

Teaching as an Emergent Process in the Context of Learning and Development

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Abstract: Developmental models of learning have not received the degree of attention they deserve, particularly in their implications for teaching. Although developmental models date back to Piaget, and were developed further by Bateson, it is only in more recent times that these theories of learning have come back into focus as important tools in understanding learning. In part, this is thanks to the insights provided by investigation of the phenomenon of the learning organisation. One of the important implications of a developmental approach to learning is that deep learning is an emergent process, rather than a mechanistic process. Although at early stages of development of the learner, learning is and probably needs to be bounded, as the learner develops to maturity as a learner, these boundaries need to become more porous and eventually disappear. If the teacher is to respond appropriately to the changing needs of the developing learner, then they need to embrace teaching as an emergent process, rather than the traditional, structured process that serves well enough for the learner at earlier stages of development.

Keywords: Stages of Development, Teaching as Emergent Process, Learning as Emergent Process, Learning Organisations, Deep Learning

Introduction

WHEN PIAGET (1950) identified developmental transitions in learners, it set the scene for significant changes in the praxis of teaching. This was particularly the case for teaching children, because Piaget only dealt with developmental changes observed in children. Bateson (1972) stands out as one who provided an extension of Piaget's developmental theories into adult learning activities. Unfortunately, Bateson's work and that of other developmental researchers has had minimal impact on the praxis of teaching. Similarly, the work of Vygotsky (1978), who identified the inherent tension between learning and development (being and becoming) has had little impact, at least in the Western world.

In more recent times, contributions from investigators such as Fisher and Torbert (1995), Allee (1997) and Bierly, Kessler and Christensen (2000) have revived interest in theories of development as they impact upon learners and learning. There seems to be a growing awareness that there is a series of developmental changes in learners that impacts significantly on their learning capability.

In no small part, this growing awareness is a response to the phenomenon of the learning organisation and its developments. The way in which Senge (1990) captured the imagination of managers and researchers with *The Fifth Discipline*, had resounding reverberations in renewed interest in adult learning in the context of the work place. One of the important aspects of Senge's learning organisations was the

phenomenon that he called *metanoia*. *Metanoia* is a Greek word that means "a radical change of mind", and implies a quantum change or developmental leap.

Thus, there was renewed attention to the idea of a developmental approach to learning, both for individuals and for collectives (organisations). This developmental approach contains within it the seeds of different learning processes occurring at different levels of development. As the learner develops, their learning becomes a more emergent process, rather than one bounded by constraints imposed either from without or from within the learner.

As the learner develops in this way, the role of the teacher needs to adjust to the emerging capacity of the learner to embrace greater ambiguity. Thus there is an argument that as the learner matures, the teaching process needs to become more emergent. This calls into question the need for teachers to develop or mature as teachers, in order that they can be comfortable with an emergent teaching process.

This paper explores each of these issues in more detail, and draws the conclusion that teacher training needs to be transformed into teacher development. Such teacher development is likely to be a life-long process rather than something that can be achieved in a "one-hit" intervention.

The Origins of Developmental Theories of Learning

The ancient Greeks at first suggested that learning is the process of experiencing the world and building

up a copy of the world in the mind. The fatal flaw with this view is the unreliability of perception. The complexity of the perceptual process makes it probable that the mental world is not a reliable copy of the outside world.

As a consequence, two opposing views developed, and these views (rationalism and empiricism) persist to this day. The contemporary manifestation of the empiricist view of learning is that of behaviourist learning (Skinner, 1976). Piaget (1950) instead espoused the rationalist tradition. Rationalism renounces copy theory altogether and says that real learning has little to do with simply experiencing the world as a passive observer.

For rationalists, the mind actively seeks knowledge and self-perfection; it is not merely shaped by the environment, as empiricists believe. The rationalists' commitment to autonomous internal forces of mental growth and perfection remains today in those psychologists, such as Jean Piaget, who believe that learning alone is insufficient to explain all of human development (Leahey and Harris, 1985: 12).

