The Logic of Emergence: An alternative conceptual space for theorizing critical education

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Introduction

The objective of this paper is to explore complexity in the context of the political in order to bring into focus its potential to contribute to the project of Western critique in general, and education in particular. This is partly in response to concerns that that complexity is largely uncritical (e.g. Best and Kellner, 1999) and partly in response to calls for "a new critical language for education" (Gur-Ze'ev, 2005). I have pursued this objective first, by providing some background to the idea of criticality in modern Western thought. Following this I explain where the "criticality" in complexity is located. Finally I show how the critical impetus of complexity (here I draw on the notion of "strong emergence") may be helpful in theorizing the "project" of critical education in the light of current tensions between modern and postmodern versions of criticality (Gur-Ze'Ev 2005).

What does it mean to be critical?

The Western ideal of critical thought goes back at least to Socrates' reflective questioning of common beliefs and explanations and has a rich and complex past. To avoid getting caught up in this rich history, I have narrowed the discussion to a particular *political* project within *modern* Western critical thought which is concerned with what Foucault – in a short article entitled *What is Enlightenment?* – describes as "the undefined

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work of freedom" (Foucault 1978/online). According to Foucault, this project is motivated by an attitude or ethos which places importance on exploring and going beyond whatever it is that limits our freedom, *however that freedom is defined*. I shall use Foucault's notion of "the undefined work of freedom" as an organizing framework for this paper. My motivation for doing so is that in making a distinction between (i) our *understandings of* the concept of freedom and (ii) our *quest for* whatever it is we call freedom, it becomes possible to see that modern Western society has pursued its ideal of freedom through the vehicle of critical thinking *in a number of forms*. When complexity thinking is placed into this "critical milieu" one of its possible functions within the project of modern Western critique comes into view.

I shall focus on three distinctly different critical approaches to the ideal of freedom that have come into existence since the 17th century (which is popularly understood to mark some sort of beginning for the "modern" era). These are Kant's rationalism (transcendental idealism), Marxist and neo-Marxist[1] structuralism (dialectical or historical materialism), and Foucauldian poststructuralism (archaeology and genealogy). While the three approaches originated in the 18th, 19th and 20th centuries respectively, all three offer conceptions of freedom which are concurrently highly influential in modern Western critical thought. I shall briefly describe the politics of these three important approaches in order to develop a background from which the "political criticality" of complexity (i.e., its approach to human freedom) can be judged. I have chosen to begin with Kant rather than other influential thinkers in the Western critical tradition around this time as his philosophy is widely regarded as opening the *modern* self-image of critical thinking. Neo-Marxist and Foucauldian approaches have been included for the way in which they build on, respond to, or interweave with the Kantian perspective and each other. For the most part, the neo-Marxist position can be understood as a radical response to Kant's rationalism while Foucault's poststructural perspectives represent, in some ways, an opening or deepening of Kant's foundational critical philosophy (Olssen 2006) as well as being "haunted" by Marxism (Olssen 2004). The relationships between these three positions are therefore rather complex.

[1] As articulated by the Critical Theorists of the Frankfurt School (from Adorno and Horhheimer to Habermas).

Freedom of thought – Kant's rationalism

Kant's critical philosophy is closely connected to his moral philosophy in which freedom plays a crucial role. He advocated freedom as one of three fundamental truths of the universe (the others being God and Immortality). For Kant, without freedom there is no choice, without choice there was no struggle and without struggle there is no genuine morality. In this regard freedom, for Kant, is *the condition of possibility of morality*. It therefore plays a central role in his critical philosophy and politics where he aligns *reason* with *freedom of thought*. This is most explicit in his short essay entitled "An Answer to the Question: *What is Enlightenment?*" (Kant 1784/online) which in turn is closely connected to his three Critiques (written between 1781 and 1790). In *What is Enlightenment*, Kant effectively describes human freedom as the state in which one can "use one's understanding [reason] without guidance from another." For Kant, reason begins when we no longer rely on external standards (human or divine) that are already in place.

Reason, according to Kant, has to reach *beyond* that which is presented or given. But in arguing that reason is inherently "synthetic" Kant is faced with the problem of protecting it against sceptical attack. To do so he establishes the possibility of *universal* cognitive regularities; putting in place twelve "categories of understanding" which are taken to be common to all human beings at all times[2] (Friedman 2002).

Having established a firm foundation the operations of reason, Kant is then able to argue that the ability to "think for one's self" (i.e., use one's reason) without appeal to external authority is what allows human beings to influence their own destiny.[3] This freedom to influence one's destiny through reason alone, for Kant, is the *measure of humanity*. It is what makes humans *human*. It is at this juncture that Kant's critical

[2] Without such rules Kant argues that there is no way to account for our knowledge of ideas such as substance, space, time, unity, plurality cause and effect, possibility, necessity and reality.

[3] For Kant this freedom to choose one's destiny ties in with his understanding of morality (making human being's moral creatures – morality is therefore caught up with "humanity").

philosophy can be understood as a political project for he argues that if humans can only be human through the exercise of reason, then it is imperative that humans are allowed to exercise their capacity for reason (Kant 1784/Online). This imperative, for Kant, is intimately connected with the ideal of "Enlightenment" which he understands as the state in which humanity as a whole is freely – i.e., through the exercise of reason – able to raise itself from "barbarism" (ibid.) and "progress towards improvement" (ibid.). Such progress, Kant argues, can only be achieved through *the public use of reason*, that is, "the use that anyone as a scholar makes of reason before the entire literate world" (ibid.). This public use of reason, for Kant, is opposed to dogmatism "that is, to the presumption that it is possible to make progress with pure knowledge, according to principles, from concepts alone … without having first investigated in what way and by what right reason has come into possession of these concepts. (Kant 1781/Online).

