

Reconceiving Educational Systems and Processes: Toward a Philosophy of Transformative Learning and Transformative Education

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1. Introduction: some philosophical preliminaries

Thinking philosophically and transformative learning

In the university I teach philosophy. My aim is not merely for students to learn *about* philosophy, but is particularly to foster students' *thinking philosophically*. By *thinking philosophically* I mean investigation of ideas, their sources, contexts and implications, and the values and value-contexts (natural, sociocultural, historical, institutional, interpersonal and personal) with which they are associated. Such investigation is primarily conceptual, but needs to be empirically well-informed. Thinking philosophically is important wherever ideas matter, and is done by all deeply thoughtful people. But whereas thinking philosophically may be subsidiary in other fields of inquiry, it is of course the primary focus (and ought to be the primary goal) of university philosophy subjects.

It is a great deal easier to learn (a little!) *about* philosophy – viewed as “the product” of thinking philosophically, as what philosophers have said and thought – than it is to think philosophically; for in thinking philosophically not only are there techniques to be learned, discovered and practiced, but one also becomes peculiarly *vulnerable*. This comes about because one's honest inquiry into values and value-contexts may challenge one's own values, commitments, theories and (value-imbued) factual assumptions – and this is discomfiting. However, in learning to think philosophically one must learn to open oneself to this vulnerability – indeed one cannot even learn much *about* philosophy without meeting this challenge – that is, without entering *as philosophical participant* into the realm of inquiry whose “products” one seeks to understand.

Whoever takes this step into thinking philosophically has his or her outlook transformed. Recognition that it is possible / permissible / advisable / necessary to think philosophically is transforming. Immersion in the *process* of thinking philosophically may be transforming. All philosophical traditions have recognised and embraced transformation inherent in thinking philosophically, as have thinkers as different in their views as Socrates and Nietzsche, Epicurus and Kant, Śāṅkara and Bertrand Russell. And when (as today) suspicion is cast on traditions, their assumptions, and the complicity of ideas in relations of power (e.g. Foucault 1972 & in Rabinow 1984), it is through entering philosophically into dialogues of critique that we come to fuller awareness of what we are, have been, and can become. It is the continuing transformative power of thinking philosophically – in the lives of individuals, cultures and traditions – that makes philosophy a continuing source of value.

Because my own focus as a teacher is the fostering of students' philosophical thought and their embrace of an “examined life”, I have made this the beginning of my discussion of transformative learning. But it is also an indication that my investigation

of transformative learning is to be philosophical, and is undertaken as part of a personal project to philosophically reconceive educational systems and institutions.

Education, values and transformative learning

The transformation which characterises transformative learning is of the learner's *meaning perspective* (Mezirow 1991; 2000; 2003) – the learner's way of knowing, understanding, or making sense of something and of relating to it. I shall discuss later the views of several theorists regarding the forms taken by transformative learning. First though I want to consider more generally its roles in education – particularly in university education.

A system of education is more than a system of learning, and to be an educated person is more than simply to have learned much. The difference between merely learning much and being educated is that an education is learning shaped by values apt for the flourishing of a society and its people. Education fosters awareness of those values, their importance, how they came to arise, are exemplified and may be furthered, and promotes their inculcation. Of course, the details and character of an education may vary socioculturally and historically, as circumstances and culturally-shaped and -shaping values differ. My object here is not to investigate definitions of education but is rather to note its close connection with conceptions of sociocultural flourishing, a connection made explicit by many major educational thinkers in the Western tradition – despite their different conceptions of what sociocultural (and individual) flourishing may be – compare, for example, Plato's (1963) *Republic* with Dewey's (1958) conception of a democratic education for democratic flourishing.

Flourishing is essentially a value-laden and context-sensitive concept. It is more than mere continuance and more than viability; but it needs to be an achievable possibility rather than a utopian ideal. People and peoples have led, and many today do lead, flourishing lives. But they have not done so without effort, or without thoughtful concern for the future and their roles in creating or securing it, and for the circumstances of the present and past which make it possible. These remain the active concerns of education. Nor is flourishing a state of mere equilibrium into which a “well balanced” society or individual settles, for strictly speaking (that is, scientifically) equilibrium is a state in which all useful work has ceased. Rather, flourishing is a process of continual activity, not merely of “enjoying”, but of maintaining, re-making, and when necessary re-thinking the sociocultural and socionatural relationships which make it possible. I will later argue that to understand the conditions for our flourishing, conditions of dynamically maintained resilience which occur far from equilibrium, we need to reconceive them in terms of emerging scientific and philosophical understandings of complex processes. Moreover, because complexity theory *is* the science and philosophy of transformation, it appropriately contextualises understandings of transformative learning and transformative education.

Given that personal, interpersonal and sociocultural flourishing ought to be goals of education, and that these goals involve some of our deepest values, values-*education* must be part of education. Values-education will include, but will by no means be restricted to, matters of moral development and moral education. Epistemological values too – concern for truth, inquiry, sound reasoning, attentive observation, appropriate testing, judicious critique, dialogue and co-operation, cultivation of imaginativeness and

insight, preservation and increase of understanding, aptness and effectiveness of explanation, clarity and elegance of conception – must be fostered educationally. And despite the suspicion in which aesthetic values (mistakenly viewed as merely matters of personal taste) are still held, education must have regard to these too – most particularly to the implicit poetics and “logics” of narrative and metaphor, and their relation to both epistemological and moral values (and to our deepest self-understandings).

Values-education should not be mere socialisation, training or indoctrination; it should not foster unreflective, uncritical or unimaginative acquiescence in any system of values. Rather, its progress should be marked by development of capacity and respect for what Socrates termed an ‘examined life’, a development which need not cease while one still breathes and is blessed with the power to reflect and question. Values-education will seek to foster such a life not only in one’s personal reflection, but in one’s involvement in an actively reflective community (or involvement in the creation of such a community). It thus has political as well as personal dimensions – political in Aristotle’s (1980) sense of active civic participation (and not the present debased sense in which “politics” is thought to be something that happens elsewhere, and is conducted by others on one’s behalf).

Values-education will foster regard for learning as *itself* a value. For without regard for learning one will never lead an examined life, and never a life of flourishing, or contribute (except by accident) to anyone else’s flourishing, or learn anything of value except grudgingly, uncaringly or by accident. Moreover, as we live in times of great change, a period in which it is more than ever important to *learn how to learn*, this too will be fostered educationally both as capacity as a value. Learning (better) how to learn is part of personal, interpersonal and social flourishing and is an indispensable aspect of genuine education. Moreover, learning how to learn is *transforming* of the learner’s relationship to further learning and is the foundation of the lifelong learning which characterises personal flourishing. Learning how to learn – meta-learning – is thus important for transformative learning.

In my view, transformative learning and transformative education are best understood holistically. As a contribution to such an understanding, I will offer here an argument for an holistic understanding of values-education, and a sketch of its relation to transformative learning. The approach I take is in terms of the idea of virtues or excellences of character. This is not simply (or even primarily) because I think that moral philosophy is best conceived in these terms – although that is my view. Rather, it is because there are particular advantages of viewing moral education, and values-education generally, in these terms (see e.g. Crittenden, 1978). Moral development may be fostered more comprehensively as integrated qualities of character (see below) than as conformity with rules and principles whose relationships may be obscure to the learner. Furthermore, there is in general less contention over what qualities are indeed virtues than there is over moral rules and principles: moral education must successfully navigate through shoals of cultural difference. Relatedly, a virtues-based approach permits those learners who are so inclined to treat rules and principles as the foundation of virtue, while those not so inclined may treat them as moral “trainer wheels” or simply as preservatives in times of temptation. The merit of a virtues-based approach is even more obvious regarding epistemological values, which need to be internalised (that is, *as* virtues) in order that one become an honest, fair-minded, attentive, accurate and

insightful observer, inquirer, reasoner, communicator or collaborator. Such an approach to values-education can more readily be made inclusive of different modes of moral development and moral reasoning (or as Gilligan 1982 calls them, different moral ‘voices’) and, more generally, is well adapted to the variety of learning styles one finds among any group of learners.

