
The Teacher as Designer: pedagogy in the new media age

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ABSTRACT This article outlines a learning intervention which the authors call Learning by Design. The goal of this intervention is classroom and curriculum transformation, and the professional learning of teachers. The experiment involves the practical application of the learning theory to everyday classroom practice. Its ideas are grounded in pedagogical principles originally articulated in the Multiliteracies project, an approach to teaching and learning that addresses literacy and learning in the context of new media and the globalizing knowledge economy. The need for a new approach to learning arises from a complex range of factors – among them, changes in society and the economy; the potential for new forms of communication made possible by emerging technologies; and rising expectations amongst learners that education will maximize their potential for personal fulfillment, civic participation and access to work. The authors first brought together the Learning by Design team of researchers and teachers in 2003 in order to reflect upon and create new and dynamic learning environments. A series of research and development activities were embarked upon in Australia and, more recently, in the United States, exploring the potentials of new pedagogical approaches, assisted by digital technologies, to transform today's learning environments and create learning for the future – learning environments which could be more relevant to a changing world, more effective in meeting community expectations and which manage educational resources more efficiently. One of the key challenges was to create learning environments which engaged the sensibilities of learners who are increasingly immersed in digital and global lifestyles – from the entertainment sources they choose to the way they work and learn. It was also about enabling teachers to explicitly track and be aware of the relationship between their pedagogical choices and their students' learning outcomes.

Background: the social conditions for the emergence of a transformative paradigm of learning

A revolution is occurring in education. This revolution is being fuelled in part by the new information and communication technologies. Fundamentally, however, the change is in the human relations of learning. The reference point for the changes we will describe in this article is the traditional classroom. This classroom was essentially a communications technology, a room large enough for a teacher to talk to 20, 30, even 40 learners at once. Its classical oral communications modes were the teacher exposition, question and answer involving one learner at a time and whole-class recitation in unison. For most of the time, an individual learner had to sit in silence. The primary written communications medium in this classroom was the textbook (closely following the state-directed syllabus). The learners produced their work (a piece of writing, a test) for an audience of one – the assessing teacher. The main official trace of the student's work was a recorded score. The teacher was pivotal in the predominant communication patterns of the traditional classroom, orchestrating classroom talk, directing students to the textbook and marking their work or their tests. Lateral peer-to-peer communication was, for the most part, practically

unmanageable and when it did occur, it was mostly ‘off-task’. This classroom was the medium for the transmission of disciplinary knowledge, inculcating a rudimentary ‘basics’, divided for convenience into ‘subjects’ or ‘disciplines’. At the heart of these disciplines were the ‘three Rs’: reading, writing and arithmetic. The substance of these basics tells a lot about what was assumed to be the nature of knowledge. School knowledge was a kind of shopping list of things to be known – through drilling the ‘times tables’, memorizing spelling lists, learning the parts of speech and using correct grammar.

There were problems with this kind of curriculum, and these were not with its contents alone, but also with the underlying orientation to knowledge. Was there not more to being a good communicator and mathematically capable? Was there not more to knowledge than the black-and-white rigidity of right and wrong answers (and if you were in any doubt about this, the test answers would set you straight). And what kinds of persons would be formed by a schooling in which knowledge was about being told things by authority figures and passively accepting that their answers were always correct? If the underlying lesson of the old basics was about the nature of knowledge, then it was a lesson which was appropriate for a society which expected its workers to take orders unquestioningly at work and its wives to take orders at home. Much of the time, however, the traditional classroom was a place of passivity, boredom and failure. And even this made a certain kind of sense, as poor results at school served as a moral lesson in a society where most jobs were drearily unskilled, not requiring much beyond work discipline and the capacity to put up with boredom. If that is where you ended up, it must be your own fault for not doing better at school.

This type of education, in a sense, worked perfectly well for a society in which learners were destined to belong to traditional workplaces which required deference to authority and whose skills requirements were minimal, predictable and stable. It was well suited to the creation of homogeneous and submissive citizenries. It was appropriate to the development of compliant personalities. There was even a logic of sorts in having a large number of learners ‘fail’ at school; it was a way of rationalizing lack of opportunity for a large part of the society. This world has now gone, or at least it is in transition, particularly in the more affluent parts of the developed world. This kind of schooling is becoming less and less relevant to the future needs of learners – any learners, in any part of the world.

A series of related social changes are occurring, encapsulated in part by the idea of an emerging ‘knowledge society’. In this sort of economy, value is increasingly located in the intangibles of human capacity, organizational flexibility, business processes, customer relationships, brand identity, social networks, technological know-how, product aesthetics and service values. This represents a shift away from the old grounding of value primarily in fixed capital and basic skills. This is not to say that knowledge was unimportant before; it is simply to argue that knowledge and creativity now take a uniquely central place. In the domain of citizenship, the dynamics of belonging and governance now occur at multiple and overlapping levels – from community organizations and workplaces, to self-regulating professions, to communities of common knowledge and shared taste, to the increasingly federated layers of local, regional, national and supranational government. In the domain of personality, identity differences are becoming ever more accentuated, and the keys to stable personality are responsibility, resilience and tolerance. Table I is a summary of these changes.

| | Early industrial society | Developed industrial society | Knowledge society |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Work | Value in fixed capital, not the skills of workers, who are mostly unskilled. Minimal, predictable, stable work expectations. A premium placed on discipline, reliably taking orders. | New technologies and the humanization of work. Higher levels of skill and communicative and interpersonal capacities required in the workplace. | Value in human skills and relationships, intangible organizational knowledge, service values. Complex and changing expectations require flexibility, creativity, innovation and initiative. Ongoing creativity and innovation. |

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| Civics | Citizens expected to be passive and loyal to leaders. A homogenous citizenry, or one at the very least where people are expected to become the same. Uncritical loyalty to leaders expected. | Blurring of the boundaries between public and private realms, developing democracy, migration, globalization. | An active, aware, multicultural citizenry. Many levels of civic participation and responsibility (community organizations; global and local social webs; corporate ethics; varied local, national, regional and global levels of governance). |
| Personal life | Ideally compliant personalities, accepting of established structures and values, respectful of authority figures, taking orders. The nuclear family as the model, and the gender relations that go with it. | Identity and diversity become more important issues. Transformations in family life away from the model of the nuclear family, multichannel media, diverse communities, more engaged personalities. | Multiple family types, multilayered identities, social networks, tolerance, ethics, responsibility, resilience. |

Table I. The changing social order.

