The Palgrave Handbook of Critical Thinking in Higher Education

Edited by

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The Knowledge Practices of Critical Thinking

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Introduction

Which knowledge practices demonstrate "critical thinking" in higher education? A rapidly growing literature is addressing what kinds of "thinking" may be considered "critical." However, as yet, there is relatively little analysis of what could be called "actually existing 'critical thinking' in higher education," or the knowledge practices actors consider to be educational evidence of this capacity. The nature of the knowledge in, for example, what students write for tasks aimed at eliciting critical thinking, and what teachers reward in those assessments as evidence of critical thinking, remain underexplored. This chapter briefly illustrates how these knowledge practices can be analyzed in empirical research, drawing on the sociological framework of Legitimation Code Theory (henceforth "LCT").

We begin by arguing the need for the study of the knowledge practices in critical thinking to complement the existing focus of research on exploring cognitive processes of knowing. Second, we introduce LCT as offering conceptual tools capable of capturing the organizing principles of knowledge practices. For brevity, we focus on the concept of *semantic gravity*, which explores the context-dependence of meaning. Third, we enact this concept in illustrative analyses of two assessments ostensibly aimed at eliciting critical thinking: a high-achieving "critical reflection" essay from social work and a "reflective journal" from business. These texts are analyzed in terms of their principal stages, showing changes in the forms taken by the knowledge practices they express. We show that both examples of achievement in critical thinking are characterized by *waves* of semantic gravity, or recurrent movements between context-dependent meanings (such as concrete examples) and context-independent meanings (such as generalizations and abstractions), that *weave* together and transform these different forms of knowledge. We also highlight how this generic attribute is realized differently within the social work and

business essays, revealing its subject-specific features. Last, we conclude by briefly discussing how studies using LCT are enabling the understanding of achievement and knowledge-building in ways that can foster students' skills in higher education.

Seeing knowledge practices

Critical thinking is becoming a key focus of research and policy in higher education. A voluminous literature is embracing such far-reaching issues as preparing tertiary students for lifelong learning, active citizenship, and employment. This significance is paralleled in policy by the inclusion of critical thinking in graduate attribute agendas by universities (Barrie 2004; Hammer and Green 2011; Moore 2013). Yet, it remains unclear what critical thinking refers to in terms of the knowledge expressed in pedagogic and assessment practices, that is, what is taught and assessed as evidence of critical thinking.

One reason is a "subjectivist doxa" endemic to much educational research: "the widespread belief that 'knowledge' entirely comprises a state of mind, consciousness or a disposition to act, is wholly sensory in source, and must be inextricably associated with a knowing subject" (Maton 2014b, 4). This doxa is reflected in the tendency to understand critical thinking as exclusively subjective states of consciousness and mental processes—a tendency possibly encouraged by the word "thinking." For example, well-known definitions include "reasonable reflective thinking focused on deciding what to believe or do" (Ennis 1993, 180), and "disciplined, self-directed thinking" (Paul 1990, 52). Similarly, the Delphi panel of 46 experts (Facione 1990) defined critical thinking as a set of cognitive skills (such as analysis, interpretation, inference, and self-regulation). Conversely, the notion of critical thinking as *also* involving the expression of forms of knowledge, such as in classroom discourse and student assessment, is largely obscured. Indeed, even when such educational practices are studied, they tend to be examined for outward signs of mental processes rather than as knowledge practices themselves (e.g., Hammer and Green 2011).

This emphasis on mental processes is echoed by the tendency of studies to focus on perceptions, such as academics' beliefs (Jones 2004) or participants' self-reporting of skills (see Taylor 2007). Moore (2013), for example, examined six academics' understandings of critical thinking at an Australian university, identifying judgment, skepticism, originality, sensitive reading, rationality, critical stance, and self-reflexivity. Similarly, studies of participants' perceptions of their critical thinking skills through interviews or questionnaires focus on such cognitive constructs as "abilities to identify issues and assumptions, recognize important relationships, make correct inferences, evaluate evidence or authority, and deduce conclusions" (see also Phillips and Bond 2004; Tsui 1998; 2000; 2002, 743). While offering insights into actors' *perceptions*, such studies rarely explore the nature of actors' *practices* in higher education.