The extension of the rationalist view of learning led to the distinction of development from mere change.

Werner (1957) made a careful distinction between development and change or growth. Not all change is development, for change may be regressive. Nor is all growth to be regarded as development. A change that does not constitute a qualitative improvement is not development. Werner borrowed the term *orthogenesis* from embryology and defined development thus:

It is an orthogenetic principle which states that whenever development occurs it proceeds from a state of relative globality and lacks differentiation to a state of increasing differentiation, articulation and hierarchic integration (Werner, 1957: 126) (Leahey and Harris, 1985: 356).

Arguably, the most important contemporary enhancement to learning theory, came from the work of Piaget (1950). Piaget shared Werner's general organismic, inner-directed view of human development. He proposed that cognitive development unfolds in much the same way a logical argument unfolds, step by step in a logically necessary sequence of stages and sub-stages. He drew a sharp and significant distinction between empirical knowledge (*learning*) and logico-mathematical knowledge (*development*) (Table 1). In doing so, Piaget seems to have confused process and outcome.

Table 1: Processes and Units of Learning and Development in Piaget's Theory

TYPE OF CHANGE	Learning	Development
FIELD	Figurativity	Operativity
TYPE OF KNOWLEDGE	Empirical	Logico-mathematical
SOURCE	Objects	Actions
TYPE OF ABSTRACTION	Empirical	Reflective
BEHAVIOURAL BASIS	Perception	Schemes (Abstracted actions)
MENTALISATION PROCESS	Internalisation	Interiorisation
MENTAL UNITS	Schemas (Representations, Concepts)	Operations (Mental actions)
PROCESS OF CHANGE	Learning	Assimilation Accommodation Equilibration

Source: Adapted from Leahey and Harris, 1985: 361

By combining aspects of Piaget's learning and development and identifying the outcome as (experiential) learning, Kolb (1984) has called into question whether Piaget's distinction was correct. What Piaget referred to as development, was in fact the outcome of that development. In other words, what he labelled as development was a higher level of learning, which was achieved via a developmental process.

Empirical knowledge has to do with facts - knowledge of the outside world - and how we represent them internally which Piaget called *figurativity*.

Logico-mathematical knowledge has to do with our actions on the world or its internal representations, which Piaget called *operativity*.

Piaget's distinction of development from learning raises the question of whether all references to learning should also include a consideration of development. Vygotsky (1978) clearly endorsed the position that they are linked in a dialectic.

Bateson (1972) extended the staged development theory of Piaget beyond the development of children to incorporate stages beyond Piaget's formal opera-

tions. The significance of Bateson's approach to learning lies in the clarity of the categories he proposed. Bateson (1972: 283) defined learning as an action that denotes change, with change itself denoting, in turn, processes which are themselves subject to change. Included in this view is the idea that all learning is stochastic because it involves trial and error.

Arising from this, Bateson proposed the following four categories of learning:

- Zero Learning: all acts that are not subject to correction.
- Learning One: revision of choice within a given set of alternatives.
- Learning Two: revision of the set from which the choice is to be made.
- Learning Three: revision of a set of sets.

Zero Learning

The key to Bateson's definition of Zero Learning is that it involves minimal change and also the absence of trial and error. Learning therefore means accepting life as it is with learners lacking any propensity to frame and ask questions, with learning itself becoming stereotypical. Reflex responses and habitual behaviour are indications of a person operating at Level Zero.

Learning One

Learning One, in contrast, is a more operational level of decision making, because it involves selecting from a given set of alternatives in responding to an event in a particular way. It also means a form of learning which enables learners to act out the thought processes, although it means people are given jobs to do and they do them. The underlying assumption with Learning One is that knowledge is a commodity that can be stored and transmitted. It is, therefore, an acquisition model of learning, where students learn large amounts of information and they are then tested on their understanding through examination. Chia (1991) referred to this as the acceptance of the universalism and transferability of knowledge.

