ways of being' (Poulet 2010). However, this evaluation is at odds with the formal enunciation of explicit criteria and with how apprentices are required to transfer what they learn in Freemasonry to

‘be masons’ in their everyday lives. Anderson’s constitutions of 1723, the founding text of Freemasonry, indicate some guidelines for members, not only in the lodge but also in every area of social life, such as relationships with family, neighbours, etc. However, it is impossible to fail in the masonic career or to be downgraded (Poulet 2010). In a sense, ‘doing is passing’, and presenting planks in public, being assiduous and so on, is ‘doing’. I use the expression ‘tacit pedagogy’ to describe this specific organization of education, one devoid of formal social groups specialized in transmission and formation. In Freemasonry, each apprentice will become a master in a relatively short time and in turn initiate newcomers: there is no specialization in teaching roles.

The examination of official texts and rules of masonic apprenticeship allows for a description in terms of a tacit pedagogic device. This involves a relatively strong framing of people (through grades and the disciplining of bodies through ritual) but at the same time an institutional silence concerning the end results of masonic practice and its knowledge contents. Pedagogic relationships are not frozen but recontextualized over the course of the ritual and the gradual organization of time.

Bernstein (2000) distinguished three ‘rules’ that organize a pedagogic device: ‘distributive rules’ that shape who gets access to what forms of experience; ‘recontextualizing rules’ that shape the nature of pedagogic discourse; and ‘evaluative rules’ that organize pedagogic practices. First, the distributive rules in Freemasonry separate the sacred and the profane. In the masonic context the separation is first one of people, elaborating a symbolic line between initiated people/masons and profane people/non-masons. This distribution in Freemasonry can be usefully described by the Specialization dimension of LCT, and specifically *specialization codes*. Maton (2014b; Chapter 1, this volume) defines four principal specialization codes: *knowledge codes* (emphasizing specialized knowledge, principles or procedures and downplaying attributes of actors as the basis of legitimacy); *knower codes* (downplaying specialized knowledge and emphasizing attributes of actors, such as cultivated dispositions); *élite codes* (where legitimacy is based on both); and *relativist codes* (where ‘anything goes’). The masonic pedagogic device appears to be characterized by a ‘knower code’ in that becoming a learner relies on downplaying specialized knowledge and emphasizing attributes of actors: what matters is ‘who you

are' rather than 'what you know and how' (Chapter 1, this volume). Second, *recontextualizing rules* in the masonic context concern people rather than knowledge, recomposing profane hierarchies into masonic hierarchies through grades. At the same time, however, planks present themselves as abstract and thus raise questions concerning the nature of the knowledge involved. Third, evaluative rules in the masonic context organize the preparation and presentation of planks. In this study I argue that the code for making this work is acquired by a tacit pedagogic device.

Accordingly, one cannot find in official texts explicit reference to what knowledge people are supposed to learn in Freemasonry. That which is enunciated by members is thus the principal data for analysis. Here I analyse through dialogism the different voices that compose a message enunciated by an individual (Todorov 1984). Tacit guidelines are explored through analysis of discourses of different kinds, including those presented as 'personal opinion' or 'personal experience'.

Tacit guidelines for knowers

At this point it is useful to revisit briefly the distinction by Bernstein (2000) between 'horizontal discourse' and 'vertical discourse'. On the one hand, 'horizontal discourse' refers to everyday or commonsense discourse and is, among other things, extremely context-dependent and segmentally structured. On the other hand, 'vertical discourse' refers to uncommonsense discourse, such as academic discourse, that is coherent, principled and less context-dependent. Where the meaning of horizontal discourse is given by its relations to a context, meaning of vertical discourse is given by relations to other meanings. As Bernstein wrote: 'The social units of the pedagogy of *Vertical Discourse* are constructed, evaluated and distributed to different groups and individuals, structured in time and space by *principles* of recontextualizing' (2000: 160; original emphases).

Following the idea of Bernstein, knowledge and individuals are to be analysed complementarily to describe what organization of discourse is mobilized. In masonic lodges, the organization of individuals in apprentices, companions and masters leads to a certain rigidity in the social determination of roles. Moreover, masonic apprenticeship proceeds to the formalization of relatively abstract reasonings using analogy and metaphor – a vertical

discourse – by developing the manipulation of abstract meanings. In the masonic pedagogic device, the legitimacy of being selected is first the knower: evaluation is conditioned by some qualities attributed to the learner prior to any kind of knowledge in itself. This participates to the elaboration of a tacit pedagogic device, in which there is no specialization in teaching roles: every apprentice will be a companion and then a master, and everyone is both a learner and a teacher (Poulet 2010).

Discourse and traces of the pedagogic device

The guidelines for writing a plank are not official and the modalities of interpretation are not objectivized as explicit criteria. They can, however, be identified through the discourses of apprentices, such as in relation to the expectation to 'produce something original'. The following extract is from an interview with a mason:

> I'm a teacher! So I tried to give my work a personal turn as we are asked to, but I couldn't help myself starting by reading books. Although I have seen apprentices after me who realized more personal works than I did first.

Here an implicit expectation is not to produce an academic work, as in 'starting by reading books'. The masonic apprenticeship is apparently considered as something quite different from formal schooling. As we shall see later in the chapter, the texts represent a series of recontextualizations of symbolic elements characterized by a so-called 'originality' of reasoning and putting together things which were separated. Originality also lies in constructing original relationships between arguments and knowledge elements, and more generally creating semantic transpositions from a context to another.

The pedagogy in lodge is constructed on a tension between an explicit and rigid structure of members (apprentices, companions, and masters) and opacity of the guidelines that are acquired tacitly. Analysis of planks reveals indicators of implicit guidelines, especially in relation to what I refer to as *a masonic voice* or the use of institutional discourses as something individually produced by members. Analysis also reveals the coexistence of two roles in

one discourse: someone who is initiated both receives and transmits masonic knowledge, ways of knowing and, above all, ways of being. Consider, for example, the following extract from a plank entitled ‘secret master’:

> I want to remind [you], that ‘it is easier to do your duty than to know it’, that the masonic ideal is ‘the accomplishment of duty until sacrifice’, and that this duty is as ‘unyielding as fate, as demanding as necessity, always obligatory as destiny is’.

The repetition of ‘duty’ implies something one must do to be a good mason or good apprentice. The speaker presents himself as legitimate in the role of ‘reminding’ other masons of the right things to do, such as funding good practices and having good habits. At the same time, however, the quotation marks indicate the acceptance of an official discourse, the voice of the institution. It appears that the authority of being a master allows the enunciation of what is ‘true’ in the official discourse without criticizing it. The positioning of the speaker is grammatically double: the personal pronoun ‘I’ indicates the legitimacy to speak (‘remind’) and teach other members (an implied ‘you’). The action that is projected (in quote marks), is the explicit wording of the official voice. Nevertheless, the arrangement of official statements in order to produce something presented as an individual discourse corresponds to the tacit instructions of the planks: producing something personal from masonic tools.