Thus, what comprises critical thinking and how it is explored are both typically understood in terms of knowing processes located within the minds of knowers. In contrast, the knowledge practices held by actors in higher education to constitute demonstration of critical thinking in classroom discourse and assessments have been relatively neglected. Thus, what is required is a means for analyzing these knowledge practices. Moreover, such analysis needs to move beyond surface features of educational practices to explore their organizing principles, in order to show how these may differ across subject areas and stages of education. For example, a major focus of discussion on critical thinking concerns relations to disciplines. This debate has often polarized into arguments for critical thinking as *either* generic (Ennis 1985; 1997; Kuhn 1991) *or* subject-specific (Atkinson 1997; McPeck 1992; Moore 2011). As a growing number of scholars suggest (Davies 2006; 2013; Moore 2011), there is a need to move beyond this false dichotomy. Doing so in turn requires a means for systematically analyzing the organizing principles underlying knowledge practices, to show what features are generic or specific.

To explain this focus further is perhaps best achieved through illustration. As Moore and Maton (2001, 154) argue, "describing what is obscured by a blind spot is extremely difficult, for what you are trying to point to simply cannot be seen through the current lens." Accordingly, we shall introduce a framework for analyzing knowledge practices (LCT) and enact one of its concepts (semantic gravity) in analyses of student assignments judged by teachers in higher education to successfully exemplify critical thinking. Empirically, we analyze reflective assignments or "written documents that students create as they think about various concepts, events, or interactions over a period of time for the purposes of gaining insights into self-awareness and learning" (Thorpe 2004, 328). This form of assessment is becoming increasingly popular as a means of assessing critical thinking in applied disciplines, including business and management education (Carson and Fisher 2006; Fischer 2003; Swan and Bailey 2004), nursing (Epp 2008; Smith 2011), psychology (Sutton, Townend, and Wright 2007), social work and health sciences (Fook 2002; Fook and Askeland 2007), and teacher education (Hume 2009; Mills 2008; Otienoh 2009). Our examples are drawn from social work and business studies. We should emphasize: we are not concerned with determining whether these assignments demonstrate "thinking," "reflection," or other cognitive processes that are "critical" or otherwise. Rather, our aim is to briefly illustrate how a concept from LCT helps explore the nature of what has been judged by teaching professionals in higher education to demonstrate critical thinking in student writing in different disciplines. We thereby hope to illustrate how this approach can offer insights into how generic and subject-specific attributes of what is considered critical thinking can be analyzed, made explicit, and taught and learned.

Legitimation Code Theory and semantic gravity

Legitimation Code Theory (LCT) is a sociological framework for researching and informing practice (Maton 2013; 2014a; 2014b). It forms a core part of social realism, a broad "coalition" of approaches that reveal knowledge as both socially produced and real, in the sense of having effects (Maton and Moore 2010). LCT extends and integrates ideas from a number of approaches, most centrally those of Pierre Bourdieu and Basil Bernstein. This conceptual development has a close relation with empirical research. LCT is rapidly growing as a basis for studies of education at all institutional levels and across the disciplinary map—from primary schools to universities, from physics to jazz—in a widening range of national contexts, as well as beyond education. (For numerous examples of this body of work, see http://www.legitimationcodetheory.com.) The framework comprises a multi-dimensional conceptual toolkit, where each dimension offers concepts for analyzing a particular set of organizing principles underlying practices. Here, for illustrative brevity, we focus on only one concept: *semantic gravity* (Maton 2013; 2014a; 2014b).

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 meaning is dependent on its context. For example, the meaning of the name for a specific event in the academic subject of history (the 1917 Russian Revolution) embodies stronger semantic gravity than that for a kind of historical event (revolutions), which in turn embodies stronger semantic gravity than theories of historical causation. Semantic gravity thus traces a continuum of strengths with infinite capacity for gradation. It can also be used to analyze change over time by describing processes of *weakening* semantic gravity, such as moving from the concrete particulars of a specific case toward generalizations and abstractions, and *strengthening* semantic gravity, such as moving from abstract or generalized ideas toward concrete and delimited cases.

To analyze change over time one can trace profiles of the relative context-dependence of meanings (Maton 2013; 2014a). Figure 33.1 illustrates three simplified profiles: a "high flatline" (A1) of relatively context-independent meanings; a "low flatline" (A2) of relatively context-dependent meanings; and a "gravity wave" (B) of movement between stronger and weaker semantic gravity (and vice versa). These profiles also illustrate different ranges between their strongest and weakest strengths: A1 and A2 have much lower ranges than B.

