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On the edge: Shifting teachers' paradigms for the future

Jane Gilbert and Ally Bull
with Liesje Stevens and Margaret Giroux

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The past 20 years or so have seen increasing concern that our schooling system, set up for a different age, is not able to prepare today's learners for the fast-changing world they will live and work in. Strong arguments for radical change—not gradual improvement—have been made, from a number of quarters. There is some consensus about the broad set of ideas that should guide this change, and, based on this, a large literature on the needs of 21st century learners. Much has been said about future-oriented learning and teaching, and future focus is one of the New Zealand Curriculum's eight key principles. However, while there has been some exploration of what future-oriented teaching practice might look like, there has been very little work on what all this means for individual teachers.

This project's starting point was that future-oriented education makes major demands on teachers. It requires them to do—and be—very different things from those required in the past. Many schools are developing new learning spaces, using new models of learning, and adopting technologies that could replace aspects of current practice. Many of today's teachers are happily adapting to these shifts, adding new skills to their repertoire. However, this adaptation, on its own, is not enough to produce the step change in teacher thinking needed for effective future-oriented education. Our aim was to investigate whether this step change is possible and, if it is, what it looks like.

To do this, we tracked a group of education professionals as they participated in a professional learning and development programme (PLD) designed to support this kind of change. This PLD had two complementary parts. Part 1 was a university course designed to build participants' knowledge of recent scholarly thinking on education's future. Part 2 was a workshop designed to support participants' individual cognitive growth. Face-to-face and online networks between participants were encouraged. Researchers explored changes in the participants' thinking as the PLD progressed, through a series of interviews and other interactions. All participants reported major changes in their thinking, but only about a third of the group experienced the step change intended. The individuals in this sub-group are mainly highly experienced teachers, currently in senior leadership roles, but a few are outliers—educationists who have not followed the usual pathways into teaching.

We think these findings have two main implications. First, the step change in thinking that was this project's focus is difficult, and it seems only a few individuals are "ready" for it. Second, future-oriented teacher PLD needs to be designed in ways that take account of the developmental needs of the individuals involved.

Background to the research

The educational futures literature identifies a number of "mega-trends" driving the need for change in education. Briefly, these are as follows:

- The "digital revolution"—the exponential growth in computing power and digital networks, and the implications of this for society, the economy and the nature and distribution of employment opportunities.¹
- Globalisation—the dissolving of traditional boundaries between nation-states and their economies.
- New "networked" forms of knowledge that are now "too big to know".²
- Demographic and economic changes in the BRICS³ group of countries, and the likely changes in world order as a result of this.⁴
- The advent of the Anthropocene⁵ and the many other "wicked problems" we face in the 21st century.⁶

1 See, for example, Kurzweil (2005); Brynjolfsson & McAfee (2011, 2014).

2 Castells (2000); Weinberger (2011). The "too big to know" concept is taken from the title of Weinberger's book.

3 BRICS refers to Brazil, Russia, India, China and South Africa.

4 Marginson et al. (2011).

5 The new geological era characterised by human-induced climate change.

6 The term "wicked problem" is now widely used to refer to very complex problems that are difficult or impossible to solve—or even define—using the tools and techniques of one organisation or discipline. Because they have multiple causes and complex interdependencies, efforts to solve one aspect of a wicked problem often reveal or create other problems. See Conklin (2006).

According to this literature, these trends are likely to produce the end of work as we currently know it. Most manufacturing work, as well as whole classes of professional work, will be replaced by intelligent technologies. The breakdown of nation-state boundaries will limit the ability to levy taxes, which will in turn limit the capacity to provide public services, invest in infrastructure, and so on. Social inequalities will increase. And then there's the physical effects of climate change. Taken together, these trends represent a strong challenge to the current order, and to "known" ways of doing things. They disrupt key aspects of the 20th century's social, economic and political order, and, following from this, 20th century education's key assumptions.

A key function of the mass education systems of the 20th century was to turn out people with the knowledge, dispositions, and skills needed in 20th century economies and societies. Another function was to screen and sort people for their likely place in these economies and societies. It was assumed that it was possible to know what learners would need for their futures, and to give it to them.

Now, in the 21st century, our education system needs new goals. The educator's job must go beyond imparting already known knowledge and assessing the extent to which individuals "achieve" this. To survive and thrive in the fast-changing, highly uncertain, complexities of "postnormal" times,⁷ people need the capacity to do more than simply "consume" already-existing knowledge: they need to be able to produce *new* knowledge, on their own and with others. Doing this requires a well-developed intellect. It requires intellectual capacity, intellectual "processing power" and flexibility. While these are traditional educational goals, they haven't always been achieved. But now, they really are needed—by everyone.

If the 21st century educator's work is to design experiences to build these capacities in students, then *they themselves* need to have these capacities, in well-developed form. A future-oriented education system must be led by teachers who are adaptive, intellectual adults, not "consumers" of ideas, or followers of models and templates developed by others. To effectively scaffold their students' development, teachers need to have had opportunities to focus on their *own* development. They need to have experienced—and been able to process—the highs and lows of ongoing self-development.