Kant's critical program can therefore be understood as an ongoing rational interrogation of human productions (concepts), on the collective (social) as well as the individual level which is constrained by a universal set of cognitive regularities that facilitate a reasoning ability that transcends specific historical and social conditions.

Kant's critical philosophy is considered to have had an enormous influence on Western thought, not least of all for its role in the ensuing "rationalization of human society" in the interests of furthering Enlightenment ideals. However, as Horkheimer and Adorno (1973) made clear, the promised critical Utopia of the Enlightenment vision which Kant's philosophy supported had failed to materialize. Instead of "liberating men from fear and establishing their sovereignty" (p. 3) the rationalist program of Enlightenment had achieved precisely the opposite and had become the principle of domination. In their words: "the fully enlightened earth radiates disaster triumphant" (p. 3) The reason for this, so they have argued, is that while scientific and mathematical rationality was initially used to attack all forms of superstition and dogma in the name of a free and open society, it had become increasingly separated from these commitments as it transformed nature into an object of domination and itself into an instrument of efficiency and instrumentality. For Horkheimer and Adorno the legacy of scientific and mathematical rationality is therefore

not one of Enlightenment but of barbarism and the subordination of subjectivity to the totally administered society as evidenced by Fascism and other totalitarian regimes that represent a complete negation of human freedom.

Freedom from hegemony: Neo-Marxist structuralism

For Horkheimer and Adorno, the critical "solution" to the failure of the Enlightenment lay in Marxism, which concerned itself primarily with the *lack* of freedom – or, more accurately, the unequal distribution of power – *within* the Enlightenment program (bearing in mind that the Enlightenment program was itself concerned with freedom and the unequal distribution of power). The Marxist mode of social critique turned away from Kant's *individualist* critical philosophy founded on the autonomous and conscious subject and instead articulated a form of critique founded on socio-historical processes (dialectical materialism) which, as Lucáks reminds us:

> "The premise of dialectical materialism is, we recall: 'It is not men's consciousness that determines their existence, but on the contrary, their social existence that determines their consciousness'" (Lukács 1919/online).

The idea that consciousness is socially determined enables a very different analysis of freedom and cultural domination from that articulated by Kant. This is a form of freedom which the rational and autonomous individual cannot achieve simply by his or her own efforts and conscious will. Gramsci's highly influential work on cultural hegemony (an innovation of Marxism) is invaluable for understanding the Marxist perspective on freedom from cultural domination. Gramsci (2006) argued that in "advanced" industrial societies the perspectives of the ruling class (the hegemonic culture) have a dominant voice in (hegemonic) cultural innovations such as mass media, mass organizations and educational institutions which means the hegemonic perspective is advanced while that of the non ruling or "subaltern" classes (the masses, the workers) is suppressed. Because of this, the subaltern classes are indoctrinated in the hegemonic perspective (and

dominated by it) instead of being free to develop their own perspective which would reflect their own needs and state of being. In other words the subaltern class adopts a "false-consciousness" which serves the needs of the hegemonic culture (and keeps the subaltern class in a state of servility/oppression). The result is an *ideology* that masks the true nature of the structures (of oppression) in capitalist society. The main argument is that since the relationship between the hegemonic and subaltern classes is culturally (or economically rather than naturally) produced it can therefore be disrupted only if it is seen for what it *really* is. Although Gramsci's analysis of cultural domination is advanced specifically in terms of economic classes his work has been broadly applied since it suggests that prevailing cultural norms (including institutions, practices and beliefs) should not be viewed as "natural" but, rather, should be investigated for their implications for social oppression (Gramsci 2006). Along these lines, Gramsci's work has been used as a critical *methodology* which aims at the "exposure" of "true" but unrecognized workings of power, while disestablishing "false" understandings of social reality in order that people may come to understand the nature of their oppression and in this way acquire the tools that are necessary to overcome it.

While Marxism has been influential in shaping the direction of modern social critique, a major criticism of this perspective is that it does not provide an adequate theoretical basis for analyzing issues related to collective identity and action. Part of the problem is that "the subaltern classes, by definition, are not unified and cannot unite until they are able to become a 'State'" (Gramsci 2006, p. 43). This means the subaltern classes cannot see their position within the social structure and act together to work toward achieving what is in their best interests. In this regard they cannot organise collectively to counter the power of the hegemonic class. Not being able to recognize the position of a class or not being able to act on these interests is what differentiates "false consciousness" from "class consciousness." Within this framework, the only way in which the subaltern classes can come to recognize the "true" workings of power is through outside intervention, e.g. through some form of education. This is the motivation behind critical pedagogy (see, e.g., Freire 1996). An insurmountable problem with critical pedagogy, however, is that it is paternalistic. The "father figure" (i.e., the "all knowing" educator) has to somehow get the "children" (i.e., working

class adults) to "see" what is "really" going on, a relationship which is itself hegemonic.

