

The Work of Writing in the Age of Its Digital Reproducibility

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Just as a child who has learned to grasp stretches out its hand for the moon as it would for a ball, so humanity, in all its efforts at innervation, sets its sights as much on currently utopian goals as on goals within reach. Because . . . technology aims at liberating human beings from drudgery, the individual suddenly sees his scope for play, his field of action, immeasurably expanded. He does not yet know his way around this space. But already he registers his demands on it. (Benjamin, 1936/2008, p. 242)

A new translation of Walter Benjamin's essay, "The Work of Art in the Age of Mechanical Reproduction" has changed the rather inert phrase "Mechanical Reproduction" in earlier translations to "Technological Reproducibility" (Benjamin, 1936/2008). This shift poignantly speaks to possibility, rather than technological inevitability, and affordance, which creates a space for meaning-making instead of deterministic consequences. In the essay, Benjamin argued that something in art changes once it is reproducible. This is the case not only for the tangibly new manifestations of representation that emerge, such as photography and cinema, but also in the nature of art itself, even the nature of seeing. Painting has an aura of situation-specific authenticity such that copies present as forgeries; whereas, the photographic image is designed for its reproducibility. Photography opens new ways of seeing accessible only to

the lens, things that are not visible to the naked eye and that can be enlarged, or things not noticed by the photographer but noticed by the viewer. Cinema substitutes for the theatre audience a group of specialist viewers—the executive producer, director, cinematographer, sound recordist, and so on—who, based on their expert viewing, may intervene in the actor’s performance at any time. Photography is like painting, and cinema is like theatre, but both also represent profound changes in the social conditions of the production and reception of meaning (Benjamin, 1936/2008).

We are in the midst of another revolution in the means of production of meaning, at the heart of which is digital technologies for fabricating, recording, and communicating meaning. With the sweep of a finger, a child can reproduce symbols, sound, and color to produce multimodal screen pages and to connect with others who are far afield. What does this revolution mean? What are its affordances? How do the changes connect with the dynamics of identity? This is not to ask what consequences follow from the emergence of this new mode of mechanical reproduction. Rather it is to ask, what are its possibilities? What does it allow that we might mean or do with our meanings? What new possibilities for representation does this revolution suggest? How does it reflect and affect transformations in the nature and social functioning of identity?

This chapter has two dimensions. As its analytical basis, the chapter surveys the changing landscape of what might be called the new digital media. The chapter then asks, on a practical dimension, what might we do with this new media in that important site for the formation of the social relationships of meaning-making, the school? How does identity configure itself in the learning process? The chapter begins, however, with a critical diversion, examining two aspects of the new media, frequently posited as new—the “virtual” and the “hypertextual.” We want to argue that these things are not terribly new. We then make the case about some significant aspects of the new digital media that are in fact profoundly new, aspects of digital reproducibility that have enormous implications for the ways in which we make meaning and the ways in which, in the near future, we might learn: (a) a shift in the balance of representational agency, (b) a new dynamics of difference, (c) the pervasiveness of multimodality, (d) the rise of a new navigational order, and (e) the ubiquity of recording and documentation. Section by section, this chapter juxtaposes these five new aspects of the emerging communication environment with a description of the kinds of practical interventions that are possible in schools. At each point, we return to investigate the connections between new literacies and identity. This will be drawn from our own ~~practical~~ research work, implementing and reviewing the impact

of the multiliteracies approach to literacy learning (<http://multiliteracies.com>) and the learning by design framework for tracking teacher's pedagogical choices and their impacts on student learning (<http://L-by-D.com>).

A DIVERSION: THE VIRTUAL

We hear much talk of the virtual as a characteristic feature of our contemporary communications environment. Some of this is enthusiastically utopian, dwelling on the possibility of being brought alluringly close to spatially remote sights, sensations, information, places, and people. We can have immediate and cheap access to a whole world of representations, received at times in a verisimilitude so striking that we feel we are virtually there. Therefore, our horizons of interest and concern become less spatially circumscribed. However, others positing the significance of the virtual warn of the dangers in a dystopian hyper-modernity. Substituting for communal person-to-person contiguity, we now have telepresent persons whose proxies are terminals. Intimacy is made remote. Meanings divorced from context. And grey global uniformity abolishes spatial distinctions (Virilio, 1997).

Such, however, are the characteristic optimisms and anxieties of all representation that is other than person-to-person. These have been with us since the time of the first traces of graphemic representation at the beginnings of visual art and writing. The significance of the virtual in representation has been multiplied a thousand times since the beginning of modernity, with the rise of the printing press and later the telegraph, the telephone (see Figure 1), sound recording, photography, cinema, radio, and television. The virtual has been an enormously significant phenomenon in our meaning-making existences since the beginning of modernity. Digitization in and of itself adds nothing of qualitative significance to this dynamic.

Nor can the concept add much to an understanding of the impact of the new media on schools. Schools have always been (peculiarly) places whose reference points are exophoric. They can refer to anything and everything of the world, in the peculiarly "other-worldly" manner that is characteristic of pedagogy (Cope & Kalantzis, 2010). What is the classroom, even in its most conventional forms, other than the virtual worlds conjured into students' imaginations by textbooks or teacherly narrations in the form of history, geography, literature, or biology? The new media can support this process, to be sure, but they will not change it significantly.

ANOTHER DIVERSION: HYPERTEXT

Hypertext is another phenomenon we are often told is new in the digital communications environment, creating as it does unheralded opportunities for nonlinear readings and user-designed navigation paths. We would argue, however, that there is nothing particularly new about hypertext.

To trace the origins of the underlying logic of hypertext, let's examine the first of a number of neglected moments in the history of modern textuality that we will mention in passing in this chapter. The year 1450 is celebrated as the year of Gutenberg's invention of the printing press. However, something of far greater significance happened about 50 years later with the emergence of the characteristic features of modern textual architectures. Except for the typography, Gutenberg's 1450 Bible was, in essence, the same as a medieval scribal manuscript, complete with hand illumination. For a marvellous illustration of an extant copy, visit <http://courses.cit.cornell.edu/hist151/Images/JromPapr.jpg>

It was not until about 1500, or the end of the period in the development of the book—now called by historians “the incunabula”—that the modern intratextual, intertextual, and extratextual order became established. By then, some 8 million books had been printed. It took that much bookwork to create this new textual architecture.

The following were some of the features of the newly emerging intratextual regime, none of which were to be found in the Gutenberg Bible: graduated types, spatial page design, section breaks, chapter headings, subheadings, running heads, tables of contents, title pages, alphabetically ordered indexes, internal cross-referencing, managed redundancy (e.g., summaries, conclusions)—and, the most simple and revolutionary of all these textual inventions, continuously numbered pages. These devices were all designed to support nonlinear readings, anticipating an endless range of user-initiated reading paths. These features supported a hierarchical ordering of text into sections and subsections.

This was also the beginning of an intertextual order in which texts did not begin and end at their covers. Rather, texts come with author, title, and publisher identification to facilitate citation and bibliography, conventions of quotation, footnoting, and the cataloguing practices of librarianship. Texts were deeply inveigled into each other's presence. Both the intratextual and intertextual sat within the context of a new extratextual regime, a new cultural order. Some dimensions of this order included establishment of the veracity of assertions by distinguishing authorial voice from externally verifiable sources (Grafton, 1997), the demarcation of private ownership rights to textual meaning through copyright, a new premium placed on accuracy through editing and proofreading, and the

linguistic standardization of vernacular languages in the form of the literature and literacy practices of modern nation-states (Eisenstein, 1979; Febvre & Martin, 1976).

For all the hype in hypertext, it mostly does little more than what these practices have always done, which is to point to connections across and outside a particular text. Hypertext might point to connections faster, but the process has not essentially changed. It is little wonder that the work of hypertextual reading is accompanied by some old metaphors, when, on the Internet, we “browse” and use “bookmarks,” we search “indexes,” and we find ourselves taken to “pages.”

These old architectures are not only textual, but they are also intrinsically pedagogical. This brings us to another neglected moment in the history of modern textuality: the forgotten textbooks of that first, most innovative, and most prolific of textbook writers, Petrus Ramus (1515–1572). Eleven hundred editions of the Ramus texts were published between 1550 and 1650. A professor at the University of Paris, Ramus was not a man of intellectual originality. Rather, he had an ingenious instinct for the shape of the emerging epistemic order in which knowledge was analytically laid out and spatially organized, replacing the authority and pedagogy of rhetoric and dialogue with the compartmentalized and formally schematized knowledge of modern pedagogy (Ong, 1958). For a clear example of a Ramus text, visit <http://mathdl.maa.org/mathDL/46/?pa=content&sa=viewDocument&nodeId=2591&bodyId=369.2>.

Ramus took the available knowledge of the world (Euclid, in the example of the geometry text in Figure 3), broke it into its atomic components, summarized each element using a rationalized economy of expression, and ordered the components in an exposition designed for a novice, starting with the simpler and foundational components before moving on to the more complex superstructures of knowledge. Knowledge was thus compartmentalized, taxonomically classified, and presented in a textual mnemonics of visual juxtaposition. Such became the way of modern, didactic curriculum. Pedagogical and textual forms were inseparable.

Moving pedagogy into the ostensibly hypertextual space of learning does not necessarily change this logic, as is made manifest in the lock-step sequencing of curricula loaded into learning management systems or the expository granularity of digital learning objects.

So, if there is nothing particularly new in the virtual or hypertextual, what might be new in the age of digital reproducibility of meaning, and what might be the pedagogical consequences? The remainder of this

paper runs through five topics, which, we suggest, are importantly new, and have significant implications for literacy learning.

A SHIFT IN THE BALANCE OF REPRESENTATIONAL AGENCY

What are the conditions of life for our students in the era of the new digital media? What are the implications for the relationship of learner identities to the pedagogical conditions of effective learning? Such are the changes in their representational environment that we might, with some justification, label today's learners as members of Generation P, for "participatory" (Gee, 2004b; Haythornthwaite, 2009; Jenkins, 2006). Not simply vicarious viewers of movies, today's learners play computer games in which they are the central characters and in which their actions and identities in part determine narrative outcomes. Not simply listeners to the top 40 songs on a radio station's playlist, they create their own playlists on their personal listening devices. Not simply consumers of broadcast television, they cruise across thousands of television channels and millions of YouTube clips; they even choose their own viewing angles on interactive TV or make their own videos and upload them to the web. Not simply readers, they are, as often as not, positioned as writers at the same time that they are also readers in today's writing experiences—in wikis, blogs, Facebook or MySpace pages, or small messaging spaces such as SMS or Twitter. Traditional relationships of culture, knowledge, and learning are profoundly disrupted, and even the terms of the either/or differentiations we have hitherto ascribed to these relationships: creator/audience, producer/consumer, writer/reader, and so on. The key to these changes is an intensified cognitive and practical input on the part of previously more passive recipients of culture and knowledge, a shift in the direction of the flows of knowledge and culture, a transformation in the balance of creative and epistemic agency.

Digitization alone does not bring about these changes. Notwithstanding a shift in the manufacturing method, the textual relations of production and consumption barely change in the first phase of digitization. For instance, in the 1980s, encyclopedias were moved from print to databases on CD-ROMs. However, the social relations of knowledge production did not change in any fundamental way until the arrival of Wikipedia. Anyone, without distinction of social position or rank, can write a page or edit a page. The arbiters of quality are readers and other writers, and all can engage in dialogue about the veracity, or otherwise, of the content in the edit and edit history areas, a public metacommentary

on the page. The roles of writers and readers are blurred, and textual validation is an open, explicit, public, and inclusive process. This represents a profound shift in the social relations of text production since the all-but disappearance of the traditional encyclopedia.