From another perspective, consider the following extract from an apprentice’s plank in which the speaker both writes what he thinks he is supposed to do and at the same time submits it to the judgment of other members:

> Of course I will not make a dissertation of personal interpretation about each symbol that was showed, received, heard since my initiation. This would be weighty, swollen-headed. For me, it would only be the narration of tasteless catalogue, and I’m not sure there is an interpretation for everything …
>
> If I understood what I have to do in this work, I prefer to demonstrate how much the discovery and the apprenticeship of symbolism in lodge can lead someone profane to convert his/her gaze.

The conversion of ‘gaze’ refers to the assimilation of something considered as defined or fixed by rules, even though they may not be explicit. The notion of ‘gaze’ here condenses the notion that understanding masonic apprenticeship consists of the conversion of a way of being, seeing and comprehending things into one that is specifically masonic. In this extract, a mason is tacitly described as ‘someone profane’ with a certain gaze, implying the masonic gaze is a tool in profane situations. More precisely, the following extract from an interview refers to the role of the ‘surveillant’ in the making of planks.

> [The surveillant] doesn’t give the correct version. Precisely he mustn’t give the correct version, because there is not a correct version. But he will make comments. He will say ‘this is interesting, but this is a cut and paste, there is no personal thought. What you are supposed to do is giving your personal opinion, what you think, and make us think on the possible options of the topic.’ The ‘surveillant’ tries to make someone understand what is the masonic approach.

The tacit pedagogic discourse is like a line between two different postures; the existence of framing is evoked but as something relative and not explicit in its content. Rejecting the concept of ‘correcting’ as part of the masonic apprenticeship means rejecting the existence of ‘good versions’, that is, ‘good planks’. The expressions of formulae, as in ‘make us think’ or ‘tries to make someone understand’, show variability in the status of producers or receptors of knowledge. One can be in one case the ‘object’ of an action by another or the ‘subject’ of the same action on someone else.

The following extracts from planks by apprentices evoke further the tacit rules of their production: ‘[A plank] is something one has to build. There are some keywords, as some film directors make a movie from a title’; ‘Most of the time I’m not off-topic because I am totally focused on the topic and on what I want to make. And then I do the plank, and that’s it’. The reference to the ‘keywords’ involves a tacit guideline whose appropriation is made by observation, and is little framed because ‘keywords’ are considered as topics or ‘titles’. The second quote completes it by throwing light on how the knower code works in Freemasonry: ‘off-topic’ refers to the existence of a good way to talk about a masonic subject, but at the same time the nature of a

successful plank comes down to the author and his/her personal qualities. This tension between institutional discourse, self-enunciation and tacit pedagogic rules emerges in the structure of planks.

As discussed in relation to the earlier excerpt, ‘secret master’, semantic and lexical analysis of planks reveals at least two voices in the discourse, that of the disciple and that of the teacher (as in the enunciation of official principles), a polyphony that is a discursive mark of the tacit pedagogic device. The voice of the teacher (or masonic voice) corresponds to the utterances of specialized ideas from the masonic field, such as the ritual or the grade. The following extract exemplifies a tension between official and individual enunciation that is clearly evident in apprentices’ planks:

> What I consider as a wild interpretation of symbols or masonic topics may only generate ambiguity, mistake and deflection. If the free interpretation of symbolism in lodge were unconditionally accepted, it would be the acceptance of a certain weakness of the topic, of words and of ritual, just considered as simple stands for flights of fancy.

The member’s use of ‘may’ indicates a tacit limit not to be transgressed in the masonic work of producing planks. This explicitly involves a framing of practices and the closing of what is possible to institutional prescripts. Indeed, it corresponds to the idea that not everything can be legitimately said in the lodge. Tacitly, the good use of masonic tools (that is, by a good mason, as the speaker tries to demonstrate) would be the good method to know what can be said and erase what cannot.

Tools for recontextualization in planks

Thus far I have explored the nature of the tacit pedagogic device. Given that it is tacit, instructions for learners in writing planks and presenting it in public do not define or frame precisely the content. I now focus on the ‘plank’, exploring representations of knowledge and relationships between different knowledge, as trace and product of this specific pedagogic device. According to the hypothesis of a knower code of specialization, what makes someone legitimate in lodge are certain qualities attributed to them. However, legitimacy for members in these ‘inner’ terms does not involve a total

relativity in the production of knowledge. Planks need to deal with many propositions, and many references, and the symbols that are required are a tool for creating a certain specialization of knowledge, at least in its form.

Symbolism and analogical reasoning

Manipulating symbolic meanings is considered to be a particular feature of masonic apprenticeship (Berteaux 1996). However, if the terms used can be specific, the cognitive operations involved are common and involve logical structures of thinking and reasoning found widely. Thus, metaphor and analogical reasoning in planks refers to what Jean-Michel Berthelot (1997) calls a 'hermeneutical pattern cluster' or set of operations putting together different elements following a certain logic. This 'schème herméneutique' builds links among different ideas using the postulate that things belong to related symbolic fields, expressing universal semantics. For Berthelot, the 'hermeneutical pattern cluster' is one of the oldest forms of reasoning humanity may have used to understand the world. It does not in itself involve some knowledge or skills specialized to a specific domain of practice. Using symbolic language is at the core of masonic apprenticeship; a symbolic representation of a concept allows relatively broad access to the production of meaning for members. This raises the question of the nature of the 'hermeneutical pattern cluster' in Freemasonry that leads members to a formal use of metaphor, analogic reasoning and interpretation of symbols.

What characterizes analogical reasoning is the semantic relationship between two domains: a base domain and a target domain (Vosniadou and Ortony 1989). In planks, base and target domains correspond to disciplinary translations taking knowledge from different fields, for example from philosophy, etymology, and history. Movements from one context to another are realized through different forms of metaphoric tools. Analysis highlights two principal kinds of analogy: what I refer to as lexical analogy, comparing two different lexical contexts; and methodological analogy, comparing ways of thinking and ways of interpreting. These two kinds of analogy proceed by an interpretation producing a metaphoric meaning, which would be expressed in symbols or ritual.

Lexical analogy

With the exception of some rare examples, symbolic elements in planks are borrowings from other domains that have been recontextualized through the prism of masonic apprenticeship. The following pattern is based on the analysis of a plank called ‘egregore’. In this text, the recontextualization of the topic and main concepts involves implicit analogical reasoning from a religious/theological context to a masonic context. The plank structure can be summarized as:

- Religious field (basis domain): Faith – corporal asceticism (tool of comparison) – communion
- Masonic field (target domain): Initiation – (problem at stake) – egregore.

