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The Things You Do to Know: An Introduction to the Pedagogy of Multiliteracies

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After a brief history of the context and evolution of the idea of Multiliteracies, this chapter focuses on its pedagogy. Originally framed as Situated Practice, Overt Instruction, Critical Framing, and Transformed Practice, these four orientations were subsequently translated in the Learning by Design *project into the 'Knowledge Processes' of Experiencing, Conceptualizing, Analyzing and Applying. The chapter explores the roots of* these *orientations in what it characterizes as 'didactic' and 'authentic' pedagogies.* Learning by Design *is by comparison 'reflexive', combining elements of each of these traditions into a new synthesis. The chapter goes on to spell out the pedagogical specifics of each of the Knowledge Processes, then their epistemological basis as distinctive kinds of 'knowledge-action'. We conclude by contrasting the cognitive emphases of both didactic and authentic pedagogy with the epistemological theory of learning that underpins* Learning by Design. *Its focus is on action rather than cognition—not what we know, but the things we do to know.*

Towards a pedagogy of Multiliteracies

The short history of a word

'Literacy' is a term that presents itself as emphatic and singular. The emphatic part accompanies the modern insistence that everyone has at least 'basic' levels of competency in reading and writing. 'Literacy' in this sense means some quite definite things to be acquired: to read the ordinary texts of modern society—newspapers, information books, novels; to be able to write using correct spelling and grammar; and to appreciate high-cultural values through exposure to a taste of the literary canon. The singular part arises when literacy is presented as a single, official or standard form of language, one right way to write, and an idealized canon of authors conventionally considered 'great'.

By the mid-1990s, the emphatic and singular connotations of the term 'literacy' were beginning to work not-so-well. The mass media and then the internet spawned whole new genres of text which meant that narrowly conventional understandings of literacy were fast becoming anachronistic.

Also, the forces of globalization and manifest local diversity increasingly juxtaposed modes of meaning making that were sharply different from each other. The challenge of learning to communicate in this new environment was to navigate the differences, rather than to learn to communicate in the same ways. Besides, it was becoming obvious that traditional literacy pedagogy was not working to achieve its stated goal of providing social opportunity. Inequalities in education were growing, suggesting that something needed to be done in literacy pedagogy to address this.

It was in this context that the New London Group came together to consider the current state and possible future of literacy pedagogy. Convened by Mary Kalantzis and Bill Cope, the group also consisted of Courtney Cazden, Norman Fairclough, Jim Gee, Gunther Kress, Allan Luke, Carmen Luke, Sarah Michaels, and Martin Nakata. The group's initial deliberations—a week-long meeting in September 1994—produced an article-long manifesto (New London Group 1996), and then an edited book (Cope and Kalantzis 2000) which included the original article. In 2009, in consultation with other members of the group, Cope and Kalantzis published a paper reflecting on subsequent developments (Cope and Kalantzis 2009); then in 2012 they produced a book outlining the theory and practice in greater detail (Kalantzis and Cope 2012a).

To capture the essence of the changes that the group felt needed to be addressed, we coined the term 'Multiliteracies'. A Google search 20 years later shows 196,000 web pages that mention the word. Google Scholar says that 12,700 scholarly articles and books mention Multiliteracies. Amazon has 193 books with the word in their title. At the time, we never imagined that the idea could become this widely used.

The broader context for the Multiliteracies work was the development at the same time of the New Literacy Studies, prominently involving Brian Street (Street 1995), James Gee (Gee 1996), and David Barton (Barton 2007). The idea of Multiliteracies also represents a coming together of related ideas developed before and since by members of the New London Group: Courtney Cazden (Cazden 1983; Cazden 2001; Cazden 2006; Luke et al. 2004), Mary Kalantzis and Bill Cope (Kalantzis and Cope 2012b; Kalantzis and Cope 2015a; Kalantzis and Cope 2015b), Norman Fairclough (Fairclough 1995a; Fairclough 1995b; Fairclough 2001), Jim Gee (Gee 2003; Gee 2004; Gee 2014), Gunther Kress (Kress 2003; Kress 2009; Kress and van Leeuwen 1996), Allan Luke (Luke 1994; Luke 1996a; Luke 2008), Carmen Luke (Luke 1995; Luke 1996b; Luke and Gore 1992), Sarah Michaels (Michaels 2005; Michaels et al. 1993; Michaels et al. 2005), and Martin Nakata (Nakata 2001a; Nakata 2001b; Nakata 2007).

In short: the Multiliteracies thesis

The 'Multiliteracies' argument has three components, framed as the 'why' of Multiliteracies, the 'what' of Multiliteracies, and the 'how' of Multiliteracies.

This book is only about the 'how' or the pedagogy of Multiliteracies. By way of background, here is a quick summary of the first two parts of the argument.

In the 'why' part of the argument, we outlined the dramatic changes occurring in everyday life in the realms of work, citizenship, and identity. These changes render older practices of literacy pedagogy increasingly anachronistic. This argument is expanded in Chapter 2 of our *Literacies* book (Kalantzis and Cope 2012a), and Chapters 3 to 5 of our *New Learning* book (Kalantzis and Cope 2012c).

On the subject of the 'what' of Multiliteracies, we add two 'multis' to 'literacies': the 'multi-' of enormous and significant differences in contexts and patterns of communication, and the 'multi-' of multimodality. In the case of the first of these 'multi-'s, the Multiliteracies notion sets out to address the variability of meaning making in different cultural, social or domain-specific contexts. This means that it is no longer enough for literacy teaching to focus solely on the rules of standard forms of the national language. Rather, communication and representation of meaning today increasingly requires that learners become able to negotiate differences in patterns of meaning from one context to another. These differences are the consequence of any number of factors, including culture, gender, life experience, subject matter, social or subject domain, and the like. Every meaning exchange is cross-cultural to a certain degree.

The other 'multi-' response to the question of the 'what' of Multiliteracies arises in part from the characteristics of the new information and communications media. Meaning is made in ways that are increasingly multimodal—in which written-linguistic modes of meaning interface with oral, visual, audio, gestural, tactile, and spatial patterns of meaning. This means that we need to extend the range of literacy pedagogy so that it does not unduly privilege alphabetical representations. Supplementing these, the Multiliteracies approach suggests bringing multimodal texts, and particularly those typical of the new, digital media, into the curriculum and classroom. This makes literacy pedagogy all the more relevant and engaging for its manifest connections with today's communications milieu. It also provides a powerful foundation for synesthesia, or learning that emerges from mode switching, moving backwards and forwards between representations in text, image, sound, gesture, object, and space. A burgeoning literature has emerged in the area of multimodality, most prominently in the work of Gunther Kress (Kress 2009; Kress and van Leeuwen 1996), Theo van Leeuwen (van Leeuwen 2008), and Ron Scollon (Scollon 2001). Our own account of multimodality is to be found in our forthcoming book, *Making Sense: A Grammar of Multimodality*.

This book is about the third part of the Multiliteracies argument, the 'how' of a pedagogy of Multiliteracies. In the original formulations of the New London Group, the following major dimensions of literacy pedagogy

were identified: *situated practice*, *overt instruction*, *critical framing*, and *transformed practice*. In applying these ideas to curriculum practices over the past decade, we have reframed these ideas somewhat and translated them into the more immediately recognizable 'Knowledge Processes': *experiencing*, *conceptualizing*, *analyzing,* and *applying* (Kalantzis and Cope 2010). Whichever terminology is used to categorize learning activity types, the essential idea in the Multiliteracies approach is that learning is a process of 'weaving' backwards and forwards across and between different pedagogical moves (Luke et al. 2004):

- *Situated practice/experiencing*: Human cognition is situated. It is contextual. Meanings are grounded in real-world patterns of experience, action, and subjective interest (Gee 2004). One key pedagogical weaving is between school learning and the practical out-of-school experiences of learners. Another is between familiar and unfamiliar texts and experiences. These kinds of cross-connections between school and the rest of life Cazden calls 'cultural weavings' (Cazden 2006).
- *Overt instruction/conceptualizing*: Specialized, disciplinary knowledges are based on finely tuned distinctions of concept and theory, typical of those developed by expert communities of practice. Conceptualizing is not merely a matter of teacherly or textbook telling based on legacy academic disciplines, but a Knowledge Process in which the learners become active conceptualizers, making the tacit explicit and generalizing from the particular. In the case of Multiliteracies teaching and learning, overt instruction/conceptualizing involves the development of a metalanguage to describe 'design elements'.
- *Critical framing/analyzing*: Powerful learning also entails a certain kind of critical capacity. 'Critical' can mean two things in a pedagogical context—to analyze functions, or to be evaluative with respect to relationships of power (Cazden 2006). In the case of a pedagogy of Multiliteracies, this involves analyzing text functions and critically interrogating the interests of participants in the communication process.
- *Transformed practice/applying*: This entails the application of knowledge and understandings to the complex diversity of real-world situations. In the case of Multiliteracies, this means making texts and putting them to use in communicative action.