To take another example, writing on a printed book used to be a kind of transgression, a guilty necessity for students. The space for writing was limited to underlining and writing in the white space of the margins. Electronic books are designed to be written in. The spaces for annotation are limitless.

Of course, there are auras of familiarity with the new digital media. Designers and consumers alike reach for metaphors from an earlier world of textuality in order to ease products and services into the new world of textuality. If we do not find it strange to have a bookshelf in a pad, it is because the metaphors have worked for us; they have served to hide some of the novelty of the machine in the imagery of the familiar.

Here are some apparent textual parallels:

business card, resume	LinkedIn
broadcast TV	interactive TV, YouTube
manuscript	Google Docs
encyclopedia	Wikipedia
diary	blogs
scrapbook	Facebook, MySpace
novel, soap opera	video games
broadcast radio, playlists	podcast, iPod
photo album, picture book	Flickr
letter, memo	e-mail
brochure	website
telegraph, telegram	Twitter

The auras of familiarity are, however, deceptive. If one thing is common to the new digitized media, it is a shift in the balance of representational agency. People are meaning-makers as much as they are meaning-receptors. People are writers in the same space that they are readers. Readers can talk back to authors, and authors may or may not take heed in their writing. We are designers of our meaning-making environments, as much as we are consumers—our iPod playlists, our collections of apps, our interface configurations. Blurring the old boundaries of writer and reader, artist and audience, and producer and consumer, we are all users now. And this, in the context of a series of epochal shifts that are much larger than digitization alone: in postFordist workplaces, where workers make team contributions and take responsibility

measured in performance appraisals; in neoliberal democracies, where citizens are supposed to take increasingly self-regulatory control over their own lives; and in the inner logic of the commodity in which “prosumers” codesign specific use scenarios through alternative product applications and reconfigurable interfaces (Cope & Kalantzis, 2009b; Kalantzis & Cope, 2008b).

So what to do in schools? How do we build pedagogies appropriate to a world in which the balance of agency has changed in these ways? In our work with the multiliteracies and learning by design projects, we have proposed an understanding of the learning process centered on the notion of design.

Design has a fortuitous double meaning. On the one hand, design denotes something intrinsic to any found object—inherent patterns and structures irrespective of that object’s natural or human provenance. Things have designs. Design is morphology. This is design, the noun. However, design is an act of conception and an agenda for construction. This meaning takes the word back to its root in the Latin word *designare* or “to mark out.” Design is a certain kind of agency. This is design, the verb. We can make this duality of meaning work for us to highlight two integral and complementary aspects of design. In our learning by design work, we are particularly interested in the second meaning, the stuff of human agency, how learners “do design.”

Our narrative of design-as-agency runs like this:

(Available) Designs

We live in a world of designs, available to us in the form of our representational heritage—language, imagery, spatial forms, sounds, and gestures. These designs are available to us as semantic resources, at once meanings in the world (intrinsic “sense”) and meanings for the world (meanings we ascribe to the world in “sense making”). Meanings present themselves as if they are inherent to our social world. We also give meanings to these things, varied according to the peculiarities of our life-formed perspectives, the focal points of our attention, and our motivating interests.

DESIGNING

Using the semantic resources of available designs, we engage in acts of designing. And when we do, we never simply replicate available designs. We always rework and revoice the world as found. When our represented meanings are understood to be design processes, each act of meaning

reworks available design resources. However, something is always also added. No two stretches of several hundred words or no two images, even the seemingly most predicable or clichéd, are ever quite the same. And this difference is telling. Designing of meanings always involves an injection of the designer's guiding interests and cultural experiences, their subjectivity and identity.

(THE RE-)DESIGNED

The process designing, of making a meaning in the world, leaves tangible and intangible traces—a linguistic utterance or an image. As the design narrative draws to a momentary close, the world has been transformed, in no matter how small a way. Indeed, for having been through this transformation, neither the designer nor his or her world will ever be quite the same again. The redesigned is returned to the world, and this return leaves a legacy of transformation. The redesigned joins the repertoire of available designs and so provides openings for new design narratives (Cope & Kalantzis, 2000a; Kress, 2000, 2009).

Let's consider a young child learning to write, representing a meaning via the peculiar visual and linguistic modes of literacy. We could, and in fact in school we mostly do, present the child with available designs, not anticipating transformation—hence phonics drills, spelling lists, grammatical rules, and the other formalisms of textual meaning. Take, however, the following example of what might be regarded as proto-writing. A child sits on his father's lap, and this is what he says: "Do you want to watch me? I'll make a car . . . got two wheels . . . and two wheels at the back . . . and two wheels here . . . This is a car." Kress read this double sign as consisting of circles signifying "wheel" and wheels signifying "car." These are what he called "motivated signs": "it is the interest of the sign-maker at the moment of making the sign that leads to the selection of the criteria for representing . . . —'wheel-ness' and 'car-ness'" (Kress, 2003, pp. 42–43).

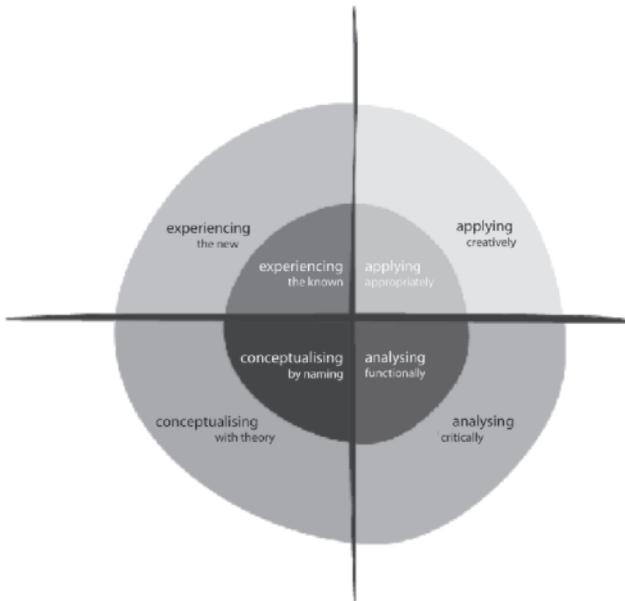
By recognizing this to be a design process, we grant agency to a young sign-maker undertaking a piece of work. This work might not, however, be noticed as early writing in a literacy learning context where a teacher or a parent is anxious to tell young learners the conventional formal literacy things that the learners do not yet now. However, from a designerly perspective, the available resources for meaning are to be traced to what the child does know and can do as a designer, grounded in his or her life experiences of cars, wheels, circles, and drawing. The child designs. The result is a proto-written, (re)designed meaning. In designing, the young designer has transformed his or her world, become a new person. The

designers have learned through their action. Designing is this ordinary, and this extraordinary.

Design is never simply an instantiation of received “grammars,” derived perhaps from what might at times seem to be stable disciplinary rules of language or a school subject area. Design is always and necessarily a process of transformation and, thus, is an engine of change. Design is of course stabilized by the fact that we derive patterns of meaning and programs of action from structures of meaning, which often appear rule-like in their persistent, at times insistent, presence in the world. Designed is also stabilized in the traces we leave in the redesigned. However, design is also and necessarily an act of revoicing, reworking, remeaning.

How then, might we translate this conception of learner-as-designer into pedagogical practice? In the work of the Learning by Design project, we have suggested a more participatory approach to learning in which learners are designers of their own meanings and understandings. The students learn by undertaking a series of knowledge processes, or “things you can do to know”:

Figure 1. The learning by design knowledge processes.



Learning designs can be created by teachers or negotiated with learners and consist of knowledge processes, selected in any (justifiable) sequence from the following.

Experiencing . . .

Experiencing involves the known—learners reflecting on their own experiences, interests, and perspective (e.g., bring in, show or talk about something or somewhere familiar) or the new—learners observe or take part in the unfamiliar; they are immersed in new situations or contents.

Conceptualizing . . .

Conceptualizing occurs by naming (learners group things into categories, apply classifying terms, and define these terms) and with theory (learners make generalizations using concepts, and connect terms in concept maps or theories).

Analyzing . . .

Analyzing occurs functionally (learners analyze logical connections, cause and effect, structure and function) and critically (learners evaluate their own and other people's perspectives, interests, and motives).

Applying . . .

The processes are applied appropriately (learners apply new learning to real-world situations and test their validity) and creatively (learners make an intervention in the world, which is innovative and creative, or transfer their learning to a different context).

The theoretical rationale for this pedagogy is grounded in the notion that effective pedagogy involves a process of “weaving” (Luke, Cazden, Lin, & Freebody, 2003) in and out among a variety of activity types or forms of engagement. We used the four broad categories to differentiate the various types of learning strategies that can be deployed based on their inherent epistemic orientations.

EXPERIENCING

Human cognition is situated and contextual. It follows that forms and patterns of meaning are most learnable when grounded in the real world of patterns of experience, action, and subjective interest (Gee, 2004a, 2006). Based on this finding of contemporary learning science, one kind of pedagogical “weaving” is between school learning and the practical out-of-school experiences of learners. Another is between school texts covering familiar and unfamiliar content. These kinds of cross-

connections between school learning and experiences of the rest of life are “cultural weavings” (Cazden, 2006a; Luke et al., 2003). The experiential activity types of “cultural weavings” take two forms. Experiencing the known engages learners in reflection upon their own experiences. It brings into the classroom familiar knowledge and ways of representing the world. By means of these types of activity, learners introduce invariably diverse knowledge, experiences, and interests into the classroom. Experiencing the new entails observing or reading the unfamiliar and immersion in new situations and texts (Kalantzis & Cope, 2005). Learners are exposed to new information, experiences, and texts, but only within a zone of intelligibility and safety—sufficiently close to the learners’ own life experiences to be within their “zone of proximal development” (Vygotsky, 1978).

CONCEPTUALIZING

Specialized, disciplinary knowledge is based on the finely tuned conceptual distinctions typical of those developed by expert communities of practice and characteristic of bodies of academic knowledge. In the case of teaching writing, for instance, students develop a metalanguage with which to describe how texts work; in the discipline of science, students develop a conceptual language that interprets and explains at a progressively higher level of abstraction natural and physical phenomena. In this knowledge process, learners become active conceptualizers, generalizing from the particularities of the experiential world. Conceptualizing by naming involves drawing distinctions of similarity and difference and categorizing and naming the constituent elements of a subject domain. Here, learners give abstract names to things and develop concepts (Vygotsky, 1962). Conceptualizing with theory means making generalizations by putting the key terms together into interpretative frameworks. Learners build cognitive models or knowledge representations. Conceptualizing requires that learners be active concept and theory-makers. It also requires weaving between the experiential and the conceptual (Kalantzis & Cope, 2005). This kind of weaving is primarily cognitive, whether 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 (Cazden, 2006a; Vygotsky, 1962).

ANALYZING

Powerful learning also entails the development of analytical capacities. This can mean two things—to be analytical of structures, functions,

causes and effects or to be evaluative with respect to human relationships and interests (Cazden, 2006a). Analyzing functionally includes processes of reasoning, drawing inferential and deductive conclusions, establishing functional relations such as between cause-and-effect and analyzing logical connections. Learners develop chains of reasoning and explain patterns. Analyzing critically involves evaluation of the perspectives, interests, and motives of those involved in knowledge making, cultural creation, or communication. Using this method, learners interrogate the interests behind a meaning or an action and reflect metacognitively on their own processes of thinking (Kalantzis & Cope, 2005; Luke, 2002).