To see the advantages of a virtues-based conception of transformative learning and transformative education (education understood as essentially requiring transformative learning) we might consider the theory of Aristotle’s *Nicomachean Ethics* (1980). For Aristotle, the foundation of personal and civic life was the citizen’s development of *the virtues* – excellences of character constitutive and productive of *eudaimonia* (Aristotle’s term for his conception of human flourishing). We would not agree today with Aristotle’s inclusion of such traits as ‘magnificence’ among the virtues, and we would do well to reconstitute a theory of virtues on non-elitist, non-sexist and culturally more inclusive lines. But from Aristotle’s conception of the virtues we may derive an understanding of great relevance to transformative learning and to education. Aristotle argues that each virtue is the ‘mean’ between two vices – one of ‘deficiency’, one of ‘excess’, such as courage being the ‘mean’ between its ‘deficiency’, cowardice, and its ‘excess’, rashness. But this is sometimes found puzzling, for *where* and *how* is this ‘mean’ to be found? – Aristotle does not make this sufficiently clear. There is no formula; but if we understand the virtues *holistically* – each virtue being dependant upon and implicated in other virtues – there is a way of deciding. Consider, for example, virtues implicated in courage. These include concern for the real facts (the truth) of one’s situation, honesty with oneself, personal integrity and consistency, steadfastness, regard for one’s obligations (to ignore which may be cowardly or rash), loyalty to others and concern for others’ well-being, rational self-regard, and so forth. ‘Excess’ or ‘deficiency’ in any of these implicated virtues will entail ‘excess’ or ‘deficiency’ with regard not only to courage, but to other implicated virtues also. Thus the ‘mean’ for the virtue of courage will be that “location” on its continuum (between ‘deficiency’ and ‘excess’) such that virtues implicated in it, or in which it is implicated in the case under consideration, are likewise optimised. I am not suggesting we adopt Aristotle’s model, but rather that by interpreting it in this way we can clearly see the interdependence and holistic integration of the virtues. This must be of prime concern for values-education. For whenever in the course of values-development or values-based deliberation one’s conception of some aspect of values themselves comes into question (as happens in moral development and in the course of an examined life), any alteration of one’s conception will have consequences for one’s interpretation of other values; if the former changes it will thereby produce or predispose an holistic transformation of one’s perspective on values more generally.

As we will see, transformative learning theory and practice are pervaded by notions of requisite virtues and implicated values (e.g. Mezirow, 1991, 2000, 2003). And were it not for the holistic interdependence of these virtues and values, transformative learning, understood as *integrated transformation* of meaning-perspective (which thereby necessarily includes intimations or apprehensions of the importance, significance or value of matters attended to) would be impossible.

“Graduate attributes” as educationally inculcated values

Many universities today require that their programs, courses and subjects foster in students a set of “Graduate Attributes”. At Swinburne University of Technology these are that graduates be:

- *Capable in their chosen professional, vocational or study areas;*
- *Able to operate effectively and ethically in work and community situations;*
- *Adaptable and able to manage change;*
- *Entrepreneurial in contributing to innovation and development in business, workplace, or community; and*
- *Aware of the natural, socio-cultural and economic environments in which they participate.*

These attributes are not to be mere potentials. Rather, to possess them, students must already be practised in *exemplifying* them, and have internalised them as (professional) virtues. Moreover, graduates will possess these attributes and the adaptability required for them only if they have effectively learned *how* to learn. These requirements are reflected in the structure and assessment of courses, programs and subjects.

In many (probably most) cases, albeit in varying ways, students’ acquirement of the desired attributes will have required some transformative learning. I lack space to argue this in detail, so I must leave it to the reader to ponder the implausibility of these attributes being all acquired without some significant transformation of most students’ meaning-perspectives – including their outlook on life, self-conceptions, integrated abilities, understandings, and life-plans. (I refer the reader particularly to the sixth type of transformative learning discussed in my next section.) However, if this is so, then in addition to considerations relating to particular fields of learning and their requirements (and I am certain that within the university there are many fields in which transformative learning is essential or desirable), the university has further reason, in its requirements regarding graduate attributes, to ensure that its systems and educational processes are apt for promoting transformative learning.

I will return to these issues briefly but more generally in the penultimate section of my paper, in which I begin to develop an understanding of the complexity and health of educational systems.

2. Modes and means of transformative learning: a philosophical discussion

Transformative learning is not easy to characterise, and should probably be deemed a contested concept. Nonetheless, in the empirical literature clear instances are readily identifiable, as perhaps they are among one’s own students. It is learning which is not merely “more of the same”, and not merely ‘informational’ (Kegan 2000: 48) but involves challenge to prior ways of thinking, feeling or acting – a significant change of outlook which shows itself in thought and action. Impetus for transformative learning theory came initially from two directions. The first was from explicitly political critique and “consciousness raising” in response to entrenched forms of political oppression – such as in feminist critique of patriarchy (and the entrenchment of patriarchy in

educational institutions and expectations) and in grassroots peasant movements associated with Paulo Freire's (1972) liberatory 'pedagogy of the oppressed'. The second was from Jack Mezirow's empirical and theoretical studies of transformative learning (particularly Mezirow 1978 & 1991). I shall begin my discussion by examining Mezirow's current view of transformative learning, endorsing its broad outline but arguing that Mezirow unduly restricts the scope of his definition and model of transformative learning by bringing to it conceptions of intelligence, rationality and reflective judgement which are too narrow. After next briefly surveying four further types of transformative learning which have been identified by other theorists and practitioners, I will argue that there is reason to distinguish a sixth type which has so far gone unrecognised in the literature.

Mezirow's theory of transformative learning

Over the course of twenty-eight years Mezirow has developed and somewhat amended his view of transformative learning, but in three essentials it is unchanged. Essentially, he thinks, the transformation is of the learner's 'perspective' or 'frames of reference', where:

Perspective transformation is the process of becoming critically aware of how and why our assumptions have come to constrain the way we perceive, understand, and feel about our world; changing these structures of habitual expectation to make possible a more inclusive, discriminating, and integrating perspective; and, finally, making choices or otherwise acting upon these new understandings (Mezirow 1991: 167).

Or as Mezirow has put it more recently:

Transformative learning is learning that transforms problematic frames of reference – sets of fixed assumptions and expectations (habits of mind, meaning perspectives, mindsets) – to make them more inclusive, discriminating, open, reflective, and emotionally able to change (Mezirow 2003: 58).

A frame of reference is a "meaning perspective," the structure of assumptions and expectations through which we filter sense impressions. It involves cognitive, affective, and conative dimensions. It selectively shapes and delimits perception, cognition, feelings, and disposition by predisposing our intentions, expectations, and purposes. It provides the context for making meaning within which we choose what and how a sensory experience is to be construed and/or appropriated. (Mezirow 2000: 16)

[Problematic, t]aken-for-granted frames of reference include fixed interpersonal relationships, political orientations, cultural bias, ideologies, schemata, stereotyped attitudes and practices, occupational habits of mind, religious doctrine, moral-ethical norms, psychological preferences and schema, paradigms in science and mathematics, frames in linguistics and social sciences, and aesthetic values and standards (Mezirow 2003: 59).

Secondly, Mezirow has continued to hold that transformation is accomplished essentially through the agency of self-consciously critical rationality:

Transformative learning is coextensive with rationality in instrumental and communicative learning...

Transformative learning involves critical reflection of assumptions that may occur either in group interaction or independently. Testing the validity of a transformed frame of reference in communicative learning requires critical-dialectical discourse. Habermas's concept of emancipatory learning is here interpreted as the process of transformative learning that often takes the form of task-oriented problem solving in instrumental learning and critical self-reflection in communicative learning.

Critical reflection requires understanding the nature of reasons and their methods, logic, and justification. Transformative learning is metacognitive reasoning involving these same understandings but, in addition, emphasizes insight into the source, structure, and history of a frame of reference, as well as judging its relevance, appropriateness, and consequences (Mezirow 2003: 61).

Thirdly, from his own empirical studies Mezirow has identified a multi-stage process through which transformative learning proceeds. While he allows that there may be variations from the following ten-stage model (Mezirow 1995: 50; 2000: 22) he thinks it captures what typically happens in transformative learning:

1. Experiencing a disorienting dilemma
2. Self-examination with feelings of fear, anger, guilt or shame
3. Critical assessment of assumptions
4. Recognising that one's discontent and the process of transformation are shared
5. Exploration of options for new roles, relationships and actions
6. Planning a course of action
7. Acquiring knowledge and skills for implementing one's plans
8. Provisionally trying out new roles
9. Building competence and self-confidence in new roles and relationships
10. Reintegrating one's life on the basis of the new perspective

There has been some empirical confirmation of the general outline of Mezirow's view of transformative process, but also some disconfirmation of both the number and order of its discernible stages. (For a survey and discussion of relevant studies see Taylor 1998: 39-43. For a study of learners' metacognitive awareness of stages in their perspective transformation see King 1998.) I am not surprised that many studies found evidence of recursion and cyclical iteration in some learners' transformative process (Taylor 1998: 40). This accords well with my own personal experience of transformative learning, and with my understanding of the effectiveness of cyclical forms of inquiry such as action-learning/action-research (Zuber-Skerritt 1993) and hermeneutic interpretation (G. Taylor 1993). However, it is with Mezirow's view of the essential role of self-consciously critical reason in transformative learning that I will mostly be concerned here.

