

Anti-capitalist Analytical Fusion: Science, Pedagogy and Revolution

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Responses

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Abstract

In this paper I review recent work in neo-liberalism and science education as they relate to critical social analysis. I take the position that under neo-liberalism, education in general and science and technology in education in particular press the energies of teachers toward the production of workers, the everyday tools for the expansion of empires, the police state and the war machine. This is by no means a comprehensive view of the field, instead it is an exploration in the further development of a personal critical revolutionary *praxis* standing in solidarity of pedagogies that are progressive, activism oriented that seek to promote the revolutionary project. A radical departure from the stricture of academic journal writing this paper reflects the critical voice I have been developing over the last several years. It is a fusion of auto-ethnography, critical social theory and free verse.

Key words: Neo-liberalism, Critical Analysis and Science, Technology & Activism in Education

Neo-liberalism and Education

A Beginning

How did we get here? Has history always been so? Imagine two kids playing in a dirt lot. Careless, reflecting the laughter of a society they begin to play and idle at life. Taken by each other they spit, argue and sometimes curse. Life is not always like this. War, famine and disease, have throughout history been part of the human experience, yet what else is the human experience? A capitalist asserts being human has to do with purchasing power: toys, freight, schooners, yachts, a person's ability to buy tied to the level of education they attain (Rodriguez, 2008). Ivy League outcomes render capitalists personal material gain and social success, but for the world, struggle; the great recession of 2008-2009. On many corners in the United States and throughout the world the people are lining up for soup, spare beds, anything they can get their hands on, and why? Perhaps the sand lot wasn't enough. Children grow, we age, men and women begin to act in society according to the lives they have chosen but more insidiously been trained to become.

Quotidian paraphrasing: Lacan said it's great to have what's shiny so long as what's shiny continues to shine and provided what's shiny relates to an original thought, idea or experience (Lacan, 2006). What can we say is an original thought, idea or experience? Since most of our becoming has to do with the people, places and histories that surround us. Take a person, change the place across space and time will (s)he be an astronaut, a surgeon, a cleric, a suicide bomber or a freedom fighter. Will (s)he be one of these, some of these or none? Are all of these professions and are they chosen? Or do we somehow inhabit ideas that are predetermined: ethnicities, social class, gender, sexuality, are social tags innocuous?

In teaching and learning, they are much more, in teaching and learning we begin to see with our eyes, our hands, and our hearts (Freire, 1997, Fromm, 1956). The critical experience that is the day to day of the classroom, the boardroom, and the sand lot are known events in our personal history. You know who you were in the classroom, the boardroom, and the sand lot. From childhood you are able to decide in all that is living, to be, to live a life in all of your dreaming. It is in learning we determine the course of our lives: we accept or do not accept the world we see as we act on our knowing.

What was it Marx said? Spaces and places are fields for the production of someone else's knowledge, wealth or phobia (Bowles & Gintis, 1976; Marx, 1906). Is life as Karel Kosik understood society's eyes of experience, *the pseudo-concrete and the pseudo-intellectual*, what we feel as we are alive in the day the week and the hour (1976)? Whether you're swinging a hoola-hoop, a hammer, a sickle or gong some of what you do and perhaps all of what you do is decided according to what you have been perceived to be by the weak and the powerful. Does all of this sound esoteric? Sure. But that is part of the design, at least the education made possible under capital.

Global Capitalism

According to Dave Hill there are five major trends in Global Capitalism, they are: 1) Spread of capitalism both geographically throughout the states of the world and sectorally within those states. 2) Deepening of capitalist social relations with the commodification of everyday life. 3) Increasing use of repressing economic, legal, military, and other state and multi-state apparatuses globally and within states. 4) Increasing use of ideological state apparatuses in the media and education systems. 5) Increasing concentration of wealth and power (power to retain and increase wealth) in the hands of the capitalist class (2004).