APPLYING

This kind of weaving brings knowledge and experience to bear through the process of practical application. Applying appropriately entails applying knowledge and understandings in predictable or correct ways to real-world situations and testing their validity. Applying creatively involves a more distant transfer of knowledge from its original setting to a different context. This weaving may involve innovative and creative application of knowledge; it may bring to bear the learner's interests, experiences, and aspirations in such a way that the application is uniquely voiced. This is a process of making the world anew with fresh and creative forms of action and perception; learners do something that expresses or affects the world in new way or that translates their previous knowledge to a new setting (Cazden, 1994; Kalantzis & Cope, 2005).

We do not understand these four broad pedagogical moves, or knowledge processes, as a sequence to be followed. Rather, we suggest them as an explicit framework for naming the range of pedagogical moves that teachers may use to demonstrate their pedagogical repertoires and their application in purposeful ways, or at the very least to justify the range of pedagogical moves teachers may use to meet particular teaching and learning goals. In this conception, pedagogy is not an ideological conceit or adherence to fashion, but a process of deliberate choice and purposeful shunting between different acts of knowing, measuring their insights against each other. Education is a business broadening not just learners' specific knowledge but also their capacities to make knowledge for different disciplines and different purposes. The purpose here is not to supply a formulaic sequence of pedagogical action but to expand teacher and learner repertoires of knowledge-making action. Pedagogy in this conception is the design of knowledge as action in characteristic ways in different academic and social domains: choosing activity types, sequencing

activities, transitioning from one activity type to another, and determining the outcomes of these activities. In the everyday practicalities of pedagogy, talk of knowledge repertoire becomes a way for the teacher or learner to say explicitly, “now I am using this particular way to know, and, now I am using that other way, and here is the reason why I did this, then that.” By the end of a learning experience, the learner and teacher are able to say, “This is what we have done to know and this is the knowledge we have acquired and the knowledge abilities we have developed.”

Most importantly, this approach positions the learner not as a recipient of disciplinary knowledge but as an actor. Learners become makers of knowledge and meaning, designers, who work with available semantic resources, but who are nevertheless forever redesigning the world of meaning. In the process, learners are adding something of their identity in the process of redesign. They redesign the world and themselves. This is how learners become mathematicians, historians, scientists, or writers. This is how they learn.

The learning by design pedagogy is the extension of a research program we first developed in the multiliteracies project (Cope & Kalantzis, 2000b; New London Group, 1996). More recently, we worked with groups of teachers and clusters of schools in Australia and the United States to test an online learning design environment for teachers and learners to document pedagogical choices and their knowledge outcomes (<http://L-by-D.com>). One of our coresearchers, Anne Cloonan, quoted a participating learning by design teacher in rural Victoria, describing her students’ “passion projects,” or web pages, about a subject dear to their hearts (a staggeringly dispersed panoply of interests):

We’ve got a wide range of children within this room. Three quarters of the children are boys and also a huge range of abilities and . . . prior experiences and things that they bring with them from home. So as a way of connecting to them and making their learning more meaningful to them and engaging them and motivating them, technology and computers were a fantastic link, [connecting] it to what they already knew . . . Not all children have access to a computer at home, so there’s been lots of planning for that concept naming and being able to understand that this is a “hyperlink,” or this is a “font” . . . identifying these features and concepts that they need to be able to use and need to be able to name . . . being able to articulate what the concept is and then learn what does this do . . . The critical analysis has been a really big part of looking at the Web pages [and] newspapers for example and identifying features, they’ve been quite

critical as to why they've chosen a particular background colour or animation, or does that font work with that particular coloured background. The children are very good at that now and they use the language very easily, very comfortably . . . We've applied what we've learnt in creating our own Web pages, each child now has their own personal profile, which is on the school intranet . . . including the hyperlink to their passion project . . . So they've come in with what they know and we're building on that and hopefully transforming their practice. (Cloonan, 2007, p. 242)

The documentation suggests that students are led by their teacher to weave among experiencing the known (their passion project, working on something closely connected to their identities), conceptualizing (deconstructing the grammar of a web page), developing a metalanguage of design, critically analyzing websites, and applying their knowledge in the construction of a web page. The learning by design pedagogy was deployed in this case not only to expose students to a range of learning experiences that made explicit what they can do to know but also to demonstrate forms of action that require engaged participation in the knowledge-making process while recruiting student identity. Ultimately, the purpose of the learning design was to harness learners' identities in a double way, as personal interest and personal expertise in expressing those interests on a web environment.

Working across the Lanyon Cluster of schools in the Australian Capital Territory in which the learning by design pedagogy was being implemented, another of our coresearchers, Keiju Suominen, concluded:

There was a strong sense of the importance of active participation in the learning process both through intellectual and creative endeavors involving problem solving and decision making as well as through embodied activities such as collecting data and role playing. The students wanted to be actively involved as producers of knowledge and knowledge products not just as passive recipients of others endeavors. (Suominen, 2009, p. 141)

Van Haren, also working in the Lanyon Cluster, captures the spirit of Generation P in her interviews with students. Here is one symptomatic voice, among many:

Researcher: Do you like school?

Student F1: Depends on what you are doing. If you are doing

something interesting like big projects or debates, seeing different points of view and asking questions. If I feel connected to it and know what it's getting at – what the point is. . . . It is easier to understand why you are doing it and you can actually put it into your life now; not finding out later. (van Haren, 2007, pp. 64–67)

She concluded:

The evidence indicates that when teachers gave up control and scaffolded the agency of students through the knowledge processes, students took up this opportunity for autonomy and their learning was transformed. This transformation is more than assimilation and just moving to what the teacher wanted the students to learn. (van Haren, 2007, p. 125)

These examples demonstrate one of the key principles the Learning by Design project: the importance of identity and agency in the formation of knowledge and high learner performance.

A NEW DYNAMICS OF DIFFERENCE

One particularly important consequence of the shift in the balance of agency is the development of a new dynamics of difference. The convenient aspirations to sameness and the pressures to acquiesce and conform of an earlier era suddenly have become anachronistic—mass consumer uniformity has given way to many niche markets; nationalistic (and at times racist) identities have given way to a necessary global-local cosmopolitanism; and mass broadcast media have given way to constructing one's own, invariably peculiar take on the world across an uncountable number of new media spaces. Gone are the days when we had to become the same in order to participate as workers, citizens, and community members. By opening a new scope for agency in spaces that were previously structured as sites of compliance, opportunities emerge for the flourishing of differences. This period can be characterized by the phrase from each according to his or her identity and to each according to his or her proclivity.

The new media, in particular, provide channels for differences to represent themselves. After an era in which every pressure was to create homogeneity (the mass media with one or two newspapers in every city, half a dozen main television channels, and top 40 radio playlists), today's society and media provide spaces for divergence (the myriad of blogs and

online newspaper offerings; the thousands of television channels and millions of YouTube offerings; and iPod playlists or iPhone app configurations, where no two are the same). Not only does difference come to light more vividly and poignantly, given the easy usability and accessibility of the new media, but differences can also auto recreate. Individuals and groups can become more different. The cost of entry for different ways of speaking, seeing, thinking, and acting is lower. You do not need specialist trade skills or heavy-duty infrastructure to be out there in your own voice—through the web, or in video, or using digital print. The economies of scale of cultural production have been reversed. The logic of mass production (big production TV, long print-run books) is displaced at least in part by the logic of mass customization (tens of thousands of widely divergent messages in YouTube; books where a print run of one costs the same per unit as a print run of ten or ten thousand).

Here is one example: although only a thousand or so speak Yol u Matha, a language of Australia's Northeast Arnhem Land, language and literature materials can be made for bilingual teaching in school. Even a character created for a sound that cannot be captured in roman script, can be drawn from the universal, multilingual scripting library, unicode, and find its way into Wikipedia and word processors. With no economies of scale of text manufacture, the maintenance of Yol u Matha is easier than ever and perhaps more essential than ever ("Yolngu Matha," 2010).

This new media environment makes it possible for discourse communities to diverge, to find and develop voices that are truer to their evolving selves—identity-speak, profession-speak, peer-speak, diaspora-speak, fad-speak, affinity-speak. New media intensify the logic of discourse divergence captured in the idea of multiliteracies (Cope & Kalantzis, 2000b). Knowledge and culture become more fluid, contestable, and open. Discourses become less mutually intelligible, and we need to put more effort into cross-cultural dialogues in order to get things done.

In these ways, the rebalancing of agency in our epoch brings with it a shift away from a fundamental logic of uniformity in an earlier modernity to a logic of difference. And more: we do not just have difference as a found object, legacies of lived experience that we can at last recognize, but there is also today a tendency to divergence or to become more different. Here is one of the great paradoxes of what is also an era of globalization, when we are undoubtedly becoming more closely interconnected in many respects: communications, media, trade, travel, capital flows, ideas flows (Steger, 2008). We also live in a time when the scope for agency allows us to make ourselves more different. And because we can, we do. Take, for instance, the rainbow of gender identifications and expressions of sexuality in the newly plastic body; or the shades of

ethnic identity and the juxtapositions of identity, which challenge our inherited conceptions of neighborhood; or the locale that highlights its peculiarities to tourists; or the bewildering range of products anticipating any number of consumer identities and product reconfigurations by consumers themselves.

So what are these differences? How do we conceptualize them for the purpose of knowing our students? Here's a catalogue of differences, which in an earlier modernity we tried to ignore, or assimilate, or, if they could not be ignored or assimilated, which we tried to separate onto another side of a geographical border, or an institutional boundary, or a normative divide of "deviance":

Material

Class: social resource access, employment, and social status

Locale: neighborhoods and regions with differential social resources

Family: relationships of domesticity and cohabitation

Corporeal

Age: child development, life phases, and peer dynamics

Race: historical and social constructions linked to phenotypical differences

Sex and Sexuality: the bodily realities of masculinity, femininity, and varied sexualities

Physical and Mental Abilities: spectrums of bodily and cognitive capability

Symbolic

Language: first and second language learners, dialect and social language

Ethnos: national, ethnic, indigenous, and diasporic identities

Gender: identities based on gender and sexual orientation.
(Kalantzis & Cope, 2008b)

All of these differences present themselves in our late modernity as insistent demographic realities. They have become normative realities, too, supported by an expanding conception of human rights (Fraser, 2008; Kalantzis & Cope, 2008b).

However, as soon as we begin to negotiate these differences in good faith, we find ourselves bedeviled by the categories. We discover in our communities and in our classrooms that the gross demographic groupings are too simple for our needs. Instead, we find we are negotiating an inexhaustible range of intersectional possibilities—where gender and race and class meet, for instance. We face real-world specificities, which

confound generalizations about people who formally fit the ostensible categorical norm. In fact, if you take any one of the categories, you'll find that the variation within that group is greater than the average variation between groups. There are no group norms. The gross demographics might tell of larger historical forces, groupings, and movements. But they do not tell enough to provide a sufficiently subtle heuristic or guide for our everyday interactions. For history's sake, we need to do the gross demographics, but also a lot more. We are also in the presence of differences that can be grasped only at a level that defies neat demographic classification.

NARRATIVES

Narratives are the stories of people's lives, their experiences, their backgrounds, their life histories—in short, the givens that are constitutive of who they are, what they know, and how they enact their being. Narratives tell how the social and historical are instantiated in the personal and contemporary.

PERSONAE

Personae are the identities, grounded in the quirks of personality traits and the experiential narratives of a larger social history. Persona captures the kind of person you envision yourself to be, style yourself to be, and present yourself as. It may be affected. It may be semiconscious or unconscious. Persona may be manifest in gesture, demeanor, social intersubjectivity, and the various modes of presentation of self, such as fashion, ways of speaking, or modes of interaction.