Because teachers educated in the 20th century system are unlikely to have these capacities, or to have had these opportunities, they are likely to need support to undergo the step change into a 21st century system. All this is well-known: however, the trickier questions involve knowing what kinds of support are needed and how best to provide them. This project was designed to investigate these questions.

Research questions

The project's broad question was:

- What kinds of support do teachers need to experience the kind of on-the-job transformative learning they need to participate in a future-oriented education system?

The specific research questions were as follows:

- Are participants able to use the resources and support provided in the PLD to transform the way they think?
- Are some teachers more "ready" than others to do this, and, if so, what are the characteristics of these teachers?
- Did some components of the PLD have more effect on participants' thinking than others?

Theoretical frameworks

The project design (both the PLD and the research project) drew on the research literature on adult cognitive development and work in a related area known as "transformational" learning. Our starting point was that knowledge and skills, while an important part of any PLD programme, are, on their own, not enough

7 Sardar (2010).

to produce practice change.⁸ Practices are underpinned by ways of thinking: thus practice change requires changes in the underlying way of thinking—i.e., cognitive change or schema-level change.

Cognitive change requires a change, not in *what* an individual thinks, but a change in *how* they think. It requires a change in the *system* used to represent, organise, and *give meaning to* ideas.⁹ This kind of change is difficult.¹⁰ Most people are unwilling—or unable—to make this kind of schema-level change unless certain conditions are in place. These conditions include: being able to articulate one's current beliefs; experiencing and acknowledging some sort of cognitive dissonance;¹¹ and having opportunities to investigate the sources of that dissonance. For most people, schema-level change is both an individual *and* a social process, and most people need structures to scaffold the process.¹² As constructivist learning theorists have argued for more than three decades, adding new ideas into an existing schema does *not* usually change the schema. The new ideas are assimilated or “made to fit” with the existing schema, or, if this can't be done, they are put aside and/or rejected.¹³

Constructivist accounts of learning have been highly influential (at least in theory) in discussions of *student* learning: however, they are less frequently applied in thinking about *teacher* learning. Teacher PLD programme design is often still underpinned by long-outdated assumptions about learning: for example, the view of learning as a process of absorbing and internalising standardised content, which is able to be “deposited” in learners' minds by a more knowledgeable “other”. There is, however, a small but growing international research literature that uses constructive-developmental theories of adult cognitive development, and the related concept of “transformational” learning to investigate how best to support schema-level change in teachers.

Very briefly, this literature describes how adults—in particular, working adults—grow and change over the course of their lives. For example, Robert Kegan (1982, 1994) identifies five qualitatively different “orders of mind” in which individuals are successively more able to deal with complexity, and to see (and take action in relation to) multiple perspectives simultaneously. Adults in the different orders of mind have very different internal psychological worlds—they “make sense” of the world in different ways, often in ways that are incompatible with those of someone in another order. As a result of the various experiences they have, and the opportunities they have to process those experiences, people tend to move from the first “magical” childhood mind, through the second “self-sovereign” mind, usually in adolescence, into the third of these five orders, known as the “socialised mind”. Most adults settle in this stage.¹⁴ Kegan (and others) argue that, while this might have been satisfactory state of affairs in earlier times, to thrive in the postmodern world of today, people need to be functioning in the fourth order, known as the “self-authored” mind, if not the fifth, or “self-transforming”, “postmodern” mind.

To move from one order to another people first need to see things that, in their current order, are largely unquestioned, seen as “just how it is”, but that actually structure the way they see the world. Kegan describes this as making what we were formerly unaware of, or “subject to”, “object”, that is, outside ourselves and available for inspection, review, and possibly change. What we are “subject” to we cannot stand back from and examine. We are *identified with it and run by it*. In contrast, what we hold as “object” can be reflected on and considered, controlled and managed. According to Kegan, in the development of adults, just as in earlier stages of human development, “differentiation always precedes integration”. As he puts it:

Before we can re-connect to, internalize, or integrate something with which we were originally fused [“subject to”] ... we must first distinguish ourselves from it [“make it object”]

(Kegan 1994, p. 326).

8 This is widely acknowledged in the research literature on teacher professional learning: see, for example, Timperley et al. (2007), but also Darling-Hammond and Sykes (1999), Darling-Hammond (2003), Fullan (2005), Hargreaves and Shirley (2009), Pajares (1992), Beijaard et al. (2004).

9 Kegan (1994, 2000).

10 See Kahneman (2011) for an account of this.

11 The term “cognitive dissonance” is usually used to describe the experience of being exposed to situations or ideas that conflict with and/or are not able to be incorporated into one's existing schema.

12 For recent work in this area, see Drago-Severson (2012); Baxter-Magolda and King (2004).

13 See, for example, Posner et al. (1982); Strike and Posner (1985); Derry (1996), but note that this literature is huge.

14 It is important to note here that this is not a theory of “moral progress”, and there is no simple correlation between the orders it proposes and intelligence, happiness, or life satisfaction. The theory's purpose is to understand the different ways people make sense of their worlds. See Kegan (1994). For a short summary of this work, see Garvey Berger (2007) or Garvey Berger (n. d). For more, see Garvey Berger (2012).

A number of researchers, mainly United States-based, are building on this work in programmes designed to explore the conditions that best support people to move *between* these orders of mind.¹⁵ Many of these researchers use the term “transformational learning” to describe what happens as people make the transition to another order.