This brief introduction is simplified and partial—semantic gravity is but one concept of this sophisticated framework. Nonetheless, it will suffice to illustrate how analyzing the organizing principles of knowledge practices may offer

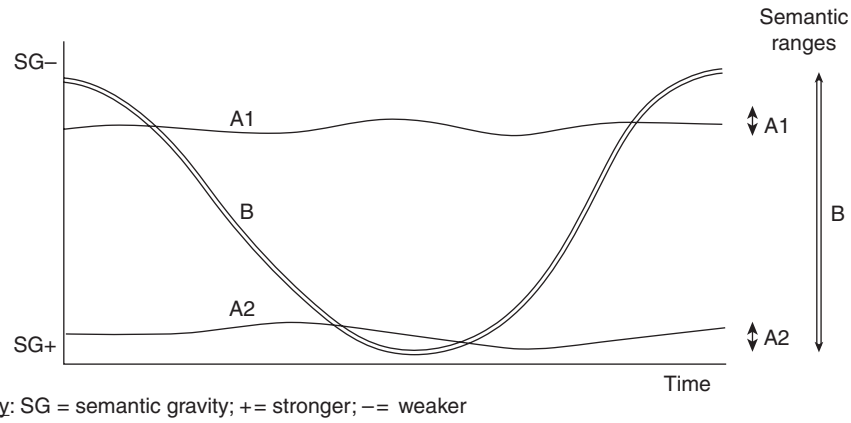

Figure 33.1 Illustrative profiles and semantic ranges.
Source: Adapted from Maton 2013, 13.

insights into what is judged as evidence of critical thinking. To do so we focus on written student assignments. The wider project from which we draw comprises analyses of model "critical reflection" essays from social work (Pockett and Giles 2008) and highly graded "reflective journals" from business studies (collected as part of an ongoing PhD study at a large metropolitan Australian university). To enable detailed illustrative analyses we explore here a single exemplary text from each subject area.

A "critical reflection" essay in social work

Our first text is a high-scoring "critical reflection" essay written by a final year undergraduate student in social work. The essay was published as a model answer in an edited collection titled *Critical Reflection: Generating Theory from Practice* (Pockett and Giles 2008). The purpose of the assignment was to prepare students to enact what is described as a process of critical reflection and thereby "create new professional knowledge" and develop "their emerging identity as 'new graduate social workers' about to enter the workplace" (Pockett and Giles 2008, xiv). To guide their writing, students were asked to

> select a critical incident from their field education experience and using Fook (2002, pp. 98–100), analyse the incident through the process of deconstruction and develop new practice theories as a form of reconstruction . . . identify, describe and critique key themes within a critical review of literature, and redevelop practical theory in relation to the critical incident. (Pockett and Giles 2008, xiv)

Students were required to "critically reflect on their learning" (Pockett and Giles 2008, xiv) based on Fook's (2002) model of critical deconstruction and reconstruction. This model comprises four stages:

1. *Critical deconstruction*: "searching for contradictions, different perspectives and interpretations" (92);
2. *Resistance*: "refusing to accept or participate in aspects of dominant discourses which work to disempower, or perhaps render a situation unworkable because of this" (95);
3. *Challenge*: "the identification or labeling of both the existence and operation of discourses and that which is hidden, glossed over or assumed" (96); and
4. *Reconstruction*: "formulating new discourses and structures" (96).

Uncovering one's own assumptions about social work practice through this kind of critical reflection is considered a highly valued skill for practitioners as part of fostering social justice (Brookfield 2001; Fook and Askeland 2007). In the assignment students were required to identify a difficult situation or "critical incident" that they encountered during their field placement and discuss that incident using Fook's model. Thus, to successfully demonstrate critical reflection, the incident must become an object of study to be analyzed by the student using ideas from social work.

To explore the model essay we shall begin with its basic structure. The essay comprises five stages that we shall term as follows:

- *Introduction*—in which the student discusses the importance of critical reflection for the subject area of social work;
- *Critical Incident*—where the student narrates an incident from her field placement when she was subjected to verbal sexual harassment;
- *Excavation*—in which the student deconstructs her own "dominant assumptions" by focusing on what she perceives as an inappropriate response to the incident, using "critical deconstruction," "resistance," and "challenge" from Fook's model;
- *Transformation*—where she draws on Fook's notion of "reconstruction" to discuss lessons learned from her experience and acknowledge the need to change her behavior in similar situations in future; and
- *Coda*—where she finishes the essay by emphasizing the role of critical reflection in enabling "self-transformation" in professional practice.