AFFINITY

Affinity is constituted by attachments, to groups and to worldviews or stances—for instance, the infinitely varied shades of religious or areligious affinities, and political or apolitical affinities. Affinities may also be to products or material objects, or games or sports, or aesthetics or styles. You are what you associate yourself with, and what that association stands for. Affinity captures an extraordinary variety of senses of connection, from personal beliefs and attitudes, to membership in networks, to more formal connections with groups.

ORIENTATIONS

Orientations are the ways in which people connect with new and unfamiliar contexts, their preferred ways of knowing (by immersion in the facts or by big picture abstraction), their ways of learning (experiential or conceptual), their ways of speaking of particular things (technical or applied discourses), and their ways of relating to people.

So what do we do in schools? Following are several of the practical paths taken by the learning by design pedagogy:

1. THE DESIGN IDEA

The design idea at the heart of the knowledge processes—simply granting a wider scope for participative agency in the learning process—opens the curriculum to diversity. As soon as we take agency into account, the more multifarious its manifestations become, and the more complex the matrices and intersections. And to facilitate all these agencies in one classroom! The solution of the command society was one teacher talking at the middle of the class, one textbook telling one narrative one chapter at a time, one test that told of one way of knowing. The result was assimilation to the middle way, or failure. As soon as we allow scope to learner agency, however, we allow many differences to flourish at the same time as creating a more powerful sense of inclusion and belonging in the classroom. Students bring different experiences to the learning process. They find their own best paths to knowledge-making and learning.

2. EXPLICIT PEDAGOGICAL OPENINGS

Apart from the fact that every knowledge process is a form of action, a business of designing meaning and knowledge and thus engaging with identity, several of the knowledge processes explicitly draw in differences. In experiencing the known, students are invited to bring into the classroom perspectives, experiences, and knowledge from the students' social worlds that are familiar to them. In analyzing critically, students reflect on their own and others' perspectives on knowledge. In applying creatively, students take new knowledge back to apply it in real-world settings, or transfer what they have learned into another context. Each of these knowledge processes establishes direct points of contact with learners' lifeworlds. When the gross demographics are too simplistic, these

pedagogical moves create avenues in the curriculum for learners to be who they are and to express who they are in all its subtlety and richness. This is a way to value what they already know. Rather than second-guessing the dimensions of difference, these pedagogical moves open out the curriculum to embrace what learners bring to the learning experience, at times surprisingly and unpredictably. Such a learning environment opens a window onto student identities and helps teachers and fellow students to figure out what makes them “tick.” By honoring their lifeworlds as places of valid and relevant knowledge, this learning environment creates the sense of belonging that is central to inclusive education.

Suominen described the way in which the learning by design pedagogy contributed to improved student performance in the schools she surveyed:

Naturally, we would expect more personal connection references from students working on learning designs where this forms an integral part of the design. However, the link between overall student performance and personal connection references was to a degree unexpected. Although all the designs contained some learning activities designed to make personal connections to the learning, particularly in the knowledge process of Experiencing the Known, the Learning Elements [hybrid online lesson planning and curriculum delivery spaces, described later in this paper] where personal connections were woven into most of the learning activities seemed to have the most impact on student learning. In these learning elements, although the learning was designed by the teacher for the entire class, the nature of the activities worked to personalize the learning for each student. (Suominen, 2009, p. 132)

3. ALTERNATIVE NAVIGATION PATHS

Learning by design does not require that every learner be on the same page at the same time. In fact, if a teacher or group of teacher-collaborators builds up a bank of learning elements accessible online, different students or groups of students will be able to do different learning elements at the same time. Or, if doing the same learning element, they may be able to negotiate navigation paths that prioritize or order knowledge processes according to preferred “learning styles”—some students might prefer big-picture conceptualizing before they immerse themselves in experiencing, while others may prefer the reverse.

4. ASSESSING COMPARABILITIES

When, at any one time, students can be doing what engages them most effectively at a particular moment, and when this might be so varied, how can a teacher know what a learner has learned? A much more graphic, realistic, and detailed view is possible in an environment in which actual performance is recorded in portfolios rather than bald test scores. Complex, multiperspectival assessment-, which continuously feeds back into the process of appropriate learning design for that student, becomes possible. Students can also work together more readily in the digital environment. Lesser or greater contributions are visible for what they are (and this could at times be appropriate), and differential perspectives and knowledge can be valued as the basis for collective intelligence (Kalantzis & Cope, 2011a).

Centering educational energies on learner agency in all its variety will create a new dynamic, sociability, and ethics of knowledge creation. Inclusive education changes the direction of knowledge flows so learners and teachers are more actively involved in the construction of knowledge. Learning is a matter of engagement, moving backward and forward between formal knowledge and the knowledge base of the lifeworld. When learner lifeworlds are so varied, diversity of perspective becomes a learning resource. Learning is most powerful when collaborative and diverse perspectives are brought to bear. Knowledge construction and learning, in other words, are all the more potent for the productive engagement of diversity among learners. This basis for learning and knowledge ecologies is very different from traditional transmission models of pedagogy and broadcast models for communicating learnable meanings. In the kind of “new learning” environment we are advocating here, the educational outcome is not content knowledge, or at least not that primarily. The outcome is the development of kinds of people who have the capacity to learn and act in particular ways. They can navigate change, negotiate deep diversity, and make and lead change, rather than be knocked about by it. They can engage in sometimes difficult dialogues, they can compromise and create shared understandings, and they can comfortably extend their cultural and knowledge repertoires into new areas. They are tolerant, responsible, and resilient in their differences. The key questions for educators, then, are how do these new types of people learn to be themselves, learn to relate with others, and learn how to get things done in today’s knowledge ecologies.

THE Pervasiveness of Multimodality

When we in the New London Group coined the word *multiliteracies*, we had in mind multi in two senses, or two caveats to the traditional notions of literacy as standard forms of the language and literacy as alphabetical literacy. The first multi we have already spoken about in the previous sections of this paper—that representation varies according to situation of use, the active designing proclivities of meaning-makers, and deeply divergent identities. Literacy established rules for a singular right way to mean. Multiliteracies, on the other hand, is about navigating one's way around a world of different meanings. The second multi refers to multimodality, or the increasing inweavement of written text into modes of meaning, which are also visual, spatial, gestural, audio, and spoken.

At the beginnings of modernity, the modes of meaning drifted apart. The printing press required different processes for text (the offset letterpress) and image (engraving) (Cope, 2001), and so, if image and text were to be in the same book, for the most pragmatic of manufacturing purposes image and text were best separated into different sections. In schools, we created separate disciplines for language and art and put them in different cells of the class schedule. At times, the modes were even dragged apart. The radical iconoclasts of Protestantism tore stained glass windows and statues out of churches in order to force upon supplicants an unmediated relationship with the Word. In later modernity and not in a dissimilar spirit, the theorists of the “language turn” assumed linguistic meaning was all, or at least primary.

In our more recent modernity, the modes have been coming back together, what Kress called a shift from word culture to image culture, and language has merged with other modes into a new grammar of multimodality (Kress, 2009). This can in part be attributed to the affordances of the new communications environment. As early as the mid-20th century, photolithography put image and text conveniently back onto the same page. Then, since the mid-1970s, digitized communications have brought image, text, and sound together into the same manufacturing processes and transmission media. Here is another enormously significant, though oft-neglected moment in the history of modern textuality: the shift in the elementary modular unit of text manufacture from the character (a process invented by Gutenberg in his letterpress print technology of 1450, or possibly by Li Sheng with moveable type in 1040) to the pixel.

The simple but hugely important fact is not only that printed words and images are now made of the same stuff but also recorded sound. This means we can more easily put them together, and because it is easier, we

do in complex overlays of text and image in, for instance, magazines and web pages. The page of writing, in which tools of spatial design were once the exclusive preserve of typesetters, has now been made available to the masses. Meanwhile, more text finds its way into images, the easy overlay of text and visuals, or the easy bringing together in video of image and gesture and sound and written linguistic overlays. (Television has much more writing over it than was the case in the initial days of television—take the sports or business channels, for instance.)

This momentous shift toward multimodality suggests that, in our school literacy practices, we need to expand our representational repertoires. This is not to subtract from legacy literacy practices. Rather, it suggests an additive process in which the grammars of particular modes are integrated into a more expansive multimodal grammar. It also suggests processes of synesthesia, or mode switching, representing designs in one way, then another. And once more, those elusive things, innovation and creativity, may emerge in the key or mood shifts from one mode of representation to another.

Not that we should not regard alphabetical literacy as important. Indeed, in many senses, it is more important than ever because its sites are now so pervasive and so critical to navigating every aspect of working, public, and personal life. We need to recognize and honor the range of these sites, however, and we can do that only through a multimodal view of meaning, encompassing the following:

- *Written Language*: writing (representing meaning to another) and reading (representing meaning to oneself)—handwriting, the printed page, the screen.
- *Oral Language*: live or recorded speech (representing meaning to another); listening (representing meaning to oneself).
- *Visual Representation*: still or moving image, sculpture, craft (representing meaning to another); view, vista, scene, perspective (representing meaning to oneself) (McGinn, 2004).
- *Audio Representation*: music, ambient sounds, noises, alerts (representing meaning to another); hearing, listening (representing meaning to oneself).
- *Tactile Representation*: touch, smell and taste: the representation to oneself of bodily sensations and feelings or representations to others by “touch.” Forms of tactile representation include kinesthesia, physical contact, skin sensations (heat/cold, texture, pressure), grasp, manipulable objects, artifacts, cooking and eating, aromas.
- *Gestural Representation*: movements of the hands and arms, expressions of the face, eye movements and gaze, demeanors of the body,

gait, clothing and fashion, hair style, dance, action sequences (Scollon, 2001), timing, frequency, ceremony and ritual. Here gesture is understood broadly and metaphorically as a physical act of signing (as in “a gesture to”), rather than the narrower literal meaning of hand and arm movement. Representation to oneself may take the form of feelings and emotions or rehearsing action sequences in one’s mind’s eye.

- *Spatial Representation*: proximity, spacing, layout, interpersonal distance, territoriality, architecture/building, streetscape, cityscape, landscape. (Kalantzis & Cope, 2008a)

Between and across modes, there are profound parallels, as well as deep differences. The following figure shows some of the parallels (Cope & Kalantzis, 2009a):

Figure 2. Outline of multimodal grammar (adapted from Cope and Kalantzis, 2009a).

<i>Dimensions of Meaning</i>	<i>Modes of Meaning</i> >	Linguistic	Visual	Spatial
Representational: What do the meanings refer to?	Participants: Who and what is participating in the meanings being represented?	Naming words, which make sense in terms with their relationships with nearby words and contextual pointers.	Naturalistic and iconic representations, visibly distinguishable contrasts.	Objects in relation to nearby objects, part/whole relationships, contrasts.
	Being and Acting: What kinds of being and acting do the meanings represent?	Processes, attributes, and circumstances.	Vectors, location, carriers.	Placement, topography, scale, boundaries, location.
Social: How do the meanings connect the persons they involve?	The Roles of the Participants in the Communication of Meaning: How does the speaker/writer mean to draw the listener/reader into their meaning?	Participant relationships and vicarious observer relationships.	Perspective, focal planes of attachment or involvement.	More and less negotiable spaces: e.g. parks versus prisons.
	Commitment: What kind of commitment does the producer have to the message?	The kind of affinity meaning-makers have to the propositions they are making, and the degrees of certainty they express—“modality.”	Contextualisation, depth, abstraction.	Emphatic (fences, barriers), or less insistent spatial designs.
	Interactivity: Who starts the interchange, and who determines its direction?	Agenda setting, turn taking, topic control.	Eye contact, response.	Spatially determined interchanges: audiences by a theatre, students by a classroom.