Herein lies an enormous challenge, and an enormous opportunity for education. What education does – building the knowledge capital of a society, the creative capacities for innovation as well as the sensibilities to navigate ambiguity and complexity – is now fundamental. Traditional classrooms and bureaucratic education systems cannot provide society with what it now requires. The agenda of the new learning is to meet the needs of the knowledge society in a globalized world (Kalantzis & Cope, 2008). Table II is a brief historical overview.

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| The institutionalized mass schooling of early industrial society | The twentieth-century modern school | Learning by Design: a vision for new learning |
| Educational paradigm: <i>didactic teaching</i> | Educational paradigm: <i>authentic education</i> | Educational paradigm: <i>transformative learning</i> |
| The classroom: desks in rows, a blackboard at the front, bare walls or at most some lettering charts or a map. | Learners work around groups of desks; different functional or resource areas around the classroom; children’s work decorates the walls. | No need for classes to be collocated: students work in groups, or individual students work collaboratively using networked computers – at home, in small collaborative work areas, in the school’s information resource center, at community-located project sites. |
| My classroom, my work: private spaces for teachers and learners, in the case of teachers examined only by inspectors and in the case of learners examined only by teachers. | A space that increasingly brings in and engages outsiders: aides, parents, community members. | A fully transparent place of community collaborations, social networks, online publication of teacher-created programs and resources, student portfolios, etc. |
| Classroom discourse: teacher-dominated, recitation, question and answer. | More student dialogue, hampered by traditional classroom architecture. | Extensive lateral student-to-student communications. |
| Presented facts and theories (in the textbook, by the teacher), student repetition. | A focus on experiential learning. | A balance of knowledge processes: experiential, conceptual, analytical and applied. |
| Memorization, repetition, learning by rote, ‘correct’ answers. The teacher as didact. | ‘Inquiry’ learning, child-centered education, student opinions and points of view encouraged. The teacher as learning facilitator. | Balanced learning, involving a variety of activity types or knowledge processes. The teacher as designer and manager of learning. |

The Teacher as Designer

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|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Content knowledge for a stable society. | Learning as a process (learning how to learn) for a changing society. | Intellectual depth and ongoing innovation through a balance of process and content knowledge. |
| Students as receivers and absorbers of knowledge, as determined by syllabus, textbook and test. | The syllabus is less rigid about content; textbooks are less central; tests become more sophisticated. | Contextual learning; learning in communities of practice; learning how to participate in learning communities. |
| Sameness: all students on the same page, every learner doing the same work and moving ahead at the same pace. | Limited acknowledgement of student differences, but constrained by classroom architecture and timetable demands; individualized learning; some self-paced learning. | Differences: cultures, interests, abilities catered for through flexible physical and learning architectures, multi-learner environments, group-paced learning. Creativity and remaking of self. |
| Incentives of reward (mainly marks and grades) and punishment. | Traditional rewards remain, albeit in the form of more sophisticated assessment regimes; some traditional punishments abandoned or made illegal. | A premium placed on student engagement; incentives designed into the learning experience – the range of learner activities or ‘knowledge processes’, the collaborations in the learning community; assessment by peers; publication of portfolios to be shared with peers, parents and the community. Explicit relationship between teacher inputs and learner outcomes. |
| Written text privileged. | More images, diagrams and other forms of visual representation, but written text on the printed or handwritten page still predominates. | Multimodality in learner meaning making, reflecting the complexities and richness of the new media. Assessment expanded to capture twenty-first-century skills and sensibilities. |

Table II. Changing education.

From these generalities of context, to the specifics of our learners today, we need to create a new kind of school, with a new kind of professional teacher, which nurtures a new kind of learner.

To start with our students: in our schools, we see the arrival of a new generation of learners. We’ll call them Generation ‘P’, for ‘participatory’. These learners have different kinds of sensibilities to the students of our recent past. A previous generation was used to being passive watchers of stories at the cinema or on television. Generation P has become used to being a character in the stories of video games, where they play a part in how the story ends. A previous generation used to listen to the ‘top 40’ songs from playlists selected by a radio station. Generation P makes their own playlists for their iPods, and if you ask the students in any class what is on their iPod playlists, they are all going to tell you something different, depending on their preferences. A previous generation became literate by reading in their spare time. Generation P becomes literate by writing in their spare time – on Facebook, Twitter, blogs and even text messaging. A previous generation passively watched television programming that others considered good for them on a handful of available channels. Generation P ‘channel surfs’ hundreds of channels, or the millions of videos on YouTube, or makes their own videos – on the phones even – and uploads them to YouTube. This generation will be frustrated by a curriculum which expects them to be passive recipients of formal, generic textbook content.

Nor is this what we want in workplaces. The best workers today and in the near future will not be those who resentfully take orders from the boss. They will be ones who participate, who solve problems, who innovate, who are risk takers, who are creative – in sum, who give their very best to the organization they work for.