Echoing this position Henry Giroux's analysis of the project of neo-liberalism is pervasiveness evident on its influence globally and on the restructuring of social life (2009). This is restructuring social life to support the interests of capital, the cementing of capitalist social relations of production manifested across the known world. Currently there exists an increasing stranglehold on every corner of the planet by global industrialists. Nothing and no-one escapes the path of capitalist expansion or consumption.

Have a look at the major tourist attractions where children and adults hawk the latest cultural artifacts, artifacts purportedly crafted by local people. Upon closer inspection, their labels prove pieces you can buy at the pyramids in Egypt, Mexico or Guatemala are made in Thailand, India or China. And the children and adults on the street spending their day to day collecting, sorting and selling these marvels experience a bit of a capitalist's dream; the more they sell, the more they sell. Put another way, one hundred key-chains sold to tourists will buy a sack of rice, a bag of beans or a bowlful of chickpeas. Fifteen hours on the street will ensure you can buy medicines, clothes for your family or food.

Capitalists and capitalism operate under the assumption that if you starve a person enough while offering them a way out of misery, climb the ladder, produce/sell enough key-chains, while avoiding revolution, you will have arrived at a self perpetuating system. The minutiae of capital are avoided, the sequence and the outcome are not as necessary as the systems, apparatus, in place to ensure their success. It is important to note here the fruits of capital are not as important as the perpetuation and maintenance of the systems. People do not continue under ideological slavery because of the rewards set before them: they act upon the idea the reward that is capital buys freedom.

Under such a system one must wonder, what of the price of an education? Can we say it is worth a thousand key-chains, two thousand or ten thousand? And what of the labor power traded along the human chain from the hands that produced the item to the hands that consumed the item. Global Neo-liberalism is the dream come true for many caught on the human chain, from inception of the idea, genesis of a product,

to conception of the fruits of capital [surplus value]. How we arrive at the nexus of production is paradoxical. Why do humans continue to believe they can buy their way through life?

Education Research and Practice

The work educational researchers/philosophers do in and out of the Academy purportedly provide the worldwide seeds for change, this is the advancement of the sciences, the search for knowledge, truths humanity can engage to provide an improved, measurably, living experience for all. But the academy is increasingly driven by the market and Professors their research and teaching time limited by the tenure clock.

Working at the computer in the lab or out in the field we are constrained by a twofold desire, first: to chase our ideas our intuition telling us our research will bear fruit; useable ideas related to the improvement of the living conditions of students and teachers as a consequence all things in the natural environment. Second: we attend to the necessities of the research market, what I mean is those at the short rung of the research ladder must produce saleable ideas. The products generated will ensure the research timeline is met, by the fifth or sixth year of the tenure clock the professor will have established a recognizable research agenda and launched a reputable product for the institution. What we generate supports the diversity of the teaching sciences but for capitalists, creates merchandise; text or market research, which can be prepackaged for sale on the open market.

It is estimated by Hill and Kumar (2009) among others, the global education market is worth in excess of 3 trillion dollars. What has been established by critical educationists is the global project for total domination of the planet by capitalists. This has not subsided as a consequence of the great recession of 2008-2009, instead its pace has quickened. Added to the strain of the tenure clock instructors, professors, and teachers now must contend with the corporatization of the educational workplace (Giroux, 2009). Schools and Universities are increasingly competing for governmental as well as corporate dollars in the form of grants, capital campaign donations and other investments on school communities and in college campuses.

Corporations like Taco Bell and Nike build Football stadiums or other athletic arenas while major shareholders in corporations fund building and research lab projects and in return are given access to the ideas or knowledge produced by the labs, intellectual property rights, and the right to place their names as benefactor on the sides of lecture halls. Such corporations as Sodexo-Marriott, Starbucks, Hilton, McDonald's as well as Visa and MasterCard (Giroux, 2009) US Bank and Wells Fargo now control not only what and where students eat on campuses but also their consumerization via the establishment and development of a credit history. Their purchasing power, the ability to eat at a University dining hall and their education loans, transform in later life to a credit rating; the history needed to continue purchasing auto and home loans and specialized credit cards, in the United States: Sears, Best Buy or Chevron.