This pattern means egregore is to initiation what communion is to faith. By this analogical reasoning the author of the plank makes a recontextualization of the subject from theology to Freemasonry, where ‘egregore’ is considered as a disciplinary tool. This plank is representative of others where analogical reasoning corresponds to a transfer of a proposition from something known by the author (common knowledge) to something to be explained (target domain: egregore as a masonic concept) (Grize 1997). What analogical reasoning uses is a relational property more than a simple comparison between two different objects.

Methodological analogy

The following extract is from a symbolic plank, one where the topic is a symbolic reference:

> Throughout our initiatory path and elevation ceremonies, we are often confronted to [with] words. Words from biblical origin and more precisely from Hebrew origin, most of the time, and whose real meaning and interpretation we don’t always know.
>
> Before I try to develop the interpretation of these words for a kadosh knight, we will try to go into hidden meaning in depth as I’m asking you, my knight brothers, to walk with me a little on the path of kabbalah.

Here analogical reasoning is not as explicit. Nonetheless, we can identify the base domain as the masonic method and the target domain as the Kabbalistic method. From one grade to another, the same tools can be used. Kabala, for example, is a recurrent reference for masons. What is interesting here is the postulate for masons that what they learn in Masonry, specifically the way of learning and of understanding things, is then useable in any context. One would just have to transpose, to translate masonic method any time something is unknown. In other words, methodological analogies establish an experiential connection between different contexts. As long as one is masonic, a tool can be used to understand new topics and issues in any new context. The 'method' is considered as all-encompassing and all members are eligible to improve and develop it.

The process is similar in this extract, suggesting a kind of continuity in the way a mason should comprehend a topic:

> We need to leave a conjugal vision of the creation, to leave the idea of one god and his spouse, to express it into time, space, into a succession, long before the world of the living. We need to think from invisibility to visibility to have slowly access to something beyond here, we need to pass from a totemic materiality to an abstract conception.

As interpretation is considered as an unmasking game of meaning through symbols, anything can be apprehended through the masonic method. In this extract, from a plank entitled 'at the beginning', the author use the method of deconstruction for symbols in order to build a 'research' question on a Bible, or, at least, a religious topic.

Analogies and verticalization of discourse

Analogical reasoning focuses on the *commensurability* of contexts – it is based on the possibility that ideas can be transferred, however much they are at the same time transformed. Therefore, the analogical operation involves a kind of 'verticalization' of discourse: things can be put together through the enactment of a principle. Knowledge that may be disciplinary or experiential can be integrated with tools of abstraction such as metaphors, analogy, etc. This means that the use of analogical reasoning tools may include

condensation, that is, strengthening of semantic density (Maton 2014b). At the same time, the possibility of integrating different contexts in masonic discourses (within planks) allows the possibility of variations in the strengths of semantic gravity, or the degree to which meaning is context-dependent. The concepts of semantic gravity and semantic density enable a description of masonic apprenticeship (analysed through the planks) as into a kind of verticalization. On the other hand, interpretation allows a personalization of written productions and a strengthening of semantic gravity. In one sense, this is the internal tension of the masonic pedagogic device: a knower code of specialization underpinning a logic of electing people by initiation that also engages in the manipulation of non-specialized, non-masonic knowledge to become a resource for masons in contexts other than the lodge.

Knowledge-building through metaphorizing language

As already mentioned, the use of metaphor is a social process of thinking, allowing for condensation in both experiential elements (events, facts) and in disciplinary knowledge through a process of abstraction. On the one hand, this involves producing lexical categories and context-independent knowledge. On the other hand, it helps authors to transpose ethics, moral prescriptions or philosophic issues beyond masonic contexts. As noted above, the trans-contextual properties of analogical reasoning enables a relative weakening of semantic gravity by standing above specific things and contexts. At the same time, conceptualization and concentration of meaning implies a relative strengthening of semantic density, as will be further explained below. Semantic density and semantic gravity as heuristic indicators enable us to describe how a form of vertical discourse is constructed in planks and so how knowledge-building is enabled in the elaboration of masonic concepts.

Grammatical metaphors and verticalization

Semantic density is defined as ‘the degree of condensation of meaning within socio-cultural practices’, including symbols (Maton 2014b: 129). To explore this in the data, I draw on systemic functional linguistics, and in particular nominalization and grammatical metaphor (Halliday and Matthiessen 2004).

The concept of grammatical metaphor refers to a specific use of a process of nominalization that produces two layers of meaning, one is a congruent or typical unmarked meaning realized in a non-nominalized form, such as a process expressed as a verb, and the other is a metaphorical realization, such as a process represented as an entity, where the meaning of a process is still retrievable. The use of grammatical metaphor thus represents a conceptual condensation and a lexical consensus in its utilization (Halliday 1985). As O'Halloran (2005: 83) explains:

> The presence of grammatical metaphor necessitates more than one level of interpretation, the metaphorical (or the transferred meaning) and the congruent…. If, therefore, an expression can be unpacked grammatically to a congruent meaning, it is a case of grammatical metaphor.

It is thus expected that an analysis of grammatical metaphor and nominalization could provide indicators for shifts in the semantic density of knowledge, and so insights into the knowledge-building of planks and how individuals from different social backgrounds can be assimilated into the practice of context-independent ways of speaking and writing.

The following extract is from a plank called 'the fire'.

> Throughout our history, men have strived to light the burning-bush by themselves and feed it with combustibles, in order to domesticate and multiply it. By doing so, they were trying to oppose themselves to the Lord by saying: 'I am the one who is beyond being itself.' But they are reduced to smoke and ashes in the end.
>
> The human domestication of fire has led to the use of thermal energy. The steam machine depends on the hearth, which transforms static water into a source of energy, and the electric engine harnessed Zeus' lightning from sky to earth. Henceforth, the burning-bush is encaged in a boiler, in a piston engine where it runs along high voltage lines.