The Learning by Design project aims to create new school environments which shape a new kind of learner. The curriculum of the new school will encourage learners to be actively and purposefully engaged in their learning by setting them real intellectual and practical challenges. Teachers and learners will be able to make meaningful choices about what and how they learn in order to meet new higher standards of performance. Here are just a few examples of the kind of work students might do: researching information using multiple sources and reporting upon their findings in an extended project report; tackling real-world problems which they have to try to solve; analysis of issues from different perspectives requiring critical thinking; group work in which different students contribute to making a joint report; and doing their work in new media and Internet spaces, in which the students may bring together writing, images, sound and video. We are imagining here more engaging and more varied learning spaces. These are spaces that will be more relevant to the kind of world in which Generation P already lives.

The new learners will take greater responsibility for their learning in part because they are given greater autonomy and scope for self-control. They will be a knowledge producer, drawing together a range of available knowledge resources – instead of a knowledge consumer, fed just one source, the old textbook. They will work effectively in pairs or groups on collaborative knowledge projects, creating knowledge to be shared with peers. They will continue to learn beyond the classroom, using the social media to learn anywhere and anytime – a phenomenon called ‘ubiquitous learning’. They will critically self-assess and reflect upon their learning. They will give feedback to their peers in ‘social-networking’ interactions. They will be comfortable players in environments where intelligence is collective – not just the sum of things that can be retained in the individual’s head, but with a capacity to source knowledge online or from other students or from experts, parents and community members.

These are big changes, indeed. However, none of these things will be achieved without a transformation of the teaching profession. If we are to have ‘new learners’, we need ‘new teachers’, no less. The new teacher will be a designer of learning environments for engaged students, rather than someone who regurgitates the textbook. Instead of being the authoritarian, they need to be able to ‘let go’, allowing learners to take more responsibility for their own learning. They need to be authoritative sources of knowledge without being authoritarian. They need to be comfortable in Internet learning design and delivery platforms – learning spaces which are not just lesson planning, or just a textbook, or just a student workbook, but all these things, with a look and feel more like Facebook and blogs. This will involve a big shift in professional identity, as teaching increasingly moves from being the talking profession to an online documenting profession. Instead of closing the door of their classroom and doing their own thing, the new teacher will be a collaborative professional, sharing their learning designs with other teachers online, reusing and adapting others’ learning designs, jointly writing learning designs in teams, peer reviewing others’ learning designs, team teaching in classes that can at some times be smaller than normal and at other times bigger than normal – in other words, developing a professional culture of mutual support and sharing. The new teacher will manage multifaceted learning environments in which not every student has to be on the same page of the textbook at the same time. In fact, different students may be working on different things, depending on their learning level, needs and interests. Instead of waiting until the test at the end, the new teacher will continuously assess students, tracking progress all the time to make sure their teaching is right for each learner’s needs. In every respect, the new teacher will take a greater degree of control of their professional lives and responsibility for their students’ learning outcomes.

For these reasons, the Learning by Design project anticipates nothing less than a transformation in the kinds of learners and the kinds of teachers who live in the schools of the near future. To summarize:

The New Learner:

- is actively and purposefully engaged in their learning (the most effective learning is engaged learning);
- belongs in their learning, connecting their identity, subjectivity and agency into their learning;
- brings their experience, interests and voice to the learning task at hand;
- takes responsibility for their learning through a measure of autonomy and self-control;
- is a knowledge producer, drawing upon a range of available knowledge resources;

- works effectively in collaborative knowledge activities and shares knowledge with peers;
- continues to learn outside of formal classroom settings, using social media to support ubiquitous or anywhere/anytime learning;
- is comfortable in multimodal, digital knowledge-creation spaces, bringing together text, image, diagram, video, sound, dataset, instant messaging, etc.;
- critically self-assesses and reflects upon their learning;
- uses and gives feedback in ‘social-networking’ interactions, learning in recursive feedback loops involving peers, parents, experts and invited critical friends, as well as teachers;
- engages in intensive horizontal communications and collaborative learning;
- is a comfortable player in environments where intelligence is collective – sourcing, negotiating and synthesizing knowledge in a group learning context and by searching and critically evaluating a range of online knowledge sources.

The New Teacher:

- takes a greater degree of control of their professional lives, designing learning experiences for their learners based on broad learning goals and curriculum standards;
- is a purposeful learning designer, rather than (just) a curriculum implementer;
- is able to ‘let go’, giving learners the space to take greater responsibility in their learning;
- knows that to be authoritative does not mean being authoritarian;
- is comfortable in online learning design and delivery platforms – spaces which are not just lesson planning, or just a textbook, or just a student workbook;
- is comfortable working with learners in new, multimodal, online social media spaces;
- has a new professional identity, as teaching becomes less of a talking profession and more of an online documenting profession;
- is a professional collaborator, contributing productively to a culture of professional support and sharing;
- puts more work into documentation of best practices whilst creating less work for themselves as they contribute to and share a reusable knowledge bank;
- engages their learners’ identities and harnesses lateral knowledge-making energies amongst learners;
- manages a multifaceted learning environment in which learners may be engaged in a variety of different activities simultaneously;
- differentiates instruction in order to cater effectively to learner diversity;
- is a leader in a dynamic, knowledge-producing community;
- is a practitioner-researcher, building and interpreting the evidence base of pedagogical inputs in relation to learner outcomes;
- creates and implements ubiquitous assessment ‘for learning’, not just end-of-program assessment ‘of learning’;
- creates and applies evaluation protocols to measure the effectiveness of pedagogies and programs.

Diversity, Belonging and Transformation

Rather than focusing on what are, in some paradigms, supposed to be native differences between the capabilities of individual learners – theories of pedagogy which emphasize the psychological or the ‘innate’ – the Learning by Design approach instead focuses on the sociocultural differences between learners and the role this plays in their transformation as learners.