The evolution of this pedagogical framework has occurred through a number of stages. A significant focal point in this evolution has been the *Learning by Design* project. This project commenced in Australia in 2000 when we were at RMIT University in Melbourne, with the support of a series of grants from the Australian Research Council. As part of this project, we developed a Microsoft Word lesson documentation template in which teachers

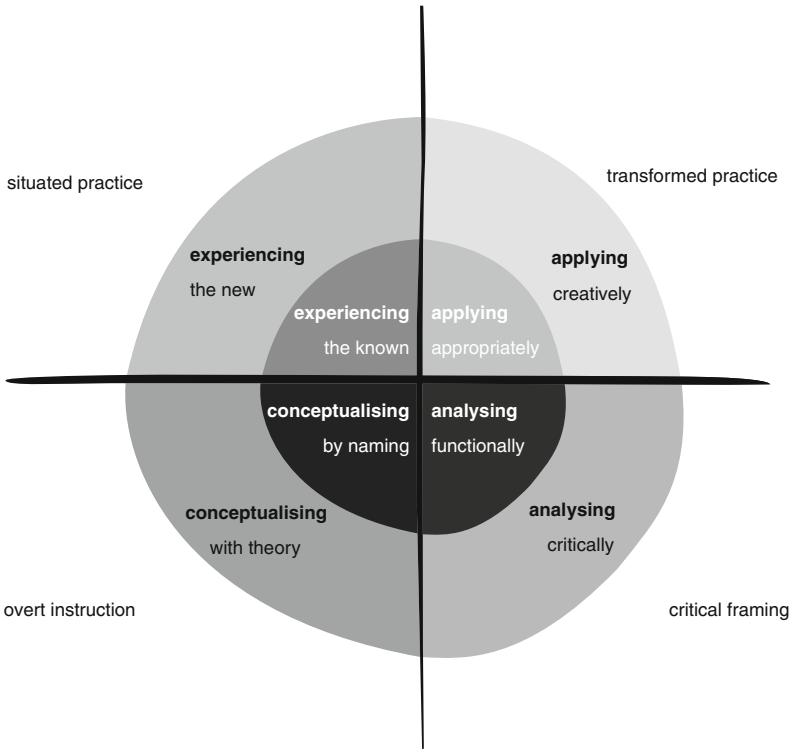


Figure 1.1 Mapping the original Multiliteracies pedagogy against the 'Knowledge Processes'

collaboratively mapped out teaching plans around the activity types identified by the Knowledge Processes, taught to these plans, revised them based on their teaching experience, and shared them as a lasting record of their pedagogical experiences. Since we moved to the University of Illinois in 2006, we have received a number of grants to continue this work from the Institute of Educational Sciences in the US Department of Education and the Bill and Melinda Gates Foundation. In 2008–2010, we created a new online web planner in which many hundreds of Learning Modules were created in the US, Australia, and Greece. Then, with the development of our *Scholar* online learning platform since 2010, Learning Module development and publication has moved there. This book includes the work of colleagues who have been engaged in the Multiliteracies pedagogy since the beginning of the *Learning by Design* project, as well as others who have come to explore the pedagogy more recently.

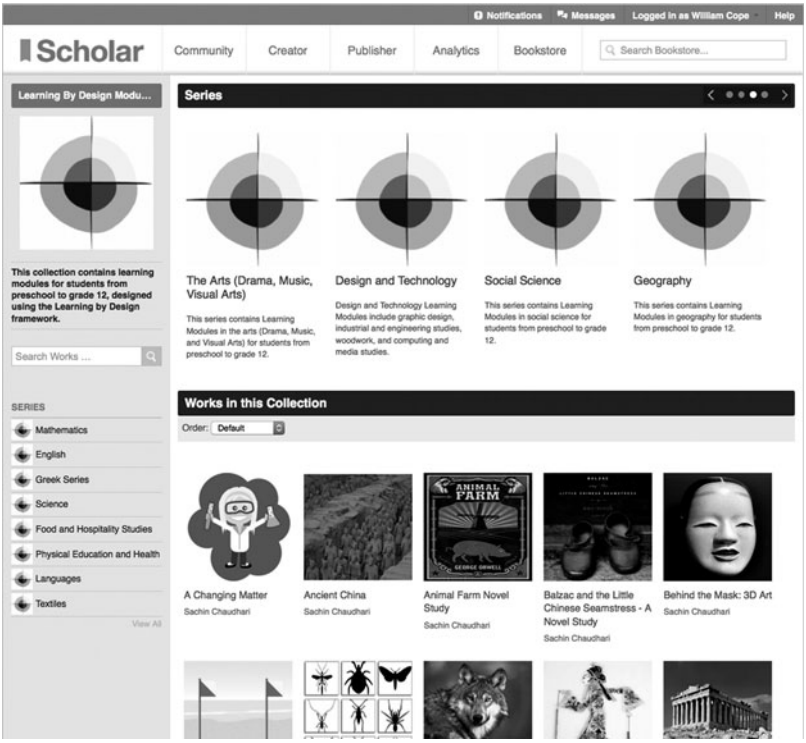


Figure 1.2 Learning Modules in the Scholar Bookstore (www.cgscholar.com)

The question of pedagogy

Mass-institutionalized schooling is a relatively new thing in human history. As a social project, it is barely a century and a half old, and to the extent that not every child goes to school, still incomplete. While its visible manifestations (school buildings and classrooms, teachers and students, curriculum plans and learning resources) are ubiquitous, its underlying pedagogies have been a source of continuous dispute. For the sake of argumentative clarity in this chapter, we name the two poles in the dispute 'didactic pedagogy' and 'authentic pedagogy'. Elsewhere in our writings, we make some finer distinctions (Kalantzis and Cope 2012a: Part B; Kalantzis and Cope 2012c: Chapters 2, 8), but for the purposes of this chapter, we characterize these two, archetypical positions. We do this in order to characterize Multiliteracies or *Learning by Design* pedagogy as 'reflexive'—neither didactic nor authentic, but both. When both come into play, each of the constituent parts and the whole becomes something different.

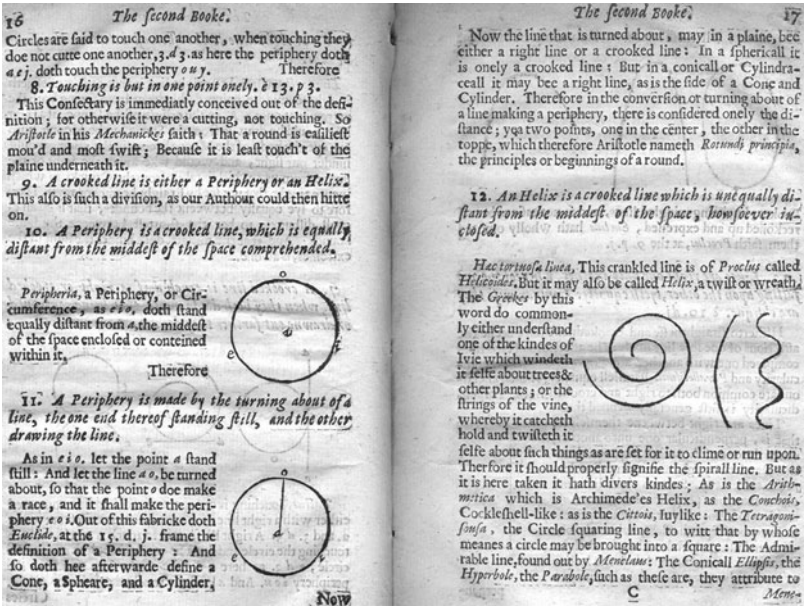
Didactic pedagogy

'Didactic' in English carries semantic loadings that it does not carry in other languages, where 'didactics' is a neutral term equivalent to 'curriculum', 'instruction', and 'pedagogy' in English. When we use the word 'didactic', we use it to capture some of its peculiar connotations in English. It means to be told things rather than to find them out for yourself. It positions the teacher as an authority figure and the student as a beneficiary of the knowledge they convey. It involves the transmission of knowledge from the knowing expert to the as-yet-unknowing novice. And of course, in a certain perspective education is, inevitably and always, all of these things. However, the critics of didactic pedagogy seize on its peculiar emphases that position students as passive recipients of knowledge and compliant objects of authority.

The distinctive mode of didactic pedagogy lies deep in the traditions of the societies of writing. St Benedict set the discursive rules of the relation of the teacher to the taught in these terms: that it 'belongeth to the master to speak and to teach; it becometh the disciple to be silent and to listen' (St Benedict c.530 (1949)). This later becomes the genre of the lecture in didactic pedagogy, a one-to-many relation of knowledge authority to knowledge recipient. In didactic pedagogy, the silence of the student may be broken by the teacher via the traditional classroom discourse structure of Initiation—Response—Evaluation (Cazden 2001: 28–30). Initiation: teacher asks a question which anticipates an answer. Response—students put up their hands and the teacher selects one to respond, as a presumed proxy for all in the class. Evaluation: 'That's right', or 'That's wrong, can someone else answer?'