In this extract, there are three different operations evident. First, a metaphor: 'burning-bush' is compared with 'fire' and 'thermal energy'. For this operation, Bible references are used as common knowledge and a tool for analogizing. Second, two lexico-semantic domains are mobilized: the 'life of

men’ is comparable to the ‘life of fire’; the steam machine changes water into the same way electric motor transforms the lighting. Third, meaning is condensed as grammatical metaphor, in: ‘the human domestication of fire has led to the utilization of thermal energy’. A slightly more congruent meaning might be expressed as: ‘men domesticate fire and, therefore, use thermal energy’. However, in this extract, processes become entities, and congruent subjects (actors) disappear. The ‘domestication of fire’ is considered as a thing in a causal relationship with something else, ‘the utilization of thermal energy’. Resources of nominalization and grammatical metaphor in this way enable the condensation of a multitude of phenomena and events. I also include as nominalization the process of representing a whole clause as an entity, as indicated in double brackets in, for example, ‘[[What I discovered through this book]] comes from the Mesopotamian basin’. All planks thus contain at the same time indicators of a relatively weaker semantic gravity (analogical reasoning, metaphor) and a relatively stronger semantic density (grammatical metaphor, nominalization).

An analysis of instances of nominalization (grammatical and lexical) and grammatical metaphor across all planks reveals a small number of concepts specific to Freemasonry. That is to say that masonic concepts are a ‘patch-work’ of other fields of knowledge. Although some of these concepts are recontextualized in the masonic apprenticeship, others keep much of the same meaning from their original disciplinary context. The resources are organized into three categories, depending on the particular nominalization that is mobilized (*in italics*): specific masonic lexicon, disciplinary borrowings, and methodological reifications.

Specialized masonic lexicon:

- *The lighting of small columns* is executed in order;
- (May beauty adorn it!) *This injunction* expresses an interpretative nature;
- *Working until we find our individual midnight* in order to rediscover in our lodge a mystical time outside time;
- In fact, *the interjection* ‘you built a masonic desert’ suits me in a second degree lecture;
- *Becoming luminous* points to the commitment of consuming oneself as a candle for the benefit of others.

Disciplinary borrowings (theology, history, philosophy, etc.):

- *The priestly ordination* takes place in the apostolic and roman catholic church;
- *Job's laments* do not only suffer from persistent scabies anymore;
- *Fusion* becomes confusion;
- *The dating of those sources* is not possible and *genesis* constitutes a reference point in the quest of a creative principle;
- *Virtualization of our lives* appears more tangible.

Methodological reifications where operations become entities:

- *What I discovered through this book* comes from the Mesopotamian basin;
- *The translation* here is more evident;
- *Your questioning* is enough to define the problematic, but the answer cannot be determined easily;
- *Observing certain of our society's driving forces* should not be forgotten by masons whose project is to promote improvement of mankind;
- *Consulting a computerized dictionary of French language* leads us to make this quote.

More generally, planks are characterized by a diversity of ways of creating nominalized and metaphoric meanings.

I have organized the specific masonic elements in two functions: *fragmentary nominalizations* (ritual, constitutions, books extracts, etc.) and *incorporating nominalizations* (references to major concepts such as initiation, tradition, and general operations of masonic work).

Incorporating nominalizations mostly appear in proximity to the pronoun 'we' or equivalents (us, our, etc.). They refer to founding concepts of masonic identity and condense meanings that relate to the masonic apprenticeship in which all members are symbolically constructed as part of a whole.

Fragmentary nominalizations mobilize masonic concepts and lexicon in a different way. They take the form of either direct quotes and indirect quotes from the practices of masonic ritual and performative words for setting up sacred space and time, as in: *lighting of small columns, getting out from*

profane time, etc. These fragments could be reported in inverted commas. *Injunction*, *adopting a sacred time*, etc. condense some operations of the ritual but broaden this other semantic domain. *Injunction*, for example, refers to some indication given by the masonic ritual but broadens this to any injunction like semantic proposition.

The other kind of quote condenses operations and ritualized practices, defined by their repetitive character. So for example, 'installing the ritual system' refers not to parts of the ritual but to a condensation of these practices into something more general. These nominalizations indicate a verticalization of discourse through the condensation of meaning, contributing to the recreation of a collective consensus and semantic cumulativity of individual experiences in apprenticeship (Martin 2007). What is interesting in the results of these inquiries is both how speciality is constructed as a fundamental part of identity, and at the same time what possibilities are opened by the verticalization of discourses.

Conclusion

In this chapter the writings of 'planks' in Freemasonry have been analysed in terms of their employment of resources of analogical reasoning as abstraction, lexical metaphor and grammatical metaphor, and their effect for knowledge practices interpreted in terms of strengths of semantic gravity and semantic density. Doing so helps reveal verticalization processes in the discourse produced by these actors. Social origins and educational backgrounds of actors are diverse in Freemasonry and yet, in varying proportions, these indicators are present in all planks. This suggests that masonic apprenticeship produces a verticalized form of discourse but one accessible to all members. Mobilizing abstract meanings typically entails at least an apprenticeship, access to which is unequally distributed in society. From this perspective, then, the use of metaphor and analogical reasoning through symbolic language in Freemasonry appears to function as a means of enabling a relative transcendence of social determinations based on the use of widely shared, commonplace competences.

This analysis has aimed at making explicit a tacit pedagogic device. In Freemasonry, the paradoxical point is, on the one hand, to build pedagogic discourse underpinned by a knower code where what counts is who the

knower is more than what or how s/he knows. However, on the other hand, this specialization code does not involve an ‘emptiness’ of knowledge in the apprenticeship. In fact, people ‘learn’ in Freemasonry how to deal with abstract meanings, borrowed from the legitimate fields of knowledge production (philosophy and history, for example) while the institutional discourse does not explicitly require the discourses of secondary or tertiary education.

The complexity of the link between knowledge and knowers is particularly well expressed by Foucault, writing about discourses, and discourses on discourses:

> Commentary limits the unpredictability of discourse to the action of an *identity* that takes the form of *repetition* and *the same*. The authorial principle limits this unpredictability through the action of an *identity* that takes the form of *individuality* and the *I*.
>
> (Foucault 1970: 30)

This sums up the stakes of analysing knowledge and knowers in a tacit pedagogic device. Though based on a knower code, the logic of election of new members enables people with very different backgrounds to engage in an apprenticeship in manipulating abstract meaning. However, at the same time, this logic of authorship does not express a relativist code, where ‘anything goes’. If many disciplines are drawn upon, it is always within a logic which could be described as its broadest as the commensurability of discourses. This allows for the expression of multitudes of diversity, not only as a serialization of opinions, but with the possibility of a semantic deliberation: what can be expressed in a common language with few ‘official’ interpretations — the symbolic tools.

As a space dedicated to writing and public speaking, masonic experience is the experience of ‘having a voice’. From this viewpoint, research on how abstract discourses are elaborated, outside of politics or educational fieldworks, reveals the sociology of democratic practices. The latter is a tool to describe the social modalities of understanding, such as integration into a community (belonging, common language tools, and integration of individual experiences). In the case of Freemasonry, manipulating analogy and metaphor of language is a social tool for commensurability.