Figure 2. Outline of multimodal grammar (adapted from Cope and Kalantzis, 2009a) (continued)

	Relations between Participants and Processes: How are the participants connected to each other and with the actions and states of being that are represented?	Agency, or transitivity, 'nominalisation'.	Agency as represented through vectors, eye-lines, perspective.	Principles of layout.
Organisational: How do the meanings hang together?	Mode of Communication: What is distinctive about the form of communication, and what conventions and practices are associated with this form of communication?	Spoken or written language; a part of what is going on or representing what is going on; monologic or dialogic.	Still or moving images, two or three dimensional representation, representational versus interactive.	Architecture topography geography.
	Medium: What is the communication medium and how does this define the shape and the form of the representation?	Physical medium, such as recorded or ephemeral speech.	Different media, such as oil painting versus photography.	Natural environment, building, website.
	Delivery: How is the medium is used?	Intonation, stress, rhythm, handwriting, typing.	Brushstrokes, photographic film.	Construction, landscape.
	Cohesion: How do the smaller information units hold together?	Information structure, reference, omission, conjunction, wording.	Left/right, top/bottom, centre/margins, framing, salience/gravitational pull.	Structural, aesthetic.
Contextual: How do the meanings fit into the larger world of meaning?	Composition: What are the overall organisational properties of the meaning-making event?	Genre, such as romance novel or doctor-patient conversation.	Genre, such as landscape photography compared to photojournalism.	Building or environment types.
	Reference: What/ how do meanings point to contexts and contexts point to meanings?	Frame of reference, pointers, metaphor.	Frame of reference, foregrounding/backgrounding, resemblance/metaphor.	Location, prominence, metaphor.
	Cross-reference: How do meanings refer to other meanings?	Intertextuality, hybridity.	Pastiche, collage, icon.	Motifs.
	Discourse: How does the whole of what I communicate say something about who I am in a particular context?	Primary and secondary discourses, dialects, register, orders of discourse.	Imagery.	Topography, architectonics.

Figure 2. Outline of multimodal grammar (adapted from Cope and Kalantzis, 2009a) (continued)

Ideological: Whose interests are the meanings skewed to serve?	Indication of Interests: How does the meaning-maker declare their interests?	Authorship, context and purpose of meaning.	Naturalistic or stylised images.	Symbolism, facades, portals, signs.
	Attributions of Truth Value and Affinity: What status does the meaning-maker attribute to their message?	Assertions as to the extent of the truth of a message, declaring one's own interest, representing agency.	Realistic (e.g. scientific diagrams), versus heavily authored (e.g. artistic) images.	Spatial arrangements, such as of a court room compared to a park.
	Space for Readership: What is the role of the reader?	Open and closed or directive texts, anticipated and unanticipated readings.	Highly detailed panoramas versus propaganda.	Alternative ways of using a space, directive or allowing alternatives.
	Deception by Omission if not Commission: What's not said and what's actively one-sided or deceptive—deliberately or unconsciously?	Selectiveness in foregrounding and backgrounding, non-declaration or obscuring of interests.	Foregrounding and backgrounding, distortion, perspective.	“Front” and “back” spaces, public and private.
	Types of Transformation: How is a new design of meaning created out of available designs of meaning?	Extent of creativity, degree of self-consciousness of representational resources and their sources.	Extent of creativity, degree of self-consciousness of representational resources and their sources.	New or hybrid forms of spatiality: e.g., Websites, food courts (Cope and Kalantzis, 2009a).

These parallels are the reason why we can describe a picture in words or turn a novel into a movie or turn a plan into a building. A verb in a sentence is like a vector in an image. The “given” and “new” in a sentence is like the left and right in an image, at least if you speak a language written from left to right (Kress & van Leeuwen, 1996). However, there are also deep and intrinsic differences between the modes, the linear temporality of writing underwriting a logic of causality; and simultaneity of the image underwriting a logic of location (Kress, 2003). It is why the movie is so much like the novel, and at the same time so unlike it (Kalantzis & Cope, 2008a).

Synesthesia is the process of mode shifting, rerepresenting something from one mode into another. Traditional literacy pedagogy does not by and large recognize or adequately use the meaning and learning potentials inherent in synesthesia. Traditional literacy pedagogy tries to confine itself to the monomodal formalities of written language, as if the modality of written language could be isolated as a system unto itself—

sound-letter correspondences, parts of speech and the grammar of sentences, the study of canonical literary works, and the like. In the context of today's representational media, this agenda is unrealistically narrow and anachronistic.

Synesthesia, however, has always been integral to representation and learning. In a very ordinary, material sense, our bodily sensations are holistically integrated, even if our focus of meaning-making attentions in any particular moment might be one particular mode. Gestures may come with sound, images and text sit side-by-side on pages, and architectural spaces are labeled with written signs. Much of our everyday representational experience is intrinsically multimodal. Indeed, some modes are intrinsically close to others, so close in fact that one easily melds into the others in the multimodal actualities of everyday meaning. Written language is closely connected to the visual in the use of spacing, layout, and typography. Spoken language is closely associated with the audio mode in the use of intonation, inflection, pitch, tempo, and pause. Gesture may need to be planned or rehearsed, either in inner speech (talking to oneself) or by visualization. Children have natural synesthetic capacities, and rather than separating the modes, we should build upon and extend these natural capacities by actively encouraging mode shifting and mode integration (Kress, 1997).

In a multiliteracies classroom, one of our coresearchers, Mary Neville, described the use of digital recording technologies to create a multimodal learning ecology:

Teacher A and [a visiting] film maker set up . . . [a] literacy classroom [as] a film “production house.” [They] transformed . . . a classroom atmosphere and arrangement of traditionally “doing school” with desks, exercise books and a blackboard . . . The classroom didn't seem to shape the learning, rather the multimodal texts gave the impression of shaping a “green space” in the classroom where desks and blackboard were irrelevant and other “open space” sites for discussion and filming equipment were located for creative innovation. (Neville, 2008, pp. 88–89)

My students and I really enjoyed being involved in this project [said the teacher]. It gave them a context in which to engage, intellectually, with some really higher order thinking. It gave them a sense of purpose and focus—a way of channeling their collaborative intellectual efforts into a single and fairly complex intent. It was stimulating for us all, not only because of the nature of the content, but also because it required new skills and

competencies. It's hard to put all that into words—you have to be there and listen to their conversations and appreciate the complexity of how these 11 and 12 year old kids were thinking and behaving; “if you are working in television you've got about 30 seconds to make your audience watch your program or they go (clicks fingers)”; “let's do a voice over”; “you ask a rhetorical question”; “you have such freedom . . . as a film maker.” (Neville, 2008, pp. 91–92)

The data suggest that the pedagogical effectiveness [of this teacher's] classroom was related to increased cognitive, transformational opportunities for students linked to the inclusion of a video “production house” [the] focus was on the real world of film production. . . . A pedagogical concentration on the “how” of multimodal text production provided students with “insider” knowledge. This pedagogical concentration had links to teachers knowing the discourse of the social practices surrounding multimodality. (Neville, 2008, pp. 133–134)

At another research site, a teacher reported to Cloonan the ease with which younger learners were able to operate multimodally and synesthetically:

Being part of the . . . Multiliteracies project . . . I've realized that I've made assumptions about the children's learning. I've realized that there are much deeper layers to learning, [such as] being aware before of visual literacies . . . I have found that I can look at it at a much deeper level, and I'd never have unpacked pictures to that level before, I'd never have dreamt of doing something like that with Prep children and what's really blown me away is that this age group children are more able to take this on board than some of the children I work with in other areas of the school. I've worked with a literacy support group in [Years/Grades] 3 and 4 and I've tried to use the same ideas and it's harder for them to take on board. They've got to actually unlearn to focus on the alphabetic literacy and learn that it's fine to use all those other [modes] that are there to support them in the meaning . . . The Preps' language and understanding [of this] is much deeper or they're much more willing to use that [metalinguage] or demonstrate [their multimodal expression]. (Cloonan, 2007, p. 194)

Each example demonstrates the gaps in the teachers' and the learners' capacities in the new communication environment. At the same time, with timely and expert intervention, the examples also show the strides that can be made, and the possible alignment of the lifeworld of the school with that of the home and the broader community where multimodality is now ubiquitous.

THE RISE OF A NEW NAVIGATIONAL ORDER

The new digital media require users to get around the representational world in new ways. To be a new media user media requires a kind of thinking that we will call conceptualization. In our textual journeys through the new digital media, we encounter multiple ersatz identifications in the form of icons, links, menus, file names, and thumbnails. We work over the algorithmic manifestations of databases, mashups, structured text, tags, taxonomies, and folksonomies in which no one ever sees the same data represented the same way. The person browsing the web or channel surfing or choosing camera angles on digital television is a fabricator and machine-assisted analyst of meanings. The new media, in other words, do just not present us with a pile of discoverable information; they require more work than that. Users can navigate their way through this thicket only by understanding its architectural principles and by working across layers of meaning and levels of specificity and generality. This is a new cognitive order, the textual elements of which arose in an earlier modernity, to be sure, but which in their intensity and extensiveness require a peculiarly abstracting sensibility. They also demand a new kind of critical literacy in which fact is moderated by reciprocal ecologies of knowledge validation, which are full of metadialogues around interest (e.g., the edit history pages in wikis). Meanings and knowledge are more manifestly modal, contingent, and conditional—not that serious knowledge has ever been anything but this, despite the implicit epistemologies of tests. It is just that this is less avoidably the case in this era of the new media.

As an aside, what passes for most literacy assessments today is heavily biased to reading (more than writing) because that is more readily assessable through discrete item comprehension tests based on ostensibly intrinsic and indisputable authorial meanings. Meanwhile, writing is expensive to assess, requiring as it does slow human reading, and writing is not necessarily very reliable in the application of an overall grade. Not only are comprehension tests founded on an unsustainably simplistic, static theory of meaning and representation (Barthes, 1976; Eco, 1981). They are also an anachronism given the conditions of work, citizenship,

and community life in the 21st century—by default, they value receptive meaning capacities over productive meaning capacities, and this in an era when constructive team contributions are valued over taking orders, creativity and problem solving are valued over compliant operationalization of systems, and risk taking and entrepreneurship are valued over line management and bureaucracy. As we argue elsewhere, the productive complexities of writing need not be neglected as a site of assessment. In fact, writing is particularly well suited to new modes of assessment in the “social web” (Kalantzis & Cope, 2011b).

To be an effective sense-maker and communicator today, not just a viewer or reader or consumer, you need to master today’s sociotechnical architectures of representation. You need to be able to read and write representational designs. This creates a new cognitive load, not just to think in conceptual-design terms but also in order to monitor reflexively your thinking about your thinking, or metacognition. What are the skills and logics of critical discernment in a media environment of seemingly infinite extent and that is so demanding that we make navigational choices? How does one plan where one goes or recap where one has been? How are social and informational networks to be mapped, if one is to get a clearer view of their patterns of meaning? The new media need a new, conceptualizing sensibility (Cope & Kalantzis, 2004).

To move to the specifics of the work of writing, we want to mention two more neglected moments in the modern history of textuality. The first can be framed as a trivial pursuit question—when did we first digitize text, and when did digitization become a significant part of the text-manufacture process? The answer is from the production of the Linotron 1010, a phototypesetter (printing projected images to bromide paper), first put into use at the U.S. Government Printing Office in 1967. By 1980, most books were phototypeset.

Another neglected moment is the invention of Generalized Markup Language (GML) in the IBM labs in 1970. This became Standard Generalized Markup Language (SGML), used at first mainly for computer and software code documentation. These represent a radical shift in markup practices, from typographic markup (visual markup by font variation and spatial layout) to the semantic and structural markup, which is now integral to digital media spaces. Tags markup the text for its structural (e.g., <sen>) and semantic (e.g., <auth>) features, thus storing information in a way that allows for alternative renderings (stylesheet transformations) and in a more accurately searchable form.