Habermas (1985) attempts to solve the problem by going back to Kant's rationalism to find a different way out of the "false consciousness" dilemma. He does this by drawing a distinction between communicative rationality (a form of rationality located in *interpersonal* linguistic structures) and strategic or instrumental rationality (which is located in universalized structures of *individual* thought). In his pragmatics of communicative rationality, Habermas argues for universal pragmatic principles through which mutual understanding is generated. He sees the rationalization of society in terms of the institutionalization of "communicative competence," this being an ideal type of speech situation in which participants are equally endowed with the capacities of discourse, recognize each other's basic social equality which means that *speech is undistorted by ideology or misrecognition.* Communicative rationality, for Habermas, is therefore the "way out" of hegemonic domination and dependence and in this sense the route to human freedom. The Habermasian utopia in which hegemonic power imbalances are eradicated through the institutionalization of a particular form of "communicative competence" (together with other Marxist and neo-Marxist utopian impulses and totalizing strategies for implementing social change) have in turn been questioned by Foucault's analyses of power as it relates to the human condition. With regard to Habermas's work Foucault comments that

> …there is always something which causes me a problem. It is when he assigns a very important place to relations of communication and also to functions that I would call 'utopian'. The thought that there could be a state of communication which would be such that the games of truth could circulate freely, without obstacles, without constraint, and without coercive effects, seems to me to be Utopia. It is being blind to the fact that relations of power are not something bad in themselves, from which one must free oneself. I don't believe there can be a society without relations of power (Foucault, quoted in Olsson 2004, p. 463)

Freedom as transgression: Foucaudian poststructuralism

While Foucault's approach shares many parallels with Marxism in its analysis of social structures as being fraught with power relations his conception of social change is altogether different from the Marxist approach in that he does not want to free society from relations of power, to achieve a Utopia free of coercive effects. Foucault's critical approach is an outright rejection of teleology and is, instead, *radically* open ended. In his own short essay entitled *What is Enlightenment* Foucault provides a reading (and deepening) of Kant's critical program in which he characterizes the impetus of Enlightenment as

> not faithfulness to doctrinal elements, but rather the permanent reactivation of an attitude – that is, of a philosophical ethos that could be described as a permanent critique of our historical era (Foucault 1978/online)

> It has to be conceived as an attitude, an ethos, a philosophical life in which the critique of what we are is at one and the same time the historical analysis of the limits that are imposed on us and an experiment with the possibility of going beyond them. (Foucault 1978/online)

From this it becomes clear that freedom, for Foucault, is not a *thing* but a *movement* which inhabits the interstices of power relations. Freedom, in this sense cannot be separated from power relations and power cannot be removed from social relations. His mission is therefore not to posit freedom as thing to achieve or a place to reach but is rather to interrogate relations of power to find the articulations where freedom *can take place.* For Foucault, when power relations no longer exist, when we finally arrive at the promised Utopia in which all the people of the world think with the same form of rationality, *there is no longer any freedom*. What we have, instead, is a totalitarian state.

> In fact we know from experience that the claim to escape from the system of contemporary reality so as to produce the overall program of another society, of another way of

> thinking, another culture, another vision of the world, has led only to the return of the most dangerous traditions (Foucault 1978/online).

In seeing things this way, Foucault's critical approach addresses the notion of (political) freedom at the deepest level, but there are nevertheless a number of objections to this analysis. Most importantly – at least in the context of this paper – Foucault's work has been criticized by Habermas (1994) for not dealing adequately with collective power and the state, a problem which, at least according to Habermas, denies the possibility of a progressive politics. Foucault himself acknowledges the legitimacy of this objection, framing it as a question to which he can respond:

> …if we limit ourselves to this type of always partial and local inquiry or test, do we not run the risk of letting ourselves be determined by more general structures of which we may well not be conscious, and over which we may have no control? (Foucault 1978/online)

His response is that, on the one hand, it *is* the case that we have to give up hope of ever reaching a point where we have access to those general structures that constitute our historical limits so that we can move beyond them once and for all. ("Since the experience we have of our limits … is always limited and determined… we are always in the position of beginning again" (Foucault 1978/online). On the other hand, he asserts that this does *not* mean "that no work can be done except in disorder and contingency" (ibid). For Foucault, the work in question "has its generality, its systematicity, its homogeneity, and its stakes" It must

> …on the one hand, open up a realm of historical inquiry and, on the other, put itself to the test of reality, of contemporary reality, both to grasp the points where change is possible and desirable, and to determine the precise form this change should take. (ibid.)

The political disagreement between Habermas and Foucault is one concerning norms. For Habermas, the lack of a positive norm in Foucault's political theory leaves open the door to oppressive social regimes. For Foucault, the presence of a positive norm in Habermasian political theory denies the possibility of freedom. I think that they are both right in their respective criticisms. Foucault's mistake lies in *not guarding against the closure of political freedom*. Habermas's mistake lies in guarding against the closure of political freedom *by attempting to use a norm to enforce a particular version of political freedom.* That both theorists are right does not mean, however, that we have no option but to take sides. Another way forward is to understand this "impasse" as suggesting that the political question is not *how to achieve* or *reach* a pre-defined state of political freedom (in Habermasian style) but *how to guard against the closure of freedom* (including the closure of the notion of freedom itself). In other words we have to guard against the closure of political freedom *without imposing norms*. I believe this is the task of criticism at the *political level*.

This articulation of Foucault's understanding of power can be found in the poststructural political analyses of Chantal Mouffe, who provides a conception of politics – or, more accurately, what she calls "the political"[4] (2005) as *fundamentally hegemonic*. What is interesting about Mouffe's politics is that she begins with the notion of difference and "in eradicable antagonism" (Mouffe 2000) as being politically *normal* rather than politically *pathological*. For Mouffe "the political" is the embodiment of power relations; it exists in ineradicable conflict about how to organize our common life. Her central thesis is that *every political order* is the expression of a hegemony which always entails some form of exclusion… *one cannot take power out of the political*. For this reason – so she argues – it is necessary to accept the hegemonic order of society as *hegemonic* rather than pretending we can reach some ideal political state in which hegemony no longer exists. Only once we understand the political as fundamentally hegemonic does it becomes possible to take responsibility for the exclusions that its hegemony produces. We can

[4] For Mouffe *the political* is "the dimension of antagonism that is inherent in human relations" while *politics* "consists in … trying to defuse the potential antagonism that exists in human relations." (Mouffe 2000, p. 15).

take responsibility for hegemony by putting in place a politics in which alternatives to the existing hegemonic order *are still possible*. The politics necessary to ensure that hegemony is always provisional is "agonistic pluralism" which – as Mouffe explains – is characterized by "agonistic debate" in the political sphere about possible alternatives to the existing hegemonic order. It is through such agonistic debate – the interaction of a multiplicity of voices – that alternatives to the existing hegemonic order actually emerge.