Figure 33.2 traces the profile of semantic gravity characterizing the knowledge claims expressed throughout the essay. One overarching feature to note

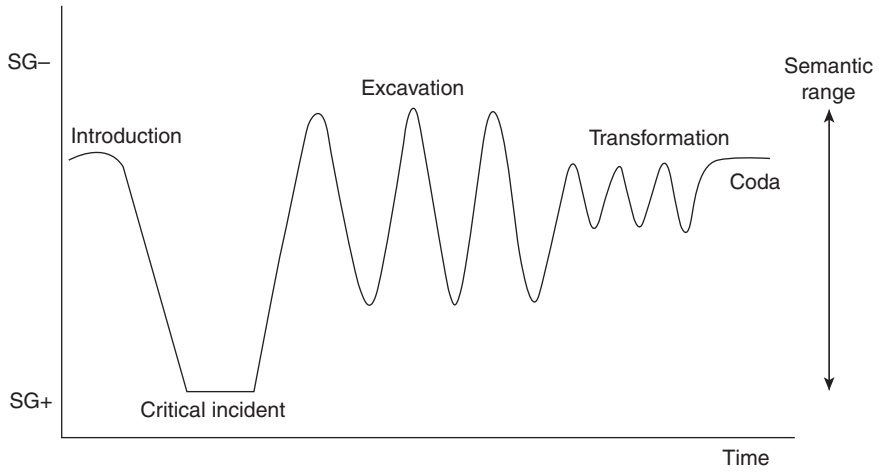

Figure 33.2 Semantic profile of a successful reflection essay in social work.

is the series of *gravity waves* characterizing the essay: recurrent movements are made between concrete particulars (such as an account of the "critical incident") and more generalized and abstracted concepts. The essay thereby weaves together meanings of greater and lesser context-dependence, empirical examples and theoretical constructs, and experiential and academic forms of knowledge. We now turn to explore the particular forms taken by this "semantic weaving" (Maton 2013; 2014a) by addressing in turn the key stages of *Critical Incident*, *Excavation,* and *Transformation*.

Critical incident

The essay begins by describing in general terms the technical concepts comprising a process of critical reflection in social work (thus the relatively high position of *Introduction* in figure 33.2). In the *Critical Incident* stage, the essay then comprises a short narrative of the student's difficult experience with a young male patient (Jared) who attended a drug and alcohol rehabilitation program. The student, a young female apprentice social worker, was subjected to verbal sexual harassment by the patient during her field placement. While the technical term "critical incident" frames the stage, this concept remains undefined by the student and embedded within the context of the particular case. The student provides an account of her concrete personal experiences that is highly contextualized; for example:

> It was in this unit that my critical incident occurred . . . I thought as I had established some rapport with the clients previously; I could get them involved

> [in preparing lunch]. I entered the lounge room where two of the boys were playing a video game. As I approached Jared, I asked "Jared, could you please give us a hand in the kitchen?" The answer was simple and encapsulated my critical incident: "I will if you give us a kiss." (Pockett and Giles 2008, 17)

The series of concrete contexts that give the narrative meaning represent relatively strong semantic gravity, which is maintained through this stage of the essay (*Critical Incident* in figure 33.2). This low gravity flatline works to ground the essay in the specific critical incident, and, as we now show, serves as the launchpad for a weakening of semantic gravity through introducing more detached, "objective," and theorized meanings.

Excavation

The knowledge claims comprising the incident are transformed by the student in the *Excavation* stage through their relation to the concepts of "boundaries," "gender," and "power." This creates a series of gravity waves (figure 33.2) as the essay moves between concepts and concrete examples generalized from the incident. The stage begins by introducing the concepts:

> In my incident the emerging themes that I believe warrant further investigation relate to professional practice, namely the issue of boundaries, gender and power. (Pockett and Giles 2008, 17)

The student then strengthens semantic gravity slightly by relating these relatively abstract, context-independent terms to the concrete particularities of her critical incident. For example, the student negatively evaluates her assumptions about feeling obliged to maintain a professional persona while expecting clients to reveal their personal selves:

> The irony of my distinction only becomes clear now. While I expect to be able to put on a professional "mask," consisting of the professional skills and knowledge of social work practice when working with clients, I expect clients like Jared to "bare all," to reveal to me their personal problems, issues and insecurities. (Pockett and Giles 2008, 20)

Though more context-dependent than technical concepts, this is not simply empirical description. While grounded in the specific events already recounted, the student is reflecting here on that incident, rising above the specific context to describe more generalized issues, such as feelings of expectations of which the encounter with Jared represents but one instance. Thus, as the profile of figure 33.2 shows, this represents weaker semantic gravity than the *Critical Incident* stage (the bottom of waves here are higher than

those of that stage) but stronger semantic gravity than such highly abstract terms as "power" (represented by the peaks of waves).

