

Pointing at the Flow of Language

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a review of:

Brown, T. (2001). *Mathematics education and language: interpreting hermeneutics and post-structuralism* (revised second edition). Dordrecht: Kluwer. 301 pp. ISBN 1-4020-0013-8.

There are a number of ways we can approach the sliding water that forms a river. We can attempt to conquer it, perhaps by building a bridge over it, diverting it or harnessing it for generating electricity. We can reflect upon the apparent stability of the river's shape in juxtaposition with the constantly moving waters. We can immerse ourselves in the flowing waters and revel in the power of the river, let ourselves be taken up in the current, and lose our dry land referents.

Like water, language flows in mathematics classrooms. Language practice itself can characterize a gathering of people as a mathematics learning environment. In such a setting, the shifting nature of language is typically ignored and mathematical meaning is assumed to have shape and permanence. Tony Brown (2001), in his book *Mathematics Education and Language: Interpreting Hermeneutics and Post-structuralism*, draws attention to the medium of classroom interaction. He points to the moving waters of language in the experience of mathematics classroom participants and foregrounds the particular contexts of student and teacher experiences in his consideration of mathematics learning.

In this review of the second edition of Brown's book, I consider the context of his text to draw connections with student and teacher experiences of mathematical learning. First, I give an overview of the contents of the book. Second, I look at the form of the book as it directs my attention to the context-bound nature of language, particularly as it pertains to mathematics education.

What is said in this book

Brown begins his analysis of language in mathematics education with a review of scholarship in hermeneutics and post-structuralism and relates it to mathematics education. In what might be called chapter zero, because it follows the introduction and precedes Chapter 1, Brown locates his work in the context of constructivist discourses in mathematics education. He sees himself as building on the post-structuralist work of Valerie Walkerdine and providing theoretical framing for the critical mathematics education initiated by Ole Skovsmose (Brown, 2001, pp. 19-20).

In Chapter 1, Brown outlines the significance of phenomenology and hermeneutics scholarship to mathematics education, demonstrating how our language accounts are shaped by the world in which we find ourselves, while, at the same time, our languaging shapes this world. Mathematical objects are inaccessible except through language, so mathematical concepts are especially

impermanent in the flow of time and experience. A mathematics text can be static, but any person's interpretation of the text is necessarily dynamic, dependent on the experience of the interpretant.

In Chapter 2, Brown sets out to discredit any presumption that mathematics is anchored in universal truth. He draws on Saussure and Lacan in his discussion of the interplay between signs and how they relate to the objects they seem to signify. He uses an example of some students' narrations of their investigation of quadrilaterals to illustrate how conceptions of a sign change with time. Because of the inherently linguistic and temporal nature of mathematics, Brown suggests that instead of seeing the task of mathematics as movement to pre-defined concepts, we see it as an on-going fitting of language to the learner's experience of being exposed to inherited mathematics and of inventing mathematics.

If mathematical signs are impermanent, what is real in mathematics? In Chapter 3, Brown addresses this question directly. He uses student-written texts as exemplars to indicate the complexity of sharing mathematical perspectives. When a learner or teacher uses language, like a finger, to point at her continually shifting mathematical experience, her audience can only see the pointing finger, not the dynamic objects to which it is pointing. The language is more real than the objects of mathematics. However, when a student's experience of a mathematical activity is reduced to language, much is lost. Instead of seeing a communication as a representation of the extent of a learner's knowledge, Brown encourages us to see it as a snapshot of experience, which operates on the conversers' on-going evolution of mathematical knowledge.

The next two chapters focus more on particular classroom events than did the earlier, more theoretical chapters. Brown sets the tone of most other chapters in his book with a synopsis of the chapter, but Chapter 4 begins with an anecdote about a group of boys playing a mathematical game. He uses accounts of mathematics learning events to highlight the physical and social environment in which students and teachers face their tasks. They cannot escape contextual constraints on their mathematical experience.

Brown's aim in Chapter 5 is to "offer some preliminary work in theorising the individual learner's perspective in mathematics lessons" (p. 134). To describe a student's perspective, Brown puts himself in the shoes of a student and imagines what the student perceived in a particular mathematical investigation. Drawing on Schütz, he shows how students can only operate on the world as they see it, not as it is. It may seem odd that Brown would presume to speak on behalf of a student to reveal a student perspective. However, Brown's attention, here and throughout the book, seems to be focused more on teachers than on students. Since a teacher cannot have direct access to her students' perspectives, she can only imagine these perspectives based on the language clues provided by her students. Brown's projected

account of student experience is the kind of account to which teachers typically have access. Perhaps this explanation lies behind Brown's choice to invent rather than to listen to students give their own accounts.