Note

1 See Carvalho (2010) for a study enacting LCT to explore informal learning in a museum; see also Maton *et al*. (Chapter 4, this volume).

Part III

Resources for knowledge-building

12 Starting points

Resources and architectural glossary

Karl Maton

Resources

Legitimation Code Theory (LCT) comprises more than this book. There is more to Specialization and Semantics than has yet been discussed here; there are other dimensions of LCT being enacted in major research projects; and there are further dimensions to uncover. Where, then, should the relative newcomer to LCT begin? The obvious starting point is *Knowledge and Knowers* (Maton 2014b), which introduces and exemplifies concepts from the two dimensions enacted in the current volume, augmented by a paper on 'semantic waves' (Maton 2013) and one discussing the analytic methodology of 'semantic profiles' and work using 'semantic codes' (Maton 2014a). *Knowledge and Knowers* supersedes many previously published papers (Maton 2000a, 2000b, 2006, 2007, 2009, 2010, 2011; Moore and Maton 2001) that were substantially, if not wholly revised and augmented through relations with new concepts. Another way into the framework is a series of talks. Though dated, not 'pedagogized', and not designed for distribution, scholars describe listening to extra-curricular lectures given in 2011 as useful accompaniment to reading *Knowledge and Knowers*. They are available on the LCT website (see below).

LCT is relatively young and so explicitly *pedagogic* introductions are as yet few. The 'Education and knowledge' chapter of the undergraduate textbook *Sociology: Themes and perspectives* (Van Krieken *et al*. 2014) provides a useful introduction to LCT after discussions of Pierre Bourdieu and Basil Bernstein. More pedagogic introductions should be available in future.

LCT is a field activity. The core corpus of publications given above is dwarfed by a greater number of papers enacting the framework in research into an ever-widening diversity of topics and issues. Thanks to the collegial spirit of the LCT community, much of this work (including doctoral theses) can be discovered via the website: www.legitimationcodetheory.com.

Papers enacting the concepts in research are an invaluable way into the framework – they often engage more directly with one's area of substantive study. However, they should represent a *starting point* rather than the sum of engagement with LCT. There is no guarantee that an empirical study defines or enacts concepts appropriately (even where quoting definitions), for no framework is always and everywhere fully understood by all proponents. Thus, I strongly encourage scholars to read the core corpus of book and articles (mentioned above). One's reading of a theory should not be solely second-hand. It is also invaluable to engage with empirical studies beyond one's substantive topic. Such reading will triangulate understanding of concepts and ensure one's vision does not remain too locked into a specific context. Thanks to the flexibility of LCT concepts, much can be learned from studies even where their focus is very different to one's own.

LCT forms the basis for a community of scholarly and pedagogic practitioners. The website provides a hub for discovering their activities and provides links to:

- an email forum in which scholars and students can engage in friendly and informal discussion; and
- social media sites (e.g. Facebook and Twitter) with news of lectures, events, papers, PhDs, etc.

The *modus operandi* embodied by an approach is normally acquired through close supervision from an experienced scholar. However, the rapid international growth of LCT may mean such mentoring is not yet available in some locations. Part I of this book aims to make the underpinning principles of research more accessible but cannot answer the numerous specific questions that arise within any particular project. The email forum provides a valuable means of connecting with other scholars and students to discuss problems and share strategies. Research groups are a means of making such contact more sustained; see the website and ask on the forum about other

scholars near you. The *First International Legitimation Code Theory Colloquium* was held in June 2015 in Cape Town. News of future conferences will be on the sites listed above.

LCT is unfinished. There are many areas for future development and a considerable amount of ongoing research pushing the theory in new directions. The website and social media offer news of talks on the latest work, such as the Sydney Roundtable, and are updated regularly with new publications.

LCT cumulatively builds on several foundational frameworks. For additional reading on Basil Bernstein's code theory, Moore (2013) offers a valuable starting point; on Pierre Bourdieu's field theory, the work of Michael Grenfell (e.g. 2012, 2014) is best (see also Maton 2003, 2005); for social realism, see Maton and Moore (2010), Moore (2009), Wheelahan (2010) and Young (2008); and on relations between systemic functional linguistics and LCT, see Martin (2011) and Maton and Doran (2016). These are not the only influences on LCT – see also Roy Bhaskar on critical realism, Karl Popper on critical rationalism, Mary Douglas, Ernest Gellner and others, including the founding figures of sociology – but they are valuable starting points for understanding the immediate foundations and neighbours of LCT.

An architectural glossary

LCT is a relational theory. The gaze the framework embodies and the insights it provides lie not simply in individual concepts but in relations among those concepts. Offered below are brief descriptions of the basic architecture and conventions of LCT. This is neither definitional nor definitive; it is definitely *not* a substitute for definitions and exemplifications in research. This is simply another 'starting point'. Most concepts can be found more fully defined in Maton (2013, 2014a, 2014b) and Chapters 1–5 (this volume), and there are more concepts in LCT than included here. Given this form of glossary is necessarily self-referential, repetitive and highly abstract, I should reiterate that LCT concepts are built from and for substantive research. Nonetheless, it should provide a basic sense of how concepts interrelate within the framework. Words in **bold** have their own entries; words in *italics* but not bold are LCT concepts but do not have their own entries here.

Entries in alphabetical order

+/− refers in LCT to stronger/weaker (not binaries of strong/weak). Denotes strengths of all **legitimation code** concepts as relative on continua of strengths. Always follow concept initials; e.g. ER+, SR− and SG−, SD+.

↑/↓ refers to strengthening/weakening of **legitimation code** concepts along continua; e.g. ER↑ denotes 'strengthening **epistemic relations**'. Can use with '+/−' to locate start and end points of change; e.g. 'ER−↑−' indicates 'relatively weak **epistemic relations** that have strengthened but remain relatively weak'. This example shows strengthening/weakening may involve **code drift** as well as **code shift**. Arrows retain meanings across all concepts (so SG↑ means 'strengthening **semantic gravity**' and SG↓ means 'weakening **semantic gravity**'). Arrows always follow concept initials.

4–K model extends **specialization codes** by distinguishing: two kinds of **epistemic relations (ontic relations** and **discursive relations)** and two kinds of **social relations (subjective relations** and **interactional relations)**. Called '4–K' because for knowledge practices these four relations are to the known, knowledges, knowers and knowing, respectively. Varying strengths of the two epistemic relations generates **insights**; varying strengths of the two social relations generates **gazes**. Both can be modified by **lenses**. Levels of conceptual delicacy of 4–K model: **specialization codes** – **insights/gazes** – **lenses**.

5–Cs: mnemonic for key components of **constellation analysis**: *clustering*, **constellations, cosmologies**, *condensing* and *charging*.