Some (repairable) shortcomings in Mezirow's theory of transformative learning

Mezirow's field is *adult* education. And he thinks that transformative learning is peculiar to *adult* learning because whereas reasoned critique of *assumptions* is not restricted to adults, critical *self*-reflection on assumptions – that is, 'becoming critically aware of how and why our assumptions have come to constrain the way we perceive, understand, and feel about our world' (Mezirow 1991: 167; and 1998) – betokens mature competencies, outlook and values. Now, although I politely refer to the cohort of younger students in my first-year university philosophy classes as 'young adults', in some cases this is little more than an honorific term – some students are by no means adult (and some are happy to admit it). Yet some of these, although in certain respects immature, do show themselves capable of critically *self*-aware reflection on their assumptions – as certainly I would hope of them, given that we begin the semester by considering Socrates' and Sartre's conceptions of an 'examined life' and what it might mean to live (or to refuse to live) such a life. This makes me somewhat suspicious of the detail of Mezirow's conception of transformative learning, for by semester's end, a few of these students do appear to have undergone, or to be in the process of self-consciously undergoing, a transformation of meaning-perspective.

I really do wonder whether Mezirow has given due consideration to the self-aware *philosophical* capabilities of adolescents – and perhaps even of younger children under appropriately arranged dialogical conditions, such as those of classroom philosophical discussions based on the 'Philosophy for Children' model, where (as I have witnessed) even primary school children sometimes frame dialogues as philosophically insightful and seemingly as mature as those of many first-year university philosophy tutorials (see Pritchard 2006 for discussion and further references).

Adolescents *are* sometimes capable of critically self-aware reflection on their assumptions, and of active transformation and integration of aspects of their lives, so I am suspicious of the restriction of transformative learning to adults – an assumption which most researchers in the area seem to share with Mezirow. My doubts are not removed by Mezirow's (2000: 26; 2003: 60-61) citation of King and Kitchener (1994) who locate the highest stage of reflective judgement in

individuals with fully differentiated abstract categories [who] see the problematic nature of controversies. The dissonance involved in understanding that a true problem exists conversely pushes them to become active inquirers involved in the critique of conditions that has been reached earlier, as well to become the generators of new hypotheses. Since the methods of criticism and evaluation are applied to the self as well as others, individuals see that the solutions they offer are only hypothetical conjectures about what is, and their own solutions are themselves open to criticism and reevaluation. (King & Kitchener 1994: 73)

I have encountered adolescents who evinced such forms of reflective judgement. And I believe I have encountered transformative learning in adults who perhaps never scaled these lofty heights of reflective judgement – more on this shortly. I'd like to see some relevant empirical studies – particularly studies of adolescents and even younger children exposed to 'Philosophy for Children' programs. My expectation is that *if* it emerges that transformative learning (as Mezirow understands it) is very uncommon among

philosophically adept adolescents, it need not be because they are incapable of critically self-aware reflection on their assumptions, but may have some other explanation.

It may seem odd for a philosopher to criticise Mezirow's Socratic definition and model of transformative learning as unduly intellectualist and narrow, but I do think his restriction of transformative learning to that mode alone is unwarranted. Mezirow's type of transformative learning does occur and is very important, but other modes may be just as important. In these, critical rationality may play a lesser role, its place largely taken by transformative perceptual, imaginal, affective or performative activity, or take inexplicit or non-discursive form (I shall explain shortly how this is possible). Mezirow does allow that factors other than critically self-aware reflection may be among the preconditions and consequences of transformative learning. But despite his responses to problems and criticisms (such as those reviewed by Taylor 1998: 21-45), Mezirow continues to leave himself very much open to criticism by instrumentalising the not-wholly-cognitive, as when, for example, he allows merely that empathy is 'relevant' and that 'qualities of emotional intelligence ... are obvious assets' for participating in critical-dialectical discourse, and when he stresses that 'conditions fostering social justice are essential' here because '[h]ungry, desperate, homeless, sick, destitute, and intimidated people obviously cannot participate fully and freely in discourse' (Mezirow 2003: 60). What he says is of course true, but sometimes the not-wholly-cognitive is much more than an extrinsic provider of enabling conditions, or simply an eventual beneficiary of transformative learning. Learning may intrinsically *be* perceptual, emotional, imaginal, performative, aesthetic, moral, social or political, and not merely be (intellectually) *about* these aspects of experience and spheres of activity. And in any of these modes learning may *be* transformative, whether or not it involves self-consciously critical reasoning.

I will discuss other types of transformative learning in the next section. But first I want to consider how Mezirow's form may be reinterpreted more inclusively. I will begin by endorsing Mezirow's basic account of *what* it is which stamps all transformative learning as *transformative*. Mezirow says that it is the transformation of problematic frames of reference – problematic 'meaning perspectives' – where these are understood as including

fixed interpersonal relationships, political orientations, cultural bias, ideologies, schemata, stereotyped attitudes and practices, occupational habits of mind, religious doctrine, moral-ethical norms, psychological preferences and schema, paradigms in science and mathematics, frames in linguistics and social sciences, and aesthetic values and standards (Mezirow 2003: 59).

However, as Mezirow recognises (2000: 5-6), *frames of reference* are not necessarily declarative or verbal. But where they are not, there is no good reason, either theoretical or phenomenological, for supposing that their dynamics *must* be verbally, propositionally or ratiocinatively mediated. Nor need their sometimes problematic character be verbally conceived. The problematic for a dancer for example, might be spatio-kinetic, perceptual, aesthetic, performative; it might be felt rather than thought, or it might be thought *in* experience *as* experience, perceptually, enactively, rather than as reflection or reasoning. It may be dealt with through non-discursive modes of intelligence (see e.g. Gardner 1983) in repeated creative performance. Nonetheless (and paralleling Mezirow's ten-stage model) the dancer's situation might be first experienced as an

uncomfortably disorienting dilemma; there might be relevant self-examination and critique, but enactively, in practical performance, rather than ratiocinatively; there could also be exploration of options, planning, development of new skills, provisional trying out of new approaches, practice and development of competence, and integration of a transformed perspective into the dancer's frame of values and understandings. The dancer's transformative learning may be as personally significant and as transforming of meaning perspective, as any more Socratic transformation might have been. Moreover, such a case may indeed be one of self-reflective critical rationality (to use Mezirow's phrase) – as an *ex post facto* analysis may very clearly show – but rationality exercised through non-discursive modes of intelligence.

Mezirow seems equivocal about such cases. On the one hand, clearly he recognises that transformative learning for a dancer might involve such non-verbal (or 'presentational') forms of construal (Mezirow 2000: 5-6). So, could the whole process of transformative learning sometimes be non-verbal? Mezirow does not make his view on this clear when he says such things as that '[w]e use language here only when we experience a problem in understanding or want to share the experience' (Mezirow 2000: 5). The dancer of my example does experience a problem, *inter alia* a problem in understanding, but perhaps says nothing (even sub-vocally, or perhaps says only 'No, that's not right!'). Are there clues in Mezirow's view of the distinction between instrumental and communicative transformative learning, and of the criteria of rationality appropriate to each?