So, what are the cultural conditions of learning? The form and extent of learning is determined by the conditions in which it occurs. And some conditions are more favorable than others. Two conditions, particularly, impact on learning: first, whether a person’s identity, subjectivity or sense of themselves has been engaged; and second, whether the engagement is such that it can broaden their horizons of knowledge and capability.

In order to learn, the learner has to feel that the learning is for them. They have to feel they belong in the content; they have to feel they belong in the community or learning setting; they have to feel at home with that kind of learning or way of getting to know the world. In other words, the learner’s subjectivity and identity must be engaged. Learners have to be motivated by

what they are learning. They need to be involved as interested parties. They have to feel that the learning is for them. The learning has to include them. And if they are learning in a formal educational setting such as a school, they also have to feel a sense of belonging in that social and institutional context. The more a learner 'belongs' in all these senses, the more they are likely to learn.

Belonging to learning is founded on three things: the learning ways, the learning content and the learning community. From the learner's point of view, the 'learning ways' question is: Do I feel comfortable with this way of knowing the world? (Do I feel at home with this style of thinking or way of acting? Do I feel it can work for me? Do I know it can help me know or do more?); the 'learning content' question is: Do I already know enough about an area of content to want to know more? (Do I already know so much about something that I naturally want to know more? Has my appetite been sufficiently whetted by what little I already know to want to know more?); and the 'learning community' question is: Do I feel at home in this learning environment? (Do I feel sufficiently motivated to take on the learning tasks required by this environment as my own and feel safe enough in this space to be able to risk moving into new domains of knowledge and action?).

The learner's subjectivity, however, is always particular, and this particularity must be engaged. Here, the concept of 'difference' is helpful because it highlights some dimensions of learner particularity. So, what are these differences and how do we conceptualize them for the purpose of knowing our students? Here is 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 the 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, 2008).

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, 2008).

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 that we purport to categorize 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 will 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 only be grasped at a level which defies neat demographic classification:

- *Narratives*: the stories of a person's life, their experiences, their background, their life history – 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 is instantiated in the personal and contemporary.

- *Personae*: identities, grounded both 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 semi-conscious 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*: constituted by attachments to groups and to world views or stances – for instance, the infinitely varied shades of religious or areligious affinities and political or apolitical affinities. *Affinity* may also be to products or material objects, to games or sports, or to 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 of networks, to more formal connections with groups.
- *Orientations*: 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, for instance); their ways of learning (experiential or conceptual, for instance); their ways of speaking of particular things (technical or applied discourses, for instance); and their ways of relating to people.

So, what do we do in schools? In the following sections, we outline the practical aspects of Learning by Design as a curriculum intervention strategy, before returning to the question of how this approach addresses learner diversity in its extraordinarily subtle complexity.

The Microdynamics of Pedagogy

How do we translate into practice these large ambitions to create a new kind of schooling that engages learner agency and addresses learner diversity? Developed as a part of the Learning by Design project in Australia and the United States, the Learning Element is an innovative technology tool for teachers which reconfigures traditional curriculum design and instructional roles. Using Web 2.0 social-networking technologies, the technology supports teachers as they design online modules of teaching content.[1] Our goal is to provide teachers with a space to make explicit their pedagogical choices, to justify them in terms of learning goals and to track the impact they have on learners. Emerging ‘social web’ technologies provide us with new means of connecting, sharing and tracking our practices and being accountable to our communities.

The Learning Element currently consists of two closely interconnected online spaces, which users can choose to view separately or juxtapose in side-by-side panes presenting parallel views: (1) a ‘teacher resource’ space in which lesson planning occurs and (2) a ‘learner resource’ space in which this plan is translated into student-accessible text for independent or semi-independent learning. The project has recently added a third space, a ‘learner workbook’ space in which students undertake activities that have been scaffolded in the ‘learner resource’ space. Thus, teachers and learners can track the relationship between pedagogical choices and learner performance/outcomes in an ongoing way. The technology supports multimodal text delivery (text, image, video, audio). It uses key elements of today’s Web 2.0 social-networking technologies, including the potentials for the collaborative design of content amongst teams of teachers, easy dissemination to students, and rapid, responsive formative and summative assessment of student work. This has the potential to connect the learner’s school life and home life in meaningful ways. The Learning Element is a kind of Facebook for educators and students, focusing on professional and learning interactions. It is a space which closely and easily interconnects learning design, learning content delivery, learner activity and learning assessment.

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 online software provides for explicit tracking of pedagogical choices and learner performance by a potentially much wider set of stakeholders, from students and their peers across the world, to concerned administrators and parents. Learners learn by undertaking a series of ‘knowledge processes’ or ‘things you can do to know’ (see Figure 1).



Figure 1. The Learning by Design knowledge processes.

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

Experiencing

- *the known*: learners reflect on their own experiences, interests and perspective – for example, bring in, show or talk about something/somewhere familiar.
- *the new*: learners observe or take part in the unfamiliar; they are immersed in new situations or contexts.

Conceptualizing

- *by naming*: learners group things into categories, apply classifying terms and define these terms.
- *with theory*: learners make generalizations using concepts and connect terms in concept maps or theories.

Analyzing

- *functionally*: learners analyze logical connections, cause and effect, structure and function.
- *critically*: learners evaluate their own and other people's perspectives, interests and motives.

Applying

- *appropriately*: learners apply new learning to real-world situations and test their validity.
- *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 purposefully and deliberately 'weaving' (Luke et al, 2003) backwards and forwards between a variety of activity types or forms of engagement in order to ensure specific-subject matter and other learning goals. We have used four broad categories to differentiate the various types of learning strategies that can be deployed, based on their inherent epistemic orientations. They relate to requirements for the mastery of different subject areas (mathematics, history, science, and so on), different skills (such as inquiry, problem solving, innovation, and so on) and different sensibilities (such as empathy, inquisitiveness, exploration, calculated risk taking, and so on).