He further stated:

.... it is like equipping a mechanic with the tools of trade. Problem situations identify themselves unambiguously and hence lend themselves to the appropriate use of tools provided (Chia, 1991: 8).

This approach to learning is very common, with its instrumentalism having its origin in the positivistic scientific paradigm. For the learner, knowledge is external and objective and the world is perceived by learners as being separate from them.

Learning Two

For Learning Two, "self" becomes involved and a different paradigm emerges. It is driven by the following philosophical parameters:

- A firm belief in the assumption that knowledge is about attributing meaning to the world, including self, rather than seeing knowledge as a commodity which exists independently of people and as such stored to be transmitted.
- Education is about the development of the whole person rather than the individual's intellectual potential.
- A greater inter-connectedness between the learner and the world, including other learners.
- Learners choosing their frames of reference in their approach to situations.

Learning is therefore viewed as a process where a learner tests their theory out on the world in order to make sense of it. These processes are the interrelationships between theory and practice whilst also reflecting trial and error. Through this process of making sense of the world by building information into constructs, change occurs, which leads to development of self, thereby creating learning. In this way, Learning Two is about learning how to learn, and as such, it is deeper, because it involves making a decision having considered the sets of alternatives. Having chosen a set from the available sets, the process embraces Learning One, which is focused on the efficiency of learning. Learning Two is about the effectiveness of an operation and is therefore a more strategic level of thinking. It essentially involves a process of challenging beliefs and assumptions, including those of the learner. Everything is therefore open to question.

Learning Three

While the first three levels of learning are relatively easy to illustrate, this is not the case with Learning Three. Bateson saw it as:

... something of the sort that occurs from time to time in psychotherapy, religious conversions, and in other sequences in which there is profound reorganisation of character (1972: 301).

At Learning Three, the "self" is no longer of significance, which is not the case in Learning Two. Bateson described this as follows:

If I stop at the level of Learning Two, 'I' am the aggregate of those characteristics which I call my 'character'. 'I' am my habits of acting in context and shaping and perceiving the contexts in which I act. Selfhood is a product or

aggregate of Learning Two. To the extent that a man achieves Learning Three, and learns to perceive and act in terms of the contexts of contexts, his 'self' will take on a sort of irrelevance. The concept of 'self' will no longer function as a nodal argument in the punctuation of experience (1972: 304).

Understanding oneself is an outcome of Learning Two. Learning processes that facilitate the observation of oneself will lead to Learning Two. Such processes may involve the formulation of new concepts about oneself, or alternatively, making conscious processes that have always been there. Going beyond the context of personality and then examining the contexts that influence the formation of personality traits means self becomes irrelevant. This represents a release from Learning Two, with individuals seeing the world for the first time at Learning Three. The holism within this level means self become integrated.

Developmental Stages

Bateson quite clearly perceived these categories of learning as developmental stages. The achievement of the ability to carry out Learning Two was perceived by him as a quantum leap. Those who had not made that leap were capable only of operating at Learning Zero or Learning One. Similarly, those who had not yet developed the ability to conduct Learning Three had only the three choices of category available to them.

Argyris and Schön (1978) appropriated Bateson's levels of learning and relabelled Learning One as single-loop learning, and Learning Two as double-loop learning. In their research on individual learning, they found that in difficult interpersonal interactions, people see others as causally responsible for (and rarely learn about their own contribution to) the problematic interaction (single-loop versus double-loop learning).

The solutions might become part of the problem unless we understand the *origins* of the problem we are trying to solve (Steiner, 2001: 150).

Meanwhile, Vygotsky (1978) was a Soviet psychologist working as a contemporary of Piaget. His work became a victim of Stalinist repression and came under severe attack during the last years of his life and was suppressed after his death. He was first published in the U.S.A. in 1962 and has only become an established part of education research over the past two decades. Vygotsky, in his book *Mind and Society*, rejected three older views of education:

- The purely maturational view which suggests that a child's individual level of mental development constitutes a prerequisite or precondition for learning to take place;
- The view that learning and mental development are synonymous; and
- The mind as a network of generalised rather than specific capabilities where the mind was assumed to be like a muscle that when exercised in a given area of knowledge would produce learning elsewhere.