The next set of chapters focuses on teacher practice. In Chapter 6, Brown considers the teacher's experience in much the same way as he considers students in the previous chapter. He uses transcripts of classroom interactions to describe how a teacher develops an understanding of a student's activity by projecting backward and projecting forward. Only a particular view of the present is available to the teacher at any time. Again, Brown is content to construct the teacher's experience instead of listening to teachers themselves give accounts of their own contexts.

Chapter 7 is unique to the second edition of this book. In it, Brown uses the transition from arithmetic to algebra as an example of how a narrative approach can help us understand students' negotiation of boundaries in mathematics learning. His goal is not to improve the teaching of algebra, but rather to demonstrate how attention to particular views of learning transitions promotes particular enterprises.

Chapter 8 is also new in this second edition. Here Brown draws on Derrida and John Mason to add to his early chapters' theoretical consideration of language. Without significant reference to Chapter 3 where he discusses the inherent loss that accompanies the generation of texts, he takes up this focus again, but in greater detail. While language provides a static glimpse of dynamic experience, it also points *away* from significant aspects of the experience by pointing *to* particular aspects. Mathematical meaning never stabilizes as learners "oscillate between bringing language to their mathematical experience and bringing meaning to language through reflection" (p. 206).

Chapter 9 focuses attention on developing teachers. With excerpts of practitioners' narrative accounts of their mathematics teaching, Brown locates teachers' identity in terms of their movement through time. He claims that self-reflection is necessary for teachers to understand their identities, which might be best described in terms of the changes through time in the teacher's perceiving, describing and acting. With this claim, Brown promotes practitioner research and, for teachers' professional development, continuing narrative reflection.

The last two chapters form a reworking of Brown's concluding chapter that appeared in the first edition of this book. In Chapter 10, he underscores the necessity of immersing oneself in a tradition in order to critique it. Here he identifies the need for students to take notice of the particularities of the mathematics in their culture, but he is unclear about how students might be directed toward such awareness. His focus remains on teachers and their awareness of culture in mathematics.

Finally, in Chapter 11, Brown sets a discussion of some tensions in mathematics education in the context of constant change, which he calls 'homeorhesis', as opposed to homeostasis. He explains the apparent dualities of these tensions in terms of the different experiences stakeholders bring to the enterprise of mathematics education. These 'reconciliations', as he calls them, are positioned to provide justification for Brown's conclusion: that we need to shift "the ways through which we generate and pass on our intellectual heritage" (p. 275), paying attention to the flow of experience and language rather than resisting it with static conceptualizations.

What is said?

My synopsis of Brown's theses may seem quite conventional, but there is a problem. If I take Brown seriously, I ought not to talk about *what is said* in his book. Each reader can only find meaning in terms of her own experience of it. Indeed, Brown's book was different for me each time I read it. I ought to be able to talk only about *my* experience of the book. I am succumbing to illusion when I imagine that the meaning in his text is static, an illusion that Brown seems to share when he tells his readers what meaning they will make: "we will see how Ricoeur sees this effect" (p. 26). Thus, I now turn my attention to my experience of Brown's text. For the synopsis I provided above, I chose to pretend that meaning is static and universal in order to provide at least some context in which to set the following analysis.

What might be seen in the form of the saying

The form of a text can say as much as the content. Indeed, Brown and others immersed in post-structuralist discourses would contend that there is no such thing as content in text. There are two broad categories that I will use to consider Brown's text more critically: narrative context and verb tense. I will relate both of these to the learning of mathematics.

Narrative Context

In Chapter 9, Brown advises teachers to engage in writing narratives in order to develop an understanding of their identities and of possibilities for their practice. I wonder how Brown's inquiry would be different if he were to look for meaning in his own narration of his research and practice, rather than in theory.

Clandinin and Connelly (2000), who describe narrative inquiry as a research method, set their work in the context of their own inquiry and their supervision of narrative inquirers. Like Brown, they claim that understanding only makes sense in terms of the experiences one brings to a situation. Clandinin and Connelly write from their experience. By contrast, Brown generally starts from theory and then draws on particular experiences as examples of the theory. Clandinin and Connelly call this a formalist approach and suggest that it does not take seriously the dependence of meaning on experience (p. 40f).