- *Experiencing*. Human cognition is situated and it is 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, 2004, 2006). On the basis of 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’ (Luke et al, 2003; Cazden, 2006a). 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 et al, 2005). Learners are exposed to new information, experiences and texts, but only within a zone of intelligibility and safety – sufficiently close to their 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, a conceptual language that interprets and explains natural and physical phenomena at a progressively higher level of abstraction. 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, 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* puts the key terms together into generalizations and 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 et al, 2005). This kind of weaving is primarily cognitive, 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 (Vygotsky, 1962; Cazden, 2006a).
- *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. By this means, learners interrogate the interests behind a meaning or an action, and also reflect metacognitively on their own processes of thinking (Luke, 2002; Kalantzis & Cope et al, 2005).
- *Applying*. This kind of weaving brings knowledge and experience to bear through the process of practical application. *Applying appropriately* entails the application of 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. It 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 a new way, or that translates their previous knowledge to a new setting (Cazden, 1994; Kalantzis & Cope et al, 2005).

These four broad pedagogical moves, or knowledge processes, are not a sequence to be followed. Rather, they are an explicit framework for explicitly naming the range of pedagogical moves that teachers choose in order to demonstrate their pedagogical repertoires and their application in purposeful ways, or at the very least to justify the range of pedagogical moves they may use in

order to meet particular teaching and learning goals. In this conception, pedagogy is a process of deliberate choice and purposeful shunting between different acts of knowing, insights gleaned one way then another complementing each other. Education is a business of broadening not just learners' specific knowledge, but their capacities to make knowledge for different disciplines and different purposes.

The purpose here is not to supply a formulaic sequence of pedagogical actions, but to expand both teacher and learner repertoires of knowledge-making action and to meet specific learning goals. Pedagogy in this conception is the design of the sequence of knowledge moves and appropriate ways for various 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 a 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 this other way, and here is the reason why I am doing this, then that.' By the end of a learning experience, both 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 agent in the knowledge-making process. The learner is a maker of meaning, a designer who works with available semantic resources, but who is nevertheless forever redesigning the world of meaning. In the process of redesign, they are adding something of their identity. 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 (New London Group, 1996; Cope & Kalantzis, 2000b, 2009). More recently, we have worked with groups of teachers and clusters of schools in Australia and the United States to trial an online learning design environment for teachers and learners to document pedagogical choices and their knowledge outcomes.

One of our co-researchers, Anne Cloonan, quotes a participating Learning by Design teacher in rural Victoria, Australia, describing her students' 'passion projects' or web pages about a subject dear to their hearts (a staggeringly dispersed panoply of interests, incidentally):

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)

Students are led by their teacher to weave between 'experiencing the known' (their passion project, working on something closely connected to their identities), and 'conceptualizing' (deconstructing the 'grammar' of a web page, developing a metalanguage of its 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. It also demonstrates forms of action that require engaged participation in the knowledge-making process whilst recruiting student identity. Ultimately, the purpose of the learning design was to harness learners' identity in a double way – as personal interest and personal expertise in expressing those interests in a web environment. It also

explicitly aimed at expanding their technical knowledge about the Web and the most effective ways of deploying its affordances to make particular meanings.

Working across the Lanyon Cluster of schools in the Australian Capital Territory, in which the Learning by Design pedagogy was implemented, another of our co-researchers, Keiju Suominen, concludes that the Learning by Design framework demonstrates that

there was a strong sense of the importance of active participation in the learning process both through intellectual and creative endeavours 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)

Rita 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. (Haren, 2007, pp. 64, 67)

She concludes:

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. (Haren, 2007, p. 125)

These examples demonstrate one of the key principles of the Learning by Design project: the importance of identity and agency in the formation of knowledge and high learner performance. They also demonstrate how this learner agency can be harnessed to underpin deep and sustained new learning in particular subject areas.

From the Speaking Profession to the Documenting Profession

New media spaces are not just spaces of communication; they are also places of ubiquitous 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 – emails, 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. The Learning Element has three spaces.

The *teacher resource* space is a curriculum and lesson planning environment, a scaffold for designing learning objectives and learner activity sequences and assessment strategies. These can be directly aligned with national, state, local and school standards and assessment benchmarks. Here, learning designs are created using the professional language of education: aligning with formal standards and school curriculum goals, framing the objectives of specific tasks, 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. They are also able to adapt and rewrite others' Learning Elements, giving due credit to the previous author of a rewritten text.

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 environment could be the teacher-designed and assembled substitute for conventional textbooks in the near future.

The *learner workbook* space is where 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 the teacher, peers, parents or invited experts; and responsive formative and summative assessment.

This is a hybrid space. Informed by learning benchmarks and curriculum goals, it is 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 which has a distinct thematic coherence, covering a topic to an appropriate level of detail and conceptual sophistication for learners at a particular level. It 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 to be equivalent to a 'unit of work' or the chapter of a conventional textbook. The Learning Element's overall pedagogical architecture is marked by section icons, as shown in Figure 2.