Modern education also introduces the written textbook as a source of authority. If the symbolic founder of oral classroom discourse was St Benedict, the founder of the modern textbook was Petrus Ramus, a professor in the University of Paris in the mid-sixteenth century. Ramus took the texts of classical knowledge—Euclid's geometry, Aristotle's rhetoric, for instance—and rebuilt these as textbooks. The differences between textbooks and source knowledge are revealing. The textbook is a digestible synopsis, divided to manageable chunks, and with ideas ordered from those that are more elementary to more complex, composite ideas (Ong 1958). Knowledge so acquired can subsequently be tested in examinations. The rewards of school success were then in the scores and the rankings achieved, extrinsic rewards less than intrinsic pleasures of coming-to-know. Other written traditions make parallel pedagogical innovations, such as the system of scholarship that went into the making of the mandarin class in imperial China.

The tradition of didactic pedagogy remains alive and well in the 21st century. Two symptomatic examples will suffice. One is Direct Instruction, which has since the 1970s offered curriculum that not only scripts the teacher-initiating dialogue, but correct evaluative answers. Teacher initiation: 'Say the next group of words that are a sentence'. Anticipated


16 *The second Booke.*

Circles are said to touch one another, when touching they doe not cutte one another, 3.*d* 3. as here the periphery doth *a e j.* doth touch the periphery *o u y.* Therefore

8. *Touching is but in one point onely.* 2 13. *p* 3.

This Confectary is immediatly conceived out of the definition; for otherwise it were a cutting, not touching. So *Aristotle* in his *Mechanickes* saith: That a round is calliest mou'd and most swift; Because it is least touch't of the plaine underneath it.

9. *A crooked line is either a Periphery or an Helix.*

This also is such a division, as our Authour could then hitte on.

10. *A Periphery is a crooked line, which is equally distant from the middest of the space comprehended.*

Peripheria, a Periphery, or Circumference, as *e b o*, doth stand equally distant from *a*, the middest of the space enclosed or conteined within it.

Therefore

11. *A Periphery is made by the turning about of a line, the one end thereof standing still, and the other drawing the line.*

As in *e i o*, let the point *a* stand still: And let the line *a o*, be turned about, so that the point *o* doe make a race, and it shall make the periphery *e o i*. Out of this fabricke doth *Euclide*, at the 15. d. j. frame the definition of a Periphery: And so doth hee afterwarde define a Cone, a Spheare, and a Cylinder.

Now

The second Booke. 17

Now the line that is turned about, may in a plaine, bee either a right line or a crooked line: In a spherical it is onely a crooked line: But in a conicall or Cylindracall it may bee a right line, as is the side of a Cone and Cylinder. Therefore in the conversion or turning about of a line making a periphery, there is considered onely the distance; yea two points, one in the center, the other in the toppe, which therefore Aristotle nameth *Rotundi principia*, the principles or beginnings of a round.

12. *An Helix is a crooked line which is unequally distant from the middest of the space, howsoever inclosed.*

Hae tortuosae lineae, This crankled line is of *Proclus* called *Helicoides*. But it may also be called *Helix*, a twist or wreath. The *Greekes* by this word do commonly either understand one of the kindes of Ivie which windeth it selfe about trees & other plants; or the strings of the vine, whereby it catcheth hold and twisteth it selfe about such things as are set for it to clime or run upon. Therfore it should properly signifie the spirall line. But as it is here taken it hath divers kindes: As is the *Arithmetica* which is Archimede'es Helix, as the *Conchois*, Cockleshell-like: as is the *Cittois*, Ivylike: The *Tetragonizousa*, the Circle squaring line, to witt that by whose meanes a circle may be brought into a square: The Admirable line, found out by *Menelaus*: The Conicall *Ellipsis*, the *Hyperbole*, the *Parabole*, such as these are, they attribute to

C

Mene-

Figure 1.3 Ramus's geometry: the invention of the modern textbook

student response: 'She started to go home'. Teacher initiation: 'What's the last word in the sentence?' Anticipated student response: 'Home'. Teacher initiation: 'So, what do you write after the word home?' Anticipated student response: 'A period'. (Engelmann 2014: 9). Direct Instruction also comes with textbooks that outline the conceptual content of literacy and mathematics in the mode of analytical exposition developed by Ramus centuries before. These remain a staple for poorly-resourced schools in disadvantaged neighborhoods, along with related programs of 'explicit instruction' (Goeke 2009) and 'response to intervention' (Buffum et al. 2009).

For another contemporary example we can explore certain kinds of technology-mediated learning. In the 'flipped classroom' (Bishop and Verleger 2013), the teacher records a video of their lecture and distributes it online. However, the student remains in the same discursive relation to the teacher and knowledge as originally prescribed by St Benedict. Electronic tutors put the machine in the position of teacher in the traditional initiate-respond-evaluate pattern of didactic classroom discourse. With the electronic whiteboard, all students' eyes still need to be directed to the board, a prop for the directive teacher that is not fundamentally different from the chalkboard. And e-textbooks reproduce the textbook form, summarizing, chunking, and sequencing the world in which the students are still positioned as knowledge consumers—absorbers of information to

be remembered, routines to be replicated, or definitions to be applied (Cope and Kalantzis 2015).

Be its mode of delivery old or seemingly new, didactic pedagogy has several distinctive epistemological features. Its core constructs are facts that can be remembered and concepts that can be applied as analytical constructs, rendering correct answers in specific instances. Its principal epistemological precepts are cognitive—memory and logical reasoning. And its theory of the ontogenesis of knowledge is mimetic—knowledge authorities (teachers, textbooks) transmit knowledge which is acquired by learners.

And for as long as didactic pedagogy has been around, whatever its practical utility, it has also been hated and parodied. Charles Dickens makes Mr. Gradgrind the representative teacher:

> Thomas Gradgrind, sir. A man of realities. A man of facts and calculations. A man who proceeds upon the principle that two and two are four, and nothing over, and who is not to be talked into allowing for anything over … [He] … swept [his] eyes over the inclined plane of little vessels then and there arranged in order, ready to have imperial gallons of facts poured into them until they were full to the brim … [H]e seemed a kind of cannon loaded to the muzzle with facts, and prepared to blow them right out of the regions of childhood at one discharge. He seemed a galvanizing apparatus, too, charged with a grim, mechanical substitute for the tender young imaginations that were to be stormed away. (Dickens 1854 (1945): 15–18)

Authentic pedagogy

For centuries, the critics of didactic pedagogy have proposed alternatives, beginning with Jean-Jacques Rousseau:

> Teach your scholar to observe the phenomena of nature; you will soon rouse his curiosity ... . Put the problems before him and let him solve them himself. Let him know nothing because you have told him, but because he has learnt it for himself. If ever you substitute authority for reason he will cease to reason, he will be a mere plaything of other people's thoughts. (Rousseau 1762 (1914): 126)

The case of these critics has been moral, political, and at times utopian, anticipating that a new and better world can be forged through educational reform. Their case has also been practical, experimenting with new arrangements in laboratory schools and advocating a progressive curriculum, with the aim of demonstrating that their progressive pedagogy achieves the ends of education more effectively than traditional, didactic pedagogy.

The word we will use to name this alternative pedagogy is 'authentic', representing a certain kind of relevance and trueness-to-life. Authentic

pedagogy is true to what-practically-needs-to-be-known in the world, rather than the abstract facts and theories of didactic pedagogy, its academic discipline for discipline's sake. It is also true to student interest and motivation, rather than knowledge that is imposed, or students being cajoled by external motivations such as test scores and beating one's peers.

John Dewey, expressed the spirit of his philosophy of pragmatism in the idea that education should be grounded in experience, not abstract disciplinary schemes, imposed by teachers upon students:

> To imposition from above is opposed expression and cultivation of individuality; to external discipline is opposed free activity; to learning from texts and teachers, learning from experience; to acquisition of isolated skills and techniques by drill, is opposed acquisition of them as a means of attaining ends which make direct vital appeal; to preparation for a more or less remote future is opposed making the most of the opportunities of present life; to static aims and materials is opposed acquaintance with a changing world. (Dewey 1938 (1963): 19)

For Dewey, the objectives of progressive education were also political—in the true spirit of democracy to develop practices of active social participation on the part of learners, rather than passive acquiescence to the commands of authority figures (Dewey 1928 (2008)).