[R]ationality refers to assessing reasons supporting one's options as objectively as possible and choosing the most effective means available to achieve one's objectives. In instrumental learning, rationality is judged by whether we are able to achieve technical success in meeting our objectives (for example, use methods that result in improved performance). In communicative learning, rationality is judged by our success in coming to an understanding concerning the issues at hand. (Mezirow 2000: 10)

Mezirow will view the dancer's learning as 'instrumental' – a sort of problem-solving. The following passage bears this out:

We establish the validity of our problematic beliefs in instrumental learning by empirically testing to determine the truth of an assertion. In communicative learning, we determine the justification of a problematic belief or understanding through *rational discourse* to arrive at a tentative best judgement. The only alternatives to discourse for justifying a belief are to appeal to tradition, authority, or force. (Mezirow 2000: 9-10)

The dancer does empirically test all manner of aesthetic and spatio-kinetic options, judging which are more or less likely to solve the (unarticulated) problem, and thereby is undergoing instrumental learning, but does not engage in rational *verbal* discourse (Mezirow assumes discourse must be verbal) and so is not engaged in communicative learning. Here, I think, we can clearly see how Mezirow's otherwise insightful theory is let down by its reliance on an inadequate epistemological theory. For suppose there are *two* dancers, engaged together – collaboratively and creatively – in transformative learning of the sort I have sketched. Their collaborative learning is certainly communicative – although not verbally – for they are responding as dancers to the mutually communicated options they are collaboratively testing. That testing now

includes an element of *inter*-subjectivity, which brings it into line with Mezirow's requirement that it be as objective as possible (although that condition might have been satisfied even in the case of a single *expert* dancer.)

Some though may still wonder how these cases could legitimately be termed self-reflective exercises of critical *rationality*, when little or no explicit *reasoning* was involved. A "fudged" answer might be that (declarative) reasoning was present unconsciously, but I shan't fall back on this dogma of Cartesian-computationalist cognitive science (for critique, see Dreyfus 1992). Rather I would draw attention to characteristics of *expert* activity and the experience and judgement of experts (see Dreyfus & Dreyfus 1986). Relevantly to their fields of expertise, experts (including the expert dancer) *perceive and experience* a situation differently from the non-expert; what for the inexpert may require a long and laborious process of reasoning, the expert may immediately *see* or insightfully grasp (or in the case of the dancer, *feel* spatio-kinetically and aesthetically) in critical detail. (I recall a long-retired professional ballet dancer telling me that 'Dancers have no intelligence' – she meant that typically they are not very good discursive reasoners and don't shine in verbal intelligence. While I'm not suggesting she was correct in that judgement, I'm pleased that current theories of multiple forms of intelligence are now able give expert dancers their due as *particularly* intelligent.) Finally, I refer to my earlier discussion of the holism of the virtues and the holism of values-education. A corollary is that since transformative learning essentially involves values-based critique, including critique occurring in self-reflection, it may employ forms of holistic rational judgement quite unlike the linear logic thought to be typical of discursive reasoning. What my criticisms here come down to is that I think Mezirow's account needs to be based in a better philosophical theory of rationality – a theory better able to accommodate the rationality of rational holistic judgement (see e.g. Brown 1990) and the rationality of non-verbal forms of intelligence and intelligent non-verbal communication.

I hope it does not seem carping for me to make one further point. Mezirow (2000: 10) says that 'the only alternatives to discourse for justifying a belief are to appeal to tradition, authority, or force'. Wittgenstein speaks (I forget where) of an Indian geometer's proof of a geometric theorem, where that proof is given by the geometer showing a geometric drawing and simply saying 'Look at this'. The point to be made here is that *showing* is a mode of discourse, and can be a mode of *rational* discourse (the geometer's words were superfluous). If Mezirow's statement is true, it is only because *discourse* is a broader category than his Habermasian view allows him to acknowledge.

In view of the points made above, I would suggest that while the broad outlines of Mezirow's definition and model of transformative learning are correct, and while his theory is insightful and most valuable, some of its details need to be amended to accommodate the different forms that reflective judgement and self-reflective critical rationality may take – such as may be evident in the differences between expert and non-expert, and between verbal and non-verbal modes of intelligence and learning style.

Six types of transformative learning

1. ***Mezirow's cognitive-rational transformative learning*** is one of five general types of transformative learning discussed in the literature on adult learning. Some of

the other types overlap with Mezirow's, but include a further essential dimension; others are rather different.

2. ***Transformative learning as consciousness-raising***, or *liberatory* transformative learning, began as response to systematic political oppression, as was the case for Paulo Freire's socially transformative, avowedly political 'pedagogy of the oppressed' with its central process of 'conscientization':

first, the oppressed unveil the world of oppression and ... commit themselves to its transformation ... [so that] this pedagogy becomes a pedagogy of all men in the process of permanent liberation (Freire 1972: 31).

Consciousness-raising has been a feature of a number of wide-scale movements against injustice and oppression; these include feminist critique of patriarchy, civil-rights and human-rights movements, workers' and peasants' movements, other movements against socio-economic oppression, environmental movements, and so forth. From the first, Mezirow recognised consciousness-raising as a politically committed form of his own type of transformative learning. However, inasmuch as consciousness-raising always aims politically at transforming not only individual awareness of oppression but (through educative awareness) the very structures of society and tradition that have entrenched this oppression and injustice, it clearly is a distinct (albeit related) type of transformative learning.

Politically, it is of course associated with positions to the left of the spectrum. Its allegiance as educational theory is often expressed in the term 'critical pedagogy' (see e.g. MacLaren 1995). To understand its dynamics one needs to appreciate the relevance of Gramsci's (1985) theory of the sociopolitical hegemony of ruling ideologies. Since its objective is that all be able to participate in freeing the oppressed (and their oppressors) of socially structured injustice, it brings ethical imperatives to the fore of educational theory.

A number of authors discuss ethical issues associated with the fostering of transformative learning (e.g. Baumgartner 2001; Curry-Stevens 2005; Ettlting 2006). These typically have two main foci: the ethics of educators leading their learners into discomforting, sometimes deeply troubling, emotional and moral dilemmas; and disparities of power – between teacher and learners, privileged learners and oppressed learners, "insiders" and "outsiders". My own view is that an education in which none of these issues are broached and negotiated in dialogue among learners and their teacher, and which includes no consciousness-raising in any of the above-mentioned realms, is today an education grossly incomplete. (For example, the graduate of such an education will not adequately exemplify the last of the five "graduate-attributes" I listed earlier, and possibly not the second either.) Consciousness-raising is essential to our flourishing together on our shared planet and in our globalising world; it is also a necessary part of a values-education which aims at fostering the integrated virtues of responsibly aware educated people, and ought to be fostered in every university.

3. ***Transformative learning as transformation of self*** seems to me an apt description of the third type of transformative learning (clearer anyway than Dirkx's 1998 depth-psychology-based characterisation of 'transformation as individuation'). Robert Boyd, for example, thinks it is not just one's meaning-perspective which is transformed, but is nothing less than the psyche or self; for transformative learning is a

‘fundamental change in one’s personality involving the resolution of a personal dilemma and the expansion of consciousness resulting in greater personality integration’ (Boyd 1989, p. 459, cited in Imel 1998). This view ‘is grounded in the field of depth psychology, which is based on a fundamental belief in the powerful role that the dynamic unconscious plays in shaping our thoughts, feelings, and actions on a day-to-day basis’ (Dirkx 2000). Transformation is accomplished through a ‘process of discernment ... composed of the three activities of receptivity, recognition, and grieving’, which ‘calls upon such extrarational sources as symbols, images, and archetypes to assist in creating a personal vision or meaning of what it means to be human’ (Imel 1998). In essence, this process is an imaginative ‘dialogue between ego-consciousness and the powerful contents of the unconscious’ (Dirkx 2000, quoting Boyd). Although I’m skeptical about many of the details from depth psychology, I have no doubt that some transformative learning is like this, in contrast to Mezirow’s more intellectual cases.

But I must comment further. For Boyd the crucial involvement of symbolic processes at depth is ‘extrarational’: he conceives transformative learning occurring in a ‘realm of interior experience, one constituent being the rational expressed through insights, judgments, and decision; the other being the extrarational expressed through symbols, images, and feelings’ (Boyd and Myers 1988, p. 275, cited in Imel 1998). This leads Dirkx (2000) to describe this view of transformative learning (which he shares with Boyd) as ‘mytho-poetic’. The description is apt, but Boyd’s (and Dirkx’s) sharp distinction drawn here between the rational and the extra-rational is misconceived. In fact the two psychological realms are *closely* linked by what Lakoff and Johnson (1980) have called *Metaphors We Live By*. As they argue in their book of that title, the discourses of rationality are irreducibly pervaded by metaphors which are constitutive of our worldviews and of the meanings of everyday life. These include not only the ‘root metaphors’ of worldview identified by Stephen Pepper (1942), but a vast and deep system of ontological and structuring metaphors which *constitute the rational order* of thought and life (such as ‘argument is war’, ‘love is a journey’, ‘space is a container’, ‘premisses *lead to* a conclusion’, ‘premisses *support* conclusions’, etc.). Lakoff and Johnson argue that all such metaphors have their own “logics” – that is, they *rationalize license inferences*. (For example, from *argument is war*, one may infer *in arguments there may be winners and losers*.) Metaphors and images sprung from the unconscious also have their metaphoric logics – their power *as* images and metaphors would be largely inexplicable otherwise. Nor does the involvement of *imagination* – of poetic and other imagery – in this form of transformative learning warrant its being designated *extra-rational*. For, as Ricoeur (1994) argues, imagination – conceived as poetic, imagistic, metaphoric and narrative activity – is essentially involved in the meaning-making which is *constitutive* of the emergent realm of culture, society and action, and is essential to all activity of critique (Dix 2003a). I will discuss emergence and other relevant ontological issues in my section on complexity theory and transformation.