Indeed we are competing with the market for the attention span of our students as we attempt to enact our pedagogy in the construction and dissemination of diverse fields of knowledge. Our dialogue competes with text and instant messaging and the continuous gaze by the students at the laptop screen, clock or out the school or university window to the infinity. It is imperative to note here what is at stake is not a conceptual understanding of a discipline, as students continue to graduate from the many research programs across universities.

What I mean is our students are graduating, in declining numbers, but graduating. They complete coursework and manage to achieve passing marks on exams. But of what are they a reflection? Do they go on to apply the knowledge we have struggled over in our programs to the actual needs of the world and its

people? Or do they achieve simply, as in the case of the tenure clock, one more note of accomplishment; an acknowledgement by capital ensuring their place on the next rung of success. As Giroux notes:

Why should we care? Colleges and Universities do not simply produce knowledge and new perspectives for students; they also play an influential role in shaping their identities, values, and sense of what it means to become citizens of the world. If colleges [schools] and universities are to define themselves as centers of teaching and learning vital to the democratic life of the [community] nation and globe, they must acknowledge the real danger of becoming mere adjuncts to big business, or corporate entities in themselves (2009, p 38).

What many on the left, that is person's who take the political position to struggle for democracy, and intellectual and creative freedom suggest is not for all students and professors to get with the program of critical and conceptual analysis of a research field or paradigm (Giroux, 2009; Hill, 2006; McLaren, 2007). Instead we fight for an increased social, cultural and political awareness that does more than argue the size of an atom, the scale of achievement of one child or school district and/or discipline over another. We engage the tenure clock, the student, the disciplines indeed all that is human on the epistemic quest and living experience to promote lasting change.

Progress in Science & Technology in Education

A View from the Periphery

Grade schools, colleges and universities are more than mere purveyors of information or empirical paradigm (Rodriguez, 2008). And students and professors engaged in the practices of teaching and learning do more than argue quanta, the lifespan of a mud-wasp or the credibility of one way of analysis over another in describing the day to day experiences of humanity.

We are engaged in our individual practices as we wish to discover/uncover phenomena and processes related to the understanding of all that encompasses life, objects or ideas. In writing this paper I wish to add to the existing knowledge in the study of science education, science and technology studies in general and the study of activism in science and technology studies (STS) in education in particular. This is by no means a comprehensive view of the field instead it is an interest held by myself in the development of a personal critical revolutionary *praxis* and more importantly standing in solidarity of pedagogies that are progressive, activism oriented that seek to promote the critical revolutionary project.

Not a new field nor a new practice the study of science and technology in education has enjoyed and been conflicted with a similar past as that of language and literacy studies and the urban and social studies in education. The traditional paradigm holds to the Cartesian understanding or engagement of phenomena. What can we surmise about distinctions made among objects, ideas or fields of experience? And what can we understand to manipulate those fields to the benefit of the individual and society and more critically put: the employer, the license holder (trademark or copyright) and the individual?

The work of Wolf-Michael Roth provides a progressive look at the traditional forms of the study of science, science education and the study of science and technology in education. In his work from the 1990's he submits constructivist understandings for the teaching of science and technology. Similarly Lawrence Bencze, Stephen Alsop and Angela Calabrese Barton add to the existing literature in science in education studies and the constructivist and progressive research and teaching paradigms.

In from *Everyday Science to Science Education* Wolf-Michael Roth submits the notion that science and technology in education can offer the student much more than a clinical understanding of ideas, arguments or phenomena. Education in the pedagogy of sciences operates under the traditional assumption that students are objects to be filled with the diversity of data and methodology that governs what has been

misunderstood as the scientific method (Roth, 1997). Furthermore he describes what we have seen across other disciplines. Schools, Colleges and Universities act as gatekeepers, who passes the class, final exam and submits for the degree or diploma, are eventually who practices physics, microbiology or engineering in the field.