Tim Berners-Lee subsequently bowdlerized SGML to create HTML in 1990, mixing typographic with structural and semantic markup—and the five versions of HTML since then have tried to get back closer to a

consistent principle. XML was invented in 1998 as a metaspace for creating structural or semantic markup languages. These textual principles and practices have since become the most recent digital media. However, even though we will soon be five decades into the development of digital text, digitization still includes deeply embedded typographical practices—in word processing, in desktop publishing, and in the print-alike portable document format. These practices are old textual processes clothed in the garb of new technologies and remain as barriers to many of the things that structural and semantic markup is designed to address: accurate discoverability beyond character and word collocations, more accurate machine translation, flexible rendering in alternative formats and on alternative devices, nonlinear workflow, and collaborative authoring, to name a few of the serious deficiencies of typographic markup. However, significant strides are being made on the web and in new document-making environments and formats. Here are the kinds of changes in textwork that are still underway:

Figure 3. Changing the work of writing in the new, digital meaning.

<i>Gutenberg's World</i>	<i>Moving the Gutenberg Typographic Paradigm onto the Desktop</i>	<i>Text Work Using Structural and Semantic Markup</i>
Penning the word	Keying the word: the word processor turns the author into an amateur typesetter	Building textual architectures [Web pages, styled documents]
Typesetting	Desktop publishing and html [at first]; visual markup for a single rendering.	Structural and semantic markup: separating text functions from text forms [stylesheets]
To Print: letterpress then lithographic	To print-like screens, and PDF as a postscript [printer] derivative	Multiple rendering paths: print, web, voice synthesis, translation engines
Respect the authority of text and its maker. Don't write on that book.	Have the relations of text production changed? Mapping old textual practices into the digital media.	Readers who write over texts: reviews, recommendations, wikis, annotations. Exploring the affordances of digital media.

So, what do we do in schools? How do we teach writing now? Some of the answer is technological: have students write in these new environments in these new ways. There is, however, a deeper, epistemological, and pedagogical answer: teach in a way that is appropriate to the new navigational order. There is a counterpoint here in older pedagogical practices. Grounded in an earlier modernity, didactic pedagogy taught facts assembled into disciplinary shape and unveiled to learners in theoretical sequence (e.g., the rules of language and its grammar). In the 20th

century, a less abstract, authentic pedagogy emphasized experiential learning—through doing, demonstration, experimentation, or immersion (e.g., whole language, or process writing). A new learning seeks to engage learners in more powerful conceptualizing and metacognizing processes. Some of this seems reminiscent of didactic teaching—labels for things more finely defined than in the ambiguities of everyday language and theories, which tie those labels together into patterns of explanation, rather like the structural and semantic tags that drive the most contemporary of the digital media. However, the new learning engages the learner as a coconstructor of concepts—as definer, theory maker, critic, and analyst. We capture these processes in the learning by design pedagogy in the knowledge processes of conceptualizing and analyzing. Meanwhile, other knowledge processes are reminiscent of authentic education, when learners connect knowledge with personal experience (experiencing the known), are immersed in new experiences (experiencing the now), or are asked to apply their learning in real-world contexts (applying appropriately or creatively). However, spending too much time making the characteristic moves of authentic education is possible, time-consuming busy-work it sometimes seems, and this at the expense of higher-order conceptualizing. Insofar as navigation of the new media requires higher-order skills of conceptualization and abstraction, learning that engages students in and through the new media environment may support pedagogical experiences appropriate to our moment, in and for its characteristic cartographies and its grammars.

Here is a teacher in Cloonan's research developing the visual concept of angle in the images presented in illustrated fairy tales. The teacher was working with early literacy learners to develop a visual grammar and then reflecting on the power of these conceptualizing processes:

I try to make sure I'm connecting with the children's experiences by . . . continually making those links explicit, . . . conceptualizing . . . for example with deconstructing and reconstructing the pictures [in the fairy tale books] and the meaning. I had to give them a language to do that . . . The amusement of me laying down [on the classroom floor] taking a photo of [Child X] was to get that angle . . . explicit teaching and talking about angle, and now one word they really know is "angle." [By taking photographs of each other from different angles her students have developed] ways of using the language and the skills to look at things critically . . . then working out as well why is this picture a better picture? Should we use this one? What makes that one

more powerful? It's getting them to use that language, or use those understandings to frame their ideas . . . getting them to apply their knowledge . . . say in a setting of doing a PowerPoint.

I found talking with other teachers that sometimes people say this is just good teaching practice and that's really true; it is good teaching practice, it's what we've always done, but, once again, I think we're doing it at a more explicit level. I would never have spent three weeks unpacking pictures and fairytales like I have this time, but I think the time and effort really shows in the sorts of things the kids are doing. Before I would have maybe spent a session on it and assumed that the knowledge was there and assumed that they'd take it on board but not see the evidence in a really, really deep way like I'm seeing now. . . . [The students are] making links in their reading, I'm seeing it across other areas too, in other settings, other activities that they do, they're maintaining that knowledge because it's very strong and they're using that [knowledge of] design in the way they draw their characters too and there's an individualism about the way they work, they bring their own meaning to it . . . you see the power of the visual literacy coming through. (Cloonan, 2007, pp. 205–206)

Van Haren, in her research about the conceptualizing aspect of learning by design, spoke with a teacher:

Researcher: When you chose the conceptual knowledge process, what sort of learning happened?

Teacher B: . . . They had to be critical, not just look at the information. They had to justify and use criteria to sort things. We also had to do some conceptual learning before we could do the experiential because we had to come to some common understandings and definitions of technology, entertainment, and communication . . . It was giving them ownership of the knowledge and showing its purpose. It helped them to make sense of it and put it into some order. (van Haren, 2007, pp. 94–95)

Suominen concluded in her study:

Examining the student performance data along with their response data from learning journals and conversations, the

importance of the conceptualizing knowledge processes to learning becomes apparent. In research cohort A, 62.5% students whose shifts in performance scores were at or above the cohort median also recorded at or above the median use of the shared language of the knowledge domain . . . This would suggest that the conceptualizing knowledge processes and, in particular, Conceptualizing by Naming filled a gap for these under-performing students, providing them with the language necessary to participate more fully in the learning process. They had become skilled at using the language and concepts of the knowledge domain using the language to learn and to demonstrate learning. (Suominen, 2009, p. 149)

Not only are these conceptualizing capacities an increasingly prominent feature of our new media environment, supporting the kinds of cognition we need to move around the new representational order, but metacognition also enables cognition. Metacognition makes for more effective learning.

THE UBIQUITY OF RECORDING AND DOCUMENTATION

New media spaces are not just spaces of communication; they are places of recording. They are not just spaces of live communication; they are spaces of asynchronous multimodal communication of recorded meanings or incidental recording of asynchronous communication—e-mails, text messages, Facebook posts, Twitter tweets. In this context, the synchronous, unrecorded, live communication of the conventional classroom is an anachronism from an earlier information age. Some students may want to go back over things, but there is no replay. Other students may not be intellectually engaged by the communication of the moment, but there is no fast forward. While the teacher speaks, the class has to listen silently. If a student is to speak, it is one at a time, following the put your hand up to speak protocol.

For these reasons, it is likely that the speaking-down profession of the traditional didact will in time evolve into a documenting profession of making learning designs and managing lateral learning ecologies. In this spirit, we have in the Learning by Design project developed an online learning design and interaction environment centered on a digital learning object that we call a “learning element” (Kalantzis & Cope, 2011b). The learning element has three spaces. The first of two are now online in beta; the third is in development.

THE TEACHER RESOURCE SPACE

The teacher resource space is a curriculum and lesson planning environment, a scaffold for designing learning objectives, and learner activity sequences and assessment strategies. Here, learning designs are created using the professional language of education: framing objectives, developing and sequencing activities, and devising assessment. The learning element brings to learning design enormous social networking capacities to share plans with colleagues, be they an individual colleague, the members of a division in the school, or a professional grouping extending beyond the school. Teachers are able to share learning elements with colleagues, in their own institution and beyond, and discover reusable learning elements via metadata variables such as grade level, discipline area, and topic. Teachers are also able to adapt and rewrite others' learning elements, giving due credit to the previous authors of a rewritten text.

THE LEARNER RESOURCE SPACE

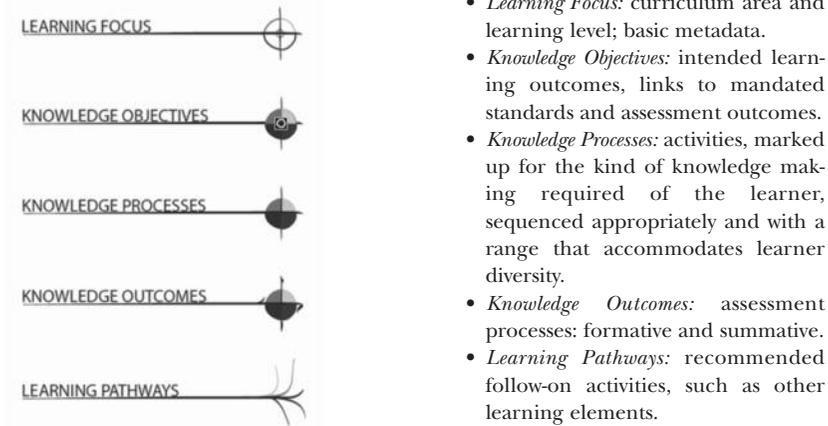
The learner resource space is a place where curriculum content can be assembled by teachers for delivery to students, directly paralleling the teacher resource space. Here, the learning designs are translated into the language of the classroom, allowing autonomous and asynchronous (in addition to directed and synchronous) access by individual learners or groups of learners. This content may consist of a wide variety of sources, including original material written by teachers, links to web-based material, embedded multimedia content, scans of excerpts from conventional print texts, etc. Given a steady shift to digital learning sources, these kinds of environments could be the teacher-designed and assembled substitutes for conventional textbooks in the near future.

THE LEARNER WORKBOOK SPACE

In the learner workbook space, learners can access learning content and do their work, directly paralleling the learner resource space created by the teacher. This space allows multimodal work (text, image, video, audio, document upload) and supports considerable social media interaction in the form of joint authorship of pair or group work; rapid commenting and feedback from teacher, peers, parents or invited experts; and responsive formative and summative assessment. This is a hybrid space—not quite a lesson plan, not quite a textbook, not quite a student workbook—but transformed and integrated variations of all three of these traditional functions.

A learning element contains a sequence of learning that has a distinct thematic coherence (covering a topic to an appropriate level of detail and conceptual sophistication for learners at a particular level). A learning element also has pedagogical coherence (anticipating learner needs, framing intended learning outcomes in terms of broader curriculum goals and standards, designing and implementing an activity sequence, and developing and implementing an assessment strategy). A learning element may vary in length, but in conventional curriculum terms, it typically might be considered equivalent to a unit of work or the chapter of a conventional textbook. The learning element's overall pedagogical architecture is marked by the following level 1 section icons:

Figure 4. The pedagogical architecture of the learning element.



Each learning element space can be viewed as a separate pane. However, the power of the software is in supporting the processes of translation across parallel panes within the learning element window. For instance, a teacher accesses the learning element software through a screen split into teacher resource and learner resource panes. This allows the teacher to translate a lesson plan (in the left-hand pane) into an activity sequence accessible to learners (in the right-hand pane), thus transferring the learning design planning processes into activity sequences and student-accessible learning content.