> The radicalization of democracy requires the transformation of the existing power structures and the construction of a new hegemony (Mouffe 2005, p. 53)

Mouffe's solution stands in opposition to political models which attempt to eradicate hegemony through invoking general rules or principles (e.g. communicative rationality) by means of which rational consensus is obtained. In denying the ineradicability of antagonism Mouffe argues that the "rational consensus" model is unable to take responsibility for the exclusions that its hegemony facilitates and in this regard forecloses the possibility of any alternative to itself. There is no political freedom in such a model of politics, no hope for those who are oppressed by its hegemony for it is insulated from the effects of pluralism of value, and the power relations arising from such difference. In fact it is longer a *political* society but a totalitarian state.

Having shown that the question of what it means to be critical can be answered in a number of ways, depending on how one understands the notion of freedom, it is now possible to turn to the question of how complexity can be "critical."

How is complexity "critical"?

Foucault's understanding of freedom as being a movement which inhabits the interstices of power relations – so I would like to argue in this section – is underpinned by an understanding of causality and process which is fundamentally different from Marxist and Enlightenment understandings of causality and process. The latter is guided by a logic of determinism which is a linear and individualist conception of cause and effect between objects whose self-determined

essences collide and interact with predictable consequences. The entire causal framework of such processes is fully determined, such that there is no freedom within the process for anything else to happen. In such processes freedom simply does not exist. An alternative to this form of logic can be derived from Prigogine's analysis of complex dynamic or *emergent* processes (Prigogine & Stengers 1984; Prigogine 1997). Prigogine has shown that with complex or emergent processes (as opposed to fully deterministic processes) the system has the freedom to develop along *alternative trajectories*. In analyzing this phenomenon, Prigogine's work exposes the mechanics of what I have referred to elsewhere as the "logic of emergence" (see Osberg & Biesta 2007). This is a logic in which choice is an *operator* in the process itself – part of its internal "mechanics" – not something that happens *to* a process, something applied to it from the outside. Since emergent processes are not fully determined – they contain within themselves the possibility of freedom – the logic of emergence could therefore also be characterized as a *logic of freedom* (rather than a logic of determination).

It seems to me that if the notion of freedom is the *impetus* for the tradition of Western critique then the concept of emergence – understood as a logic of freedom – has a contribution to make to the "project" of Western critique and at the very least deserves further attention in relation to critical education. What I shall do in this section therefore, is describe the "logic of emergence" itself. Once this has been done, I shall then (in the final section) explain how this is helpful for the project of critical education.

The logic of determinism and the logic of emergence

Let me begin by outlining the "logic of determinism", so that we can at least have an idea of what emergent processes are not. The logic of determinism is a fundamentally "object-based" logic which understands causality and process in terms of a series of individual stages or states that are all logically derivable from each other. I call it an "object-based" understanding of causality because for this understanding to hold, the various states that a system can be in must be understood as discrete, separated not only from other things in space, but also from each other in time. Henri Bergson called this a "cinematographical" view of temporality where processes are understood as a series of "snapshots" of

the transitions from one state to another (Bergson 1911, p. 301). When the various states of a process are understood as discrete (as if objects separated in time) it is possible to calculate the most logical relationship between earlier and later states of the system. In this way one can work out the logical rules or "laws" which explain the movement of a process from one state to another, either forwards or backwards in time. Since every stage of the process is in principle logically determinable, it is possible to understand the process *itself* as a discrete whole, an object, with a distinct beginning and end point and a fixed (determined) trajectory. The situation is quite different with a relational or emergentist understanding of causality and process.

The "emergentist" understanding of causality and process is a critique of determinism coming from complexity science (Osberg & Biesta 2007). What makes this critique from complexity most valuable for the current analysis is the way in which it brings into view an important difference in the causal mechanics of deterministic and non-deterministic processes. It is for this reason I choose to label this alternative understanding "emergentist" rather than poststructuralist, deconstructionist, or pragmatist. Although it could be argued that these other theoretical frameworks adopt similar views of causality and process, they do not explicitly deal with the mechanics of determinism and so the problem with determinism remains obscure. I believe it is only when the mechanics of deterministic and emergentist understandings of causality and process can viewed side by side that it becomes possible to fully appreciate the shift in logic that a emergentist understanding of causality and process entails.

One way of approaching this emergentist shift in logic is to appreciate the nature of "complex systems" – these being systems that show an increasing level of order over time, as is the case with certain physical systems as well as all living systems (e.g., knowledge systems, economic systems, ecosystems and so on). First, it should be mentioned that the name "system" is misleading as it implies the existence of a *discrete* entity when in fact none exists. Complex "systems" have no distinct boundaries, they exist only because of the fluxes that feed them and disappear in the absence of such fluxes. Tropical cyclones are a good example; it is difficult to place limits on such phenomena, as they are inseparable from other complex systems (e.g., sea and air currents)

which sustain them (for example tropical cyclones usually weaken when they hit land, because they are no longer being "fed" by the energy from the warm ocean waters). One could therefore say that a complex system is dynamic rather than static, it exists only in the interaction *between* things and is therefore not *itself* a thing. For this reason the issue of boundaries is a real problem for the concept of complexity. It is this boundary problem that leads us to a different understanding of causality and process.