Maria Montessori also framed her variant of progressive education politically, in terms of the idea of a learning environment that afforded students greater freedom:

> The school must permit the free, natural manifestations of the child … [T]he true concept of liberty is practically unknown to educators … The principle of slavery still pervades pedagogy, and therefore, the same principle pervades the school. I need only give one proof—the stationary desks and chairs … We know only too well the sorry spectacle of the teacher who, in the ordinary schoolroom, must pour certain cut and dried facts into the heads of scholars. In order to succeed in this barren task, she finds it necessary to discipline her pupils into immobility and to force their attention. Prizes and punishments are ever-ready and efficient aids to the master who must force into a given attitude of mind and body those who are condemned to be his listeners … Such prizes and punishments are … the bench of the soul, the instrument of slavery for the spirit. (Montessori 1912 (1964): 15–16, 21)

The 20th century is full of attempts to realize the objectives of authentic pedagogy. Rugg and Shumaker proposed the 'child-centred school', whose articles of faith were freedom rather than control, child versus teacher initiative, child interest instead of imposed curriculum, creative experience rather

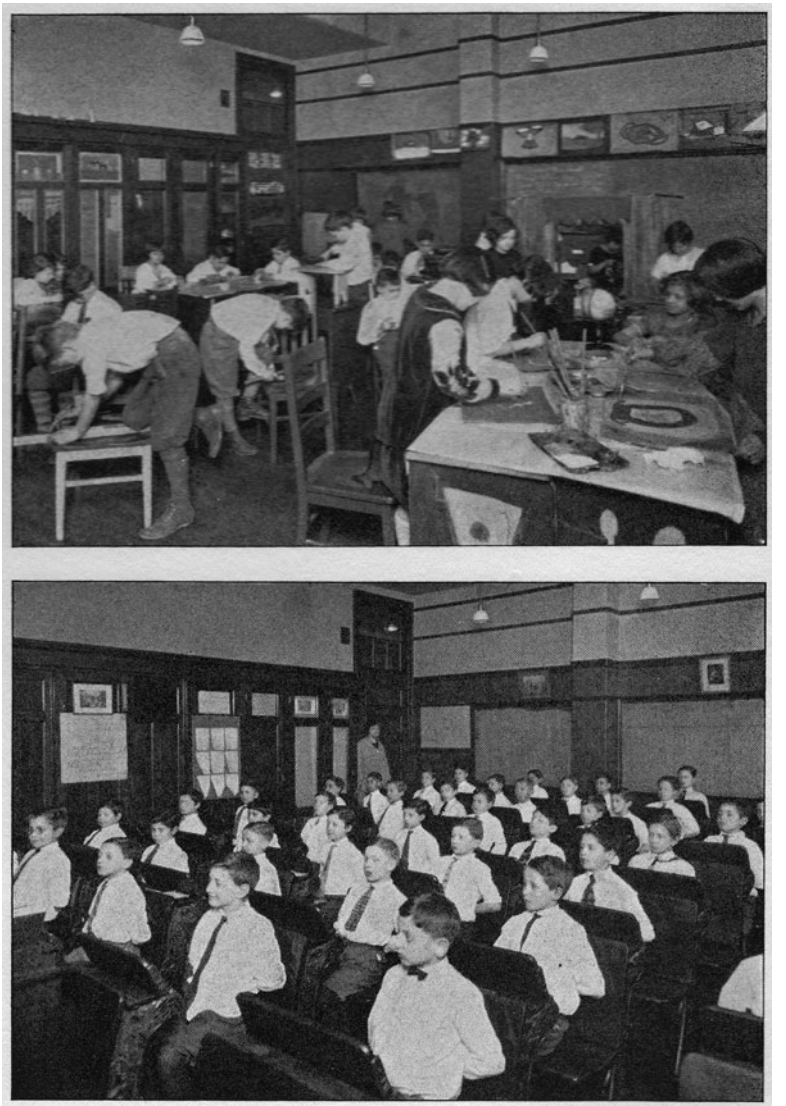
than formal academic discipline (Rugg and Shumaker 1928: 54–64). William Heard Kilpatrick developed the project method, now known as project-based learning, where in the spirit of democratic society, instead of 'servile acceptance of others' purposes' students engage in 'wholehearted vigorous activity' in projects where the learner was in control—creating a school newspaper, or a girl making a dress (Kilpatrick 1918; Waks 1997).

As the 20th century moved on, progressivism developed a new strand, under the banner 'critical pedagogy'. Among its leading lights was Brazilian educator, Paulo Freire. He used the metaphor of 'banking education' to characterize didactic pedagogy, 'in which the scope of action allowed to the students only as far as receiving, filing, and storing the deposits'. In contrast, Freire proposed a pedagogy of liberation focused on problems of justice in the world. 'Problem-posing education bases itself on creativity and stimulates true reflection and action upon reality, thereby responding to the vocation of [people] as beings who are authentic only when engaged in inquiry and creative transformation' (Freire 1972: 56).

With the turn to identity politics in the last quarter of the 20th century, critical pedagogy came to be overlaid with the claims for the recognition in curriculum of differences in ethnicity, race, gender, and sexuality (Aronowitz and Giroux 1991; McLaren 2007). Whereas didactic pedagogy ignored or over-wrote diverse identities, assimilating (or failing) others on the measure of mass society and the homogenizing forces of modernity, critical pedagogy gave authentic voice to different identities in the classroom and curriculum.

Another strand in 20th century authentic pedagogy is 'constructivism'. Tracing the microdynamics of children's learning, Jean Piaget argued that learners incorporate new experiences through processes of assimilation, and accommodate these experiences by framing them into mental representations (Piaget 1923 (2002)). Learning, in this conception, is a process of active meaning-making. Translated into a pedagogical framework, constructivism is a process whereby teachers immerse learners in experiences and help them to build mental models that make coherent sense of these experiences (Windschitl 2002). The learner is a cognitive agent, building mental models of the world for themselves.

What has been the consequence of this long history of advocacy for authentic pedagogy? Historian Larry Cuban concludes that over the course of the 20th century, in American education, notwithstanding the vociferous calls for reform, didactic pedagogy has remained the norm (Cuban 1993). More recently, it has been argued that computer-mediated learning environments herald the long-awaited widespread realization of constructivist or authentic pedagogy. Cuban's analysis is again skeptical that anything much changes when computers are brought into the classroom (Cuban 2001). Our own analysis shows that technology-mediated learning can be as didactic as ever, indeed, even more didactic when the machine becomes proxy for the teacher (Cope and Kalantzis 2015).



Courtesy of Miss Elizabeth Irwin, Public School 61, New York

THE NEW AND THE OLD IN EDUCATION

Above: Freedom! Pupil initiative! Activity! A life of happy intimacy — this is the drawing-out environment of the new school. *Below:* Eyes front! Arms folded! Sit still! Pay attention! Question-and-answer situations — this was the listening régime.

Figure 1.4 Rugg and Shumaker's child-centred school, 1928

It must remain an open question whether authentic pedagogy failed to gain ground as a consequence of its own failings, or as a result of the conservative institutional and social inertia, or the effectiveness of its critics. For its critics were certainly vociferous from the start. Boyd Bode and William Chandler Bagley were two contemporary critics of Dewey's progressive education, Kilpatrick's project method and Rugg's child-centred school. Bode argued that learning incidental to projects was:

> ... too discontinuous, too random, too haphazard, too immediate in its function, unless we supplement it with something else. Perhaps children may learn a great deal about numbers from running a play store or a bank, but this alone does not give them insight into the mathematics that they need to have ... [A]ll this emphasis on 'pupil activity,' on the one hand, and hazy 'practicality' on the other, has operated to make present-day education an intolerably superficial kind of thing. To advocate curriculum construction on the basis, not of subjects, but of pupil activity, easily results in neglect of logical organization. (Bode 1927: 150, 38)

William Chandler Bagley, a contemporary of Dewey at Teachers College, Columbia University, criticized what he called 'the doctrine of interest' underpinning progressive education. He said, it 'lends a specious sanction to neglecting tasks that lack an intrinsic appeal'. He contrasted this with the hard work of learning, including 'warming up to work' even when you don't feel like it, 'practice', repetition, overcoming obstacles, and the travails of mental discipline. Moreover, 'the present tendency in education is toward earlier and earlier differentiation of curriculums ... the basis upon which is the doctrine of interest. ... [However] the function of public education ... [is to lay a] *common* basis among *all* the future citizens of the land'. (Bagley 1915: 239–52)

Later critiques of authentic pedagogy reflect and refract these themes. Leading light of the 'back to basics movement' in the 1980s, E.D. Hirsch, started his comprehensive and best-selling attack with an assault on Rousseau and Dewey. He went on to advocate a return to didactic pedagogy which taught facts, built coherent disciplinary knowledge, and as an antidote to diversity, provided all students with basic knowledge of the traditional canon of a common culture. His concern, he claimed, was as much for disadvantaged students as any:

> To withhold traditional culture from the school curriculum, and therefore from students, in the name of progressive ideas is in fact an unprogressive action that helps preserve the political and economic status quo. Middle-class children acquire mainstream literate culture by daily encounters with other literate persons. But less privileged children are denied consistent interchanges with literate persons and fail to receive

> this information in school. The most straightforward antidote to their deprivation is to make the essential information more readily available inside the schools. (Hirsch 1988: 23–4)

Critical pedagogy also came under attack as soon as it was articulated, in the form of a vigorous debate about 'political correctness' and the sanctity of the western canon, seemingly now threatened by the forces of multiculturalism, feminism, and post-modernist or post-structuralist advocates of difference (Cope and Kalantzis 1997). Meanwhile, African-American educator Lisa Delpit, questioned the underlying cultural assumptions and differential effects of progressivism. Whereas immersive and experiential approaches to learning may work for affluent white students for whom the discourses of power make intuitive sense, explicit teaching is needed for students whose community lives are distant from the cultures of power and the discourses of academic literacies (Delpit 1988).