Theorists of this third type of transformative learning are right, I think, to distinguish it largely as a realm of imagination and feeling (Dirkx 2001), and to stress the importance of these components even in Mezirow’s type of transformation (see also Taylor 1998: 33-35; and 2001). But the link to symbolic, affective and imaginal dynamics of unconscious processes is no more than half of the explanation for the power of imagination and feeling in transformative learning. I will suggest shortly as the other

half of the explanation a type of transformative learning (type 6 below) not yet recognised in the literature.

4. ***Developmental transformative learning*** is based in theories of developmental psychology and refers to the roles of transformations of meaning-perspectives or *ways of knowing or understanding* (Kegan 2000) in the cognitive development of the individual. Piaget's research showed that the learner is cognitively active in sense-making, and in this role undergoes not only accretive learning, but also crucial transformations of thought, understanding, sensibility or self-conception (Piaget 1972; Piaget & Inhelder 1969). Likewise, Kohlberg's (1981; 1984) and Gilligan's (1982) studies of development of moral reasoning and moral concepts revealed developmental transformations. Theorists of developmental transformative learning argue that cognitive development is not completed at late adolescence or early adulthood, but continues through adult life (Daloz 1999; Kegan 1982 & 1994). Perry's research with college students showed how important for their understandings in college subjects, and for their conceptions of learning (and teaching) and of themselves as learners, was their stage of progression through nine developmental 'positions' or transformations of epistemological understanding (Perry 1970 & 1985; Daloz 1999: 70-82; Moore 2002). Kegan (1994) argues that culture itself conditions the availability or possibility of further levels of cognitive-epistemological transformation. He refers to this as 'subject-object' transformation, where an epistemological transformation occurs when what previously functioned cognitively only out of awareness, as a predisposing assumption in the *subjective* constitution of the cogniser (that is, as something the cogniser had been previously *subject to*), becomes an *object* of thought and awareness (Kegan 1994 & 2000). Such transformations are in Kegan's view the basis for transitions from traditional to modern, and from modern to postmodern worldviews, and are also the key to our coping with the demands which culture makes on our understandings and self-understandings.

Although there are many vexed issues regarding developmentalism in psychology – are developmental stages really discernible (or are they artifacts of experimental or observational methodology); are claimed sequences of stages really invariant; do developmental series end at adulthood or may they continue through the lifespan; is new stage-learning rapidly transferable throughout the whole of cognition, or does it proceed piecemeal, context by context? – it is probably permissible here to set them aside and to briefly comment only on *epistemological* matters. As Perry (1985) and Kegan (1994 & 2000) argue, it is of the greatest importance when restrictive or inadequate epistemologies are overcome by new ways of knowing and understanding. To learn a new *way* of knowing and conceiving is to open one's learning to new learning possibilities. But it is also to (begin to) reconstrue one's prior learning in terms of one's new conception of what learning is and means. Inevitably, one's *self-conception* (as learner) will undergo some transformation also. Kegan's subject-object theory shows how epistemological transformation may have a genuinely developmental *meta-structuration*. (I wish matters were as clear for Perry's epistemological series.) As a philosopher and teacher of philosophy I see developmental-epistemological transformative learning as most important.

But I am not entirely happy to see it spoken of only in these epistemological terms – an exclusivity expressive of a deep (mostly unconscious) residue of modernist philosophical

prejudice. That prejudice (which originates from Descartes' elevation of epistemology as primary in philosophy) pervades most of the literature on transformative learning, and thereby seems to have closed off to all but a few the fertility of understanding transformative learning in other philosophical ways, such as *semiotically* (e.g. Lemke 1997 & 2000, although he does not use the term 'transformative learning'), or in terms of alternative or further ways of conceiving epistemology, such as *hermeneutically* (e.g. Nelson 1997) and/or *phenomenologically* (e.g. Ng 2005). ('But isn't there already lots of phenomenological discussion of transformative learning?' someone will ask. Yes, there is. But as Ng 2005 notes, almost all educational literature is pervaded by a naïve Cartesian dissociation of the self, and of theory, between body and mind, a conceptual pathology which remains hegemonic in the Western world, part of the broader ideological hegemony which entrenches cultural, racial and gender oppression. And as Merleau-Ponty 1962 shows, the embodied experiencer-actor – the learner – is phenomenologically nothing like a mental pilot of a bodily vessel.)

Here, I think, is broad scope for transformative learning theory to become itself beneficiary of transformative learning of Kegan's subject-object type.

5. ***Organisational, group, and collaborative transformative learning*** have come to interest firstly through discussions by many transformative learning theorists and practitioners of the importance of a collaborative environment for such learning (see e.g. Mezirow 2000, 2003; Taylor 1998: 49-52; Baumgartner 2001) and secondly from the field of organisational studies – particularly studies of "the learning organisation" (Baumgartner 2001). The terms *organisational, group, and collaborative transformative learning* might mean either or both of two things: either that it is the organisation or group conceived as *itself* an agentic entity which is held to learn transformatively, or that transformative learning occurs among a group's or an organisation's individuals. Both usages are legitimate, I think, in both theory and practice. I will discuss organisational modes of transformative learning later in the paper, and specifically in relation to educational institutions and educative organisations.

6. ***Transformation from 'notional' to 'real' understanding*** is a mode of transformative learning which is the basis of many of our transformed meaning perspectives. It may be involved in any of the first four types of transformative learning above, but warrants examination in its own right. It was discussed (although not under the description 'transformative learning') nearly a century and a half ago, by Cardinal John Henry Newman in a work of philosophy entitled *An Essay in Aid of a Grammar of Assent* (Newman 1979: 76-86). This work (which remains unknown to most philosophers today) largely concerned a distinction Newman sought to draw between what he termed 'notional assent' and 'real assent'. This might be glossed as a distinction between assent or understanding as a merely intellectual phenomenon – that is, where one has only bloodless 'notions' of that to which one assents, one's way of understanding being through abstractions only – and assent or understanding in which the way of knowing is at least partly through acquaintance with the particularity of real or imagined instances – a mode of understanding which, unlike notions and abstractions, has rich connection with one's values, feelings and motives. Substituting the term 'understanding' for Newman's 'assent', transformation from 'notional' to 'real' understanding would thus be the "fleshing out" of mere notions with perceptual, remembered or imagined detail – with all of the affective, mnemonic and conative

resonances that such detail may have. Newman's key insight was that mere notions or abstractions have few such resonances, and hence have much lesser connection with and potency for one's motivational and valuational system, whereas whatever is present or presented not in the abstract but in rich particularity, offers itself as 'real', and it is this which moves us to feeling and action. For example:

[G]reat truths, practical or ethical, float on the surface of society, admitted by all, valued by few... until changed circumstances, accident, or continual pressure of their advocates, force them upon its attention. The iniquity, for instance, of the slave-trade ought to have been acknowledged by all men from the first; it was acknowledged by many, but it needed an organized agitation, with tracts and speeches innumerable, so as to affect the imaginations of men as to make their acknowledgment of that iniquitousness operative. (Newman 1979: 78)

One's notional assents may be sincere, but (to borrow a distinction from Geertz' 1973 cultural anthropology) notional understandings embody 'thin' rather than 'thick' description. However, transformation of understanding from 'notional' to 'real' is not merely a "filling out" of detail. It is also – and this is what makes it genuinely transformative – a new way of conceiving and understanding that which formerly was only notionally apprehended – a new way of knowing it. And this new meaning, through its *transformed* connection with one's valuational and motivational system, is thereby the basis of a transformed meaning-perspective – even in the case of Newman's example above, in which one's assent both before and after the transformation might be expressed in the very same words (when, in one sense, one's view has not changed, while in another sense it is utterly transformed). Summarising what he saw as the role and importance of transformation from notional to real understanding, Newman (1979: 65-86) says:

... Real Assents ... are sometimes called beliefs, convictions, certitudes; and, as given to moral objects, they are perhaps as rare as they are powerful. Till we have them, in spite of a full apprehension and assent in the field of notions, we have no intellectual moorings, and are at the mercy of impulses, fancies, and wandering lights, whether as regards personal conduct, social and political action, or religion. These beliefs, be they true or false in the particular case, form the mind out of which they grow, and impart to it a seriousness ...