While the term “transformational” appears frequently in today’s educational discussions, it is not always clear what it means, or for what purpose it is being used.¹⁶ However, in the scholarly literature, it has a long history, with many strands and influences, including Freire’s early work and a large body of research and scholarship by Jack Mezirow and his associates.¹⁷ Much of this work also has a focus on adult cognitive development. This project draws on this tradition, particularly the work of Robert Kegan (1994, 2000) and Eleanor Drago-Severson (2007, 2012).

Drago-Severson defines transformational learning as an increase in people’s cognitive, affective, intra- and inter-personal capacities that enables them to better manage the complexities of life and work in today’s world.¹⁸ Kegan and Drago-Severson distinguish transformational learning from “informational” learning. For them, informational learning involves an increase in *what* we know, an increase in the *amount* of knowledge, skills, content or information we possess. Informational learning, while obviously important in any professional learning context, does not usually change the *shape* of people’s learning: it does not change the way they see the world. At best, it adds new content to their mental filing cabinets. For Drago-Severson, this kind of learning is, on its own, not enough to help us manage the adaptive challenges we face in today’s increasingly complex and fast-changing work environments. “Transformational” learning, on the other hand, involves changes to the structure of a person’s “meaning making system”: that is, there is a change in *how* they know, not just in *what* they know. This requires a re negotiation of what Kegan calls the *subject–object balance*: that is, it requires us to make “object” something we were “subject” to.

This kind of learning requires access to new ideas; that is, some “informational” learning, but these new ideas are not enough, and “one-size-fits-all” approaches are unlikely to be effective. According to Drago-Severson, PLD practices designed to support transformational learning must take account of participants’ current “way of knowing”, and offer developmentally appropriate supports and challenges. In her research, the following practices were found to be effective:

- creating situations in which people can articulate their thinking through writing, speaking and/or acting
- creating situations that help people uncover the assumptions and beliefs that guide their thinking and actions
- providing opportunities for people to discuss ambiguities, contradictions and/or *faulty reasoning*
- providing opportunities to consider *alternative points of view*
- providing opportunities to imagine *alternative ways of thinking and behaving*
- creating situations that scaffold different forms of *adult collaboration*.¹⁹

The PLD that was this project’s focus used this work in its design. The research’s purpose was to investigate the extent to which participants were able to use the PLD to undergo the kind of schema-level change outlined above. The next section explains what we did.

15 Some of this work is education-oriented: however, most of it is designed for management and leadership contexts.

16 See, for example, the discussion in the blog Keys to transformation—see <http://blog.core-ed.org/blog/2015/02/keys-to-transformation.html>

17 Note that some of the literature uses the term “transformative” learning. See, for example: Freire (1970), Mezirow (1991, 1997, 2000). Dirkx (1998) comprehensively reviews the development of this concept.

18 Drago-Severson (2012), p. 7.

19 Drago-Severson (2007).

Research design and methods

This project started out in 2012 as a small action research project involving researchers working with two clusters of secondary school teachers in New Zealand's North Island. However, in 2013–14, this initial group expanded as new participants were recruited from other schools in different locations. Some primary school teachers and some non-teaching education professionals also joined the project. While increasing the total number of participants, this loosened the tight relational focus of the pilot, and it was not possible to sustain the cluster-based, action research aspects of the project.

The project as a whole had two parts—an intervention, in the form of a PLD programme for teachers designed to support schema-level change, and a research project designed to explore the effects of that intervention.

The intervention

The PLD had two elements:

1. A university postgraduate-level paper. This paper, entitled *The Future of Schools in Aotearoa New Zealand*,²⁰ and taught by Jane Gilbert, was specifically developed for this project. The paper explored various “big ideas” about how and why schooling needs to be different in the knowledge/network societies of the future. Its pedagogies were designed to provide opportunities to translate these ideas into practice. The paper was taught in 2012, 2013 and 2014, in a blended format (i.e., online with weekend block courses).
2. Another form of professional development with different objectives, not offered for academic credit. This PLD, which had different formats in the different years of the project,²¹ was designed to support participants to think about their own thinking, and to explore how and why they think the way they do. Jennifer Garvey Berger facilitated this work.²²

These experiences were designed to complement each other in providing opportunities for schema-level change. Participants were encouraged to collaborate with each other in classes and online and to build informal networks.

People enrolling in the university course were given information about the research project and a letter inviting them to participate. In each year of the project, on average about half of the course members signed and returned the invitation letter to the researchers.²³ A total of 31 people agreed to participate in the research project. Of these, four are school principals (all secondary), one is a deputy principal (secondary), and eleven are secondary school teachers. Seven are primary school teachers, and nine are other education professionals (tertiary teachers, or providers of PLD and/or other educational services).

There were four cohorts, organised by year of first participation. Cohort 1 (n = 7) completed the PLD in 2012.²⁴ Cohort 2A (n = 14) completed it in 2013 through the University of Waikato and Cohort 2B (n = 6) completed it through the new course at AUT university. Cohort 3 (n = 4) completed the PLD in 2014. Of the 31 who originally agreed to participate in the project, five officially withdrew as the project progressed, and a further three stopped participating. The data described here were collected from the remaining 23 participants.