The learning element aims to develop teachers' capacities in instructional design and documentation of pedagogy more suited to professional sharing than traditional, paper-based curriculum and lesson planning processes, or planning frameworks linked to individual teacher

Figure 5. Online learning design.

schedules. In so doing, the learning element engages teachers as reflective practitioners, systematically assessing and evaluating the outcomes of their own and their peers' pedagogical practices. The learning element provides more effective and explicit articulation of generic standards with learning designs customized to specific learner needs and local circumstances. The learning element facilitates tracking of teacher and learner inputs, making explicit links between teacher input and learner performance. The learning element encourages teachers and schools to adopt a knowledge management approach to documenting and sharing best practices and redrafting learning elements for reuse (modifying plans and resources for reuse based on the experience of application). And the learning element engages teachers and their students in a new media environment for the creation and delivery of learning experiences. Such a learning design and delivery environment can also cater more effectively to learning diversity by translating lesson plans and student-accessible learning designs, which can be accessed by individuals or groups and undertaken autonomously or semiautonomously and asynchronously, in the classroom or anywhere beyond the classroom, also

allowing that more than one learning element might be undertaken simultaneously by different students at the same time in the same class.

Figure 6. Side-by-side rendering of teacher and learner resource: The opening screens of an early literacy learning element.

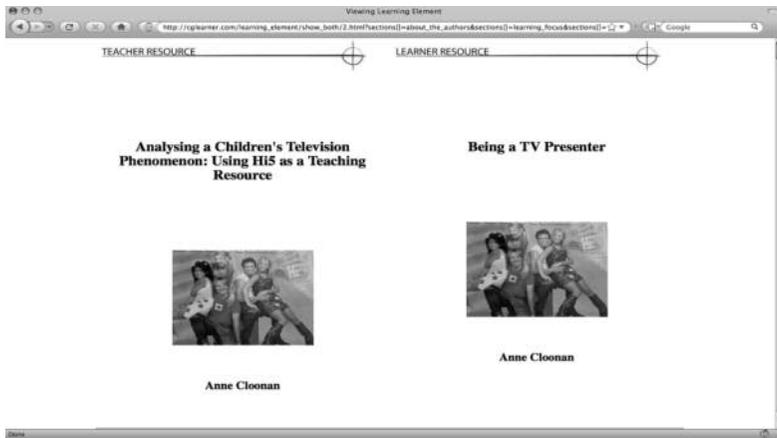


Figure 7. Example of a learning activity in the “being a TV presenter” learning element.

*Learning Activity 4:
Investigating the Hi5 Characters*

- Ask students to describe each of the 5 main characters.
- What do they look like?
- What is their style? Their interests? Their segment specialty? Their costumes, their caricature (from merchandising), their signature?
- How are they similar? How are they different?
- Why do you think they were chosen to be in Hi5?

Shared writing - the teacher collates students' responses into "What we know about" character charts. Independently, students write and draw about the different characters.

*Learning Activity 4:
Draw or write about the Hi5 characters*

I think:

 **Tim is ...**

 **Charli is ...**

 **Kathleen is ...**

 **Nathan is ...**

 **Kelly is ...**

The learning element has been through two iterations since we started software development in this area in Australia in 2005. The first iteration (Learning Element 1.0) took the form of a Microsoft Word template with an additional learning element toolbar or palette. We conducted a trial

with 30 teachers in 5 schools. In the second iteration (Learning Element 2.0), we undertook a limited translation of the teacher resource and learner resource panes into an online environment, conducting a trial in 2009 with 16 U.S. and Australian teachers participating in our online new learning and new literacies master's degree at the University of Illinois: <http://newlearning.ed.uiuc.edu/index.html>. Between 2007 and 2010, the Australian Research Council funded an analysis of the learning element in practice. We are now working on version 3.0.

Our research so far demonstrates that explicit documentation, highlighting patterns in teacher pedagogy identified in terms of knowledge processes, shows that teachers at times deploy strings of learning activities that are not always aligned explicitly with knowledge goals. At times, we have found that experiential learning dominates at the expense of analytical and conceptual work and that translation or application has become too limited, often focused narrowly on tests. Our findings show that documentation, which links knowledge processes explicitly to outcomes, enables teachers and learners to be more purposeful about the way they set and meet learning goals. Such explicitness also allows for adjustment to meet the specific learning needs of learners in diverse classrooms (Burrows, 2005a, 2005b, 2005c; Burrows, Cope, Kalantzis, Morgan, Suominen, & Yelland, 2007; Cloonan, 2005, 2007, 2008; Neville, 2008; Suominen, 2009; van Haren, 2005, 2007).

Van Haren was deputy principal of a cluster of 5 schools, 1 middle/secondary school and 4 feeder elementary schools, in the Australian Capital Territory—the Lanyon Cluster. In her research, van Haren tracked 4 students and 2 teachers for a year, using multiple assessment and observation tools. Her results emphasized the important role of teachers' pedagogical choices in relation to student performance. In diverse classrooms, pedagogical choices need to be appropriate to learner interests and dispositions (van Haren, 2007). More broadly, all teachers in the middle/secondary school in the Lanyon Cluster in 2005 adopted the learning element. Approximately 33% of the school's students are identified as low on the socioeconomic scale, based on the Australian Bureau of Statistics' Index of Relative Socio-Economic Disadvantage (IRSED). Data from the Australia Capital Territory (state) Assessment Program indicated that the school has the highest number of students performing in the lowest 20% of students across the state. For example, in 2005 33% of Year 7 students at Lanyon High School were identified in the lowest 20% in reading across the ACT (Australian Capital Territory). From 2005 to 2007, the proportion of students achieving a score within the top 20% increased by more than 33%, and the number of students who received a grade in the bottom 20% dropped by 65%. During that time,

the learning element was the single major innovation in the school.

Another piece of research involved detailed tracking of the learning element framework of 3 middle-years teachers in the state of Queensland, Australia. The project investigated changing pedagogical practices by comparing curriculum plans and processes before and after the learning element was adopted. The researcher, Mary Neville, concluded:

For the two teachers who did make significant progress, the results in the classroom proved a revolutionary experience not only for them but also for their students. . . Even for the teacher who didn't make the mental leap . . . struggling instead with a 'makeover' that essentially left the bulk of teaching practice unchanged, the increase in the students' interest was visibly heightened at the time that the 'makeover' was introduced into the classroom. (Neville, 2008, pp. 145–146)

Case study research by Cloonan investigated the professional learning of 4 elementary school teachers over the course of 8 months within the context of an early years literacy intervention by the Department of Education, Victoria, Australia. Using a complex matrix of pedagogical observation schedules, Cloonan showed how the deployment of a pedagogical knowledge processes schema of the learning element influenced teachers' reflective practices resulting in more knowing and purposeful pedagogical practices:

Documenting teaching according to pedagogical knowledge processes on the Learning Element template proved useful in . . . planning and teaching practices, supporting articulation of tacit pedagogical knowledge, resulting in greater self-awareness, ability to articulate and purposefulness in teaching. Teachers were compelled to justify their teaching choices, promoting reflective practice. (Cloonan, 2007, p. 257; Cloonan, 2008).

Another study by Suominen focused on learner experiences in classrooms in which learning designs had been created using the learning element. She concluded:

For students, these explicit learning designs empower them in the learning process, giving them a clearer understanding of learning goals and expectations. This also allows for a shift in accountability and greater agency for students as with this

explicit understanding they can assume greater responsibility for their own learning. In many ways, this creates the type of learner independence that students are accustomed to from their interactions in on-line environments as they make decisions about how they navigate and participate in these new social spaces. As classrooms using [the Learning Element] reflect not only the practices of these on-line environments but also many contemporary workplaces, the students are developing cultural and workplace competencies that are highly prized by employers. Accompanying this long-term benefit, there is the more immediate advantage of greater student engagement with learning along with improved performance. (Suominen, 2009, p. 224)

The effectiveness of the teachers turns on their pedagogical skill. More effective teachers deploy a broader repertoire of pedagogical moves, some of which are experiential (a typical strategy of progressive approaches to teaching and learning), some of which are conceptual (more typical of traditional pedagogies), some of which are analytical, and some of which are applied. They also structure and sequence these moves in a carefully premeditated way (Neville, 2005, 2008; van Haren, 2005). Recent research also showed that well-rounded pedagogies, purposefully deployed, are more effective than those that focus mainly on a single approach. In the words of Courtney Cazden, situated practice (experiential learning) and overt instruction of language concepts (conceptualizing), to take the discipline area of literacy as an example, “are often seen as representing opposing philosophies. In teaching beginning reading, we read arguments for ‘whole-language’ versus ‘phonics’; in teaching writing at any age we read arguments for ‘process writing’ versus ‘genre pedagogy’” (Cazden, 2000, p. 261). Between 2003 and 2005, she and Allan Luke worked with hundreds of teachers and thousands of learners in a major project for the National Institute of Education in Singapore, which has clearly shown that the most effective pedagogies are those that involve weaving between different activity types of knowledge processes (Cazden, 2006b; Luke et al., 2003; Luke, Freebody, Shun, & Gopinathan, 2005). Moreover, the most effective teachers, particularly when addressing the needs of equity groups and diverse classrooms, have developed ways to negotiate learner differences that move away from the traditional approach of the whole class “being on the same page” (Burrows, 2005b; Pandian & Balraj, 2005; van Haren, 2007).

Furthermore, our own research has shown that documentation of instructional choices assists in evaluating the bases for teacher effectiveness, as reflected in learner outcomes (Burrows, Cope, Kalantzis,

Morgan, Suominen, & Yelland, 2009; Cloonan, 2007; Kalantzis & Cope, 2005). Careful planning of pedagogy produces improved outcomes, as does retrospective documentation and professional sharing of pedagogical strategies. This is particularly important in the shift to e-learning environments (Burrows, 2005c; Kalantzis & Cope, 2004). How, then, might broader, and at the same time more rigorous, curriculum and instruction processes be created and implemented? Innovative curriculum work benefits from a “knowledge management” approach (Burrows, 2005c; Kalantzis, 2004; Polanyi, 1962; Stewart, 1998). This means that what is tacit in teacher professional practice is made explicit via the process of documentation in order to analyze and extend the range of that practice. This involves a prospective aspect (how is the teaching and learning process planned?) and a retrospective aspect (how are best teaching practices shared?). Clear documentation of teaching is destined to become a more important feature of the emergence of e-learning environments, which will have the effect of transforming a speaking profession into a documenting profession (Burrows, 2005c; Kalantzis & Cope, 2004). Perhaps most importantly, however, such documentation provides explicit evidence of the relationship of teaching inputs to learner performance.

Cloonan (2007) concluded her study with a comment about teacher professional sharing and learning:

Documenting teaching according to pedagogical knowledge processes in the Learning Element template proved useful in making problematic habitual planning and teaching practices, supporting articulation of tacit pedagogical knowledge, resulting in greater self-awareness, and ability to articulate and purposefulness in teaching. Teachers were compelled to justify their teaching choices, promoting reflective practice. This was most obvious in teachers accustomed to broader professional roles who displayed a ready engagement and preparedness to embrace the agency offered by the Learning Element template . . . Interview data indicates that collaborative effort and feedback supported teacher professional learning. (p. 257)

And Suominen (2009) concluded her study by reflecting on the changing role of the teacher:

In the process of exploring new learning through the use of the Learning by Design planning framework, it became apparent that the role of the teacher had changed significantly from a

knowledge authority figure directly imparting content knowledge to their students to an expert designer and manager of learning. Accompanying this new role in the learning process, there was a subtle shift in emphasis in the work of the teacher from classroom instruction to planning. However, these changes did not diminish the role of the teacher in the learning process but rather enhanced the demands on the professional expertise of the teacher. (p. 223)

CONCLUSIONS

In this chapter, we have attempted an ambitious threefold task. First, we presented an account of continuities with older modern literacy practices (the virtual and the hypertextual), as well as with what we argue are significant shifts in the representational frame of reference of the new digital media (agency, differences, multimodality, navigation, and ubiquitous recording). Integral to our analysis are the changing configurations of identity as a consequence of what we have called a change in the balance of representational agency and the prominence of learner diversity, which is evident as soon as agency is recognized and valued. Second, we have spoken in schematic terms of the multiliteracies approach to literacy teaching and learning and the learning by design approach to pedagogy, in and beyond the literacy classroom. These pedagogies explicitly attempt to recruit learner identities, in all their diversity. Third, we have spoken, albeit all too briefly, of some of the classroom practices documented in research connected with these projects and the ways in which learner identities have become manifest.