I would make four further points about this type of transformative learning. (Although none of them is made quite in Newman's terms, which are sometimes problematic, they are all offered in the spirit of his account.)

First, as understanding is always in several ways a matter of degree – is deeper or shallower, is detailed or sketchy, and so forth – transformation from 'notional' to 'real' understanding sometimes may occur by degrees, gradually and incrementally, while other times it may have the force of sudden insightful revelation. (Mezirow 2000: 21 also acknowledges that transformative learning may sometimes be gradual and incremental, while at other times it might be sudden and dramatic.) In both cases though it is transformative of one's way of knowing.

Second, this type of transformative learning is especially important for learning *transfer*; Newman's examples and discussion make this very clear. 'Real' understanding embodies *contextualised* learning. As Brown, Collins and Duguid (1989b: 12, cited in

Laurillard 1993: 19) note, ‘to the degree that abstractions are not grounded in multiple contexts, they will not transfer well’. (See also Brown, Collins & Duguid 1989b.)

Third, transformation from notional to real understanding is particularly important for two modes of transformative learning discussed earlier: transformation as ‘consciousness-raising’; and transformation effected through engagement with emotion-laden *imagery* (see Dirkx 2000, 2001 & 2006). With regard to imagery, Newman (1979: 81) is at pains to stress that ‘the natural and rightful effect of acts of the imagination upon us ... is, not to create assent, but to intensify it’. He means two things, I think: that real understanding should not substitute for notional or abstract thought, but should rather complement it (see also Laurillard 1993: Chs 2 & 3); and that it should not usurp reason’s role, but should rather *animate* reason.

In my view, Newman’s insightful discussion of the distinction between ‘notional’ and ‘real’ assent, and of transformation from notional to real understanding, was never brought to a viable stage as theory (philosophically, it was doomed by his commitment to what I think were incompatible philosophies). Subsequent attempts to reconstrue it in other epistemological terms have also been unsuccessful (I shan’t go into details), and have largely ignored the transformative dimension. But I think transformative-learning theory gives us now the terms and understandings needed to revive and apply Newman’s insight in the field of education that was so close to his own heart and practice.

My fourth comment is a suggestion as to why Newman and subsequent commentators failed to adequately explicate and theorise the distinction between ‘notional’ and ‘real’ understanding. I think this was in part because of a deficiency in underlying *empirical* theory concerning relations between thinking, feeling and motivation. This deficiency has been recently addressed by studies in neurology and neuropsychology (see e.g. Taylor 2001). I shall briefly discuss just one of these – but one which gives the very clearest indication of the practical importance of the distinction between merely ‘notional’ and ‘real’ understanding.

The neurologist Antonio Damasio (1994) discusses some peculiar cases of brain injury (that of the nineteenth-century railway worker Phineas Gage being a well-known example) in which intellectual function (or “intellectualising” function might be a better description) appears to remain almost wholly intact, yet has become dissociated from what we might term “humanity”. Not only is there total loss of emotional intelligence in these cases, and absence of normal human feeling, but there is loss also of anything that we might call “wisdom”. People so afflicted may be still capable of what appears to be “critical thought” – but this is conducted entirely in ‘notions’, which sufferers show themselves incapable of fleshing out with ‘real’ understanding, and whose seriousness they seem incapable of appreciating. Such cases bear out not only the strength of Newman’s distinction, but also the importance to transformative learning of the richness of experiential engagement and emotional connection (see e.g. Mezirow 2000, 2003; Taylor 1998, 2001).

3. Complexity theory: the science and philosophy of transformation

How is transformation possible? How can something come about which is qualitatively different from what previously has been? These are philosophical questions –

specifically, they are metaphysical – but they are also empirical, although once they might not have seemed so. Once it may have seemed foolish to suppose that empirical sciences might answer questions of such generality, for wouldn't transformation and qualitative newness be differently explicable for different scientific domains? But today there is a field of science – not *a* science, but an emerging commonality of understanding within a range of sciences (perhaps describable as a new scientific paradigm in Kuhn's 1970 sense) – which does find itself able to approach such general questions, because it seems that nature forms itself through *generic* modes of complexification which, under certain parameters of constraint *generically* yield emergent patterns of simplicity and emergent qualitative transformation.

Origins of complexity theory

Almost sixty years ago, Warren Weaver (1948) distinguished between three different kinds of dynamic regimes, corresponding (more or less) to three phases of the history of science itself. As Weaver puts it, 'physical science before 1900 was largely concerned with two-variable problems of simplicity'. Then, in the nineteenth and twentieth centuries, various sciences developed ways of statistically modeling and understanding what Weaver terms 'disorganized complexity': systems whose dynamics involved 'perhaps billions' of variables. For a considerable time, stochastic methods were the only means of representing complexity. (In some fields today complexity is treated as if these were still the only means.) However, in its most recent phase (beginning around the time Weaver wrote) science has turned its attention to 'problems ... of organized complexity'. These 'involve dealing simultaneously with a sizable number of factors which are interrelated into an organic whole' (for general introductions see Lewin 1993 and, from a more philosophical perspective, Gare 2000).

It is the range of new approaches to organised complexity which has begun to provide a generic approach to understanding complexity, emergent organisation and qualitative transformation. To quote Mittleton-Kelly (2003b):

There is no single unified Theory of Complexity, but several theories arising from various natural sciences studying complex systems, such as biology, chemistry, computer simulation, evolution, mathematics, and physics. This includes the work undertaken over the past four decades by scientists associated with the Santa Fe Institute (SFI) in New Mexico, USA, and particularly that of Stuart Kauffman (Kauffman 1993, 1995, 2000) John Holland (Holland 1995, 1998), Chris Langton (Waldrop 1992), and Murray Gell-Mann (1994) on *complex adaptive systems* (CAS), as well as the work of scientists based in Europe such as Peter Allen (1997) and Brian Goodwin (Goodwin 1995, Webster & Goodwin 1996); Axelrod on cooperation (Axelrod 1990, 1997; Axelrod & Cohen 2000); Casti (1997), Bonabeau et al (1999), Epstein & Axtel (1996) and Ferber (1999) on *modelling* and *computer simulation*; work by Ilya Prigogine (Prigogine & Stengers 1985, Nicolis & Prigogine 1989, Prigogine 1990), Isabelle Stengers (Prigogine & Stengers 1985), Gregoire Nicolis (Nicolis & Prigogine 1989, Nicolis 1994) on *dissipative structures*; work by Humberto Maturana, Francisco Varela (Varela & Maturana 1992) and Niklaus Luhman (1990) on *autopoiesis* (Mingers 1995); as well as the work on *chaos theory* (Gleick 1987) and that on economics and *increasing returns* by Brian Arthur (1990, 1995, 2002).

Organised complexity, non-linearity, emergent order, and the “edge of chaos”

The domain of organised complexity of most relevance to us here is the dynamic regime termed *chaos*. (The name, seemingly paradoxical, reminds us of the *invisibility* to earlier phases of modern science of the *emergent order* of this domain of organised complexity.) However, it has been found that the chaotic regime – and more particularly that portion of it called ‘the edge of chaos’, which lies between the dynamics of linear (rigidifying, *untransforming*) order and those of chaotic disintegration – is crucial to life and to an adequate understanding of emergent socio-cultural and socio-ecological organisation (see e.g. Kauffman 1993, 1995 & 2000; Goodwin 1995; Webster & Goodwin 1996; Solé & Goodwin 2000; Prigogine & Stengers 1985; Cohen & Stewart 1993; Dooley & Van de Ven 1999; Van de Ven & Poole 2005; Mitleton-Kelly 2003a & 2003b; Stacey 1996 & 2001).

It is *non-linear interaction* between causal factors which produces *emergent order*. Dooley & Van de Ven (1999) describe emergent order as qualitatively higher-level order which constitutes both new constraints upon, and new possibilities for a system.