20 The paper's title later changed - to Educational Futures when the course was moved from Waikato to AUT University.

21 In 2012 and 2013, it was a full-day, face-to-face workshop, while in 2014 it was a webinar.

22 Jennifer Garvey Berger is a leadership consultant and adult cognitive development expert with many years' experience facilitating work of this type.

23 This process was separate from the course delivery and was carried out by different people.

24 This group was part of the pilot project completed before the researchers applied for TLRI funding to continue this work. Five of the people in Cohort 1 continued as participants in the project in 2013–14 and their data is included here. For a report on this pilot project, see Gilbert and Bull (2014).

Data collection

Data were collected from multiple sources, which were designed to build an ongoing developmental narrative of participants' "sense-making" and/or personal epistemologies across the project's timespan.²⁵ These sources were as follows:

1. **Interview 1**, carried out before or near the beginning of the university course. This interview was designed to encourage participants to talk about themselves, their context/s, and their reasons for enrolling in the course. Interviewees' view of education, and their orientation to uncertainty and change were explored, and they were asked about any personal networks they were part of, within and outside the education sector.
2. **Interview 2**, carried out 2–3 months after the university course had finished. This interview was designed to explore participants' experiences of the course, and any changes they saw in themselves, their thinking, and/or their approach to their work. They were also asked to talk about their understanding of how/why these changes occurred. There were probes for ideas/knowledge, relationships, and opportunities for reflection. The interviewees were also asked to comment on any feelings they had about the changes they talked about, and asked about any networks or resources they used to support their own development.
3. **Interview 3**, carried out near the end of 2014. For some participants this was two years after they had completed the PLD, while for others it was one year later.²⁶ Interviewees were asked whether they thought they were thinking, behaving, or engaging with others differently, and if so, to provide examples. They were also asked to comment on the extent to which they felt able to question, challenge, or openly disagree with their colleagues; the extent to which they thought it was possible to hold multiple perspectives in their work contexts; the extent to which they felt comfortable with uncertainty/ambiguity; and any feelings they had about this.

The format of all three interviews was conversational, with a semi-structured set of questions and probes. All were carried out by telephone by one of two researchers who were known to the participants. All were audio-recorded.

4. **Monthly "double loop" reflections**²⁷ were sought from participants after they had completed the post-course interview. They were sent email messages once a month by a researcher asking them to reflect on some recent decision or action they had taken in their work. They were asked about the setting and background of the decision/action, and about the ideas/experiences they had drawn on. They were also asked about the effect/s of their decision/action, and about how, if at all, this decision/action differed from what they might have done in the past. Responses were acknowledged, and participants were then asked one further question, designed to probe more deeply into some aspect of the response.
5. **In-class observations** by researchers of participants' contributions to group discussions—this was intended to collect participants reflections in a more informal way that could complement the more formal monthly reflections.
6. We also carried out one **PLD provider interview** (with Jennifer Garvey Berger).

Our attempt to gather data from multiple sources was not entirely successful: some of these methods proved impractical to administer or did not produce sufficient useful data. For example, only five participants completed the monthly reflections regularly, and a further eight did them occasionally, so this data set is incomplete. This task proved to be too difficult for busy teachers: several participants said that, while they found the reflection process useful, they were not able to set aside the time to do it regularly.²⁸ Similarly, the in-class observations did not produce useful data. Consequently, the analysis outlined below draws mainly on material from the interviews, supplemented by material from the monthly double-loop reflections, where these were available.

25 Early in the project, researchers sought advice from Marcia Baxter Magolda regarding the appropriateness of different data sources for gathering developmental data and, from this, the decision was made to use multiple sources (interviews, reflections, in-class observations, conversations and so on). See Baxter Magolda and King (2007).

26 Cohort 3 participants were not asked to do the end-of-project interview, as it was too soon after their post-course interview.

27 The term "double loop" reflections is taken from the work of Chris Argyris—see, for example, Argyris (2004).

28 However, of the participants who did do the reflections regularly, several reported returning to them later (in the summer break), re-reading them, and thinking and reflecting more on what they had said.

As outlined above, this study started life as action research project. A complex three-stage collaborative data analysis process was originally planned, but, as the project evolved, for pragmatic reasons this process was simplified, becoming more like the “member check” commonly used to improve data validity in qualitative research.²⁹

Data analysis

The analysis reported here looked for evidence of transformational learning in the material, using the following list of defining components:³⁰

1. Access to a wide range of ideas—in this context, ideas about education, trends beyond education, and adult development.
2. An ability to “see” the wider system, and an ability to make connections between ideas from a range of different contexts.
3. An awareness of the assumptions underpinning one’s own thinking—the ability to “think about one’s own thinking”.
4. A sense of knowledge as always evolving, as tentative and incomplete.
5. A willingness to explore unfamiliar ideas or contexts, to tolerate uncertainty.
6. The ability to see—and hold—multiple perspectives simultaneously, and to see oneself as part of an interconnected web of relationships with others.
7. The capacity to understand “old”—or previously mastered—ideas in new ways.

In the findings section below we outline what this looked like.