Though Brown's text masks to some extent his experiences that inform it, remnants appear. These remnants may be more obvious in a second edition, especially when read in juxtaposition with the first edition. For example, the first edition of the book has a history itself. It has been described in a published review as "a collection of previously published essays ... revised to varying degrees" (Davis, 1999, p. 116). At times, Brown shifts back and forth between *I* and *we* voices, suggesting that he is either borrowing from previously co-authored work or that he switched voice in his adaptations and his editors missed some pronoun inconsistencies (e.g. pp. 185 and 192). The second edition is a reworking of the first edition, which Brown acknowledges many readers found difficult (p. 20).

Though much of the second edition is virtually unchanged from the first edition, we can assume that the changes relate to Brown's intervening experiences between the two editions. Changes include minor additions – for example, a new paragraph break (p. 71) and a two-paragraph addendum at the end of Chapter 1 (pp. 55-6). More significant changes include two new chapters, a chapter reworked and split in two, an overall structural reworking, comments on reviews of the first edition and Brown's own metacommentary.

Chapters 7 and 8 are new to the second edition, and the final two chapters together extend the first edition's concluding chapter. The second edition does not categorize chapters into four 'parts', as did the first edition. As a result, the original introductions to each part have been pasted into the beginnings of Chapters 1, 4 and 6, postponing Brown's synopses from the usual place in the first page or two of each chapter.

Brown also responds to two reviews of his first edition. He mentions Skovsmose's (1998) review and provides a vague answer to the concern it raises (p. 146). Brown seems to pay more attention to Davis' (1999) review, but challenges the practicality of his concern (p. 258).

Brown's commentary on his own writing includes recognition of the boldness of an assumption about student capability he made in the first edition (p. 122) and a paragraph in which he expresses hope that his new chapters will help readers with the two theoretical chapters (p. 20). The hope might be seen more as a wish, since he seems to make no attempt to connect these new chapters to the initial theoretical chapters. Indeed, in the entire book there are few explicit references from one chapter to another. This feature supports Davis' assertion that the book is a collection of previously published independent essays.

Brown notices that he reveals his voice most in the last three chapters, which are comprised of either new or significantly reworked material. He hopes that the middle chapters' more extensive consideration of particular classroom data gives warrant to the initial theoretical chapters (p. 20). Later, he even suggests that readers might consider reading the middle chapters first, to provide 'orientation' for the theoretical chapters (p. 25). I am left wondering

why he persisted in placing theory before experience even though he is aware that many readers find this positioning difficult and claims that theory can only make sense in the context of particular experience.

The question of where to place experience relative to theory is also significant for mathematics teachers and learners. When I teach, for example, I might begin a lesson by describing elegant or important mathematics and continue the lesson by asking students to use these inherited procedures. This approach might be paralleled with the typical academic flow from the theoretical to the particular, which Brown exemplifies. With this approach, particular experiences are seen as mere examples to illustrate pre-existent theory.

In an alternative approach to teaching, I could prompt students to investigate a particular phenomenon and to generalize from their mathematical exploration. After they have had a chance to experience the mathematics, we could extend the mathematical investigation by comparing their work to elegant mathematical procedures that have been developed to address similar problems. With this approach, students are expected to invent mathematics and to consider inherited mathematics in the context of their own mathematical experience. This approach parallels the kind of narrative positioning championed by Clandinin and Connelly (2000).

I assume that Brown's apparently reluctant choice to begin with experience is related to the genres of academic discourse. Similarly, mathematics students are positioned within their own classroom discourses. They too can be expected to try to adhere to their perception of the mathematical values of their teachers, which may very well privilege generalities stated outside the context of experience. As in Brown's work, evidence of students' mathematical experience is likely to appear even when they try to mask it. An attentive teacher, who wants his students to direct their attention to their experience of mathematics, might look for and work from such remnants in his students' writing and in their oral contributions to class discussion.

Verb Tense

One feature of text that can point either toward a student's experience or away from it is her choice of verb tense. After considering Brown's use of tense, I will return to considerations of verb tense in the mathematics classroom.

Time is an important theme in Brown's book. He suggests that teachers project backward and forward in the present as they make their decisions about intervention in a student's experience (e.g. p. 165-6). He identifies temporal concerns as part of the context in which mathematics must be experienced. Clandinin and Connelly (2000) also include time as a dimension of context. They refer to the weave of time, relationships and position as a three-dimensional place in which narrative is situated (p. 50).