As well as movements downward, the student also moves the knowledge being expressed back up the profile by transforming these generalized examples into the technical language associated with social work. For example, she redescribes her feelings in conceptual terms:

> Sommers-Flanagan and Sommers-Flanagan (2007) refer to this concept as "one-way intimacies" (p. 163), and as a necessary component of helping relationships. (Pockett and Giles 2008, 20)

A series of these shifts between generalized events and concepts throughout the *Excavation* stage create gravity waves with a high range. This creates the basis for the next stage of the essay in which these two forms of knowledge are transformed to become more closely woven together.

Transformation

In the final main stage of the essay the student draws lessons from the reflection process, such as identifying assumptions and her powerful position as a social worker, and proposes changes to her future practice. Despite the frequent use of personal pronouns (especially "I") that grounds the discussion in the experiences of the author, this stage exhibits weaker semantic gravity than either the earlier narrative of the *Critical Incident* stage or examples from that narrative woven into the *Excavation* stage. Meanings are no longer strongly grounded in the specificities of the case but rather refer to a greater range of potential future cases. Conversely, the focus on concrete practices restricts how high this stage reaches in comparison with the more theoretical parts of the *Excavation* stage. Thus, figure 33.2 locates this *Transformation* stage higher on the profile than *Critical Incident* but not lower than the peaks of *Excavation*. Simply put, as the profile of figure 33.2 shows, this stage is characterized by a closer weaving together of generalizable experiential meanings and conceptual terms; for example:

> I also acknowledge the intersection and overlap between "the personal" and "the professional" and that in any encounter I am not either one identity or the other. I am, for example, a "social worker," a "young person" and a "sexual being" (Stacey et al, 2002), just as the client has many identities, such as "offender,", a "young person," a "brother," and a "student." (Pockett and Giles 2008, 26)

As in the previous stage, *Transformation* involves movements up and down the profile. Exemplifying through contextualized meanings, such as the various identities of the author and the client, strengthen semantic gravity. In

turn these various examples are then abstracted into the term "multiple and intersecting identities," weakening semantic gravity:

> There are multiple and intersecting identities which are interwoven and influence each other in any encounter. (Pockett and Giles 2008, 26)

By ending the stage with relatively weaker semantic gravity, the student moves beyond the immediate context of her field placement to demonstrate her ability to *re-examine* existing discourses and her own behavior. This weaker semantic gravity is continued in the final stage of the essay, the *Coda*, where the student concludes by re-examining the value of critical reflection for social work and creating "self-reflective" practitioners.

Overall, the essay begins by being grounded by the critical incident, after which the student shows her capacity to reconceptualize and recontextualize the meanings of this incident through successively weakening and strengthening semantic gravity, weaving together the case with concepts. These meanings are then generalized into future practice. Not only does the student bring together different forms of knowledge, but she also transforms them by theorizing concrete examples and exemplifying concepts—that is, semantic weaving achieved through waves. This offers insight into one potential characteristic of the basis of successful demonstration of critical thinking, as such "critical reflection" essays are held to involve (Pockett and Giles 2008). One issue it raises is whether this profile is reflected in other subject areas. To begin to address this question we now turn to business studies.

A "reflective journal" in business studies

Our second text is a high-achieving "reflective journal" from Business in the Global Environment, a core senior undergraduate Bachelor of Commerce unit. As we discussed earlier, this form of assessment is often claimed to provide a means for encouraging or enabling the demonstration of critical thinking skills. This specific assignment aims to develop students' reflective practice and their intercultural competence, defined in the Unit of Study Outline as "a dynamic ongoing interactive *self-reflective learning* process that *transforms* attitudes, skills and knowledge for effective communication and interaction across cultures and contexts" (Freeman 2009, 1; emphases added). To help students structure their journals, the following questions were provided:

1. Choose one behaviour that you thought was a strength or weakness and identify the "below the surface" value that underpins that behaviour.
2. Having identified the cultural value that you believe underpins your particular strength or weakness, now explain how and from where that cultural

value developed using the "core elements of culture" provided on page 50 of Solomon and Schell.
3. What does this teach you about the way you behave, and your expectations of others, when working in multi-national teams?
4. How might you integrate this awareness into future team work, either at university or in the workplace?