To Vygotsky, learning was both the source and the product of development, just as development was both the source and the product of learning. Learning and development are an inseparably intertwined and emergent activity, best understood together as a whole. Their relationship is dialectic, not linear or temporal (one doesn't come before the other) or causal (one isn't the cause of the other). Learning leads development, Vygotsky said, but "development in children never follows school learning the way a shadow follows the object that casts it" (1978: 91).

Vygotsky's view that the mind is a network of specialised rather than generalised capabilities has been supported by Gardner's (1983) work on multiple intelligences.

Among Vygotsky's many contributions was a demonstration (through ingenious experimental work with children) that learning is social and learning ("worthy of the name") is inseparable from development. His work revealed learning as a continuously emergent social activity. This is quite different from the standard dualistic model of an individual learner acquiring objective knowledge.

Unfortunately, the mainstream of learning theory and praxis has embraced the empirical approaches to learning. In many contexts, operant conditioning is equated with learning, and the rationalist theories have had to mount a rear-guard action to remain visible. It is, therefore hardly surprising that these and other developmental theories of learning have rarely been put into practice. Fortunately the tide seems to be turning in favour of the rationalist (and developmental) approaches to learning theory and praxis.

Recent Developments

One of the most important aspects of cognitive development is the proposition that as one traverses developmental stages, the learning options increase. That is, the propositions of Piaget (1950) and Bateson (1972) need to be expanded, while at the same time the propositions of Vygotsky (1978) should be accommodated. Until the relevant developmental transformation takes place in the learner, they are incapable of double-loop or Level Two learning.

Thus, they are incapable of reflecting appropriately on their mental models until they have moved to the Level Two state-of-being. This is consistent with Vygotsky’s view that “learning leads development” (1978: 91).

Similarly, the learner who has not yet moved into Level Three learning is incapable of systems thinking, which requires yet deeper reflection and conceptualisation than the capability of a Level Two learner. A Level Four learner is capable of reviewing their value systems, whereas those at lower levels are not.

This pattern of learning *vis a vis* development is implied in Allee’s (1997) knowledge archetype and Bierly *et al*’s (2000) levels of knowledge, as well as in Loevinger’s (1976) levels of ego development.

Fisher and Torbert (1995) have argued that it is a vital contribution to the comprehension of the learning organisation. Their research indicated clearly that the transformation into a learning organisation is contingent upon the individual development of the leaders of the organisation.

Bierly *et al* (2000) addressed the issue of development using the common framework of data, information and knowledge as distinct levels of comprehension, and added a fourth level that they called wisdom. Using Bloom’s (1956) taxonomy of educational objectives as a reference point, they proposed four levels of learning (Table 2), which align roughly with Bloom’s hierarchy, albeit by combining some levels of the taxonomy.

Table 2: Distinctions between Data, Information, Knowledge and Wisdom

Level	Definition	Learning process	Outcome
Data	Raw facts	Accumulating truths	Memorisation (data bank)
Information	Meaningful, useful data	Giving form and functionality	Comprehension (information bank)
Knowledge	Clear understanding of information	Analysis and synthesis	Understanding (knowledge bank)
Wisdom	Using knowledge to establish and achieve goals	Discerning judgements and taking appropriate action	Better living/success (wisdom bank)

Source: Bierly *et al*, 2000: 598

These distinctions made by Bierly *et al* provide a useful means of discriminating not just different levels of “knowledge” but also the associated “learning” process as well as the outcome of each process in the form of a “bank” that can be drawn upon as input for the next higher process. They also provide support for the levels of learning concepts of Bateson (1972) and Argyris and Schön (1978).