The distinction between linear and non-linear processes is crucial. Mathematically, linearity is simply proportionality, whether arithmetic or exponential, of output to input. But because of this proportionality, linear processes produce nothing which is qualitatively *new* – they merely *reproduce* essentially the same relationships as before. Linear processes thus are readily predictable and analysable – which is why linear models have been favoured when organisational management aims at caution, safety and control – a “business-as-usual” approach (Zohar & Marshall 2004). Novelty and transformation, however, arise from non-linearity; at its deepest levels, then, education has aspects whose emergence is essentially non-linear.

A second key feature of the dynamic regime at the *edge* of chaos is that the number of complexly interacting causal variables is typically low – hence computationally and theoretically more tractable and, in the real world, more readily identifiable (Dooley & Van de Ven 1999). Process dynamics here are characterised by a high degree of causal interaction among those functional variables (Dooley & Van de Ven 1999). The trajectory of a system at the edge of chaos may be unpredictable (because of non-linear internal and contextual interactions) but in practice its low dimensionality can make it tractable or habitable to those (and those organisations) who “think on their feet” and who do not waste their time trying to control the uncontrollably unpredictable, but who rather devote effort to sensibly exploring the space of the adaptable, the recruitable and the creatable.

Generic principles of natural, social (and educational) complex systems

There are at least ten generic principles so far found to characterise natural and social complexity. Mitleton-Kelly (2003b) summarises these *generic characteristics of complex adaptive systems* as: self-organisation; emergence; connectivity; interdependence; feedback; existing far from equilibrium; involvement in a space of possibilities; co-evolution; historicity and temporality; path-dependence; and creation of new order.

In a non-linear regime, small fluctuations (including small fluctuations in the background of “noise”) can be rapidly amplified through non-linear feedback. This may permit a

system to escape from a trajectory within which it was formerly constrained, perhaps taking on new characteristics as those constraints are transcended and others come to apply – this transformation emerging in consequence of the system’s own activity as it “explores” the possibilities afforded by its changed environmental circumstances, creatively adapting to this new (and possibly dynamic) suite of constraints. Of course, describing a system as “escaping” its former trajectory and as “exploring” new possibilities and “creatively” adapting to changed circumstances would make no sense if the system and its environment functioned linearly or merely mechanically. What makes these active metaphors appropriate is that self-organisation and emergence *are active* in ways that linear systems never can be: emergent self-organisation is the process of co-creation by system and environment (which may include other, similar systems) of new forms/patterns of activity and new types of structure made possible by the interaction of constraints internal and external to the system. Not only do evolving complex systems *adapt* to their environments, they also alter them. Thus both system and environment – including other complex adaptive systems with which a system interacts – *co-evolve*.

These ways of speaking and theorising are different from those which previously have characterised the social sciences. Specifically, they seem to reify and even to ascribe causal agency to what previously (under some theoretical construals at least) were treated as theoretical constructs. (Compare, for example, Giddens’ 1984 reductive construal of *society*. Instead of reductively treating society and its structural organisation as descriptive and theoretical constructs in the manner of Giddens, a complexity account might treat it as a naturally embedded ecologically co-evolving spatio-temporal system of co-evolving interactive human systems of agents and agentive organisations, thereby attributing to society no less spatio-temporal-causal reality than is attributed to ecological systems and their components in nature.) This is no accident or theoretical oversight but rather a consequence of taking *emergent self-organisation* seriously, as do all complexity theorists. Some go “all the way”, treating emergence, including emergent causation, as metaphysically real. Others deem emergence to be irreducible only epistemologically but not metaphysically. Some take a position “half-way”, holding that emergent structural and temporal organisation is metaphysically real, but has no metaphysically irreducible causal efficacy. (All three positions can be found in Andersen *et al.* 2000.)

Emergent “order for free”: self-organisation and creativity in nature and society

Understandably, we will want an explanation of the emergent “order for free” which is made so much of by complexity theorists such as Kauffman. Part of the explanation is straightforwardly mathematical. The mathematics of the edge of chaos – especially when represented graphically – clearly shows how new macroscopic order may emerge as a mathematical ‘attractor’ in a time-series generated by simple rule-governed change which at smaller scales appears merely random or chaotic (see e.g. Kauffman 1993, 1995 & 2000; Solé & Goodwin 2000; Cohen & Stewart 1995). Likewise, computer-based studies have shown how simple algorithms can generate unexpectedly complex and coherent emergent order in systems known as *cellular automata*.

Linking several theoretical realms are studies of *dissipative processes* (see e.g. Prigogine & Stengers 1984). Dissipative processes occur in open systems in response to energy increase past a critical threshold – that is, where a system continually receiving energy from its environment is destabilised by energy through-put because it is at the limit of the current processes through which excess energy is dissipated. What happens in a

dissipative system is that at a critical point (a point of phase transition) formerly disordered internal energy fluctuation becomes coherently entrained in a qualitatively new form of ordered process which increases internal entropy production (as if the system were “finding a harmless use” for the excess energy by converting it into a form to which it is less sensitive). The system’s environment thereby bears the ultimate “cost” of the production of emergent order. An example often cited is the spontaneous macroscopic emergence of periodic state-switching in certain chemical reactions under peculiar boundary constraints with continuing inflow and outflow of energy – the Belousov-Zhabotinsky oscillator being the most celebrated example of these ‘chemical clocks’ (Prigogine & Stengers 1984). The spontaneous emergence of macroscopic chemical oscillation is certainly a striking phenomenon and, from the perspectives of earlier explanatory paradigms of physical science, a surprising one. However, dissipative self-organisation is a phenomenon of considerable generality. Another illustration is the spontaneous emergence of multiple ordered convection cells in the famous Bénard instability:

The “Bénard instability” is another striking example of the instability of a stationary state giving rise to the phenomena of spontaneous self-organisation. The instability is due to a vertical temperature gradient set up in a horizontal liquid layer... The Bénard instability is a spectacular phenomenon. The convection motion produced actually consists of the complex spatial organisation of the system. Millions of molecules move coherently, forming hexagonal convection cells of characteristic size. (Prigogine & Stengers 1984:142)

We see then that in dissipative systems nothing is created “out of nothing” – the system’s environment “funds” the production of emergent order – but the possibilities for the forms which emergent organisation may take lie within the system itself, and are realised only through the system’s *self*-organising activity.

Living systems and their transformation

Living systems are embedded in a complex, evolving web of life. Evolution in nature is always co-evolution, and co-evolution shapes and is shaped by, sustains and is sustained by the ecological matrix in which it occurs. Ecologies, rather than being just immensely complicated networks of relationships involving complex, particularly non-linear, feedback, are more appropriately and more tractably conceived as *hierarchies* of functional and ontological relationship (Allen and Starr 1982; Salthe 1985 & 1993). Hierarchical ordering is found in the largest, down to the smallest of living systems. Nature’s generic principles of organisation and creativity are nested recursively at ever smaller levels of scale. Higher levels emerge from the lower levels that subserve them, and they constrain the functioning of those lower levels. Causation as constraint is not merely tendency to inhibition, but is enablement of possibility for complex elaboration and further emergence (theorists often advert to musical analogies, e.g. Gare 1996) – constraints enable the coherence and resilience that is crucial if a system is to be able to explore, experiment, develop or evolve without this leading to its disintegration. This type of model has led to reinvigoration and enrichment of causal theory (see e.g. Andersen *et al.* 2000) Typically, as scale of functioning increases with higher levels, rate of functioning decreases (Salthe 1985 & 1993). This allows for damping effects and resilience between levels, and for dynamic restabilisation following shock (and helps explain why so-called “butterfly-effects” of non-linear amplification of small events into

monstrous consequences are uncommon). Dynamic stability or resilience is different from equilibrium. Strictly speaking – that is, scientifically – any tendency toward equilibrium in living or ecological process would constitute decline toward death or dissolution. An important (and well-known, but too little heeded) principle of dynamic stability in nature is that (ecological) system stability and resilience are better achieved through functionally interactive internal diversity than through rigidity or attempted control (Wilson 1992; Solé & Goodwin 2000).

Informational processes are potent instigators of non-linear response and feedback loops. They are of great significance ecologically and biologically, and are a prime means of constraint and enablement in nature. Natural communication is of course by *signs* (such as a caterpillar's bright colouration which signals inedibility to birds), but this means that ecologies function at least partly as complex natural *semiotic* webs. Processes of natural signification and interpretation (appropriately termed *biosemiosis* by theorists such as Hoffmeyer 1996) pervade living nature at all levels, constraining and enabling – another of nature's generic principles for creating diversity and order. Interaction mediated biosemiotically is non-linear *par excellence*, since signification and interpretation are accomplished with very little energy transfer, yet can set in train much larger processes. However, natural signification engenders resilience no less than it prompts transformation, since it permits the formation of anticipatory responses. (Semiotically responsive behaviour is found right down to the level of cell behaviour.)