Understanding intercultural differences in business behaviors through this kind of reflective activity is considered an essential skill for working in multicultural organizations (Solomon and Schell 2009) and is one of the most important graduate attributes in business school curricula. In this task students were required to reflect on their experience of multinational teamwork by examining their visible and invisible values, beliefs, assumptions, and behaviors based on Solomon and Schell's (2009) model of intercultural competency.

The journal comprises three principal stages:

- *Excavation*—where the student identifies "individualism" as a "below the surface" value underpinning his experience of a group assignment;
- *Reflection*—in which the student concludes that valuing individualism over his Chinese peers' communitarianism led to his "discounting" of his collaborators' opinions; and
- *Transformation*—where the student pledges that in future teamwork situations his behavior will be guided by the intercultural competence skills he claims to have gained through this reflective process.

Figure 33.3 traces the profile of semantic gravity characterizing the knowledge claims expressed through the journal. Comparing this with figure 33.2

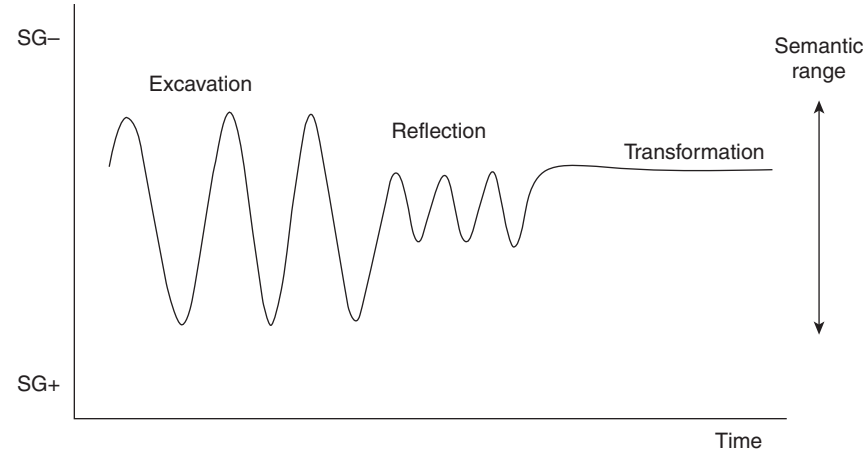

Figure 33.3 Semantic profile of a successful reflective journal in business studies.

highlights the similarities and differences between the two assignments. As in the social work essay, the business journal includes both flatlines (*Transformation*) and waves (*Excavation*, *Reflection*), and weaves together different forms of knowledge. There are also comparable stages: *Excavation* exhibits similar profiles of semantic gravity in both texts, while *Transformation* in the social work essay resembles the *Reflection* stage in the business journal (though here the *Reflection* stage replaces the *Critical Incident* and comes later). The overall profile also traces a different shape: the waves of semantic gravity in the business journal come earlier and are followed by a flatline. Moreover, this flatline is relatively high (a passage comprising consistently context-independent meanings) rather than the descriptive narrative with which the social work essay began. In short, as we shall show, though waving and weaving again feature in the business studies journal, the different functions they serve here create a different profile.

Excavation

In the first part of the journal the student uncovers a "below the surface value" he possesses—individualism—and outlines general features of Australian culture and history from which this value has evolved:

> Australia's history plays another role in Australia's core culture through its history of immigration (Encarta Encyclopaedia 2009a). . . . Some of Australia's national heroes are also responsible for developing individualism.

From such wide-ranging generalizations, exhibiting relatively weak semantic gravity, the journal shifts down to concrete examples such as:

> Sir Donald Bradman who is arguably the most famous sporting hero in Australia was made famous for his outstanding individual cricket batting record (*ESPN cricketinfo* 2009).

In turn, from the stronger semantic gravity characterizing these examples, the journal generalizes back up to the notion of "individualism":

> Individualism has consequently evolved from two main areas of core culture, its history and its heroes.