Since complex systems are always already in a state of dynamic interaction with other complex systems that are themselves in a state of dynamic interaction *ad infinitum* we find that in trying to understand such systems there is no place to begin, no foundation or point of origin that is not already in interaction with something else. Because the states of a complex system cannot be precisely delineated (because they are always already in dynamic interaction), we are faced with the practical difficulty of being unable to calculate the *logical* relationship between earlier and later states of a complex system. This boundary problem therefore means that in practice we are unable to formulate "laws" which fully explain the movement of the system, or complex process, from one state to another. As mentioned earlier (in our description of deterministic causality), it is possible to calculate such laws only if we can delineate the boundaries of various states of the process. This practical difficulty does not mean that we should give up the attempt to understand complex processes, nor does it mean our only alternative is to artificially frame the system. I believe it means, rather, that we should *not* try to understand complex processes *as if* they are objects, each with their own discrete origin, end point and trajectory, from which we can calculate the logical rules or laws that drive them. I believe it is necessary, rather, to move into a different, *non-object-based* form of logic.

Prigogine approaches such an understanding of complex processes by beginning his analysis in a different place. Instead of trying to delineate discrete stages in order *then* to calculate the laws which connect them, he focuses on the passage *between* stages. This leads him to understand complex processes in terms of a series of "jumps" which represent *new levels of order* (Prigogine & Stengers 1984). For example when water in a container is warmed from below it will begin to form convection currents which represent a new level of order. Each jump to a

new level of order, so he claims, puts the system at a crossroads or "bifurcation point"– which presents the system with two or more equally suitable alternatives. This means a choice or symmetry break must always occur when the system jumps to a new level of order (in the case of the warming water, at the micro level the convection currents can be either clockwise or anticlockwise). It is in terms of this concept of bifurcation that Prigogine's work begins to challenge determinism, for he suggests that in adopting a *particular* symmetrical alternative from those that are logically (deterministically) possible at a bifurcation point "there is nothing in the macroscopic equations that justifies the preference" (Prigogine 1997, p. 68). The symmetrical alternative adopted by the system, according to Prigogine, is purely a matter of chance. Chance is therefore included as a causal factor, an operator, in complex processes. Because chance has no "essence" and is therefore not something that can be known, its inclusion into the causal mechanics of complex processes means it is no longer only *practically* impossible (due to the impossibility of delineating the boundaries of various stages of the complex process) to logically derive the laws which fully explain the movement of the complex process from one state to another. Since the inclusion of chance means there will always be something missing from the equations, Prigogine's work implies that the logical derivation of such laws is also impossible *in principle*. In other words complex processes are not just deterministic processes which, for practical reasons are difficult to describe. They are in principle different from deterministic processes and call for a different understanding of causality. Instead of deterministic causality in which everything can be fully (and logically) calculated and known, we are faced with probabilistic causality in which an essential component of the process is *the unknown* (chance). While the principles of determinism still operate to a certain extent, there is always a fundamental absence of something, which forever disrupts strict determinism, precluding the possibility of a full logical explanation. This difference does not mean, simply, that some causal processes can be fully understood while others cannot. It calls for a different understanding of causality. Prigogine understands this difference in terms of reversibility and irreversibility.

With conventional object-based understandings of causality the trajectory that is traversed by a process is fully determined and therefore

unchanging regardless of whether the process is running in a forwards or backwards direction. For this reason Prigogine calls such processes *reversible*. The rules driving such processes can be understood as timeless and immutable. Since everything about the deterministic process can in principle be known (as if it is a discrete object), it becomes possible to assume that given a system at particular starting point at "time 1" we can in principle determine the conditions necessary to make it reach a particular end point at "time 2." In other words, with deterministic causality, a means-ends understanding of process is possible. Essentially, this kind of process can be understood as linear (Figure 1).

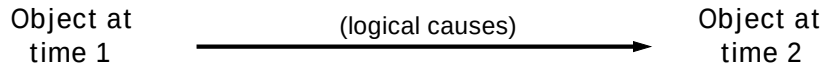

Figure 1. A deterministic or linear process in which the logical causes connecting two given events are calculable such that everything about the process can be known. In a sense, the "future" of such processes already exists (as a rational fact)

Probabilistic causality disrupts this object-based understanding of process. When chance (the unknown) is included in the causal mechanics of a process – and bearing in mind that (i) chance is included at each and every bifurcation and (ii) the (chance) decision made at each bifurcation affects the subsequent trajectory of the system and (iii) it takes very few bifurcations to produce an inordinate number of options (Figure 2) – the trajectory of the process becomes radically indeterminate *despite* the past states of the system partially determining what emerges at each bifurcation.