Allee (1997) addressed the same issue and proposed that there were another three forms of “knowledge”. Two of these she interposed between knowledge and wisdom, in the guise of meaning and philosophy, and the other, union, beyond wisdom. In effect, she has redefined the Bloom taxonomy in its original form, and added union. She proposed the following knowledge archetype:

1. *Data* floats like so many whitecaps in a larger sea of Information. Data becomes information through linking and organising with other data.
2. *Information* becomes knowledge when it is analysed, linked to other information, and compared and contrasted to what is already known.
3. *Knowledge* operates in the larger social context of meaning, which encompasses archetypal

patterns and forces, as well as our social and cultural biases, prejudices, and interpretations.

4. *Meaning* is embedded in the larger and more abstract realm of philosophy, which is the broad territory of assumptions, theories, and beliefs about how things work.
5. *Philosophy* is typified by systems thinking and is embedded in the even more inclusive wisdom perspective of values.
6. *Wisdom* enfolds our value and purpose and encompasses the totality of our worldview.
7. *Union* is an open expansive feeling state of oneness enabled by the intellect that allows us to understand and change our values in relation to the ultimate goal (Allee, 1997: 62).

In this view, every aspect of knowledge is interdependent with each of the others. There is a cultural temptation to apply a hierarchical framework to the archetype, and indeed Allee, perhaps unconsciously, succumbed to this temptation initially by illustrating her archetype with a series of concentric circles. It should be noted, however, that she perceived union as the pinnacle of her knowledge archetype, and subsequently illustrated it as shown in Figure 1. In this learning framework, as she named it, universal

consciousness is the integrating context for all of the components.

While it is self-evident that data is processed to create information and that is placed in context to create knowledge and so on, it is less obvious that the values and purposes, as part of the wisdom aspect, influences the data that it is chosen to collect, and the particular methods of analysis, linking and comparison that are applied to that data. In turn, the

data that is collected will provide feedback to the information, knowledge, meaning and philosophy structure that are in place, allowing a validation of their appropriateness or challenging that appropriateness, as the case may be. The recognition of this reciprocity cautions against the conventional wisdom that learning is a linear process commencing with the collection of data, and concluding with the creation of meaning.



Figure 1: Allee's Learning Framework

Allee acknowledged that the different modes of knowledge do form a continuum of increasing complexity and integration. This implies that there are different learning, information processing and other

dynamics for each one. The conversion of data into information is quite different from the conversion of information into knowledge, and so on.

Table 3: Learning and Performance Framework Reference Chart

Knowledge	Learning	Action Type	Performance Focus
Data	Instinctual (Sensing)	Data	Feedback (Gathering information)
Information	Single-loop (Action without reflection)	Procedures	Efficiency (Doing something the most efficient way)
Knowledge	Double-loop (Self-conscious reflection)	Functional (Doing it the best way)	Effectiveness
Meaning	Communal (understanding context, relationships, and trends)	Managing (Understanding what promotes and impedes effectiveness)	Productivity
Philosophy	Deutero (Self-organising)	Integrating	Optimisation (Seeing where an activity fits in the whole picture)
Wisdom	Generative (Value driven)	Renewing	Integrity (Finding or reconnecting with one's purpose)
Union	Synergistic (Connection)	Union	Sustainability (Understanding values in greater context)

Source: Adapted from Allee, 1997: 67-8

Allee proposed that her knowledge archetype can be extended to incorporate different kinds of learning and performance foci for each mode of knowledge. These are summarised in Table 3. Interestingly, she makes a distinction between double-loop learning and generative learning, which are often treated as synonyms by others. Allee claimed that:

in order to be a high-performing learning organisation, work processes must incorporate conscious and deliberate attention to every aspect of knowledge. Unlike linear models that impose a particular order of activity, this framework helps illuminate the natural learning patterns that underlie work processes, human behaviour, and organisational systems (1997: 70).