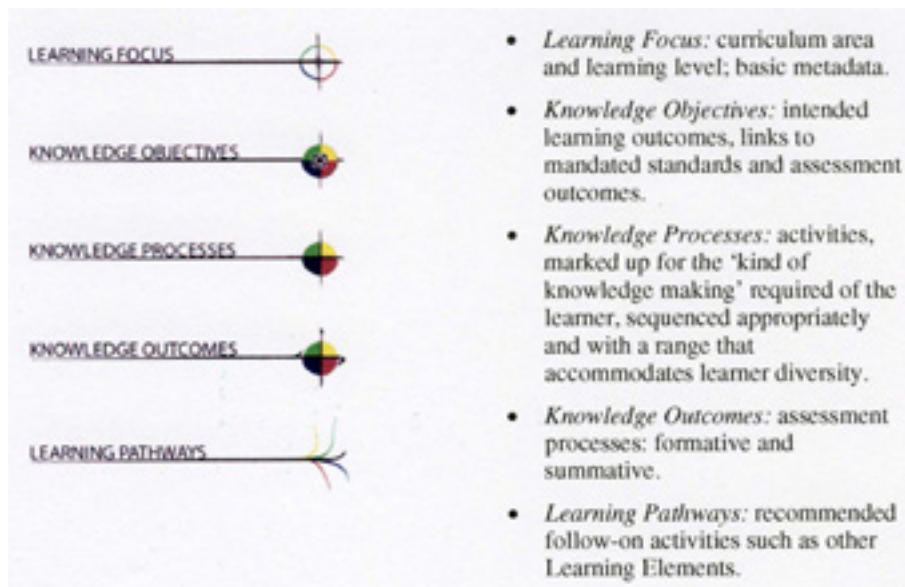


Figure 2. The pedagogical architecture of the Learning Element.

Each of the three Learning Element spaces can be viewed as separate 'panes'. 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, as shown in Figure 3.



Figure 3. Online learning design.

The Learning Element aims to develop teachers' capacities in instructional design and documentation of pedagogy that are more suited to professional sharing than traditional, paper-based curriculum and lesson planning processes, or planning frameworks linked to individual teacher schedules. In so doing, it engages teachers as reflective practitioners, systematically assessing and evaluating the outcomes of their own and their peers' pedagogical practices. It provides more effective and explicit articulation of generic standards with learning designs customized to specific learner needs and local circumstances. It facilitates the tracking of teacher and learner inputs, making explicit links between teacher input and learner performance. It also encourages teachers and schools to adopt a 'knowledge management' approach to documenting and sharing best practices – redrafting Learning Elements for reuse (modifying plans and resources for reuse based on the experience of application) by either the original teacher-author or a different teacher-reuser/adaptor. And it 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 semi-autonomously and asynchronously, in the classroom or anywhere beyond the classroom – which also allows for more than one Learning Element to be undertaken simultaneously by different students at the same time in the same class. Sample screenshots from a Learning Element are shown in Figures 4 and 5.

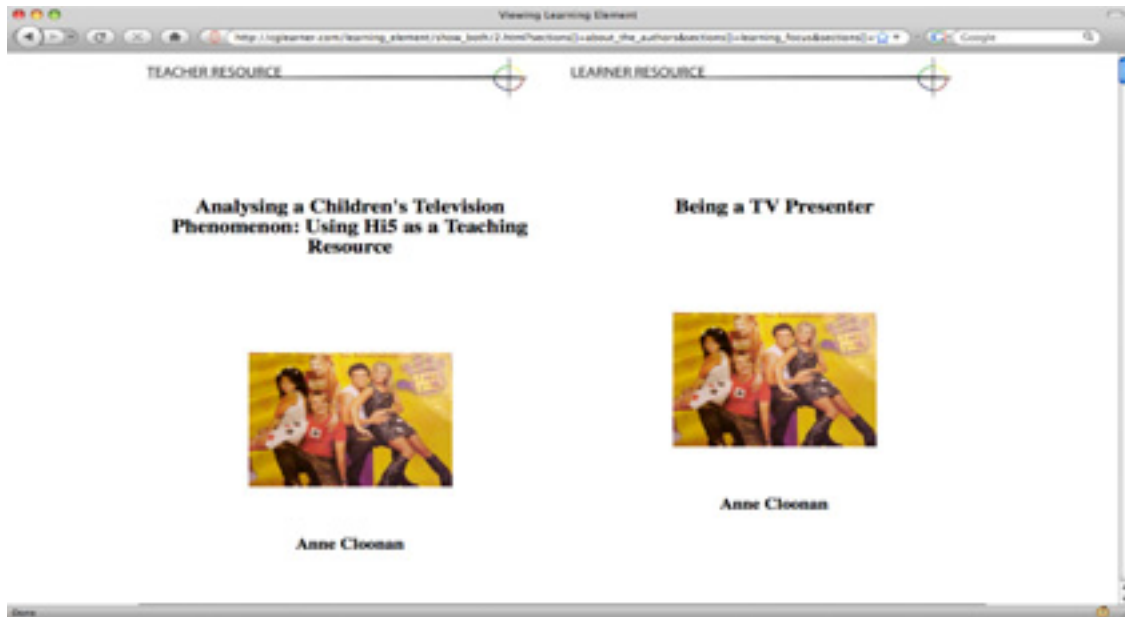


Figure 4. Side-by-side rendering of the teacher and learner resources: the opening screens of an early literacy Learning Element.

*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 speciality? Their cosnames, 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 ...**

Figure 5. Example of a learning activity in the 'Being a TV Presenter' Learning Element.

Addressing Learner Diversity

How, then, does the Learning by Design pedagogy in practical ways address learner diversity? There follow several aspects which differentiate Learning by Design from the one-size-fits-all curriculum of earlier modern schooling.

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 face all these agencies in one classroom! The solution of our recent modern past was to have 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 a myriad of 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. Design, however, also means explicitly opening up how our received meanings are made and remade by our agency in each domain of human endeavor – that is, the grammars of school disciplines, languages and discourses, as well as in everyday life.