This understanding of the disciplines, knowledge adopted from the school or the classroom community, what is enacted and engaged in the field, is contrary to what philosophers, theorists and practitioners know about being in the world and enacting a chosen profession, vocation or other way of being in the society. It is practice, reflection and further practice in a relationship with peers and the natural environment that provides an individual with the empirical knowledge needed to carry out a profession, vocation or other way of being in a society. Knowledge of phenomena in nature or the social experience is affected by history and the social relationships that contribute to the development of knowledge in a given cause or relation among objects or experiences.

This is to say, if we demonstrate the physical properties made by the upward and downward movement of a yo-yo to a student (Roth, 1997) but do not push beyond asking students to consider why a yo-yo swings up and down when a person plays with a yo-yo. Then we can expect that students will provide a pat answer: yo-yo's are affected by gravity or they spin held by a string depending on the amount of friction acting on the central pin as it rotates. The preceding is perhaps important for the understanding of gravity and friction. But what of the cognitive demands for the creation of string, the plastics and bearings involved for professional yo-yos?

Constructivism, Activism and STS like critical pedagogy across the disciplines do not assume that children are empty vessels to be filled (Freire, 1970) with facts about social relations or the natural environment. Instead they provide a framework or grounding in knowledge that supports a person in their analyses of distinct phenomena. Why do we want to know what we know about people, or people and their relationships to yo-yos? What I mean is yo-yos like atom bombs are interesting subjects, they can be related to a personal experience, but what is the end result of the use of yo-yos or the atom bomb in the world?

It is the above idea I wish to continue discussing as analyses of the efficacy of curriculum design on teaching and learning affects teaching and learning outcomes. Teachers Roth describes are more accurately represented in the constructivist paradigm he submits as more knowledgeable old timers (1997) who engage with students in pedagogy where the material and discursive relations are interrogated such that the teacher is an authority figure. The act of teaching similarly related by Freire (1998) is to embark in teaching and learning with students to share information, working with students to uncover the static and dynamic properties of distinct objects or human relationships.

Teachers, Instructors and Professors then must set the conditions for learning to occur (McLaren, 2007). In science education and STS Roth and McGinn and Roth describe these conditions as the authentic relationships engaged by teachers and students and students and the world situated in ways that reflect the complexity of processes and operations that scientists and other practitioners in the field experience (1998, 1999). These are what Roth and others describe as authentic learning tasks and authentic environments. Students are not merely to mimic experiences from the field but actually undertake figuring working with and refiguring a problem. They can then reflect on data to ascertain a series of analyses that might provide a viable solution to what has been implemented in the field as a solution to a problem.

The outcome of such practice is the student led inquiry process. No longer dependent on their teacher, or codependent as they act out their respective roles, the student with the conditions set for learning embarks on the quest for knowledge by working ideas from inception of the problem [what do we observe in or about nature?] to developing a research project including choosing what is to be studied, how it is to be studied and what if any outcomes will influence the field and contribute to the further development of ideas or a research paradigm.

The Study of Science, Technology & Activism in Education

STEPWISE

It is therefore possible that scientists, science educationists and STS researchers combine to support a theoretical and pedagogical knowledge base that is progressive; each understands the eventual application of theory and method by the others and more importantly how analyses of data affect the world. Professional scientists, engineers or physicists, at the cutting edge of the field record practices teachers and students may attempt to reproduce in the laboratory or the classroom (McGinn & Roth, 1999). Science and technology studies researchers work to support an understanding of the diffusion of the knowledge base: what are the practices at the level of transmission and adoption from scientists to teachers, and teachers to students? The care of the practice of science however is ultimately up to the teacher, instructor or professor in the classroom. Practices learned from our mentors are what we use to support our investigations and ultimately understandings of diverse social and physical phenomena.