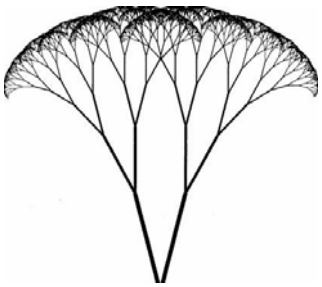

Figure 2. Fractal tree showing how simple binary branching can quickly lead to a large number of outcomes

For Prigogine, the inclusion of chance at each bifurcation means the system must be understood as *creating its own trajectory.* In other words with each new level of order a new set of creative possibilities opens up, these being possibilities which do not, in any logical sense, exist beforehand. The "space of the possible" is *renewed*. Since new levels of order introduce forms of organization which cannot be predicted from the most exhaustive analyses of the preceding stages, any rules or laws which may have accounted for preceding stages are no longer useful for explaining the new level of order. While preceding levels of order limit what is possible at subsequent levels, the logic of prior levels is insufficient to explain new levels of order. Each new level introduces a different (renewed) order of logic. For this reason Prigogine considers probabilistic processes to be strictly *irreversible*: the "logic" governing their passage through time is not timeless and immutable, but changes (in the sense of being renewed) as the process matures. Since logic can no longer describe the passage of a complex process through time, it is futile to think about such processes in terms of means and ends. A more productive way of thinking about such processes is in terms of a movement into *that which cannot be calculated* (Biesta 2001a). Since logic can no longer connect two states of a system, such processes can also no longer be understood as linear. One could perhaps think of them, instead, as *centrifugal*: forever "expanding" into the unknown (Figure 3). However, this is *not* an expansion in the sense that something unknown is *added* to what is already present, which remains the same. It is an

expansion in the sense that what is already present is *reordered* or *renewed* in a way that opens incalculable (and wider) possibilities. In this sense, the non-deterministic "logic" of emergence can be thought of as a logic of renewal.

In sum, deterministic processes can be understood in terms of the immutable laws that drive them. Probabilistic processes cannot. With the former it is useful to understand subsequent states of the system in terms of their logical prior causes (what made them possible). With the latter it is more productive to think in terms of a movement into the incalculable. The *object-based logic* of the former is retrospective (oriented towards the past and what is already known), the *emergentist logic* of the latter is prospective (oriented towards a future that cannot yet be foreseen).

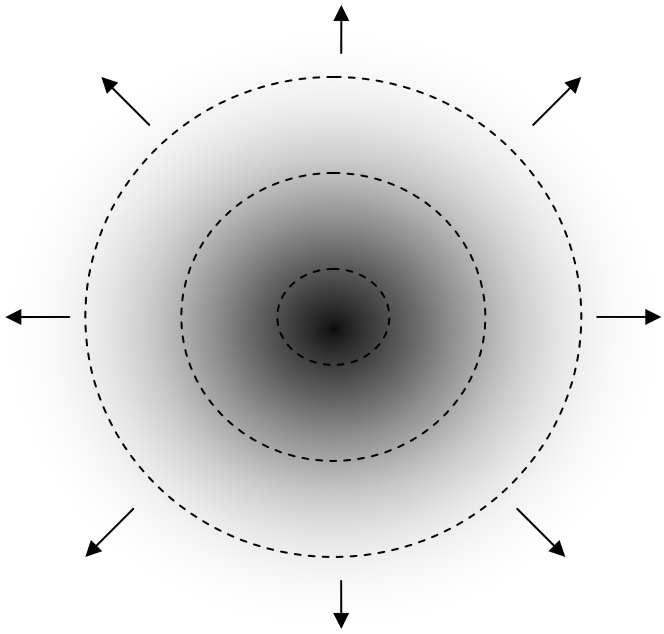

Figure 3. A complex or centrifugal process in which the "space of the possible" (the spheres within the dotted lines in the illustration) is continually expanded into that which is incalculable through "renewal" of what came before (larger spheres subsume and transcend smaller spheres). The "future" of such processes does not in any rational (calculable) sense already exist

An alternative space for conceptualizing critical education

What I hope to have made clear in the previous two sections is that when one asks whether complexity can be "critical" in an educational context, one is asking whether it is an adequate framework for addressing political concerns, and more specifically, whether it can address concerns about freedom. I have argued, further, that the way in which complexity addresses the issue of freedom is from the perspective of process. With complexity, freedom is not the *outcome* of a process. It is *internal* to complex processes.

Form this it seems evident that if complexity is to contribute to ongoing debates about the place of criticality in education it will do so in terms of this understanding of process. In this section I shall explore the way in which this understanding of process – the logic of emergence – is useful to the project of critical education. I shall do this in two steps. First I show how the logic of emergence sheds light on current problems and disagreements *within* critical education. Second I show how the logic of emergence opens an *alternative space* for our thinking about the meaning of critical education.

Problems with the concept of "critical education"

Since Kant one of the major themes of the project of Western education has been the nurturance of the faculty of critical thinking. Education was seen as the vehicle by means of which one developed one's capacity to "use one's understanding [reason] without guidance from another" (Kant 1784/Online). Although there is immediately a problem with this in that it is difficult to reconcile the *method* of education (guiding others) with the *object* of education (*not* being guided by others), the Kantian ideal of the "autonomous thinker" has in many ways remained central to liberal education. Indeed the idea of the "autonomous thinker" is often touted as the "gold standard" of critical thinking.

Liberal education has, however, come under attack from the Marxist and neo-Marxist critical camp. Here it has been argued that the goal of liberal education (which followed Kantian themes of liberation) perpetuates the existing hegemonic order and in this way is implicated in the perpetuation of social exclusions and other injustices (Apple 1979,

1993). The emancipatory "solution" that is offered is "critical pedagogy" which puts in place a *curriculum of social activism* in which the public is educated to actively participate in social critique (Freire 1996). Such social activism, so it is argued, is necessary to facilitate social change and hence the development of a more egalitarian society. However it has been argued that in fact the ultimate goal of critical pedagogy is to bring about a "critical Utopia" (Gur-Ze'Ev 2005, p. 7) in which everyone operates according to the same order of rationality which is itself beyond critique and presumed to be universally good. In this regard critical pedagogy can be shown to have *not* "done away" with the socialising function of schooling so much as replace one ("bad") social agenda with a different ("good") one.