Key findings

All of the participants were very positive about the PLD. All said that their thinking had changed. Some said that the experience “added to my thinking”, while others said that they had “become a better thinker” or were better able to “think about their own thinking”.³¹ Some said that this was the first PLD experience they’d been involved in (including university postgraduate-level study) where they had actually *had* to think.

However, using the analysis outlined above, only about a third of the participants showed evidence of transformational learning—as we have defined it here. These participants said that they had changed or “grown” as a person, that they now “thought differently”, “saw the world differently”, and approached their day-to-day work differently. All mentioned some sort of personal emotional response to the learning, most commonly, feeling “disrupted”, “unsettled” or “daunted”, but also “energised”. All talked about a renewed sense of wider collective responsibility, urgency and/or “moral purpose” in their professional work. For this group, “future-oriented education” is an “emergent” space. It is *not* something that can be known in advance, but rather something that will be created by people, thinking together. This group also reported making changes to their practice, or thinking about their practice differently.

For the other two-thirds of the participants, the learning did not appear to have been transformational. While these participants were positive about the experience, and had clearly acquired new knowledge, that they could talk about fluently, it seemed that this new knowledge had been “added into” their existing schema. This group described their learning as being “about” future-oriented education. They reported that this learning had given them more “confidence” in their capacity to “work with”, “inform” or “tell” others about it. For some in this group, the PLD experience “legitimised” their *existing* knowledge. For these participants, the

29 Meetings were held at the end of each year of the project. At these meetings the researchers presented their interim interpretations of the data from that year to the practitioner group for discussion and checking.

30 This list of transformational learning’s components was synthesised from material in Baxter Magolda (2004) and Drago-Severson (2012). Following Drago-Severson (2012), these components are a mixture of cognitive, affective, intra-personal and inter-personal factors.

31 Quotation marks in this section indicate material taken directly from participants’ interviews or reflections.

PLD did not change their existing schema or their way of knowing: for them, future-oriented education was a “topic”, a body of knowledge to be mastered.

The following examples are typical of comments made in the interviews/reflections. Because space constraints do not allow a detailed exploration of data from all participants, we have chosen to focus on material generated by the group showing evidence of transformational learning, to provide examples of what this learning looks like.

On a personal level, all of the participants in this group reported **personal** change.

- *It's actually shifted my whole perspective on the world (3-3)¹*
- *I'm not the same person I was 8 weeks ago (1-4)*
- *This is the most significant thing I have ever done. It really disrupted me. There are very disturbing ideas. I'm certain my practice has changed but I couldn't say how. I am a different person now (2-3)*

All said that they now thought differently. Some expressed this as being a new sort of learning.

- *I've always been a fairly successful student—because I've learnt the techniques to get good grades and here I am being challenged—none of those strategies worked any more—and that was quite significant—it taught me a lot, and I'm not saying I always liked it! (2-12)*

Others spoke of a greater awareness of the assumptions underpinning their thinking.

- *It makes me think an awful lot more about the reason behind what we do. (2-3)*

Some talked about **giving up their “knower” identity** and/or thinking differently about knowledge.

- *I'm not really sure there is a continuous right answer. In fact I'm pretty sure there's not—because you are participating in it you are actually changing yourself as you go through it. (2-17)*

All in this group talked of the value of being exposed to multiple perspectives, and how this had helped them to think more deeply about their own assumptions. Many said that the group discussions were important in this. For example:

- *I'm not a principal and I'm not in a senior leadership role—so talking to the principals and seeing things through their eyes was a real eye-opener—in terms of they're the link between the staff and the students and the Ministry and ERO and that sort of thing—so actually talking to them and seeing things through their eyes, and seeing that it's quite different as a staff member to a principal. (2-10)*
- *Having people there right in front of you to challenge what you're thinking—you know, with understanding—not in an aggressive way—but challenging and giving you time to answer—but most of the time it would make me try to get a clearer grip on what I was trying to say—it would start with something way up in the sky and it would filter it down to the at key argument—so I thought that was incredibly valuable (3-1)*

Some talked about their growing ability to hold multiple perspectives simultaneously.

- *I am adopting a much more open approach—I'm much more accepting of others' perspectives. (1-5)*
- *I'm practicing not being the knower. Here's our issue—let's put our heads together. That is a very powerful way of working ... It's a very collaborative way of working that I don't think we do well in schools. (1-7)*
- *It's lifted me to another place where I can see things from a different, from a few more perspectives, if you know what I mean. (3-3)*

All mentioned increased awareness of or ability to “see the system” and/or the inter-connectedness of everything.

- *I think the biggest thing was a wider world view of things and looking at how everything influences education—rather than seeing education as an insular thing that just happens cos it's there and it's always been there. It's all of a sudden looking out and seeing that science affects what we do and tech affects what we do and the changes in those things dramatically affect what we do but we don't acknowledge those in education and we should. (2-10)*

All appeared willing to work in—and embrace—uncertainty.

- *It's murkier—you don't know what the outcomes are—it's to get more comfortable in the messy space—or rather getting used to it—comfortable isn't the right word (2-9)*
- *keeping hold of the ideas and relaxing with the 'unknown-ness' (1-7)*

All of this group described their involvement in this project as energising or exciting, but also daunting and scary. At least half wondered whether they could continue in their current roles.