Pushing at the edges of constructivism in their work, Lawrence Bencze and Stephen Alsop seek to add a measure of their voice to the existing fields of science, pedagogy and inquiry. Theirs is a collective, communitarian, indeed social perspective on the acquisition of knowledge, the production of diverse communities of scientific inquiry and practice. Together their work elaborates a more authentic and political learning experience for students in understanding the application of science and technology in the world. This is scientific analysis and the dissemination of research as process and research and the production of knowledge as outcome or practice. It is the context of knowledge, its production as a possible source to ameliorate the outcomes of practicing a consumer based science education, their global concern; societal acquisitiveness moderated by a communitarian epistemology (Bencze & Alsop, 2009).

Science & Technology Education Promoting Wellbeing for Individuals Societies & Environment (STEPWISE) they offer is a human process where pedagogy ensures students and community members learn what they need to succeed at the doing of science but move beyond the scope of learning a trade. They acquire a critical and social consciousness. If we consider its implementation on a global scale STEPWISE could serve critical educators as one of several analyses, a pedagogical position with which to engage the current social and material relations that are devastating the environment.

Key to their position is ensuring that science education be, as *contextualized* as possible (Bencze & Alsop, 2009). In this way students are able to make connections between the social and natural or physical environment. Furthermore their position moves away from treating children according to their *use value* by not, “sorting students along a gradient associated with their pre-instructional cultural and social capital [class], including their abilities to think and act in the abstract.” (Bencze & Alsop, 2009, p 74) Instead they argue as does the critical pedagogical position, learning must be contextualized for, with, and by the student if the student is to remain subject of the learning experience.

Community and Revolution

I sought a graduate degree as a way of understanding the social relations that overtly and covertly contribute to how and what my students learned. It was at graduate school where I became more familiar with the progressive and critical tradition. It has been a journey marked by teaching, learning and writing about what Hannah Arendt refers to as the human condition (1957). That is the complex social relations that happen, at least on this planet, in developing the fullness of humanity.

It is my position in engaging the professoriate, teaching profession or instructorship to push theory beyond dialogue. Sitting at the armchair of freedom progressive liberals and radicals alike might argue the

benefits of liberatory education over constructivist thinking in the schooling experience. They might decry the need for a closer inspection of the functions of US democracies and neo-liberal global capitalism. And yet still not arrive at the crux of auto-emancipation. That is internalizing the depth of consciousness necessary to act on instead of simply knowing about the worlds needs: war in Croatia or the Sudan, the return of the dust bowls to the Sacramento/San Joaquin river valleys or the parchment of the Sub-Saharan African plain.

Theoretical Freestyle

Democracy as currently understood lends itself to a blanket understanding of all a capitalist cabal wishes it to be, history is dead. Or, more aptly put capital wishes history to be killed everyday. As Wal-Mart profiteering in the form of small town monopolies glutted with family owned business bankruptcies and tent cities that spring up in the wake of the mortgage and real estate meltdown. So marks Lenin's understanding of *Imperialism* the social amnesia that self converts human lives to human capital (McLaren, 2009). Can democracy vanquish capitalism? Can the tip of the spear driven into the heart of global enslavement be marked by the blood of revolutionary liberals? Radicals doing more than sitting at armchairs idling days away with prospective to change the world and turn the tide of human traffic.

Bow-tie and elbow patches, pipe tobacco at the ready the arm chair philosopher sings out the sound of democracy crying havoc ringing the liberty bell of freedom while at his white Christian feet students fawn, grovel and lick up pearls of wisdom as they're spouted in the name of the epistemic tradition, to boldly know what no man has thought before. Truth at the feet of liberty congealing to break out in new ways to light a light bulb, cook a turkey, or impress the latest generation of hyper-consumers every Tuesday and Thursday at 7:00 p.m. sharp.