7–Gs: mnemonic for attributes of **semantic profiles**: going in (*semantic entry*, where profile begins on **semantic scale**), going up (*semantic upshifts*, where profile moves upwards), going down (*semantic downshifts*, where profile moves downwards), gamut (**semantic range**), going along (*semantic flow* or degree of connectedness between points along profile), going out (*semantic exit*, where profile ends on **semantic scale**), and getting it right (*semantic threshold* or degree to whether accuracy, epistemological or

axiological, is deemed to matter).

alternating is a research strategy comprising movements between *joint analysis* combining two or more explanatory frameworks and *parallel analysis* in which those frameworks are used separately to analyse the same data.

arena of struggle is created by an **aspect** of the **Legitimation Device** (e.g. **epistemic–pedagogic device**). The arena is not a device; the device creates an arena. In education the arena is regulated by *distributive logics* and comprises *production fields* (regulated by *epistemic logics*), *recontextualization fields* (regulated by *recontextualizing logics*), and *reproduction fields* (regulated by *evaluative logics*). The 'logics' constitute the intrinsic grammar of the device; their realizations as practices are analysed using **legitimation codes**.

aspect describes the characteristic of the **Legitimation Device** revealed by a **dimension** of LCT, i.e. the device of each dimension. For example, the **Specialization** aspect is the **epistemic–pedagogic device** and the **Semantics** aspect is the *semantic device*. When enacting more than one **dimension**, aspects are combined; e.g. the *epistemic–semantic–pedagogic device* (or *ESP device*) combines Specialization and Semantics.

Autonomy (capitalized) is a **dimension** of **LCT** which explores practice in terms of *relatively autonomous social universes* whose organizing principles are given by *autonomy codes* that comprise relative strengths of *positional autonomy* (PA) and *relational autonomy* (RA). These are mapped on the *autonomy plane* and traced over time on *autonomy profiles* to explore the workings of the *autonomy device*, one **aspect** of the **Legitimation Device**. Four principal *autonomy codes* are: *sovereign codes* (PA+, RA+), *exotic codes* (PA−, RA−), *roman codes* (PA−, RA+), and *trojan codes* (PA+, RA−). PA strength (*y*-axis) always precedes RA strength (*x*-axis).

Cartesian planes are a relational means of portraying **legitimation codes**, such as the *specialization plane* (see Figure 1.2, page 12) and the *semantic plane* (Figure 1.3, page 16). Each plane combines a typology (four principal

code modalities) with a topology, the relational space generated by two continua (a space of infinite positions).

classification and **framing**, from Bernstein's **code theory** (1977), refer to strength of boundaries between contexts or categories and strength of control within contexts or categories, respectively. Extended and integrated within, among others: **specialization codes**, which effectively applies classification and framing to construals of knowledge (**epistemic relations**) and knowers (**social relations**); and *autonomy codes*, which effectively applies external classification and external framing to construals of positions (*positional autonomy*) and principles (*relational autonomy*).

code clash/code match refers to relations between modalities of a **legitimation code** (e.g. knower code of actor and knowledge code of context). Can be match or clash of varying degrees rather than categorical. Applicable to all legitimation codes and myriad forms of data.

code drift refers to change within a **legitimation code**, charting movement across a quadrant of a plane (see '↑/↓' for an example) where strengths of, for example, **epistemic relations** or **semantic gravity** change but relative overall strength remains (e.g. ER+↓+ or SG−↑−).

code shift refers to change in the **legitimation code**, such as from a *knowledge code* to a *knower code* (**Specialization**) or from a *prosaic code* to a *rhizomatic code* (**Semantics**).

code theory can refer to work centred on the writings of Basil Bernstein or collectively to Bernstein's framework and LCT. Legitimation Code Theory is not a sub-type of code theory but rather a theory of **legitimation codes**.

constellation analysis is an analytic methodology applicable to all socio-cultural practices (scientific, religious, political, aesthetic, athletic, etc.). Views constituents as a selection from a larger set of possibles, arranged into a pattern (comprising *clusters* and **constellations**), *condensed* with meanings, and *charged* with valuations (positive-neutral-negative). Basis of this selection, arrangement and evaluation is the **cosmology** whose organizing principles are revealed using **legitimation codes**.

constellations are groupings (of any socio-cultural practice) that appear to have coherence from a particular point in space and time to actors adopting a particular **cosmology** or worldview. May take any form, though binary constellations (oppositional and mutually-exclusive) are common. May comprise *clusters* of smaller groupings.

cosmologies describe the basis of practices viewed as **constellations**. Cosmologies generate **constellations**, *condense* their constituents with meanings, and *charge* those meanings (positively, neutrally or negatively, as a continuum). Organizing principles of cosmologies are given by **legitimation codes**. Two illustrative forms are *axiological cosmologies* (based on knower codes) and *epistemological cosmologies* (based on knowledge codes). There are many more.

Density (capitalized) is a dimension of LCT. Received relatively little attention as yet. Likely to be renamed when developed further within a major research study to avoid confusion with **semantic density**.

dimension is a related group of concepts that explore a set of organizing principles of practice. Currently LCT has five dimensions: **Specialization, Semantics, Autonomy, Temporality** and **Density**. Each dimension comprises at a minimum: a 'structure' that highlights a specific kind of pattern created by practices; a species of **legitimation code** that reveals the organizing principles underlying those patterns; constitutive relations that generate the **legitimation code**; a **Cartesian plane** that maps constitutive relations and their resulting modalities of **legitimation code**; profiles that trace their strengths over time; and a device which generates those modalities, over which actors cooperate and struggle for control. Table 1.1 (page 11) shows these concepts for **Specialization** and **Semantics**. Names of dimensions (e.g. **Semantics**) are always capitalized; names of concepts within dimensions (e.g. **semantic gravity**) are never capitalized.

discursive relations (DR) between practices and other practices are constituents of **epistemic relations** and contribute to generating **insights**. Part of **4–K model**. Compound noun: always use both words.

epistemic–pedagogic device (EPD) denotes one **aspect** of the **Legitimation Device**. The EPD creates an **arena of struggle** comprising *production fields* (where 'new' knowledge is created and positioned), *recontextualization fields* (where 'new' knowledge is curricularized), and *reproduction fields* (where knowledge is pedagogized). The effects of struggles over the EPD are revealed by analysing the **legitimation codes** of practices.

epistemic relations (ER), between practices and that part of the world towards which practices are oriented, can be relatively stronger or weaker along a continuum where strength is relative to other possible strengths of epistemic relations. Form **specialization codes** when coupled with **social relations**. Can be distinguished into **ontic relations** and **discursive relations** whose varying strengths generate **insights** (forms of **epistemic relations**). Compound noun: always use both words. Always pluralized because of their constituent relations.