Explicit Pedagogical Openings

Each instructional activity selected by a teacher or suggested by a textbook has some particular pedagogical underpinning in a knowledge process. Apart from the fact that every knowledge process is a form of action, a business of designing meaning and knowledge, and thus an engagement 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 their 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 the knowledge processes establishes direct points of contact with learners’ lifeworlds, as well as taking them to new learning. 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, as well as master new knowledge. This is a way to value what they already know as a basis of expanding their knowledge. Not to second-guess 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 determine their prior learning and 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 describes 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 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 personalise the learning for each student. (Suominen, 2009, p. 132)

Alternative Navigation Paths

Learning by Design does not require that every learner is 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 that are 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 which prioritize or order knowledge processes according to preferred 'learning styles' – some students might prefer big-picture 'conceptualizing' before they immerse themselves in 'experiencing', for instance; others the reverse. This allows for differentiated learning activities that enable each learner to achieve general or comparable learning goals.

Assessing Performance Comparabilities

When, at any one time, each student can be doing something that engages them most effectively at that particular moment, and when this might be so varied, how can a teacher subsequently 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 and not only bald test scores. The capacity to link the steps involved in the mastery of subject areas or learning goals is key to producing performance outcomes which are sustainable and transferable. Complex, multiperspectival assessment is required and possible in the new technologically enhanced learning environments, which continuously feed back into the process of appropriate learning design for that student. 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.[2]

Centering educational energies on learner agency in all its variety will create a new dynamics, sociability and ethics of knowledge creation. A genuinely 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, is all the more potent for its productive engagement of diversity amongst learners. Diversity of the student population does not bring the group's performance levels down. In fact, the evidence suggests an opposite effect.

This forms the basis for learning and knowledge ecologies that are 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 only content knowledge, or at least not even that primarily. It is the development of the kinds of person 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. They are capable of deep reflection, sustained investigation, creative designing and ongoing innovation. The key questions for educators, then, are how do these new 'types of people' learn to be themselves, learn to relate with others, learn how to know and what to know, and learn how to get things done in today's knowledge ecologies?

In all its difference, the lifeworld is the first site of learning, not only in the chronological sense (babies and young children) but in the extended sense that it is always prior to, or the foundation of, any education in the formal sense, or learning by design. It is from the start and always remains a place of deep learning, albeit in primarily amorphous, unorganized and endogenous ways. The lifeworld is the ground of all learning, including the secondary processes of learning by design. And as learning occurs through engagement, engagement must be with learners in their lifeworld reality, and that reality is marked by extraordinary difference.

But learning is not simply about recognizing and affirming difference. There is much more to effective education for diversity than that. Recognizing difference is not enough. Staying where

you are is not learning. Learning is a journey away from the learner's comfort zone, away from the narrowness and limitations of the lifeworld. As much as learning needs to affirm identity and create a sense of belonging, it is also a process of travelling away from the familiar, everyday world of experience. This journey is one of personal and cultural transformation.

The learning journey takes two paths, along two axes. Both of these journeys are away from who you are, and sometimes in unsettling ways. The first is a depth axis, or learning what is not immediately or intuitively obvious from the perspective of everyday lived experience. This may challenge everyday assumptions – that the earth is flat, for instance, or that certain unreflectively held values such as racism or sexism are socially sustainable. The second is a breadth axis, in which you travel to unfamiliar places in the mind, and perhaps also in reality. This is a kind of cross-cultural journey, and deeply so because it involves genuine crossover. The place to which you travel becomes part of you, part of your repertoire of life experience, and in fact another aspect of your identity. These journeys can be understood as narratives of sorts. They are life narratives of self-transformation and growth. But they are only that when the learner is safely and securely at the center of the story. Retrospectively, the learning story runs like this: who the learner was, where they went, the things they encountered, and what, as a consequence of their learning, they have (knowingly) become. In this story, learning is the key thread in what turns out to be a kind of cultural journey.

If the lifeworld is the place of belonging, the place from which learners depart, the new world of knowledge might be called the 'transcendental' – a place above and beyond the common-sense assumptions of the lifeworld (Husserl, 1970; Cope & Kalantzis, 2000a). The learning journey from the lifeworld to the transcendental takes the learner into realms that are necessarily unfamiliar but never too unsettling in their unfamiliarity. Education will not result in learning if the landscape is unseeable, unthinkable, incomprehensible, unintelligible, unachievable. Learners must travel into cultural territories which take them outside of their comfort zones, but not so far in any one stage of the journey that the journey takes the learner into places that are so strange as to be alienating. The journey will involve risk, but the risk will only be productive if the learning environment feels safe, if it is a place where the learner feels they still belong, even if only as a traveler. The learner needs scaffolds – learning prompts or support – which reassure them as they face the risks of alienation and failure in the realm of the unfamiliar. Vygotsky (1962, 1978) calls this the 'zone of proximal development'.

Learning by Design in the Classroom

The Learning Element software 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 2009-10 with 16 US and Australian teachers participating in our online New Learning and New Literacies Master's degree at the University of Illinois, Urbana-Champaign, USA.[3] In 2007-10, the Australian Research Council funded an analysis of the Learning Element in practice. We are now working on version 3.0, funded in 2010-12 by the Institute of Educational Sciences at the US Department of Education.

Our research so far demonstrates that explicit documentation is able to highlight patterns in teacher pedagogy identified in terms of knowledge processes. This shows that teachers at times deploy strings of learning activities which are not always aligned explicitly to formal standards, curriculum frameworks or particular 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 both teachers and learners to be more purposeful about the way learning goals are set and met. Such explicitness also allows for adjustment to meet the specific learning needs of learners in diverse classrooms (Burrows 2005a, b, c; Haren, 2005, 2007; Cloonan, 2005, 2007, 2008; Neville, 2005, 2008; Burrows et al, 2007; Suominen, 2009).