What are these cool kids singing for in their hipster dens in Brooklyn, Westwood, Palm Beach, and Signal Hill? When will my trust fund mature? Ask CNN, The New York Times or The Wall Street Journal, time and again they declare an end to the current state of capitalist affairs on the world stage. Yet what we have here is more akin to market control, the day after the Times and the Journal print a change in the market the market changes. Perhaps Gabriel Garcia Marquez was correct as he submitted his version of magical realism in reflecting social relations, what people believe to be true about foreigners and each other. Magical realism on the world market or a magician's trick, sleight of hand, as what the naked eye sees the mind believes.

So too with the present condition of United States global capitalist hegemony what we are no longer asked but made to believe and act out in the everyday of our human experience (McLaren, 2007). All social relationships are commodified every chance meeting is an appropriate moment to network; who do you know, what do you know, and how can you manipulate the present social moment such that all moments from this one forward will be marked by hyper social capital and material consumption; your Rollei, Cartier and the Benz's will be stacked in the driveway. So the discursive relations of human experience go. The Journal describes an educated workforce as offering "sub-prime human capital" while the Times signs off on the white house "push" for an improvement in the teaching of science math and technology in United States schools.

Analytical Freestyle in Science Education

If the above resembles a rant consider why a string of words that includes political and economic critique and the actual market functions of our global society affect the reader's view of this paper. The academy turns its nose at work marginally reviewed or constructed as outcry, pedagogy of indignation (Freire, 2004) at how people continue to enslave other people while destroying the last useable resources on the planet. Organic and academy trained intellectuals have given the world their lives, their blood sweat and

fears chasing the *ether*, the unifying principle, in some fields read as truth in an effort to solve the worlds mysteries. And how are they repaid? They are indicted by the FBI, distracted from their work by colleagues who scream bloody murder as they find ways to take solace from the everyday right wing never ending barrage.

Is it the argument *they* are after when *they* cry foul? Or is it the sign, the symbol of freedom represented by a life's work in the academy sharing the living experience with students colleagues all workers alike managing the living, the breathing and the dying. And what is capitalist schooling at its best marked by the alienating principal: fuck the guy that helped you graduate that ensured you made it to the next step, the next position on the research/career ladder. Was it truth we were after as we began our doctoral study in the hopes of shedding light on some obscure fact? The mating principles of the mud-wasp or sexuality in the human male, are these black holes in the minds eye as rebellion takes the place of cultural logic and cultural truth? So progressive educators a reflection of the reality that is human destroy the earth and its atmosphere when their pedagogy ensures children learn the science necessary to produce industrial coatings, fertilizer and cyanide without also ensuring they acquire the depth of consciousness necessary to make connections between wearing a gold and diamond ring and the use of cyanide and strip mining for their production.

Pushing further, why is Marxism such a word of abuse (McLaren & Jaramillo, 2009) even the right can see the fluidity of accepting the changing condition of the system what Lacan refers to as *synthome* of societies (Lacan, 2006). Radical pedagogy aint for the timid, it is a critical revolutionary *praxis* marked by the blood of Zapatistas, Che Guevara and progressive intellectuals organic and academic alike that understand a need for change from gripping tight to the cosmic orgone (Reich, 1973) that does not permit any competing principal or ideology to seep in. The search for truth is not about finding the source of all energy or a catalyzing principal.

It is the understanding that humans and objects share relationships, principles that adhere to organizational value and metaphysical conception and oscillations. The gangrene of racism, sexism, fascism and homophobia are human made (McLaren & Jaramillo, 2009) they are the legacy of the left and of the right. What can be done about them is marked by the ways intellectuals enact and participate in their *praxis*. A critical reflexivity that draws the kite-string of principal between the market need to produce chemicals for consumption like Zyklon B and the necessary day to day Socratic discursive practices doing more than shouting out to father capital in the classroom.