Finally, the constructivist strand of authentic pedagogy also comes under attack. Kirschner et al. are representative. The failure of 'constructivist, discovery, problem-based, experiential, and inquiry-based teaching', they argue, can be traced back to the 'minimal guidance' offered by these pedagogies. These, they argue are more effective and efficient because of the inordinate burden experiential learning puts on working memory when dealing with new information. Instead, they advocate 'instructional approaches that place a strong emphasis on guidance of the student learning process ... providing information that fully explains the concepts and procedures that students are required to learn' (Kirschner et al. 2006).

This very short history of didactic and authentic pedagogy reveals the longevity of these debates. Today, discussions about technology-mediated learning, from its didactic drill routines to the authentic 'interest doctrine' of gamification, revive scenes of contestation that have been part of our educational landscape for more than a century, albeit on a new educational canvas.

Reflexive pedagogy

When we come to propose a 'reflexive pedagogy', we at once intend to say nothing new but also something quite new. The 'nothing new' part is that there are important insights and practices in both didactic and authentic traditions that we want to retain. Pedagogy is a range of different 'things you do to know', a repertoire of learning activity types, including activity types that have their genesis variously in didactic and authentic pedagogy. The 'something new' part is that, when connected into a more balanced pedagogy, the constituent components are extended and deepened. We also want to move to a place beyond the pedagogy wars, with their often not-so-thinly veiled accusations. Our suggestion to teachers whose practices by and large fall into one tradition or the other, is to extend your repertoire—which many excellent teachers, in any event, instinctively do anyway.

Following is a comparative overview of pedagogical emphases:

Knowledge Processes	*... in Didactic Pedagogy*	*... in Authentic Pedagogy*	*... in Reflexive Pedagogy*
Experiencing			
... the known	Weak emphasis, as all students are doing the same curriculum, given to them	Strong emphasis, highlighting student interest, identity, and personal experience	Regular returns to student lifeworld experiences, knowledge, and prior experience, with metacognitive reflections
... the new	Limited to new information provided by the teacher and textbooks	Immersion in hands-on experiences: experiments, field trips, investigations in projects, and the like	Immersion in the range of information sources such as those now available on the web, as well as hands-on activities and immersive experiences
Conceptualizing			
... by naming	Strong on naming academic concepts	Weak emphasis, hoping that concepts will develop through exposure	Categorization and classification, definition of concepts
... with theory	Strong on laying out theories, learning rules, deductive reasoning	Weak emphasis—to the extent that generalizations emerge, these come naturally, via inductive reasoning	Developing disciplinary schemas and mental models
Analyzing			
... functionally	Strong on presenting functional explanations	Weak emphasis, on the assumption that this will develop incidental to experience	Argument and explanation, including text, diagram, data visualization
... critically	No or minimal emphasis on critical thinking	Strong emphasis, on the assumption that critical analysis of purposes, interests, and agendas is a key to understanding	Analysis of the interests of people and the purposes of knowledge

(*continued*)

Knowledge Processes	***... in Didactic Pedagogy***	***... in Authentic Pedagogy***	***... in Reflexive Pedagogy***
Applying			
... appropriately	Strong emphasis, but only to the extent of demonstrating with the right answers, applications of theorems and procedures	Weak emphasis, on the assumption that there is no necessarily 'right' way to do things	Putting meanings and knowledge to work effectively in proximate contexts
... creatively	Weak to no emphasis	Strong emphasis, as student work and projects express individual and cultural perspectives	Transfer of knowledge to different contexts, hybrid knowledge and cultural creations expressing student voice and perspective

By 'reflexive', we mean several things. One aspect of reflexivity is to move between these different Knowledge Processes, where the strength of the learning is the overlay modes of knowing, the productive relation of one Knowledge Process to another—relating the conceptual to the experiential, for instance, or application based on reasoned analysis, or connecting prior experience with new application, and so on. Another meaning of reflexive is the reciprocal connection between the characteristic modes of school or academic learning (conceptual schemes, critical analysis, etc.) and grounded, real-world practical experiences and applications, or simulations of these. Still another meaning is the reflection on alternative modes of professional practice that the Knowledge Processes suggest to teachers. And finally, 'reflexive' refers to the constant vigilance teachers must have, in order to gauge which pedagogical move is appropriate at different moments of the learning process, for different students, and for different subject matters. The mix and the sequence can always vary, and teachers need to be constantly reading student reactions to each move in order to determine the next best move.

By this point, what started as a pedagogy of Multiliteracies—extending or supplementing literacy teaching and learning—has become a larger pedagogical agenda. It has become a pedagogy of communication and knowledge representation for all subject areas.

Knowledge processes: the pedagogical moves of *Learning by Design*

Pedagogy is the design of learning activity sequences. Two key questions arise in the process of pedagogical design: which activities to use and in what order? *Learning by Design* is a classification of activity types, the different kinds of things that learners can do to know. It does not prescribe the order of activities, nor which activity types to use. These will vary depending on the subject domain and the orientation of learners. *Learning by Design* makes several gentle suggestions to teachers: to reflect up the range of activity types during the design process, to supplement existing practice by broadening the range of activity types, and to plan the sequence carefully.

Experiencing is a Knowledge Process involving learning through immersion in the real, everyday stuff of the world: personal experience, concrete