The points just made hold equally well, and even more obviously, for *human* systems and human ecology. These sorts of approaches are well suited for explaining the emergence and human-ecological roles of meaning-making and interpretation in socio-cultural-natural systems (see e.g. Hoffmeyer 1996, and Lemke 1997 & 2000).

I trust that the sub-text of this section of my discussion is already apparent, but by way of summary I will make it explicit: ***transformative learning is enabled, created and constrained through the same generic principles of non-linear transformation and emergent order that operate everywhere throughout living nature.*** Human systems are sociocultural-natural systems. The implications of this for education are profound – not because it is demanded that we change everything we do (although some things should change), but because what we do and how we are able to do it have been misconceived and need to be reconceived. The next section of my discussion addresses this need.

4. Toward a transformed understanding of educational systems, their complexity and their health

A consequence of the foregoing discussion is that all education – even the most informal – is systemically embedded and systemically mediated and constituted by processes and structures of self-organised emergence. Transformative educators have recognised this – albeit seldom in these terms – but only a comparative few theorists and practitioners have recognised that the systemic principles of transformative learning's emergence are the same generic principles of transformation identified by scientific theories of complexity (Karpik 2000; Jenlink 2004; Zohar & Marshall 2004; Ettl 2006). The functioning of educational institutions needs to be reconceptualised in like terms if it is to be understood how they too emerge and change in co-evolution with other sociocultural-natural systems, and more particularly how they contextualise and foster

(or even inhibit) transformative learning. These organisations are *complex adaptive systems* (Kauffman 1993, 1995 & 2000; Stacey 1996 & 2001; Mitleton-Kelly 2003b) interacting with other such systems – organisations co-evolving with other organisations. Often they are co-evolving systems of recursively nested co-evolving systems – certainly universities are of this sort. Inasmuch as they are adaptive, these systems embody their own adaptive learnings, and these too may be recursively embodied in their nested systems (for example, in teaching departments and research centres) – although learnings available at one functional level might be unavailable at levels above or below. The functional organisation of complex educational systems is hierarchical – however, this must not be understood as a hierarchy of top-down management control or an imposed design, but rather as an ecological hierarchy of multiple levels of enabling constraint and constraining enablement for self-organisation (Allen and Starr 1982; Salthe 1985 & 1993).

As elsewhere in nature and society, self-organisation of process and structure is the key to the dynamic stability and robust development of educational institutions. And as everywhere in ecological organisation, self-fostered diversity of internal functional relationships is the key to system resilience. These are principles which it is crucial for universities and other educational organisations and their functional sub-systems to recognise in their self-understandings, since organisations with poor self-understanding are most vulnerable in times of change. Unfortunately, the literature on modeling and understanding educational processes does not yet reflect these principles or convey any awareness of the inadequacy of past ways of educational modeling (see e.g. Biggs, 1993).

However, the literature on understanding *organisations* has been invigorated in the past decade or so by development and application of complexity-theory approaches to organisational dynamics, structures, creation and change (see e.g. Lissack 1996; Stacey 1996 & 2001; Mitleton-Kelly 2003a, 2003b, 2003c, 2005, 2006; Dooley & Van de Ven 1999; Van de Ven & Engleman 2004; Van de Ven & Poole 2005; Johnson & Van de Ven 2002; Vuori 2005; Carlisle & McMillan 2005; Fuller, Warren & Argyle 2005). It is in these terms that educational institutions and educative organisations need to be understood and to understand themselves.

It turns out that there are *generic* characteristics of robust complex evolving systems (Kauffman 1993, 1995 & 2000; Mitleton-Kelly 2003b & 2003c). Being generic, they apply to complex evolving organisations, as has been confirmed by detailed studies (see e.g. Mitleton-Kelly 2005 & 2006). Mitleton-Kelly's group has identified the following key characteristics of successful complex evolving organisations (Mitleton-Kelly 2003c); such an organisation:

- Facilitates (does not inhibit) emergence;
- Encourages self-organisation;
- Explores its space-of-possibilities;
- Facilitates co-evolution;
- Understands connectivity and interdependence (e.g. relationships, not isolation, fosters a collaborative culture);

- Creates variability – large repertoire of responses (diversity – people, cultures, products, markets; speed and cost, cope with change);
- Copes in unpredictable environments;
- Is not too organised and not too random (“fuzzy matrix”);
- Emphasises enabling infrastructures;
- Facilitates the emergence of:
 - New ways of working and relating;
 - New organisational forms;
 - Generation and sharing of knowledge;
- Continuously re-invents the organisation.

Educational institutions need to be aware of these generic principles, as to be unaware may lead to ossification or ill-conceived change and reduced effectiveness (at best) or disintegration and failure (at worst). I shall conclude this section by considering three implications for universities of complexity-theory studies of organisations.

Universities’ self-understanding and self-evaluation: In these times of change, universities are continually re-examining and re-evaluating themselves, but very little of their activity in this regard fits the profile of key characteristics of a successful complex evolving organisation. It needs to be recognised that every one of those characteristics applies no less to an organisation’s *processes of self-understanding and self-evaluation* than to its other activities. A complex evolving organisation which does not learn in those ways will never adequately understand itself. Universities therefore need to avail themselves of the methodological insights of complexity-theory studies of organisations (see e.g. Van de Ven & Poole 2005; Dooley & Van de Ven 1999; Mitleton-Kelly 2003c, 2005, 2006). And in order that relevant understandings which already exist in university sub-systems (in teaching departments, research groups, administrative departments and ancillary support units) become available in holistic overview, universities need to promote throughout the whole organisation knowledge and use of an appropriate complexity-vocabulary (Lissack 1996; Webb & Lettice 2005). Only in these ways will universities accomplish the essentially transformative learning needed for their self-reconception.

Collegial practice and governance: Complexity-theoretic studies of complex evolving organisations all reveal the value of what in universities have been called *collegial* forms of practice and governance – indeed, these are the very forms consistent with the profile of characteristics of successful complex evolving organisations. Collegiality has fallen out of favour in the contemporary university, partly through misunderstanding (e.g. by Ramsden 1998; Ramsden’s misunderstandings are discussed in Dix 2003b) and partly in consequence of obsolescent managerial approaches to change-management. Better understandings of more collegial modes of change-management are to be found in complexity approaches, and these will come to characterise the more successful universities.

Moreover, collegiality has special importance in the facilitation of transformative learning (see e.g. Taylor 1998: 47-59). Only in an environment where collegiality is

valued and modeled will collegially collaborative transformative learning be readily promoted.

Educational health: The health of a university may be gauged from the extent to which it *exhibits* those key characteristics of successful complex evolving organisations – the extent to which they pervade *all* of its activities – in its educational contribution toward social flourishing or the common good. Since they are *generic* characteristics, they ought to pervade not only its organisational processes and structures, but also its *educational* and research activities. They ought to be regarded as principles of curriculum design and teaching practice, no less than of organisational change-management.

The health of universities today depends upon their capacity for transformation along these lines – that is, their health depends on *their* capacity for relevant transformative learning.

5. Conclusion

The argument of my paper began with a personal *credo* for fostering transformative learning, but ends with discussion of the need for transformative learning at the institutional and organisational level of education. I trust that the argument as a whole does not appear to be mere *credo*. That such an argument is possible is not simply a matter of personal philosophy, but is rather a consequence of what I have termed *the science of transformation* – scientific studies of complex systems and complex non-linear processes of emergent self-organisation, particularly in living systems, and in ecologies and organisations. My conclusion is that for educational flourishing, no less than for the flourishing of our societies and the world, transformative learning is essential. However, just as not all self-organised systemic change is qualitative (for example, a system of Bénard convection cells subjected to a greater heat gradient, may simply develop finer cellular structure – a quantitative rather than qualitative change) neither is all learning transformative, nor should it be: a transformed ‘way of knowing’ is valuable partly *because* it can then be “put to work” in further learning (even though no further transformation occurs). Educational institutions must foster both transformative learning and non-transformative ‘informational’ and behavioural learning. But to better do so (see Moore 2005) they must look to *their own* transformative learning with regard to the science and philosophy of transformation.

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