Human and environmental devastation are the end result of our social relations (Rodriguez, 2009) which includes the needs and whims of markets and of the hyper-complex systems that are societies as they trade in material and human surplus value. The legacy of Marx and critical analyses are not the mere Utopic visions of a few stalwart yet antiquated intellectuals (McLaren, 2009) they are an entreaty cultural critique positioning trade consciousness and social amnesia as the culprits on the market stage of global capitalist domination. Critical social theory does not dis-clude what is or what the agent knows or has known, like the conglomerate it promulgates all byproduct of human relations bad and good as actors that contribute to the enslavement of the individual and the devastation of the natural environment.

Dissemination, the symbol, the division of units and of labor, the structure of the phenomenon all bear as a derivative of the human and environmental condition of existence markings of each other. All symbols of experience return to the source; that is we humans police ourselves and each other and we free ourselves and each other.

Closing Remarks

The global market occupies virtually every corner of the struggle for humanity (McLaren & Jaramillo, 2007) children in classrooms are the direct inheritors, as they grow to adulthood of the sort of social and

natural environment adults accept. War is class war as those who reap the benefits, profit margins, on a global scale are never those with most at risk; the soldiers doing the killing in the fields benefit only so far as their use value is justified in controlling the world via the wholesale slaughter of, “enemy combatants.” These are children and adults in the so called terrorist states who happen to be in the way of cementing capitalist social relations whether copper, oil, timber or human interests.

Furthermore the human life span is far too short for any one human being to have an effect that significantly impacts the world market. We are far beyond the moment where the Molotov cocktail, the baton or a rock thrown by its self can cause the adoption among the human chain of a worldwide position for revolution. Even when riots occur, the 1960s, 1980s or 1990s globally, the market fights individual citizens to a standstill. Hard to throw a rock when you are starving, or when you have to excavate rubble to recover and then bury your children.

And yet the US has been successfully fought to a standstill, in the market by Cuba and Venezuela and at war by Afghanistan and Iraq. Why does a military that possesses the sole surviving global Air Force, Navy and Army continue to make war on people that return fire from horseback using muskets and single shot World War I era munitions? The war begun in 2003 was conceived over ten years prior; in 2009 the US is still at war with according to Gibson, a military with no long history of defense no internal defense industry of note, no definable supply lines, no clear chain of command or central leadership (2009). Can it be there is more to life and war than production or enslavement?

The classroom as McLaren and Jaramillo relate and as Bencze and Alsop elaborate, were the last truly public domain where students and teachers could engage in a respite from the dominant ideology (2009, 2009). They could take it upon themselves to consider the social relations that exist and their effect on the environment. According to David Hirsch, “Neo-liberals’ desire not to intervene in markets and to focus on economic growth, primarily terms of consumption, has both significantly contributed to the environmental problems that we face and to global warming.” (2009: p5) The copper canyons in Utah were not put there by meteors but by mining operations. The depletion of salmon and steelhead in the rivers and streams of California, Oregon and Washington did not happen as a product of the ravages of time. Human constructed, petrochemicals, positions on the treatment of the environment as things existing solely for the purpose of providing the corporatocracy with surplus value created all of it.

Critical educators in and out of the classroom stand as a measure of change as the onslaught of neo-liberalism continues. People cause the ravages of time to negatively affect the planet, surplus accumulation whether it is PCB’s in the Hudson, ammonium nitrates at the mouths of the world’s major rivers or the debris from surface and subsurface detonations of nuclear material. Yet there is another more insidious form of surplus accumulation it is the toll on students in classrooms across the globe of curricula and pedagogies ensuring students leave classrooms functionally illiterate. Capable only of reading and acting out the prescribed lives global capitalists have set. Human agency and enslavement result as people live their lives careless to the effect their actions have on the natural environment and each other. Pedagogists in the natural and social sciences do more than share information with their students. They leave a lasting imprint, a seed for enlightenment, which may contribute to the production of knowledge. But, more importantly, offer an alternative to the living currently destroying the planet.

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