- *I know it's almost become a clichéd term about becoming unsettled or disrupted, but this unsettled feeling, about mainstream education, that was there already, was just further, further unsettled, to the extent that I found it increasingly difficult, certain days, to continue with the mainstream (2-12)*

All these participants saw future-oriented education as being something that opens up new possibilities, not a recipe to follow. For them, the world has changed, the future is uncertain, and doing more of the same won't work. They all talked about the need to “construct knowledge together”, to think in new ways, with different people. However, all were conscious of the difficulties in talking about complex ideas with others in ways that don't reduce the ideas to slogans.

- *How do you talk about those ideas or parts of those ideas in different contexts, at school, or with parents? (1-3)*
- *People don't particularly like change and if we are ever to get a critical mass of people on board ... that's only going to happen realistically if people start learning and reading and growing their own knowledge, discussing and talking about these sorts of things. (1-5)*

In the interviews participants were asked about any actions they had taken and/or any changes they'd made to their practice. When answering this, several talked about the importance of deep thinking, of not rushing to act, or getting others to act. For most, the most important actions involved changing themselves. Many, especially the leaders, talked of the importance of interacting more with, working with, and listening more to others (other teachers, students and parents). They talked of “giving up being the rescuer”, “the one who knows”, of “not doing it for them”, but instead inviting and making time for conversations, allowing “other voices to come through”. Several talked of the importance of seeing thinking and/or listening as action:

- *It's certainly moving—not in any transformational way but having an idea in your head of where it has to move is really important and keeping that in front of yourself. A bit like that saying about gazing on the landscape. If you keep gazing long enough you will eventually own it. Even if the landscape is an idea you will eventually own it. If you keep looking at it, it isn't quite so hard or scary. It's important to see thinking as action. (1-7)*

Associated with this was a perception of themselves as “less attached to certainty”, using “less certain” language, being more open, and less “black and white”.

- *I've started to use uncertain language because this invites conversation ... I'm beginning to really listen and work out what's important to a person at the time. I'm learning to listen in new ways. (1-3)*

Linking this back to the project's research questions, this material shows that this group of participants was “ready” for transformational learning. However, given the way the project unfolded, we are not able to provide detailed information on the specific characteristics of these individuals. Early on in this investigation there was felt to be a conflict between the project's origins—in an action research initiative involving close relationships with teachers in two groups of schools—and the planned collection of individual developmental data. The focus shifted from a design based on a series of individualised case studies to one involving a view of participants' experiences in more general terms as “emerging prototypes”, elements or nodes in a wider system.³² In this context it was decided that it would be inappropriate to collect individualised developmental information, which would be used to classify, assess, compare and contrast individual participants.³³ We also did not collect demographic or life history data, apart from material volunteered in the interview conversations. Consequently, the most we can say here is that within the group who showed evidence of transformation, there were two broad sub-groups. One was an older group, mainly very experienced principals or in other senior leadership roles, who were already looking for change, for the next step in their development. The other sub-group was more of an outlier group, people who had become involved in education through alternative pathways, often with a specific change-oriented focus. So, given that these individuals were all already change-oriented, it could be that the PLD just provided them with a framework or context to develop something they were already interested in.

The project's third research question had to do with whether or not some components of the PLD were more helpful to participants than others, and/or more effective in changing their thinking. As outlined above, the PLD had two complementary elements designed to support schema-level change—a university paper on educational futures, and a workshop on adult cognitive growth. Participants were offered conceptual knowledge, relational experiences and opportunities for ongoing reflection and discussion. In the interviews, participants were asked to comment on these different aspects of the PLD, to say what was helpful and what wasn't. In general they were positive about the pedagogies used. All said that the amount and depth of reading they'd had to do, the weekly reflections they had to write, the discussions with others from different contexts, and the multiple opportunities they had to engage with the ideas were all important factors in their learning (although many reported not enjoying these activities at the time). They identified particular ideas as being “powerful”, and, while they said that many of these ideas weren't new to them, the PLD had helped them to “make sense” of them, to see connections between these ideas and others, and to develop a personal position in relation to these ideas.

These comments are, however, not particularly helpful in understanding what, if anything, in the PLD design “made a difference”. While the course workload, the expectations, and the level of commitment required of participants were all high, the teaching/learning strategies used were not especially innovative—reading, debate/discussion, and journal-keeping are commonly used pedagogies. All of the participants were familiar with these strategies, and able to use them to further their own learning—in their own ways.

In retrospect, this appears to be the more interesting point. As we have seen, participants used the same materials and opportunities for very different ends. Some used them to learn “about”³⁴ educational futures and/or adult cognitive development, to add more ideas into their existing schema. However, others used the materials to understand themselves, their professional contexts, and their actions in those contexts in

32 Dörnyei (2011).

33 However some of the interview prompts were derived from questions used in the Subject-Object Interview (SOI) tool developed by Lahey et al. (1988).