The problem with this is that the new social agenda is *itself* a hegemonic order, which carries within itself its own forms of exclusion and social injustice. As Laclau and Mouffe have argued, it is not possible to free society from hegemony. From this perspective it can be argued that critical pedagogy has failed to meet the emancipatory challenges it set for itself, becoming part and parcel of normalizing education (Gur-Ze'Ev 1998, p. 463-468). This critique of critical pedagogy follows the same pattern as the critique of the Marxist and neo-Marxist social critique by postmodern and poststructural political theorists such Foucault and Mouffe.

The tension between Marxist and neo-Marxist critical agendas on the one hand and postmodern and poststructural critical agendas on the other has led to a situation in which it is difficult to understand how education can further the broad goals of political liberation. This has led to an increased focus, within "traditional" schooling, on "identity politics" which is seen as a way in which education can maintain some sort of political focus. However, a focus on identity politics draws attention away from *the* central problem for critical education: the problem of how the "project of education" can be anything other than a tool for normalization – one which legitimates hegemony. At this point there appears to be no way forward, for although the poststructuralist challenge to Marxist and neo-Marxist social critique is philosophically developed and profound it has been suggested that this line of critique in educational theory is incapable of positive action and therefore politically impotent. It is at this juncture that the logic of emergence can

be of assistance for it provides a structure within which it is possible to make sense of the "impasse" between modern (Kantian and Marxist) critical agendas and postmodern critical agendas.

The cause of the impasse appears to rest with assumptions about the process of education itself. For both modern and postmodern critics, the educational process is one which *necessarily* guides learning towards a pre-determined end. Indeed it is the presence of an end point that makes it possible to distinguish education from unguided learning. Since the curriculum in a broad sense (i.e., the content to be taught as well as the pedagogy and ideology supporting it) is the primary tool by means of which the human subject is guided in their learning, one could say the curriculum is the "mechanism" for the *process* of education.

If we hold a linear or deterministic understanding of process, in which given events are understood to be connected by logical causes, then it becomes necessary to understand the educational process as a trajectory connecting the human subject in an uneducated state to the human subject in an educated state, with the curriculum being instrumental in this conversion from one state to another (Figure 4).

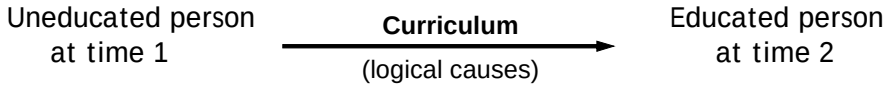

Figure 4. A linear understanding of the educational process where the curriculum is understood as the means to a pre-given end.

This ends-orientated understanding of the curriculum (made possible by a linear understanding of process) underpins every form of education where the end or intention of the educational intervention is *pre-defined*. While forms of education (e.g., liberal, radical, progressive) may differ widely from each other they are all founded on the idea that for education to be *educational*, it has to be *for* something and that something

must be defined *before* education can take place. One consequence of this understanding is that whatever the end that is chosen – and we must be clear here that the choice for such a trajectory is indeed a *choice* which has to be made by *someone* – it will always reflect particular interests and values. In this regard we have to concede that a linear understanding of process triggers an understanding of education that is indistinguishable from *socialization* (Biesta 2006). While practices of socialization are not unimportant, since they equip newcomers with the tools they need to participate in particular forms of life, it is also problematic in the sense that whoever is "included" through socialization is always included into a framework of values already defined by those on the "inside" which means it is inevitable (and unavoidable) that certain interests are promoted *at the expense of others*. When this is the case, questions about *which* or *whose* interests should be promoted through such socialization (and why) become critically important for curriculum theorists and need to be rethought again and again. However, while I do not wish to argue against the importance of rethinking the purposes of socializing curricula, I believe the importance placed on this activity in curriculum and educational theory obscures another kind of curriculum question: the question about whether a linear understanding of the educational process and hence an ends-orientated understanding of education (i.e., education-as-socialization) *is the only understanding of education that is possible*.

However, without a clear alternative to deterministic understandings of causality and process, the question of whether an ends orientated understanding of education is the only one possible cannot present itself as a possibility. The idea of an alternative understanding of process, embodied in the "logic of emergence" is therefore a big step towards opening a different agenda for educational theorizing. This is an agenda in which the current theoretical "impasse" between modern and postmodern critics of the education project is dissolved. It would appear the logic of emergence provides another way to understand the process of education, one which releases education from this socializing role and hence a new way forward, perhaps a new hope for critical education.

Education as a space of renewal

With a complex and open ended (centrifugal) understanding of process, it becomes possible to conceive of the educational process as an exploration or movement into *that which cannot currently be conceived as a possibility*. One way of understanding this is to see the curriculum as guiding learning by "expanding the space of the possible and creating the conditions for the emergence of the as-yet unimagined" (Davis 2004, p. 184). Michel Serres puts it like this:

> The goal of instruction is the end of instruction, that is to say invention. Invention is the only true intellectual act, the only act of intelligence. The rest? Copying, cheating, reproduction, laziness, convention, battle, sleep. Only discovery awakens. Only invention proves that one truly thinks what one thinks, whatever that may be. (Serres 1997, p. 92-93)

It could be argued, however, that such a conception of the curriculum, as being instrumental in producing the "as-yet unimagined" *still* has a preconceived purpose (the production of novelty, invention or creativity) and as such closes off other possibilities for education. In this sense, while a shift to a complex understanding of process may have taken place, *the guiding role of the curriculum* is itself still understood in terms of a linear, means-ends framework (Figure 5). Since the curriculum is still designed with a specific end in mind, the process of education still has a socializing function.