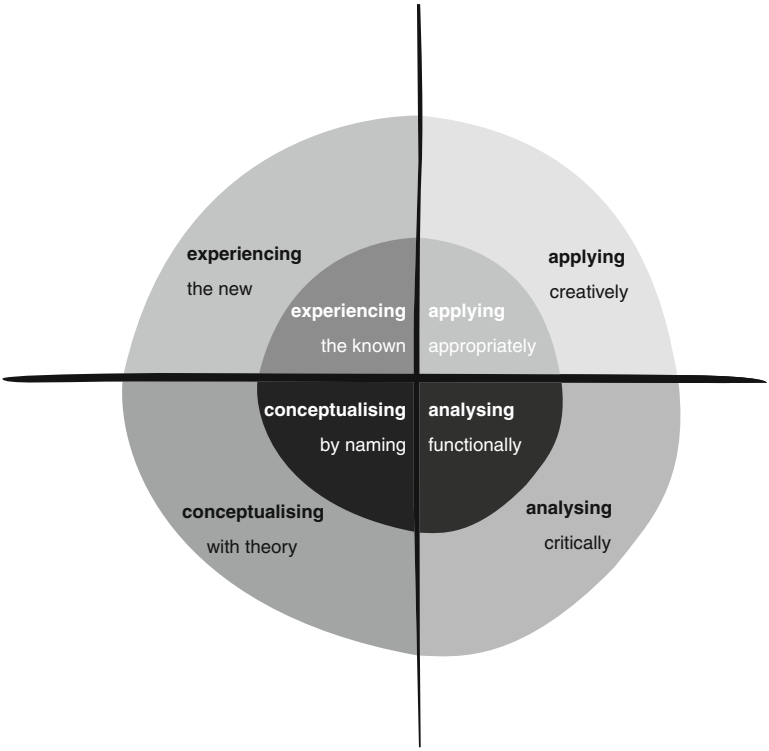


Figure 1.5 The Knowledge Processes

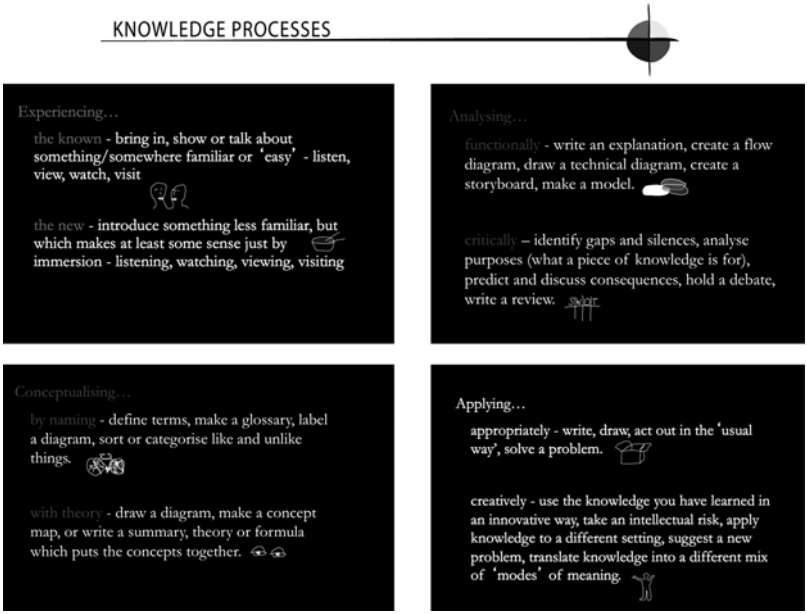


Figure 1.6 Some examples of the Knowledge Processes

engagement, and exposure to evidence, facts and data. Experiencing occurs as an unexceptional matter of course in the lifeworld—and the learning that is its consequence tends to be unconscious, haphazard, tacit, incidental, and deeply endogenous to the lifeworld. By comparison, the experiencing that occurs in pedagogy in its nature tends to be far more conscious, systematic, explicit, and structured. It assumes a stance in which the experiencing refers to a place outside of the educational setting—by means of textual, visual or audio representation, by simulation or by excursion, for instance. There are two, quite distinct ways of experiencing:

Experiencing the Known is a Knowledge Process which draws on learner life-world experience: building upon the learning resource of the everyday and the familiar, prior knowledge, community background, personal interests, and perspectives and individual motivation. Human cognition is situated. It is contextual. Meanings are grounded in the real-world of patterns of experience, action, and subjective interest. Learners bring their own, invariably diverse knowledge, experiences, and interests into the learning context. These are the subjective and deeply felt truths of lived and voiced experience. Cazden and Luke call these pedagogical 'weavings', such as between school learning and the practical out-of-school experiences of learners (Cazden 2006).

Experiencing the New is a Knowledge Process in which the learner is immersed in an unfamiliar domain of experience, either real (places, communities, situations) or virtual (presented texts, images, data, facts or other represented meanings). The 'new' is defined from the learner's perspective: what is unfamiliar to them, given their lifeworld origins. To make sense of the new in a way which is adequate to productive learning, however, the new at least has to have some elements of familiarity; it has to make at last half sense; it must make intuitive overall sense. For learning to occur, it also needs to be scaffolded; there must be means for the parts that are unfamiliar to be made intelligible—with the assistance of peers, teachers, textual cross-references or help menus, for instance. The result is a journey away from the lifeworld along a horizontal axis of expanding knowledge, taking a cross-cultural journey of one sort or another. Experiencing the New entails immersion in new information or situations, careful observation, and reading and recording of new facts and data. Learners encounter new information or experiences, but only within a zone of intelligibility and safety, of what Vygotsky calls a 'zone of proximal development', sufficiently close to the learners' own lifeworlds to be half familiar, but sufficiently new to require new learning (Vygotsky 1962 (1978): 86).

Conceptualizing involves the development of abstract, generalizing concepts, and theoretical synthesis of these concepts. By means of these Knowledge Processes, learners come to use categorizing terms that reduce the ambiguities of natural language, assembling these into the mental models that typify academic disciplines. In this process, the world comes to have deeper meanings which are not immediately obvious, some of which may even be counter-intuitive and challenge commonsense assumptions. Conceptualizing occurs in two ways:

Conceptualizing by Naming is a Knowledge Process by means of which the learner learns to use abstract, generalizing terms. A concept not only names the particular; it also abstracts something general from that particular so that other particulars can be given the same concept label despite immediately visible and situational dissimilarities. In child development, Vygotsky describes the development of concepts in psycholinguistic terms (Vygotsky 1934 (1986)). Sophisticated adult thinking equally involves naming concepts (Luria 1976). Conceptualizing by Naming entails drawing distinctions, identifying similarities and differences, and categorizing with labels. By these means, learners give abstract names to things and develop concepts. Expert communities of practice typically develop these kinds of vocabularies to describe and explain deep, specialized, disciplinary knowledges based on the finely tuned conceptual distinctions. Conceptualizing by Naming is not merely a matter of teacherly or textbook telling based on legacy academic disciplines, but

a Knowledge Process in which learners become active concept-creators, making the tacit explicit and generalizing from the particular.

Conceptualizing with Theory is a Knowledge Process by means of which concept names are linked into a language of generalization. Or, moving beyond language, the semantic relations of concepts may be represented in visual-iconic, diagrammatic form. In both cases, knowledge is represented in conceptual models or schemas. Such theorizing involves explicit, overt, systematic, analytic, and conscious understanding, and uncovers implicit or underlying realities which may not be immediately obvious from the perspective of lifeworld experience. Theorizing is typically the basis of paradigms or schemas which form the underlying, synthesizing discourse of academic discipline areas. In this pedagogical territory, didactic pedagogy would lay out disciplinary schemas for the learners to acquire (the rules of literacy, the laws of physics, and the like). In contrast, active Conceptualizing with Theory requires that learners be concept and theory-makers. It also suggests weaving between the experiential and the conceptual. This kind of weaving might be characterized as a movement backwards and forwards between Vygotsky's world of everyday or spontaneous knowledge and the world of science or systematic concepts, or between Piaget's concrete and abstract thinking.

Analyzing is a Knowledge Process involving the examination of cause and effect, structure and function, elements and their relationships. It requires reasoning in the form of explanation and argumentation. By means of analysis, learners examine the inter-relation of the constituent elements of something, its functioning, and the underlying rationale for a particular piece of knowledge, action, object or represented meaning. This may include identifying its purposes, interpreting the perspectives and intentions of those whose interests it serves, and situating these in context. Analyzing takes two forms:

Analyzing Functionally is a Knowledge Process examining the function of a piece of knowledge, action, object or represented meaning. What does it do? How does it do it? What are its structure, function, relations, and context? What are its causes and what are its effects? Analyzing Functionally includes processes of reasoning, drawing inferential and deductive conclusions, establishing functional relations such as between cause and effect, and analyzing logical connections. For instance, analyzing a multimodal knowledge representation may involve examining the choices made by creators in the design of their texts, and the effects of these choices in the representation of meanings. By analyzing functionally, learners develop chains of reasoning and explain patterns. The informational and explanatory orientation of Analyzing Functionally is typically objective. Weaving towards experiential knowledge processes, the grounding of functional analysis is often experiential, either directly

in the form of personal experience or indirectly in the form of virtual experience such as facts, images, and texts that represent experience.

Analyzing Critically is a Knowledge Process that interrogates human intentions and interests. For any piece of knowledge, action, object or represented meaning, we can ask the questions: Whose point of view or perspective does it represent? Who does it affect? Whose interests does it serve? What are its social and environmental consequences? Analyzing Critically involves critical evaluation of one's own and other people's formative experiences, perspectives, and motives. If the orientation of Analyzing Functionally is to examine the objective world, the orientation of Analyzing Critically is to interrogate the world of subjectivity—human agency, interest, and intent. And if the reasoning processes of Analyzing Functionally are primarily informational, the reasoning processes of Analyzing Critically are mainly argumentative. Weaving towards the experiential, a learner may ask, how do the claims made in an argument align with the evidence supplied? What possible counter-claims might be made (Cope et al. 2013)? What kinds of rebuttals are appropriate? These are the characteristic epistemic moves made by critical pedagogy.

Applying is a Knowledge Process in which learners actively intervene in the human and natural world, learning by applying experiential, conceptual or critical knowledge—acting in the world on the basis of knowing something of the world, and learning something new from the experience of acting. This is the typical emphasis of the tradition of applied or competency-based learning. Applying occurs in unexceptional ways in the everyday realm of the lifeworld. We are always doing things and learning by doing them. We learn by application in the lifeworld in ways which are more or less unconscious or incidental to the process of application, in ways which, in other words, are endogenous to that lifeworld. Application in pedagogy is a process in which knowledge is taken out of its immediate educational setting and made to work beyond that setting. It translates exophoric reference into actual or simulated practice. Applying is about as real as education gets, albeit not as endemically real as the unconscious applications that are of the lifeworld itself. Applying can occur in two ways:

Applying Appropriately is a Knowledge Process by means of which knowledge is acted upon or realized in a predictable or typical way in a specific context. Such action could be taken to meet normal expectations in a particular situation. For instance, objects are used in the way they are supposed to be, or meanings are represented in a way which conforms to the generic conventions of a semiotic or meaning-making setting. Never does Applying Appropriately involve exact replication or precise reproduction. It always involves some measure of transformation, reinventing, or revoicing the world in a way which, ever-so-subtly perhaps, has never occurred before. Applying Appropriately entails the application of

knowledge and understandings to the complex diversity of real-world situations and testing their validity. By these means, learners do something in a predictable and expected way in a 'real-world' situation or a situation that simulates the 'real-world'. This pedagogical weaving brings learners back to the world of experience, but a world into which they have transferred understandings developed in other Knowledge Processes.