Thus, it seems that generating, capturing, storing, sharing and using knowledge is not at all a simple process. The essential meaning of the concept of knowledge is such that it traverses depths that go beyond the scientific search for truth. “Humans seem condemned to meaning, condemned to find value, depth, care, concern, worth, significance to their everyday existence” (Wilber, 1998: xi).

Each of these proposals implicitly support the developmental perspective of learning. Each, in its own way, recognises that different learning processes are required for different levels of development. The developmental perspective was given further impetus by the development of ideas about the learning organisation.

The Learning Organisation

Garratt was the first to publish a book entitled *The Learning Organisation*, in 1987, in which he developed a model of the learning organisation. Although the desire to create organisations that are capable of conscious and continuous learning can be traced to antiquity, “all the necessary conditions to create both the intellectual and practical basis of a learning organisation were in place by 1947” (Garratt, 1995: 25).

However, it was Senge’s *The Fifth Discipline* that provided the launching pad for the increasing popularity of the concept of the learning organisation, even though it post-dated Garratt’s book by three or four years. Senge (1990) described the learning organisation as the idea most likely to preoccupy managers in the coming years.

Senge’s learning organisations were “organisations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together” (1990: 7).

He also defined it implicitly with his five “disciplines”. A discipline is “a body of theory and technique that must be studied and mastered to be put into practice. A discipline is a development path for acquiring certain skills and competencies” (Senge, 1990: 10). Senge’s learning organisation:

1. has a shared vision;
2. promotes personal mastery;
3. recognises its mental models;
4. encourages team learning; and
5. applies systems thinking in its approaches to planning and problem solving.

Personal mastery is the only truly individual characteristic in the Senge model. Personal mastery is something that can be achieved only by the individual, although there are facilitating structures and systems that can promote its development. In some respects, the development of personal mastery is reminiscent of spiritual development as practiced in most of the world’s religious traditions. “Personal mastery is the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience and of seeing reality objectively” (Senge, 1990: 7).

Systems thinking has the distinction of being the fifth discipline because it serves to make the results of the other four disciplines work together for organisational benefit. Systems thinking is based on system dynamics; it is highly conceptual; it provides ways of understanding practical organisational issues; it looks at systems in terms of particular types of cycles (archetypes); and it includes explicit system modelling of complex issues. “Systems thinking is a conceptual framework, a body of knowledge and tools that has been developed over the past fifty years, to make the patterns clearer, and to help perceptions of how to change them effectively” (Senge, 1990: 7).

The essence of systems thinking lies in what Senge called *metanoia* - a radical shift of the mind, which will allow seeing inter-relationships rather than linear cause-effect chains, and seeing processes of change rather than snap-shots. Once again, he has moved into the arena of spiritual development, by using the Greek word *metanoia*, commonly used in Christian discourse on spiritual development in association with conversion experiences.

A Developmental Model of Learning

When the insights of the various theories of learning and development are combined, it remains difficult to isolate the essence of individual learning. Bierly *et al* (2000) and Allee (1997) suggest that there are different levels of learning connected to different levels of knowledge. Gardner’s (1983) theory of multiple intelligences implies that learners have

varying degrees of capacity to learn different kinds of things, and Kolb (1984) suggests that there are different ways of learning depending on the intended outcome of the learning, as well as the learning preferences of the learner. The process of learning will therefore be contingent on these variables and more. The stage of development of the learner, for example, will constrain, but not eliminate, their ability to engage in some kinds of learning.

The degree of complexity implied in the various approaches to and theories of individual learning is extended by theories of social learning. Social learning theory builds on Bateson's (1972) theory that meaning is derived only through relationships. Learning takes place only in the relationship between learner and the object of learning. However, social learning theory has mainly been constructed on the foundation of Vygotsky's (1978) socio-cultural theory. He maintained that all cognitive learning occurs at the social level before it becomes learning at the individual level.