Rita van Haren is deputy principal of a cluster of five schools, one middle/secondary school and four feeder elementary schools in the Australian Capital Territory – the Lanyon Cluster. In her research, van Haren tracked four students and two 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 apt to learner interests and dispositions (Haren, 2007). More broadly, the Learning Element was adopted by all teachers in the middle/secondary school in the Lanyon Cluster in 2005. Approximately 33% of the school's students are identified as low socio-economic based on the Australian Bureau of Statistics' Index of Relative Socio-Economic Disadvantage (IRSED). Data from the Australian Capital Territory Assessment Program indicates 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 the school were identified in the lowest 20% in reading across the Australian Capital Territory. From 2005 to 2007, the proportion of students achieving a top 20% score increased by more than 33%, and the number of students who received a bottom 20% grade dropped by 65%. During that time, the Learning Element was the single major innovation in the school.

Another piece of research involved the detailed tracking of the Learning Element framework of three 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 adoption of the Learning Element. The researcher, Mary Neville, concludes that:

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 Anne Cloonan investigated the professional learning of four elementary school teachers over the course of eight months in the context of an early years literacy intervention by the Department of Education in Victoria, Australia. Using a complex matrix of pedagogical observation schedules, Cloonan shows 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)

Another study by Keiju Suominen focused on learner experiences in classrooms in which learning designs had been created using the Learning Element. She concludes:

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 competences 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 progressivist 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 (Haren, 2005; Neville, 2005, 2008).

Research also shows that well-rounded pedagogies, purposefully deployed, are more effective than those that focus mainly on a single approach. In the words of Courtney Cazden (2000, p. 321), 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"'. In 2003-05, 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 which involve 'weaving' between different activity types of knowledge processes (Luke et al, 2003, 2005; Cazden, 2006b). Moreover, the most effective teachers, particularly when addressing the needs of equity groups and diverse classrooms, have developed ways to negotiate learner differences which move away from the traditional approach of the whole class 'being on the same page' (Burrows, 2005b; Pandian & Balraj, 2005; Haren, 2007).

Furthermore, our own research has shown that documentation of instructional choices assists in the evaluation of the bases for teacher effectiveness, as reflected in learner outcomes (Kalantzis & Cope et al, 2005; Cloonan, 2007; Burrows et al, 2009). 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 (Kalantzis & Cope, 2004; Burrows, 2005c). 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 (Polanyi, 1962; Stewart, 1998; Kalantzis, 2004; Burrows, 2005c). 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 both prospective and retrospective aspects (How is the teaching and learning process planned, and how are the best teaching practices shared?) 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 (Kalantzis & Cope, 2004; Burrows, 2005c). Perhaps most importantly, however, such documentation provides explicit evidence of the relationship of teaching inputs to learner performance.

Cloonan concludes 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. (Cloonan, 2007, p. 257)

And Suominen concludes 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. (Suominen, 2009, p. 223)

Conclusions

The Learning by Design project has set out to achieve the following objectives. Our research shows that we are at least part-way towards achieving these objectives. It has been our aim to:

1. Bring the processes of *documenting learning* into the world of today's Web 2.0 online media (O'Reilly, 2005). This has many intrinsic advantages, including ease of use, low cost, but perhaps most importantly the potential accessibility of content to colleagues, learners and interested parties in learning communities, such as parents. With accessibility comes transparency, opening access to whatever degree is determined by an individual teacher or a school. For instance, teachers may choose to open up their processes so other teachers can know what their learners have learned; learners can see where they have come from and where they are going; and parents can see what learners are learning.
2. Place an emphasis on *the teacher as learning designer* and knowledgeable expert, rather than their historic role as a curriculum implementer and a conduit of syllabus and textbook. It also frames the school as a knowledge-producing community. For instance, the Learning Element will allow teachers to create grounded, localized versions of environmental studies, social studies or historical studies.
3. Cater to *learner diversity*, allowing for multiple individualized or small-group learning paths drawing from the bank of online-accessible lessons in a teacher's own Learning Element portfolio or assigned by a teacher from the broader, consolidated bank of Learning Elements. In other words, the Learning Elements become a resource for purposeful differentiated learning. This also encourages the creation of content that is directly relevant to local communities at the same time as it is aligned to formal standards and curriculum frameworks.
4. Create *new efficiencies* in a context and learning outcomes where more is expected of our education system and resources need to be used wisely. Teachers reinvent similar wheels in their lesson plans daily and in the oral discourse of their classrooms. The Learning Element asks teachers to commit their learning designs to the digital record. This is more work, in the first instance, than a conventional lesson plan. For this reason, teachers would only document their best designs. However, access to others' designs creates enormous efficiencies – a teacher in the same school may create a Learning Element of great local relevance, or a teacher in another school may create an excellent or highly rated learning design that another teacher wants to rewrite or adapt to local conditions. It also allows for explicit tracking of and reflection on teacher inputs and learner outputs, enabling quick recalibrations on learning for more effective and timely outcomes.
5. Foster a culture of *professional collaboration*. The Learning Element supports joint authorship and team teaching. It encourages teachers to share their greatest curricular successes and most powerful professional insights. It is accompanied by the choice of either a conventional copyright or Creative Commons license, both of which are framed to encourage rewriting and adaptation of Learning Elements by acknowledging both original sources and new contributions to the text.
6. Address in creative, flexible and relevant ways the vexing question of *evaluation and assessment* by linking in a more coherent and fluid way the process of learning with expected learning outcomes at different levels – from formative and summative assessment informing the students themselves, to providing transparent, well-supported assessment judgments to parents.

In these respects, we have been attempting to exploit to the fullest the affordances of the new digital media in order to transform the professional role of teachers and improve outcomes for learners. Beyond this, it has been our aim to develop an explicit and accountable online documentation framework which prepares learners for living, learning and working in the new world of the global knowledge economy.

Notes

[1] <http://www.L-by-D.com>

[2] <http://assess-as-you-go.com>

[3] <http://newlearning.ed.uiuc.edu/index.html>

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