Applying Creatively is a Knowledge Process which takes knowledge and capabilities from one setting and adapts them to quite a different setting—a place far from the one from which that knowledge or capabilities originated, or perhaps a setting unfamiliar to the learner. In this Knowledge Process, learners take an aspect of knowledge or meaning out of its familiar context and make it work—differently perhaps—somewhere else. This kind of transformation may result in imaginative originality, creative divergence or hybrid recombinations and juxtapositions which generate novel meanings and situations. Applying Creatively involves making an intervention in the world which is truly innovative and creative. It may also bring to bear the learner's interests, experiences, and aspirations. It is a process of making the world anew with fresh and creative forms of action and perception. Now learners do something that expresses or affects the world in new way, or transfers their newly acquired knowledge into a new setting.

Figure 1.7 Beginning a *Learning by Design* plan

Figure 1.8 The plan begins to take shape

Epistemology and pedagogy

Learning is the process of coming-to-know. Learning is pervasive in the everyday lifeworld. Mostly, it happens without having to think much about it. Such learning is endogenous to the lifeworld, incidental, casual, informal. Pedagogy, by comparison, is formalized learning. It is conscious, premeditated, and structured. Pedagogy is learning by design (Kalantzis and Cope 2014).

In developing the *Learning by Design* framework, we decided to explore the range of epistemological moves that underpin pedagogy by creating a typology of 'things you do to know'. Our focus here is not on cognition or thinking, but knowledge actions—the Knowledge Processes. These actions are not purely matters of thought. Rather, they are the epistemic actions. They are externalizations of thought in action. They shape thought through action. They require an intensity of focus and self-consciousness in taking the action.

Epistemology is the philosophy of knowing, bringing to conscious reflection the conditions of knowing. In this sense, the Knowledge Processes are epistemological orientations. Following are the underlying epistemological orientations of each of the Knowledge Processes:

Knowledge Processes		***Epistemology***
Experiencing	... the known	Identification
	... the new	Empiricism
Conceptualizing	... by naming	Categorization
	... with theory	Schematization
Analyzing	... functionally	Functionalism
	... critically	Interpretation
Applying	... appropriately	Pragmatism
	... creatively	Innovation

To know by experiencing

Experiencing the known—identification

Everyday acts of knowing, and the learning that develops as a consequence, are ubiquitous and incidental aspects of lifeworld experience. This is the ground of personal intuition, the unstated obviousness of the already-known, the richness of life fully lived. As a conscious Knowledge Process, Experiencing the Known is this, and more. The 'more' entails *identification,* or a conscious, introspective focus on social and environmental conditions of experience. Experiencing the Known has its characteristic methods for reading deeply into experience. These might involve tracing the roots of subjectivity, accounting for the sources of beliefs, articulating the reasons for perspective, explaining stance, narrating sequences of experience, contextualizing position and context, describing identity, reflecting on motivations, justifying convictions, recognizing the embodied, framing the performative, feeling the sensual, or articulating the intuitive.

What makes Experiencing the Known different from casual experience is its degree of conscious self-reflection, metacognitive awareness, and explicit identification. Nor does this Knowledge Process necessarily leave the known world unaltered. Experiencing the Known is not only to observe or read the world. It can also through its intensive and focused processes of observing and reading, transform the world. The act of articulation can make it more stable. One's commitments may become stronger as they become clearer. On the other hand, Experiencing the Known may destabilize one's world by uncovering its limitations or contradictions. Damasio describes this kind of learning as a transition from the proto-self with primordial feelings, to the self-creating autobiographical self, capable of interpreting present actions in terms of lessons drawn from the experiences of the past, and, on this basis, anticipating future actions (Damasio 2010).

Late 20th century epistemologies of post-structuralism (Derrida 1978; Spivak 1987) and post-modernism (Jameson 1991; Lyotard 1979) focus

on the ways in which knowledge is framed relative to historical, social or cultural context. Knowledge is to a significant degree a product of the identity position of the person who is articulating that knowledge. Truths do not exist in themselves, but are framed by the social meanings ascribed by language (Rorty 1989; Wittgenstein 1958). These epistemologies stand in opposition to empiricism (facts speak for themselves) and rationalist idealism (universal reason makes sense of the world). The occupational hazard of such epistemologies of identification, however, is excessive subjectivism (the world cannot be much more than my subjective experience of it), and agnostic relativism (there can be no truth because every perspective is valid) (Damasio 2010: 10, 23).

Experiencing the new—empiricism

In the 17th century, John Locke presented an *empirical* view of the sources of knowledge in these terms: 'Our observation employed either, about external sensible objects, or about the internal operations of our minds perceived and reflected on by ourselves, is that which supplies our understandings with all the materials of thinking (Locke 1690: Book 2, Chapter 1: 2)'. Observation of the world is the raw material for our subsequent thinking about the world. From this, emerges 'the scientific method' in which, based on initial or previous observations, we develop an hypothesis—a proposition or question about an object of potential investigation. Then we observe that object carefully, collecting data from extended, intensive or repeated observation. This allows us to isolate facts—things that have been proven or shown to be repeatedly or inarguably true—from mere conjectures or opinions. We draw conclusions from these facts through a process of inductive reasoning, or reasoning derived from observation.

In the Knowledge Process of Experiencing the New, our knowledge actions may include methodical observation, recording, describing, measuring, testing, experimenting, interviewing, or surveying. These are all ways to encounter the empirically unknown in order to establish facts or evidence that replace uncertainty with at least somewhat greater certainty than before. This is also how one moves outside the familiar territories of lived experience, observing things that have not been observed this carefully or in these ways before, or facts that have not been documented before. Habermas calls this orientation to knowledge 'empirical/analytic' (Habermas 1978: 302).

It is a distinctive feature of empiricism to speak 'objectively', as if the observations have been so careful that the facts must now speak for themselves. This is to take empiricism to one-sided excess. Despite its pretenses to objectivity, it never stands alone without the complement of the other Knowledge Processes. Even Locke would agree to the extent that the mind interprets its observations through reflection.

To know by conceptualizing

Conceptualizing by naming—categorization

'I think, therefore I am', René Descartes famously said (Descartes 1637 (1985): 20). The world would not exist, in this view, but for our figuring of it in thought. Immanuel Kant argued that, in order to make sense of the world, we need to *categorize* things, and to reason on the basis of these categories (Kant 1781 (1933): 22–7). Habermas describes this as the basis of a 'hypothetico-deductive' tradition in the philosophy of knowledge (Habermas 1978: 308). In the field of education, Vygotsky and Luria have traced the development of abstract concepts in children, tracing a shift in the underlying meanings of words as they become capable of generalizing from instances of the particular. This is the basis for the 'scientific reasoning' that is a characteristic feature of modern schooling (Luria 1981; Vygotsky 1962 (1978)).

Conceptualizing by Naming develops and applies categories that are based on finer semantic distinction, consistency, and agreement than is normally the case in everyday language. Such is the nature of academic, expert, technical, and professional discourses. The methods of Conceptualizing by Naming include grouping a number of specific instances under a concept label on the basis of underlying attributes, classifying, defining, and abstracting criterial features. They may also involve distinguishing things that are unlike. The occupational hazard of such work is to create excessively rigid conceptual schemas that over-simplify the messy complexity of the empirical world (Bowker and Star 2000).

Conceptualizing with theory—schematization

We use our faculties of reason to put concepts together into theories. For instance, we may say that concept A is related to concept B because, different though they are, they are both instances of concept C. Such is the nature of mental models (Johnson-Laird 1983) and conceptual schemes (Blackburn 2005: 201).

The danger of excessive reliance on Conceptualizing with Theory is that we can allow our schemas to get ahead of experience. They may become overly abstract. Students may feel that such theoretical learning is 'too hard' or 'not relevant'. Theories may also be presented to us as is if they represent taken-for-granted truths when, in fact, they could be open to legitimate challenge.

To know by analyzing

Analyzing functionally—functionalism

'If all humans are mortal,' said Aristotle, 'and all Greeks are humans, then all Greeks are mortal' (Aristotle 350 BCE). Kant called these 'analytic propositions' (Kant 1781 (1933)). If the tendency of empirical thinking is to reason

inductively, then the tendency of *functionalist* thinking is to reason deductively. Typical moves in the Knowledge Process of Analyzing Functionally include logical reasoning, tracing cause and effect, inferring, and predicting. Functional reasoning is often externalized in argument (Toulmin 2003), when for instance, the reasons for a claim are supported by evidence, logical connections are made, multiple claims are made to support these, and conclusions are drawn.