In terms of time, there is a notable difference between Brown's writing and theirs. Brown follows academic and literary convention and cites scholarship in the present tense, just as I am doing in this review. By contrast, Clandinin and Connelly often cite scholarship in the past tense. Generally, when they situate a citation in the context of their experience of the scholarship, they use the past tense, and when they comment on the form of the scholarship they use the present tense. Clearly, their use of tense reflects their awareness of the context-bound nature of their understanding. However, Brown's and my adherence to convention does not imply our lack of awareness.

Indeed, Brown differentiates between tenses in his analysis of classroom artefacts. Generally, he uses the past tense when describing classroom transcripts or student writing. However, I have noted some exceptions (e.g. pp. 22, 32-3, 109 and 244). It appears to me that Brown uses the present tense when he attempts to make generalizations based on his experience of an artefact under analysis.

Most fascinating to me is my realization that mathematics students make similar shifts. For example, Brown provides a student's write-up from an investigation (p. 94). This boy, Andrew, begins with a past-tense narrative of his group's approach to the investigation: "The shape he as [*sic*] drawn first is a rectangle shape and this is the one that we started with ..." (p. 94). Andrew's writing moves away from the past tense when he makes generalizations – for example, "to get the area of the path and garden ... you must take the L shaped garden ... change the fours to two" (p. 94).

In the moment of his writing, Andrew projects back and projects forward in the way Brown suggests for teachers. Andrew even uses 'in-order-to' reasoning in his projections, which Brown favours over fatalistic 'because' reasoning (p. 230). However, Brown does not suggest that students can be aware of their reasoning with respect to narrative and time. I see significant potential here. How would students' experience of mathematics differ if they were to be attentive to the temporal contexts of their reasoning?

Bills (2002) has identified significant disparity between higher and lower achieving mathematics students in their use of verb tenses when referring to their mathematical thinking. I wonder why the students who used the present tense were the ones who normally achieved high marks. It seems from Bills' research that the present tense is linked to generalizations and the past tense to narratives of mathematical thinking.

Brown's interest in post-structuralist discourses seems to have prompted him to step away from the traditional mathematics educator's enthrallment with generalization. I support Brown's claim for the value of directing attention to mathematical experience. However, I recognize, as I think he does, that such a cautious approach to abstraction may be contentious for many educators.

Conclusion

While disturbed by some of the structural features of the first edition of Brown's book, Skovsmose (1998) and Davis (1999) both found it to be important because of its serious consideration of post-structuralist scholarship in the context of mathematics education. Both reviewers also had concerns because of directions that they wished Brown had taken. Perhaps their concerns that Brown did not go far enough are a testament to a particular quality of the book – that it begins a conversation that has room to grow.

Though the structural features of the second edition are not significantly different from the first, the generative qualities of the book remain. I find myself in an unsettled space after reading this account of language in mathematics education.

Returning to the image of the sliding water that forms a river, I ask what Brown does with language, which is the dynamic medium of mathematics education. He is not interested in harnessing it. He directs my attention to the sliding medium which can look so stable. Now I want to jump in. I want to immerse myself in the medium and from that perspective point students' attention to the water and the river. I want to direct students' attention to the complexity of language as it relates to experience. I don't want merely to imagine their perspective of the contextual constraints in which their language flows. I want to hear them describe it themselves.

References

- Bills, C. (2002). Linguistic pointers in young children's descriptions of mental calculations. In E. Cockburn and E. Nardi (Eds.), *Proceedings of the 26th Conference of the International Group for the Psychology of Mathematics Education* (vol. II, pp. 97-104), Norwich, UK.
- Brown, T. (2001). *Mathematics education and language: interpreting hermeneutics and post-structuralism* (revised second edition). Dordrecht: Kluwer.
- Clandinin, D.J. and Connelly, F. M. (2000). *Narrative inquiry: experience and story in qualitative research*. San Francisco: Jossey-Bass.
- Davis, B. (1999). Encircling mathematical knowing and mathematics knowledge. *Journal for Research in Mathematics Education* **30** (1), 111-116.
- Skovsmose, O. (1998). Mathematics education and language: interpreting hermeneutics and post-structuralism (book review). *Zentralblatt für Didaktik der Mathematik* **98** (5), 138-141.