One way to make sense of this complexity is to embrace a developmental model of learning. Such a developmental model recognises that there are different kinds of learning. Some examples of recognition of such different kinds of learning are: Bateson's (1972) levels of learning; Kim's (1993) distinction of conceptual and operational learning; Allee's (1997) learning and performance framework; the UNESCO pillars of education which include learning to know, learning to do, learning to live together and learning to be (Collinson and Cook 2007); and Bawden and Zuber-Skerritt's (2002) distinction of learning about; learning to do; and learning to be.

It is possible to distinguish four major categories of learning, three of which can be further subdivided. Each of these sub-categories of learning represents access to a higher level of development as a learner, and/or access to a deeper level of consciousness (Wilber, 1998):

1. Learning to do something (operational learning):
 - a. Reflexive learning (stimulus-response learning);
 - b. Impulsive learning (stimulus-decide-response learning); and
 - c. Opportunistic learning (stimulus-decide-imagine-response learning);
2. Learning about something (conceptual learning);
3. Learning to be someone (humanistic or experiential learning):
 - a. Diplomatic learning (learning to be in relationships);
 - b. Expertise learning (learning how to apply a body of knowledge in familiar contexts); and
- c. Achievement learning (learning how to apply a body of knowledge in unfamiliar contexts);
4. Learning to become someone (developmental learning):
 - a. Strategic learning (thinking outside the square or double-loop learning);
 - b. Alchemic learning (thinking outside the outside of the square or triple-loop learning – accessing the personal unconscious); and
 - c. Mystic learning (tapping into the collective unconscious).

As the learner develops, they more readily access the categories with higher numbers. However, it is important to recognise that the learner is capable of accessing even the highest level (mystic learning) before they have become capable of habitually accessing that level. Thus development represents an increase in the probability that a higher level of learning, accessing a deeper level of consciousness, will be engaged by the learner.

As the kind of learning being engaged moves to a deeper level, it becomes less bounded by structures and rules and more emergent and creative. It is appropriate for lower levels of learning to be bounded by rules and structures, to ensure that the learner survives and is able to operate successfully in the culture of their society. The challenge to teachers is to break free from such bounded learning situations as the learner develops.

Teaching as an Emergent Process

If the teacher is to respond appropriately to the changing needs of the developing learner, then the teacher needs to embrace teaching as an emergent process. It will not serve the learner for the teacher to continue to embrace the traditional, structured process that serves well enough for the learner at earlier stages of development. This point is well argued by Lucas (2003), who identifies four different roles for teachers (and parents) as a child develops their cognitive skills. These roles are: custodian (of knowledge); mediator (of learning); monitor (of learning); and mentor (of the learner). Similarly, Cambron-McCabe and Dutton (2003) identify three models of teaching: transmission; generative; and transformative. In between transmission teaching and generative teaching, it can be argued lies a fourth model, that of exposition (problem-based) teaching.

However, if we are able to identify ten different kinds of learning, as suggested above, then it seems appropriate to identify as many different kinds of teaching. Each kind of learning will respond best to an aligned kind of teaching (Table 4). Thus, at the operational level, reflex learning will respond best to reinforcement or behavioristic teaching, impulsive

learning to structured training regimes (rote); opportunistic learning will respond best to instructional approaches. At the conceptual level, expository approaches to teaching are appropriate, and the role of the teacher is to guide the learner through appropriate thinking processes. At the humanistic or experiential level, diplomatic learning will respond best to a

nurturing approach to teaching; expertise learning to a master/apprentice approach; and achievement learning to a coaching approach to teaching. Finally at the developmental level, strategic learning will respond to facilitative teaching; alchemic learning to mentoring; and mystic learning to servant approaches to teaching.

Table 4: Kinds of Learning/Kinds of Teaching

Kind of Learning		Kind of Teaching	
Category	Sub-category	Category	Sub-category
Operational		Transmission	
	Reflex		Reinforcement
	Impulsive		Training
	Opportunistic		Instructing
Conceptual		Exposition	Guiding
Humanistic		Generative	
	Diplomatic		Caring
	Expertise		Master
	Achievement		Coaching
Developmental		Transformative	
	Strategic		Facilitating
	Alchemic		Mentoring
	Mystic		Service

A critical appraisal of Western education systems will identify that there is much more transmission kinds of teaching than humanistic or transformative, even at the highest levels of university education where it should be anticipated that developmental learning is the primary focus.