Among the occupational hazards of this kind of knowledge work is to develop formal reasoning that is disengaged from human and natural consequences, to create systems of technical control without adequate ethical reflection, to elide means and ends, and to promote a narrow functionalism, instrumentalism or techno-rationalism. Critics accuse analytical-functionalists of logocentrism, or privileging abstract and formal logic over humane sensation, feeling, and emotion. They accuse it of anthropocentrism, or unreflectively putting humans at the center of the universe. They also argue that it does not take sufficient account of human differences. Rationalism seems to imply that if they were to think hard enough and long enough, everyone should come up with the same rational answers. However, humans in different cultural contexts, and who speak different languages, think differently.

Analyzing critically—interpretation

'The philosophers have only interpreted the world, in various ways; the point is to change it'. This was the challenge laid down by Karl Marx to his fellow philosophers in his 1845 'Theses on Feuerbach'. What followed was a major tradition of thinking about the nature of knowledge that Habermas calls historical/hermeneutic/critical (Habermas 1978: 311–14). Empiricists tend to cloud their interest in the language of objectivity, the facts seemingly speaking for themselves, when in reality, the facts have been selected. The schematizers and the functionalists tend to speak as if reason is self-evident, rather than something that is at times opportunistically marshaled in support of particular social and cultural agendas. By contrast, a critical, *interpretative* perspective on knowledge interrogates the interests, motives, and ethical (or unethical) stances that may motivate knowledge claims. It promotes, in other words, an ever-vigilant process of critique. Some interpretative moves of this Knowledge Process include interrogating purposes, agendas and biases underpinning one's own knowledge work and the knowledge claims of others, situating knowledge in its social and cultural context, demonstrating awareness of competing perspectives, articulating and supporting or rebutting alternative arguments, and developing metacognitive awareness of the specific conditions of one's own thinking.

The dangers of this approach are an agnostic relativism—no knowledge can have any particular virtue, when every act of knowing is a matter of perspective. Such is the tendency of post-modern and post-structuralist

thinking (Rorty 1989) where, following Nietzsche, there are no facts, only interpretations (Nietzsche 1901 (1968): 267). If empiricism is overly objective in its orientation, critical interpretations are at times overly subjective. Also, despite best intentions, critical interpreters can all-too-easily become armchair critics, able to criticize but unwilling or unable to act or create alternatives to the objects of their criticism.

To know by applying

Applying appropriately—pragmatism

In philosophy, the tradition of *pragmatism* considers knowledge to be a process and product of practical activity (Dewey 1929 (1960)). This Knowledge Process may represent a return to the experiential world after empirical observation, schematic clarification, and analytical reasoning. This time the return is in order to do something that practically impacts on the world. However, as a Knowledge Process, it is different from circumstantial, informal knowledge of, and learning in, the world. It involves extra effort: translating well-laid plans into action; observing interim outcomes; and adjusting applications based on these outcomes. Applying Appropriately involves the design and implementation of practical solutions that achieve technical or instrumental outcomes. It may involve the transfer of theoretical knowledge into practice.

The critics of this kind of knowledge making accuse it of a pragmatism which may at times be too narrow. It may reflect an uncritical stance that leaves purposes and outcomes unexamined. It might even border on unreflective opportunism—because an application works, it seems it must be right. It may then be accused of uncritical instrumentalism.

Applying creatively—innovation

Knowledge work is also at times inventive and *innovative*—taking lessons from one location and attempting to apply them in a very different location, taking imaginative leaps (Sartre 1940 (2004)), visioning dramatically different alternatives, working across the boundaries of academic and professional disciplines, challenging paradigmatic assumptions, or intervening to change conditions in the natural or social world. This Knowledge Process may involve risk taking. Its outcomes may be considered evidence of creativity. However, its dangers are voluntaristic overconfidence that leads to a naive misreading of pragmatic circumstances, and failure.

By design

To do something 'by design', is to do it with a peculiar intensity of focus. Design is premeditated, a series of explicit stages of action. Each of the Knowledge Processes is a way of seeing and thinking, an orientation to the world, an epistemological take, a sensibility or way of feeling, and for

Figure 1.9 Teachers thinking about learners' thinking

Figure 1.10 After achieving a balanced range of Knowledge Processes, teachers begin to sequence these online

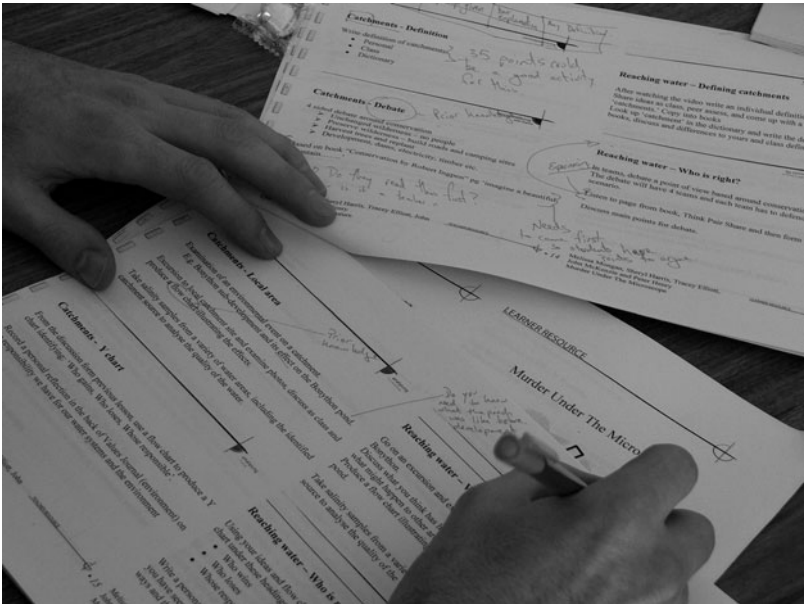


Figure 1.11 Revising the plan, after teaching the Learning Module

shorter or longer moments in time, a way of being in relation to the knowable world.

Our notion of *Learning by Design* applies both to teachers and learners. For teachers, we mean to identify the range and sequence of epistemological moves that underlie their teaching. Teachers become designers as they select the range of activities they will bring to the learning environment, plan their sequence, and reflect on learning outcomes during and after the learning. This design activity is itself a professional learning process. For learners, when the Knowledge Processes are explicitly named, they develop conscious awareness of the different kinds of things they can do to know. Increasingly, they become designers of their own knowledge and take greater control over their learning.

The Knowledge Processes that we and the other authors explore in this book are deeply rooted in traditions of pedagogy and epistemology. Our aim is to map rather than prescribe, to trace long historical genealogies rather than promise something totally new. The mix and sequence chosen by a teacher-designer may vary depending on the subject domain or the orientation of the learner. If we suggest change in practice, it is that teachers might expand their pedagogical repertoire and that learners might engage in a wider range of knowledge actions. The learning becomes more powerful not only as a result of expanding the range of Knowledge Processes, but in the shifts between one way of knowing and others. The move from the processes in the inner circle of the diagram to the outer is relatively straightforward; the shift between quadrants is more challenging. The strength of *Learning by Design* is not what is in each quadrant, but the transitions between quadrants—and this is what didactic and authentic pedagogies have each neglected, in their relative one-sidedness, their habitual staying-within their characteristic pedagogical and epistemological frames of reference. Such transitions might be likened to key shifts in music or mood swings in psychological affect.

In the spirit of *Learning by Design,* the book that follows moves from this highly conceptual and analytical introductory chapter, to the grounded experiences of schools, and teachers' remarkable efforts of application. The narratives of teaching and learning in the chapters that follow are strikingly varied, from country to country, one level of schooling to another, and across a range of subject areas far broader than 'literacy', conventionally understood. And moving even closer to grounded pedagogical practice, hundreds of *Learning by Design* Learning Modules, written by teachers and applying the Knowledge Process pedagogy, can be found in the Bookstore at www.cgscholar.com

As for the pedagogy of Multiliteracies, it does represent one big shift of emphasis. Both didactic and authentic pedagogies focused on such things as memory, understanding, reasoning—in short, meanings internalized in individual minds. Both are cognitively oriented theories of learning. The pedagogy of Multiliteracies, however, as articulated in *Learning by Design,* is

Figure 1.12 *Learning by Design* classroom

an epistemological theory of learning. Knowledge is not (just) the stuff that ends up in our minds. It is what we do and make. Learning is a consequence of a series of knowledge actions, using multimodal media to externalize our thinking. We rely on the cognitive prostheses of writing, computers, diagrams, image and sound recordings, and the like. Learning consists of ways of acting in and with these media. By these means, our ways of thinking develop. Learning for this reason is also very social, as we rely on the artifacts of collective memory, and work with others in the essentially collaborative task of knowledge making.

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