external language of description (L^2) is a form of **translation device** for relating theory to empirical data within the problem-situation of a specific study.

external language of enactment is a form of **translation device** (homologous to an external **language of description**) for relating LCT to practices, showing how concepts generate (explicit or tacit) praxis.

focus/basis distinguishes between what practices concern (*focus*) and their underpinning of legitimacy (*basis*). *Focus* gives the content of **languages of legitimation**; *basis* gives the **legitimation codes** (plus **insights** and **gazes**). Always italicized.

gazes conceptualize different forms taken by **social relations**. Part of **4–K model**. Generated by varying strengths of two kinds of **social relations**: **subjective relations** (SubR+/−) and **interactional relations** (IR+/−). Principal modalities: *social gaze* (SubR+, IR−), *cultivated gaze* (SubR−, IR+) and *born gaze* (SubR+, IR+) all reflect stronger **social relations**; a fourth, *trained/blank gaze* (SubR−, IR−), indicates weaker **social relations**. Help distinguish kinds of *knower codes* (and *élite codes*); e.g. *social knower codes*,

cultivated knower codes, etc. Gazes are mapped on the *social plane* and traced over time on *social profiles*. (Gazes have the attributes of a **dimension** but are located within **Specialization**.)

grammar in Bernstein's framework (2000) refers to relations between concepts and referents and can be 'strong' or 'weak'. In LCT, 'grammar' is integrated within **insights** (modalities of **epistemic relations**). *Knowledge-grammar* and *knower-grammar* were introduced in Maton (2014b) as temporary scaffolding concepts to enable explicit and cumulative transition from 'grammars' to **epistemic relations** and **social relations**, and then discarded.

insights conceptualize different forms taken by **epistemic relations**. Part of **4–K model**. Generated by varying strengths of two kinds of **epistemic relations**: **ontic relations** (OR+/−) and **discursive relations** (DR+/−). Principal modalities: *situational insight* (OR+, DR−), *doctrinal insight* (OR−, DR+) and *purist insight* (OR+, DR+) all reflect stronger **epistemic relations**; a fourth, *knower/no insight* (OR−, DR−), indicates weaker **epistemic relations**. Help distinguish kinds of *knowledge codes* (and *élite codes*); e.g. *doctrinal knowledge codes, situational knowledge codes*, etc. Insights are mapped on the *epistemic plane* and traced over time on *epistemic profiles*. (Insights have the attributes of a **dimension** but are located within **Specialization**.)

interactional relations (IR) between practices and ways of knowing are constituents of **social relations** and contribute to generating **gazes**. Part of **4–K model**. Compound noun: always use both words.

knowledge–knower structures extend and integrate Bernstein's model of 'knowledge structures' (2000) by additionally exploring *knower structures*. Part of **Specialization**. Organizing principles are analysed using **specialization codes**.

language of description builds on Bernstein (2000) who distinguished *internal languages of description* (L^1), or how concepts interrelate within a theory, from *external languages of description* (L^2), or how concepts relate to

referents. LCT defines an **external language of description** as a **translation device** that explicitly relates concepts to empirical data within the problem-situation of a specific study. LCT extends the model to describe **mediating languages** ($L^{1.5}$) and **external languages of enactment**.

languages of legitimation construe practices and beliefs as reflecting messages concerning the nature of achievement, i.e. notions of il/legitimacy. They concern the ***focus*** of practices (e.g. content); **legitimation codes** conceptualize the ***basis*** of these languages.

Legitimation Code Theory (always capitalized) or 'LCT' is an explanatory framework or conceptual toolkit, rather than a meta-theory or any specific substantive account generated by enacting concepts from LCT.

legitimation codes conceptualize organizing principles of practices, dispositions and contexts. Each LCT **dimension** is centred around one kind of **legitimation code**. Each is referred to as, for example, *specialization codes of legitimation* or simply *specialization codes*. Table 12.1 summarizes legitimation codes, constituent relations, and code modalities for five **dimensions**.

Legitimation Device (capitalized) is a hypothesized generative mechanism underlying social fields of practice over which actors cooperate and struggle for control in order to establish relations (of dominance, visibility, centrality, etc.) among **legitimation codes**. Each **dimension** captures one **aspect** of the Legitimation Device; e.g. **Semantics** captures the *semantic device*. Figure 12.1 summarizes **dimensions** and **legitimation codes**. The Legitimation Device is potentially endless and so likely to comprise more **aspects**.

lenses modify **insights** and **gazes**. All four relations in **4–K model** comprise relations to something; the form that something takes constitutes a **lens**. Lenses can be described for each **4–K model** relation; e.g. *ontic lenses* and *discursive lenses* for **interactional relations**. Can also describe *lens shift* and degrees of *lens clash* or *lens match*.

Table 12.1 Five species of legitimation codes

Codes	*Constituent relations*	*Principal modalities*
Specialization	epistemic relations, social relations	ER+/−, SR+/−
Semantic	semantic gravity, semantic density	SG+/−, SD+/−
Autonomy	positional autonomy, relational autonomy	PA+/−, RA+/−
Temporal	temporal position, temporal orientation	TP+/−, TO+/−
Density	material density, moral density	MaD+/−, MoD+/−

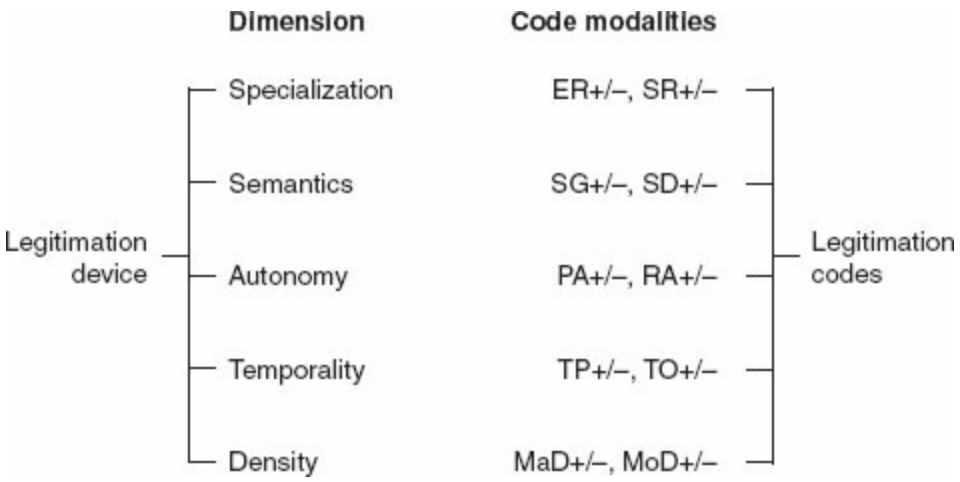


Figure 12.1 Synoptic view of legitimation codes.