34 David Perkins uses the term “aboutism” to refer to the tendency to frame all knowledge as “bits of stuff” to be learned “about” and stored away. See Perkins (2009), p. 5.

new ways, as an opportunity for personal cognitive growth.³⁵ Given that the PLD was not selective, this was probably important. Looking back it seems that it was sufficiently open or “psychologically spacious” to allow people to engage at a range of different levels, to make sense of it in different ways, appropriate for their particular developmental needs.³⁶

Implications and conclusions

This research has some obvious limitations. The number of participants was small; the way participants were recruited means that they were in no way representative of New Zealand teachers in general; and the intervention they participated in was intensive, relatively expensive per person, and in general hard to scale up. However, as an initial exploration into 21st century capacity-building, it has some interesting implications—for policy, for teacher PLD providers, and for teachers themselves as they think about their ongoing development:

1. Considerable investment is now taking place in infrastructure seen to be foundational for a 21st century education system—new “modern learning environments” and new digital infrastructure being two obvious examples. But making the most of these new spaces and technologies requires them to be “populated” by teachers who are capable of thinking outside the 20th century “box”, teachers who are ready to see the world through new eyes, using new conceptual frameworks. A “21st century-ready” teaching workforce needs to think differently, and support is required if this is to happen. This research shows that some teachers are ready to engage with this support, but others less so. Some interesting decisions lie ahead as policymakers attempt to balance resource allocation between the system’s “hardware” and the “software” needed to give the hardware its functionality.
2. If we are to “grow” this software, the “informationally”-oriented teacher PLD practice that is still the norm needs to be supplemented by more opportunities for “transformationally”-oriented PLD. By this we mean not PLD focusing on transforming *student* learning in schools, although of course this is important, but PLD designed to support individual teachers to transition to the higher “orders of mind” that Kegan et al. argue are necessary for successful functioning in the postmodern world. As we have seen, not all teachers are equally ready for this transition. One possible response to this would be to offer differentiated PLD appropriate for different developmental needs. Another would be to offer programmes with activities and tasks that are sufficiently “psychologically spacious” to allow engagement in a range of different ways, from a range of developmental starting points. Just as “personalisable” learning is now routinely advocated for students, perhaps we should do the same for teachers. We think this project shows that this is possible. Whatever approach we choose, the key point is that future-oriented teacher PLD should be less about offering pre-packaged, one-size-fits-all solutions designed to add knowledge and skills into teachers’ existing databases, and more about developing teachers’ capacity to think and work effectively in the increasingly uncertain, complex and change-oriented world of the future.
3. Teachers need more opportunities to participate in sustained collegial debate, to engage with ideas at a deep level, beyond what is possible in the congeniality³⁷ of staffroom conversations, or the filtered³⁸ space that is social media, and to be comfortable with uncertainty and *not* knowing.

35 Interestingly, these differences between participants did not align with their course grades

36 The reading journals that the course participants were required to keep appeared to be the most “psychologically spacious” of the tasks, in terms of the very different ways participants reported using these in their learning.

37 Several commentators distinguish between what they identify as the socially-oriented “congeniality” of teacher relations, and the more intellectually oriented “collegiality”, arguing for the need for more of the latter. See, for example, Evans (2012) or Barth (2006).