Thus, as figure 33.3 shows, the journal begins by weaving between concepts and cases, abstract ideas and concrete examples. This *Excavation* stage is thus similar in terms of its profile of semantic gravity to the same stage in the social work essay (see figure 33.2). However, in the other essay that stage worked to weave together the preceding empirical description of a critical incident with

concepts; here the journal is attempting to ground an abstract idea (individualism) in the context giving the student's actions meaning (his Australian culture). By coming at the start, this stage also establishes from the outset the high semantic range the journal will traverse.

Reflection

In similar fashion to the social work essay's *Transformation* stage, the journal then works at weaving more closely together these extremes of strengths of semantic gravity, creating milder waves. This *Reflection* stage involves generalized cultural values, behavior, and communication styles that are mid-range: more context-dependent than individualism but less context-dependent than specific heroes and historical events. Moreover, these ideas are related to examples that are not simply narrated events but rather generalized through the student adopting a reflective voice. Nonetheless, while traversing less range, the stage again involves waving between stronger and weaker semantic gravity as it weaves together examples with concepts (see figure 33.3); for example:

> Analysing my behaviour and expectations of others with an open mind has led to some astonishing realizations. I was surprised that my long held belief that the vast majority of the world adopted individualism as a value was incorrect. Communitarianism which opposes individualism, emphasizes the need to focus on community interests over an individual's and is the value most widely adopted worldwide (Trompenaars & Hampden-Turner 2000, p.71).

From the mid-range point established by discussing his own (generalized rather than specific) "behaviour and expectations of others" and "realization," the student weakens semantic gravity by redescribing these meanings in terms of abstract concepts of communitarianism and individualism. In turn, the student then strengthens semantic gravity with a personal example of his experience of multinational teamwork, where he negatively judges his own directness toward his peers:

> My group had three members from China where communitarianism is generally valued and other cultural differences such as communication styles made their behaviour seem foreign to me (Trompenaars & Hampden-Turner 2000, p.71). My lack of cultural knowledge led to my use of a direct communication style which is in stark contrast to the commonly indirect Chinese style and may have offended the group members due to my unintentional effect of making them lose face to each other (Fox 2008, p.49–50).

This in turn is followed by a weakening of semantic gravity to describe "all situations":

> While we did receive a high distinction for the case study, clearly in almost all situations my current behaviour and expectation of others in a multi-national team will detract from team cohesion and the task at hand.

In creating milder waves of semantic gravity, the student demonstrates his capacity to weave together theoretical and practical cases; in being situated in the middle of the semantic profile, he also shows this weaving as not too abstracted from the kind of applied situations appropriate to conducting business.

Transformation

In the final *Transformation* stage the student pledges to apply his newly acquired knowledge or intercultural competence skills to future multinational teamwork situations. This stage is couched in terms of the concept of "intercultural competence":

> The development of intercultural competence is the key to overcoming my detrimental behaviour in a multi-national team situation.

Drawing on the process of reflection exhibited in the previous stage, the student provides a list of generalized skills he deems necessary for successful participation in teamwork situations. Despite the use of the personal pronoun "I," the discussion here has moved beyond contextualized meanings to a focus on generalizable practices. In contrast to the rest of the essay, repeated references to concepts from theoretical frameworks and a lack of references to the particulars of the case previous stages have discussed contribute to creating a high flatline (figure 33.3):

> I must acquire cultural knowledge regarding the preferred communication style, values, beliefs and even the core elements of [team members'] culture to ensure team cohesion (Matveev & Milter 2004, p.106). I need to develop behavioural modification skills and change my personality orientation so that I may use the cultural knowledge to facilitate better communication and display cultural empathy rather than embracing detrimental stereotyping (Matveev & Milter 2004, p.106). I must cease discounting behaviour and embrace the full potential a team can offer by facilitating all of the group ideas.

Though drawing on abstract concepts, this stage does not reach as high as the peaks of *Excavation* but approaches the peaks of waves of *Reflection* due to the

generalized references to the student's own behavior and personality. The stage ends with references to highly generalized future teamwork situations woven together with the repeated use of the abstract concept of "intercultural competence" that frames the entire stage:

> Team members with even fundamentally different core cultures can work together in harmony and achieve far more than any individual if intercultural competence is embraced which is the view held by Associate Professor of Management Richard Milter (Matveev 2004).

Overall, the journal begins by establishing a wide range of semantic gravity, interweaving abstractions with concrete cases, before bringing these together in the discussion of a particular case, whose meanings are then generalized as rules for future practice. As in our previous example, the student thereby creates gravity waves that weave together and transform different kinds of knowledge, but he does so through a differently staged structure.