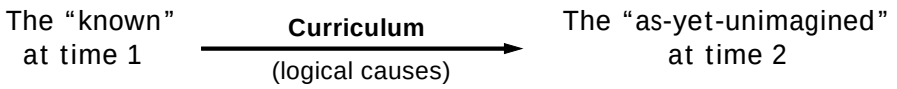

Figure 5. A linear understanding of the educational process where the curriculum is designed specifically to produce the "as-yet unimagined" (novelty)

The challenge, therefore, is to rethink the guiding role of the curriculum *itself* in terms of a non-linear or complex (centrifugal) understanding of process it is only at this fundamental level that that it becomes possible to think of education as something other than socialization. The question, then, is how to get away from this linear educational logic *without giving up the idea that the curriculum has some kind of guiding role* which distinguishes education from other kinds of learning. There are a number of steps in understanding this.

First, it is necessary to acknowledge that if the educational process is complex it is not just that the educational end is not there *in advance*, but that that the process *lacks an end altogether* – it is fundamentally open ended. If the curriculum is what drives the educational process, then this means that as long as the curriculum exists, education will continuously take place, it cannot come to an end, cannot reach a point of closure. This is very different from saying that the end can be arrived at in some other way (e.g., that the end is a function of the process itself, or that the end is arbitrary) which, at a fundamental level, would still leave us with an understanding of education as orientated towards closure. With a complex understanding of process education is not about closures but about openings. There can never be a point at which we can say someone is now "educated" because education is no longer something to be "acquired." It is, rather, an unending process. This does not mean we should no longer make judgments about the outcomes of education, quite the contrary in fact. Making judgments about the outcomes of education becomes part of the open-ended educational process. It is this continual engagement in judgment (not the arrival at an end point) that

makes the educational process *educational*.

The next thing to acknowledge, which is closely related to the first, is that if the educational process is emergent then it lacks not only an end, but also a *beginning* because there is no foundation or point of origin that is not already in interaction with something else. This means we can no longer say that education begins with the student, or with the teacher (or even with the curriculum). We have to understand all these "elements" of the educational process as always already in dynamic interaction with each other and with elements "outside" the system. Without a concrete start (or end) point we can now only describe the educational process as taking place in *space* of emergence (see Biesta 2004). Because this is the space where education takes place, it is, in effect, a *curricular* space. We have therefore moved from the idea of a curriculum as something to be followed *before we can get to education*, to the idea of the curriculum as a space where *education is already taking place*.

The third thing to acknowledge is that this complex curricular space where education is already taking place is, by definition, a space of *responsiveness.* This is the case because responsiveness does not come *after* relation; it is a necessary condition *of* relationality. Without response, nothing can be "in relation." But it is also important to distinguish between (i) *mechanical* responsiveness in which everything is predetermined and there is only a single way for the process to "unfold" and (ii) *complex* responsiveness which, as Prigogine's work suggests *opens up multiple new possibilities* and always entails an element of uncertainty as it becomes necessary to choose between options. If this is what constitutes complex responsiveness then the complex curricular space is complex because it is a space in which new possibilities are opened and critical choices have to be made, i.e., it is a *political* space in which critical judgments have to be made. We could therefore say that it is the opening of possibilities by the teacher in response to the student (which itself entails a choice from multiple possibilities), and the making of choices by the student in response to the possibilities opened by the teacher, and then again by the teacher in response to the choices of the student, that constitutes the "taking place" of education in the complex curricular space (see Biesta 2001b).

Last, we need to acknowledge that it is this opening of possibilities and making of *critical choices* that makes a complex process *radically*

indeterminate. Since the trajectory of a complex process is partially a product of non-mechanical choices (which entail a degree of uncertainty) made through countless openings of possibility, we have to understand the future of complex educational processes as centrifugal; forever moving "outwards" to occupy spaces that are incalculable from the perspective of the present. Since what could be opened through such educational processes is incalculable from the perspective of where we are now, such processes can no longer be understood as linear, motivated towards a future that is already known and pre-defined. The curriculum no longer guides by intentionally leading towards a closure. It guides through the presentation of alternatives which complicate the scene, unsettling the doings and understandings of others and demanding the exercise of critical choice, in other words, it guides by intentionally *opening* closures.

This understanding of the guiding role of the curriculum solves the theoretical impasse between modern and postmodern versions of criticality in the sphere of education for it not only succeeds (where critical pedagogy failed) in *not* imposing a normalizing framework, but does so in a way that cannot be judged to be uneducational or politically apathetic, this being the main criticism brought against child-centered and romantic educators (who simply remove the goal of education without rethinking the process) by critics all three critical camps (Kantian, Marxist and Foucauldian). Because the complex curriculum is a space of complex relationality which calls for the exercise of critical judgment again and again *at all levels* it is also a *political* space in which it becomes possible to continuously *renew* our ways of being-in-the-world-with-others and rethink everything about our world. In this sense education ceases to be about socializing people into a way of thinking/being/doing decided in advance, where those who do not manage to socialize or become socialized in the approved way are considered educational failures. It becomes, rather, a *democratic* space of *renewal* in which the possibility of thinking again *cannot* be foreclosed (Biesta 2006). I would argue that the presence of a space in which renewal can take place, is the condition of possibility of freedom. When we understand education in this way, as a space of renewal, it therefore becomes possible to understand it, also, as *a practice of freedom*.

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