38 See Pariser (2012).

References

- Argyris, C. (2004). Double-loop learning and organizational change. In: J. Boonstra (Ed.), *Dynamics of organizational change and learning* (Chapter 18, pp. 389–402). Chichester: Wiley.
- Barth, R. (2006). Improving relationships within the schoolhouse. *Educational Leadership*, 63(6), 8-13. Retrieved from <http://www.ascd.org/publications/educational-leadership/mar06/vol63/num06/Improving-Relationships-Within-the-Schoolhouse.aspx>
- Baxter Magolda, M. (2004). *Making their own way: Narratives for transforming higher education to promote self-development*. Sterling VA: Stylus.
- Baxter Magolda, M., and King, P. (2004). *Learning partnerships: Theory and models of practice to educate for self-authorship*. Sterling VA: Stylus.
- Baxter Magolda, M., & King, P. (2007). Interview strategies for assessing self-authorship: Constructing conversations to assess meaning making. *Journal of College Student Development*, 48(5), 491–508.
- Beijaard, D., Meijer, P., & Verloop, N. (2004). Reconsidering research on teachers' professional identity. *Teaching and Teacher Education*, 20, 104–128.
- Brynjolfsson, E., & McAfee, A. (2011). *Race against the machine: How the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy*. Lexington, MA: Digital Frontier Press.
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. New York: W. W. Norton.
- Castells, M. (2000). *The rise of the network society* (2nd ed.). Oxford: Blackwell.
- Darling-Hammond, L. (2003). Enhancing teaching. In W. Owens & L. Kaplan (Eds.), *Best practice, best thinking and emerging issues in school leadership* (pp. 75–87). Thousand Oaks CA: Corwin.
- Darling-Hammond, L. & Sykes, G. (Eds.). (1999). *Teaching as the learning profession: Handbook of policy and practice*. San Francisco: Jossey-Bass.
- Derry, S. (1996). Cognitive schema theory in the constructivist debate. *Educational Psychologist*, 31(3/4), 163–174. doi: 10.1080/00461520.1996.9653264.
- Conklin, J. (2006). *Dialogue mapping: Building shared understanding of wicked problems*. Chichester: John Wiley & Sons.
- Dirkx, J. (1998). Transformative learning theory in the practice of adult education: An overview. *PAACE Journal of Lifelong Learning*, 7, 1–14.
- Dörnyei, Z. (2011). Researching complex dynamic systems: “Retrodictive qualitative modelling” in the language classroom. *Language Teaching*, 1-12. doi: 10.1017/S0261444811000516.
- Drago-Severson, E. (2007). Helping teachers learn: Principals as professional development leaders. *Teachers College Record*, 109(1), 70–125.
- Drago-Severson, E. (2012). *Helping educators grow: Strategies and practices for leadership development*. Cambridge MA: Harvard University Press
- Evans, R. (2012). Getting to No: Building true collegiality in schools. *Independent School Magazine*. Retrieved from <http://www.nais.org/Magazines-Newsletters/ISMagazine/Pages/Getting-To-No.aspx>
- Freire, P. (1970). *Pedagogy of the oppressed*. New York: Penguin.
- Fullan, M. (2005). *Leadership & sustainability: Systems thinkers in action*. Thousand Oaks, CA: Corwin Press.
- Garvey Berger, J. (2007). Developing the teachers we want for the schools we need. *set: Research information for teachers*, 3, 26–29.
- Garvey Berger, J. (2012). *Changing on the job: Developing leaders for a complex world*. Stanford CA: Stanford University Press.
- Garvey Berger, J. (n. d.). A change theory: Key concepts for understanding the work of Robert Kegan. See http://www.shiftingthinking.org/?page_id=449.
- Gilbert, J., & Bull, A. (2014). *Exploring teacher professional learning for future-oriented schooling: Working paper 1 from the Back to the Future project*. Available at <http://www.nzcer.org.nz/research/publications/exploring-teacher-professional-learning-future-oriented-schooling>.
- Hargreaves, A., & Shirley, D. (2009). The persistence of presentism. *Teachers College Record* 111(11), 2505–2534.
- Kahneman, D. (2011). *Thinking fast and slow*. New York: Farrar, Straus & Giroux.
- Kegan, R. (1994). *In over our heads: The mental demands of modern life*. Cambridge, MA: Harvard University Press.
- Kegan, R. (2000). What “form” transforms? A constructive developmental approach to transformative learning. In J. Mezirow and Associates (Eds.), *Learning as transformation: Critical perspectives on a theory in progress* (pp. 35–69). San Francisco: Jossey Bass.
- Kurzweil, R. (2005). *The singularity is near*. New York: Viking.
- Lahey, L., Souvaine, E., Kegan, R., Goodman, R., & Felix, S. (1988). *A guide to the subject-object interview: Its administration and interpretation*. Cambridge MA: Harvard University Graduate School of Education Human Development Laboratory.
- Marginson, S., Kaur, S., & Sawir, E. (Eds.). (2011). *Higher education in the Asia-Pacific: Strategic responses to globalisation*. Dordrecht: Springer.
- Mezirow, J. (2000). Learning to think like an adult: Core concepts of transformation theory. In J. Mezirow & Associates (Eds.), *Learning as transformation: critical perspectives on a theory in progress*. San Francisco: Jossey-Bass.
- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 74, 5–12. Retrieved from: <http://www.dlc.riversideinnovationcentre.co.uk/wpcontent/uploads/2012/10/Transformative-Learning-Mezirow-1997.pdf>.

- Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco: Jossey Bass.
- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307–332.
- Pariser, E. (2010). *The filter bubble: How the new personalized web is changing what we read and how we think*. London: Penguin.
- Perkins, D. (2009). *Making learning whole*. San Francisco: Jossey-Bass.
- Posner, G., Strike, K., Hewson, P., & Gertzog, W. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education*, 66, 211–227.
- Sardar, Z. (2010). Welcome to postnormal times. *Futures*, 42, 435–444.
- Strike, K. A., & Posner, G. J. (1985). A conceptual change view of learning and understanding. In L. West & L. Pines (Eds.), *Cognitive structure and conceptual change* (pp. 259–266). Orlando FL: Academic Press.
- Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2007). *Teaching professional learning and development: Best evidence synthesis iteration (BES)*. Wellington: Ministry of Education.
- Weinberger, D. (2011). *Too big to know: Rethinking knowledge now that the facts aren't the facts, experts are everywhere, and the smartest person in the room is the room*. New York: Basic Books.

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Principal investigators: Jane Gilbert and Margaret Franken

Researcher team: Ally Bull, Margaret Giroux, Liesje Stevens
Margaret Franken (leader)

Practitioner group: Jane Gilbert (leader), Jennifer Garvey Berger,
Sally Haughton (Wellington East Girls' College), John Wright (Mercury Bay Area School),
Ngairi Harris (Hauraki Plains College).

However, during the project there were changes. Margaret Franken left the project, Juliet Twist joined the project, Jennifer Garvey Berger took a lesser role than originally planned (due to illness), and the 30-plus participants became part of it.

Jane Gilbert continued to lead the practitioner part of the project and managed the project as a whole, while Ally Bull co-ordinated the research part of the project.

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Contact details

For further information about this research, contact:

Professor Jane Gilbert
School of Education, AUT University
Email: Jane.Gilbert@aut.ac.nz

Ally Bull
New Zealand Council for Educational Research (NZCER)
Email: Ally.Bull@nzcer.org.nz

(Footnotes)

- 1 These numbers are participant codes. All the material in the boxes is quoted verbatim from participants' interviews or reflections.