This raises two important issues that need to be addressed. The first is the preparation of the teacher, who needs to make the transition from reinforcer to servant. The second is the exploration of processes that not only allow the learner to embrace higher levels of learning, but encourages them to do so.

The perhaps too obvious response to the first issue is that the teacher needs to develop their own higher learning capacity. In parallel with the traditional emphasis on the teacher's expertise in the content area of the object of study, there needs to be an emphasis on the teacher's expertise in the area of process. If the teacher is not at the same or a higher level of development than the learners, s/he is unlikely to "trust the process". The consequence of such a lack of trust is likely to be regression of the process to that appropriate for a lower level of learner development, where the teacher feels comfortable (and the learners more or less bored).

Apart from life experience, the greatest of teachers, there is a range of interventions that a teacher

may access in order to facilitate their own development. These include the "courage" activities identified by Palmer (1998) in *The Courage to Teach* and further developed by him and others in other publications and workshops which operate under a variety of names in Australia, Canada and the USA. They also include the Community Building Workshop devised by Peck (1987), as well as the Developmental Action Inquiry process presented by Fisher and Torbert (1995). Spiritual activities such as individual meditation and retreats offered by a variety of religious persuasions are also indicated as appropriate ways to access developmental opportunities. All of these provide an excellent context in which to experiment with and reinforce higher levels of consciousness.

As far as process is concerned, Palmer (1998) and others have encouraged the use of learning circles as a more appropriate tool for learning, particularly in the realms of advanced levels of development. Problem-based learning and action-learning provide frameworks that can be appropriate for the middle range of learners, but tend to be too structured for the most advanced learners.

Other techniques that can be useful in the context of accessing higher levels of learning include the Technology of Participation and Open Space Tech-

nology and similar large-group interventions (Bunker and Alban, 1997).

Each of these techniques allows and encourages learning (and teaching) to become an emergent process, and hence more appropriate for learners at higher levels of development. In addition, they allow and encourage developmental transformations in the learners (and teachers).

Conclusion

Despite the rigorous experimental work conducted by Piaget (1950) and Vygotsky (1978) in the early part of the Twentieth Century, and further enhanced by Bateson (1972), there has been little impact of developmental theories on the praxis of teaching until recent times.

Contributions from investigators such as Fisher and Torbert (1995), Allee (1997) and Bierly *et al* (2000) have revived interest in theories of development as they impact upon learners and learning. This paper has suggested a growing awareness that there are a series of developmental changes in learners that impact significantly on their learning capability.

The learning organisation popularised by Senge (1990) focused significant energy on a renewed interest in adult learning in the context of the work place. One of the important aspects of Senge's learning organisations was the phenomenon that he

called *metanoia*. *Metanoia* is a Greek word that means "a radical change of mind", and implies a quantum change or developmental leap.

This emphasis on *metanoia* renewed interest in the idea of a developmental approach to learning, both for individuals and for collectives (organisations). This developmental approach suggests different learning processes are appropriate at different levels of development. As the learner develops, their learning becomes a more emergent process, rather than one bounded by constraints imposed either from without or from within the learner.

As the learner develops in this way, the role of the teacher needs to adjust to the emerging capacity of the learner to embrace greater ambiguity. Thus there is an argument that as the learner matures, the teaching process needs to become more emergent. This implies the need for teachers to develop or mature as learners and teachers, in order that they can be comfortable with an emergent teaching process.

This paper has explored each of these issues in more detail, and draws the conclusion that teacher training needs to be transformed into teacher development. A number of appropriate pathways for that development have been identified in the paper. Such teacher development is likely to be a life-long process rather than something that can be achieved in a "one-hit" intervention.

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