Returning to the motif with which we began the chapter, digital reproducibility has the potential to change the work of writing. This is not to say digital reproducibility does, or that it must, or that it necessarily will. It is just to say that it can. The notion of affordance captures possibility, no more. However, because we can, if the social conditions are supportive, perhaps we might or perhaps we will change our sociotechnical practices of writing. If we do, our identities will inevitably be imbricated. Changing our meaning-making practices changes our selves.

As literacy educators, we need to make ourselves astute readers of these changes in our representational environs. Insofar as identity is so closely involved, these are also changes in our cultures and our persons. The chapter has suggested a few steps in the direction of a rejuvenated literacy pedagogy, which works to serve the practical needs of our learners more effectively, as well as building on capacities for self-realization in their emergent identities.

References

- Barthes, R. (1976). *The pleasure of the text* (R. Howard, Trans.). London, England: Cape.
- Benjamin, W. (1936/2008). The work of art in the age of its technological reproducibility. In M. W. Jennings, B. Doherty, & T. Y. Levin (Eds.), *The work of art in the age of its technological reproducibility and other writings on media* (pp. 19–55). Cambridge, MA: Harvard University Press.
- Burrows, P. (2005a). The emergence of pedagogical mentors. In M. Kalantzis & B. Cope (Eds.), *Learning by design* (pp. 177–196). Melbourne, Australia: Victorian Schools Innovation Commission.
- Burrows, P. (2005b). Learning by design: A marriage of theory and practice. In M. Kalantzis & B. Cope (Eds.), *Learning by design* (pp. 159–176). Melbourne, Australia: Victorian Schools Innovation Commission.
- Burrows, P. (2005c). The role of the teacher-enactor and author-publisher. In M. Kalantzis & B. Cope (Eds.), *Learning by design* (pp. 197–216). Melbourne, Australia: Victorian Schools Innovation Commission.
- Burrows, P., Cope, B., Kalantzis, M., Morgan, L., Suominen, K., & Yelland, N. (2007). *Data from the Australian Research Council Learning by Design project* (Unpublished manuscript).
- Burrows, P., Cope, B., Kalantzis, M., Morgan, L., Suominen, K., & Yelland, N. (2009). *Data from the Australian Research Council Learning by Design project*. (Unpublished manuscript).
- Cazden, C. B. (1994). Immersing, revealing and telling: A continuum from implicit to teaching. In D. C. S. Li, D. Mahoney, & J. C. Richards (Eds.), *Exploring second language teacher development* (pp. 59–69). Hong Kong: Hong Kong City Polytechnic.
- Cazden, C. B. (2000). Four innovative programmes: A postscript from Alice Springs. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 321–332). London, England: Routledge.
- Cazden, C. B. (2006a). Connected learning: “Weaving” in classroom lessons. In: *Pedagogy in Practice 2006 Conference*. Newcastle, England: University of Newcastle.
- Cazden, C. B. (2006b). Review of H. W. Kam & R. Y. L. Wong (Eds.), *Language policies and language education: The impact in East Asian countries in the next decade* (2nd ed.) 2004, and H. W. Kam & R. Y. L. Wong (Eds.), *English language teaching in East Asia today: Changing policies and practices* (2nd ed.), 2004. *Asia Pacific Journal of Education*, 784–789.
- Cloonan, A. (2005). Professional learning and enacting theory: On trying to be a lifelong/lifewide teacher-learner. In M. Kalantzis and B. Cope (Eds.), *Learning by design* (pp. 217–230). Melbourne, Australia: Victorian Schools Innovation Commission.
- Cloonan, A. (2007). *The professional learning of teachers: A case study of multiliteracies teaching in the early years of schooling*. Melbourne, Australia: School of Education, RMIT University.
- Cloonan, A. (2008). Multimodality pedagogies: A multiliteracies approach. *International Journal of Learning*, 15, 159–168.
- Cope, B. (2001). New ways with words: Print and etext convergence. In B. Cope & M. Kalantzis (Eds.), *Print and electronic text convergence. Vol. 2.1. Technology drivers across the book production supply chain, from the creator to the consumer* (pp. 1–15). Melbourne, Australia: Common Ground.
- Cope, B., & Kalantzis, M. (2000a). Designs for social futures. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 203–234). London, England: Routledge.
- Cope, B., & Kalantzis, M. (2000b). *Multiliteracies: Literacy learning and the design of social futures*. London, England: Routledge.
- Cope, B., & Kalantzis, M. (2004). Text-made text. *E-Learning*, 1, 198–282.

- Cope, B., & Kalantzis, M. (2009a). A grammar of multimodality. *International Journal of Learning*, 16, 361–425.
- Cope, B., & Kalantzis, M. (2009b). “Multiliteracies”: New literacies, new learning. *Pedagogies: An International Journal*, 4, 164–195.
- Cope, B., & Kalantzis, M. (forthcoming). “Education is the new philosophy,” to make a metadisciplinary claim for the learning sciences. In A. Reid, P. Hart, C. Russell, & M. Peters (Eds.), *Companion to educational research*.
- Eco, U. (1981). *The role of the reader: Explorations in the semiotics of texts*. London, England: Hutchinson.
- Eisenstein, E. L. (1979). *The printing press as an agent of change: Communications and cultural transformation in early-modern Europe*. Cambridge, England: Cambridge University Press.
- Febvre, L., & Martin, H. (1976). *The coming of the book*. London, England: Verson.
- Fraser, N. (2008). From redistribution to recognition? Dilemmas of justice in a “postsocialist” age. In K. Olson (Ed.), *Adding insult to injury: Nancy Fraser debates her critics* (pp. 11–41). London, England: Verso.
- Gee, J. P. (2004a). *Game-like situated learning: An example of situated learning and implications for opportunity to learn*. Madison: University of Wisconsin.
- Gee, J. P. (2004b). *Situated language and Learning: A critique of traditional schooling*. London, England: Routledge.
- Gee, J. P. (2006). *Are video games good for learning?* Madison: Games and Professional Simulation Group, University of Wisconsin.
- Grafton, A. (1997). *The footnote: A curious history*. London, England: Faber and Faber.
- Haythornthwaite, C. (2009). Participatory transformations. In B. Cope & M. Kalantzis (Eds.), *Ubiquitous learning* (pp. 31–48). Champaign: University of Illinois Press.
- Jenkins, H. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century*. Chicago, IL: John D. and Catherine T. MacArthur Foundation.
- Kalantzis, M. (2004). Waiting for the barbarians: “Knowledge management” and “learning organisations.” *International Journal of Knowledge, Culture and Change Management*, 4, 1827–1833.
- Kalantzis, M., & Cope, B. (2004). Designs for learning. *E-Learning*, 1, 38–92.
- Kalantzis, M., & Cope, B. (2005). *Learning by design*. Melbourne, Australia: Victorian Schools Innovation Commission.
- Kalantzis, M., & Cope, B. (2008a). Digital communications, multimodality and diversity: Towards a pedagogy of multiliteracies. *Scientia Paedagogica Experimentalis*, XLV, 15–50.
- Kalantzis, M., & Cope, B. (2008b). *New learning: Elements of a science of education*. Cambridge, England: Cambridge University Press.
- Kalantzis, M., & Cope, B. (2011a). *Assess as you go*. Retrieved from <http://assess-as-you-go.com>
- Kalantzis, M., & Cope, B. (2011b). *Learning by design*. Retrieved from <http://L-by-D.com>
- Kress, G. (1997). *Before writing: Rethinking the paths to literacy*. London: Routledge.
- Kress, G. (2000). Design and transformation: New theories of meaning. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 153–161). London, England: Routledge.
- Kress, G. (2003). *Literacy in the new media age*. London, England: Routledge.
- Kress, G. (2009). *Multimodality: A social semiotic approach to contemporary communication*. London, England: Routledge.
- Kress, G., & van Leeuwen, T. (1996). *Reading images: The grammar of visual design*. London, England: Routledge.
- Luke, A. (2002). Curriculum, ethics and metanarrative: Teaching and learning beyond the nation. *Curriculum Perspectives*, 22(1), 49–55.

- Luke, A., Courtney C., Lin, A., & Freebody, P. (2003). *The Singapore classroom coding scheme* [Technical report]. Singapore: National Institute of Education, Center for Research on Pedagogy and Practice.
- Luke, A., Freebody, P., Shun, L., & Gopinathan, G. (2005). Towards research-based innovation and reform: Singapore schooling in transition. *Asia Pacific Journal of Education*, 25, 5–28.
- McGinn, C. (2004). *Mindsight: Image, dream, meaning*. Cambridge, MA: Harvard University Press.
- Neville, M. (2005). Innovation in education Queensland: Multiliteracies in action. In M. Kalantzis & B. Cope (Eds.), *Learning by design* (pp. 231–256). Melbourne, Australia: Victorian Schools Innovation Commission.
- Neville, M. (2008). *Teaching multimodal literacy using the learning by design approach to pedagogy*. Melbourne, Australia: The University Press/Common Ground.
- New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, 66, 60–92.
- Ong, W. J. (1958). *Ramus, method and the decay of dialogue*. Cambridge, MA: Harvard University Press.
- Pandian, A., & Balraj, S. (2005). Approaching “learning by design” as an agenda for Malaysian schools. In M. Kalantzis & B. Cope (Eds.), *Learning by design* (pp. 285–313). Melbourne, Australia: Victorian Schools Innovation Commission.
- Polanyi, M. (1962). *Personal knowledge: Towards a post-critical philosophy*. Chicago, IL: University of Chicago Press.
- Scollon, R. (2001). *Mediated discourse: The nexus of practice*. London, England: Routledge.
- Steger, M. B. (2008). *The rise of the global imaginary: Political ideologies from the French Revolution to the global war on terror*. Oxford, England: Oxford University Press.
- Stewart, T. A. (1998). *Intellectual capital: The new wealth of organizations*. New York, NY: Bantam Books.
- Suominen, K. (2009). Students learning by design: A study on the impact of learning by design on student learning. Melbourne, Australia: School of Education, RMIT.
- van Haren, H. (2007). Diversity and the learning by design approach to pedagogy in the middle years. Melbourne, Australia: School of Education, Royal Melbourne Institute of Technology.
- van Haren, R. (2005). Effective teaching and learning: Pedagogy and multiliteracies. In M. Kalantzis & B. Cope (Eds.), *Learning by design* (pp. 257–284). Melbourne, Australia: Victorian Schools Innovation Commission.
- Virilio, P. (1997). *Open sky*. London, England: Verso.
- Vygotsky, L. (1962). *Thought and language*. Cambridge, MA: MIT Press.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Yolgnu Matha. (2010). In *Wikipedia*. Retrieved from http://en.wikipedia.org/wiki/Yolgnu_Matha

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