mediating language ($L^{1.5}$) is a **translation device** for relating theory to data that aims at embracing all empirical forms of a phenomenon (e.g. all English discourse, all images). Distinguished from **external languages of description**, which translate between concepts and data from a specific problem-situation.

ontic relations (OR) between practices and that part of the world towards which they are oriented are constituents of **epistemic relations** and contribute to generating **insights**. Part of **4–K model**. Compound noun: always use both words.

refocusing is a research strategy comprising movements between *soft-focus*

or fuzzier descriptions and *hard-focus* or more precise analyses.

relation clash/relation match are an intra-code form of **code clash**/**code match**. Refer to relations between different settings within a **legitimation code** modality; e.g. between *social* and *cultivated* forms of *knower codes* (see **gazes**) or *doctrinal* and *situational* forms of *knowledge codes* (see **insights**). Can be match/clash of varying degrees rather than categorical.

semantic codes comprise strengths of **semantic gravity** (SG) and **semantic density** (SD). Central to **dimension** of **Semantics**. Four principal modalities: *rhizomatic codes* (SG−, SD+), *prosaic codes* (SG+, SD−), *rarefied codes* (SG −, SD−), and *worldly codes* (SG+, SD+). The *semantic plane* is shown as Figure 1.3 (page 16), with 'SG−' at top. SG strength (*y*-axis) always precedes SD strength (*x*-axis).

semantic density (SD) is degree of condensation of meaning described as a relative strength along a continuum. Forms **semantic codes** and **semantic profiles** when used with **semantic gravity**. Compound noun: always use both words (never just 'density'). Strengthening and weakening of semantic density of specific units of meaning are termed *condensation* and *rarefaction*, respectively. When combined with concepts from **Specialization**, can be distinguished into epistemic-semantic density, axiological-semantic density, etc.

semantic gravity (SG) is the degree of context-dependence of meaning described as a relative strength along a continuum. Forms **semantic codes** and **semantic profiles** when used with **semantic density**. Compound noun: always use both words (never just 'gravity'). Strengthening and weakening of semantic gravity of specific units of meaning are termed *gravitation* and *levitation*, respectively. When combined with concepts from **Specialization**, can be distinguished into epistemic-semantic gravity, axiological-semantic gravity, etc.

semantic profile is shown by tracing **semantic gravity** and **semantic density** over time (including text-time). Two basic kinds are **semantic waves** and *semantic flatlines* (see Figure 1.4, page 17). Names adjusted if only one

concept used; e.g. *gravity profile*, *density flatline*, etc. See **7–Gs** for properties: *semantic entry*, *semantic exit*, *semantic shifts*, **semantic range**, *semantic flow*, *semantic threshold*.

semantic range is the distance between highest and lowest points traced by **semantic gravity** and **semantic density** on a **semantic profile**. Referred to as *gravity range* or *density range* when discussing only one attribute.

semantic scale is name for the *y*-axis on a **semantic profile**.

semantic waves denote a **semantic profile** that traces movements up and down (or down and up) over time (including text-time). Most notably contrasted with *semantic flatlines* that exhibits relatively little movement. Name adjusted if only one **semantic code** concept used (see **semantic profile**).

Semantics (capitalized) is a **dimension** of LCT which explores practices in terms of their *semantic structures* whose organizing principles are given by **semantic codes** that comprise strengths of **semantic gravity** and **semantic density**. These are mapped on the *semantic plane* and traced over time on **semantic profiles** to explore the workings of the *semantic device*, one **aspect** of the **Legitimation Device**.

social realism is a loose 'coalition of minds' (Maton and Moore 2010) in the sociology of education with which Legitimation Code Theory has been associated that emerged from discussions in late 1990s centred on the work of Basil Bernstein.

social relations (SR), between practices and their subject, author or actor, can be relatively stronger or weaker along a continuum where strength is relative to other possible strengths of social relations. Form **specialization codes** when coupled with **epistemic relations**. Can be distinguished into **subjective relations** and **interactional relations** whose strengths together give **gazes**. Compound noun: always use both words. Always pluralized because of their constituent relations.

Specialization (capitalized) is a **dimension** of LCT which explores practices

in terms of **knowledge–knower structures** whose organizing principles are given by **specialization codes** that comprise strengths of **epistemic relations** and **social relations**. These are mapped on the *specialization plane* and traced over time on *specialization profiles* to explore the workings of the **epistemic–pedagogic device**, one **aspect** of the **Legitimation Device**. Specialization also includes the concepts of the **4–K model**, including **insights, gazes** and **lenses**.

specialization codes comprise strengths of **epistemic relations** (ER) and **social relations** (SR). Central to **dimension** of **Specialization**. Four principal modalities: *knowledge codes* (ER+, SR−), *knower codes* (ER−, SR+) *élite codes* (ER+, SR+) and *relativist codes* (ER−, SR−). For the *specialization plane*, see Figure 1.2 (page 12). ER strength (*y*-axis) always precedes SR strength (*x*-axis). (They are not called 'knowledge/knower codes', a misnomer that obscures two codes and reduces a topology to a binary).

subjective relations (SubR) between practices and kinds of knowers are constituents of **social relations** and contribute to generating **gazes**. Part of **4–K model**. Compound noun: always use both words.

Temporality (capitalized) is a **dimension** of LCT that explores practices in terms of their temporal features whose organizing principles are given by *temporal codes* that comprise strengths of *temporal position* (TP+/−) and *temporal orientation* (TO+/−). These are mapped on the *temporal plane* and traced over time on *temporal profiles* to explore the workings of the *temporal device*, one **aspect** of the **Legitimation Device**. Four principal modalities: *prospective codes* (TP+, TO+), *retrospective codes* (TP−, TO−), *restoration codes* (TP+, TO−), and *renovation codes* (TP−, TO+). TP strength (*y*-axis) always precedes TO strength (*x*-axis).

translation device is a means of relating concepts to something beyond a theoretical framework. Forms include: **external languages of description** for translating between theory and empirical data within a specific problem-situation; **external languages of enactment** for translating between theory and practice; and **mediating languages** for translating between theory and all empirical forms of a phenomenon (i.e. a non-specific **external language**).

zooming is a research strategy comprising movements between *wide-angle* analysis of a bigger picture and *telephoto* analysis of a more delimited phenomenon.

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Index

Please note: Locators in **bold type** indicate figures or illustrations, those in *italics* indicate tables.