Conclusion

There is much emphasis in higher education research and policy on the importance of equipping students with critical thinking skills. Existing research focuses mainly on perceptions of staff and students of cognitively defined skills. Few studies explore student writing to examine the knowledge practices associated with what practitioners in higher education judge as successful demonstration of critical thinking. To do so, we drew here on the concept of semantic gravity from LCT to briefly trace the semantic profiles of high-achieving critical reflection assignments in social work and business studies. We conclude by considering what these illustrative analyses suggest about the knowledge practices of critical thinking and the usefulness of LCT for research into this area.

One aspect common to both texts is that they demonstrate mastery of semantic gravity, and specifically the capacity to create waves that weave together context-dependent and context-independent forms of knowledge, such as empirical cases and abstract concepts, transforming them into generalizable practices for future contexts. While, for reasons of space, we focused on two illustrative texts from social work and business, these characteristics are also being suggested by a rapidly growing number of studies using LCT to explore student work in a range of subject areas, including design (Shay and Steyn 2015), engineering (Wolff and Luckett 2013), English (Maton 2014b), environmental science (Tan 2013), jazz (Martin 2012), journalism (Kilpert and Shay 2013), physics (Georgiou 2015), sociology (Stavrou 2012), and teacher education (Shalem and Slominsky 2010). Such studies highlight that mastering semantic gravity to achieve a high range is crucial to achievement across the

disciplinary map. In this chapter we are suggesting that waving, weaving, and a high range may also be generic attributes of knowledge practices associated with demonstrating critical thinking. Other possible generic attributes, at least of critical reflection assignments, include particular stages. Both assignments involved *Excavation*, in which students discuss their behaviors and beliefs to demonstrate what is termed as "critical reflection" by examining their assumptions, and *Transformation*, in which lessons learned about those assumptions are elaborated.

However, the analyses also revealed important differences between assignments. *Transformation* in the social work essay is characterized by mild waving, but in the business journal there is a high flatline of relatively weak semantic gravity. They also involve different additional stages (*Critical Incident* and *Reflection*) and in different orders such that the overall semantic profiles traced by the assignments differ, as shown by comparing figures 33.2 and 33.3. This highlights potential subject-specific differences for further study. For example, in less "applied" disciplines than social work and business, demonstration of critical thinking may be achieved by beginning and ending with more theoretical, abstract, and decontextualized meanings, which are applied to concrete examples, tracing a different profile than those explored in this paper (cf. Maton 2014a). In providing a framework for empirical studies of divergent subject areas, LCT thereby enacts calls to move beyond the false dichotomy of either genericism or subject-specificity by revealing both generic attributes and ways these may be realized differently in disciplinary contexts.

Of course, exploring semantic gravity does not by itself capture the knowledge practices associated with critical thinking. Neither is the concept of "semantic gravity" the whole of LCT: it represents but one isolated part of the framework. Studies are, for example, exploring in tandem the role of "semantic density" or the degree of condensation of meaning in knowledge (see Maton, Hood, and Shay 2015). What the necessarily brief analyses of this chapter demonstrate, however, is the potential value of using such concepts for research into critical thinking. Further, this is not confined to studies of student work. Research into pedagogic practices is revealing the significance of waves of semantic gravity (and semantic density) for cumulative knowledge-building in classrooms (Martin 2013; Maton 2013; Matruglio, Maton, and Martin 2013). This conceptual versatility offers great potential for not only research but also practical pedagogic outcomes. Not all students are able to demonstrate the mastery of semantic gravity that studies suggest is so highly valued across many academic disciplines, and the knowledge practices associated with critical thinking are rarely taught explicitly, leading to students feeling "lost" and "frustrated" (Moreno 2004). By making explicit the nature of knowledge practices that constitute a demonstration of critical thinking, such as waves of semantic gravity, LCT enables the possibility of designing pedagogic interventions for teaching

the skills that achieve those practices (cf. Macnaught, Maton, Martin, and Matruglio 2013). Thus, LCT offers a framework that not only can be used to analyze the knowledge practices of critical thinking but also itself embodies those practices. Rather than either the high flatline of decontextualized and abstract discussions or the low flatline of empirical descriptions that remain locked into the specificities of their objects of study, LCT enables research to embrace a high range and to weave together theoretical concepts, empirical research, and practical outcomes. It thereby also enables the knowledge practices of critical thinking.

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