The *Critical Constructivism Primer* introduces education students to the study of knowledge; how it is inscribed by particular values and produced in problematic ways; whose interests it serves; and how it shapes the identities of those who consume it. Critical constructivism is an epistemological position that examines the process by which knowledge is socially constructed. Joe L. Kincheloe takes readers through the basic concepts and alerts them to the dangers of objectivism, reductionism, and the pathological views of self and world that emerge if students and educators are unaware of the construction of knowledge by dominant power interests. The book is essential reading for individuals who want to become researchers and educators.

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www.peterlang.com

ISBN 978-0-8204-7616-2

Critical Constructivism

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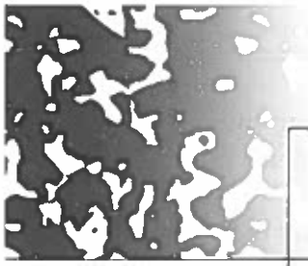
PETER LANG
PRIMER

EDITOR'S NOTE

Twelve central points are made about critical constructivism in this primer; they are interspersed throughout the text. An explanation of each point follows its boldface exposition.



CHAPTER ONE

From Constructivism to Critical Constructivism

There has been a lot of talk and writing in the education profession over the last couple of decades about the nature of constructivism and its relationship to teaching and learning. Often when I listen to individuals talk about the concept, I discern much confusion and misunderstanding. In this context I offer this primer on constructivism and my particular "take" on it—critical constructivism. Throughout this volume I will provide clear descriptions and definitions of a variety of concepts related to critical constructivism and show you how they relate to the teaching and learning processes. At the same time I believe that education students and teachers are not sufficiently challenged in both their professional education and liberal arts and sciences classes, and in this context I will offer some complex ideas. The topic of constructivism is unalterably complex and cannot be made less so. The purpose of the book, however, is to maintain the integrity and complexity of

the topic while introducing the reader to it in a smart and accessible manner. I hope you find my efforts helpful.

With these goals in mind the book presents several major concepts about critical constructivism. Each of these points is directly connected to the inseparable acts of teaching and knowledge production. Thus, critical constructivism is constantly concerned about research and pedagogy and the multiple ways they are connected. Over the next five chapters I will delineate these dimensions of critical constructivism one by one. Written in this manner, the book can be viewed as a whole or as separate parts to be read independently. The points fit together synergistically, as understanding one concept will enhance your understanding of the others. Writing the book in this manner is not designed to fragment the concept of critical constructivism but to give those new to the concept better access to its main dynamics.

Here are the main ideas of the book:

- The world is socially constructed—what we know about the world always involves a knower and that which is to be known. How the knower constructs the known constitutes what we think of as reality.
- All knowers are historical and social subjects. We all come from a "somewhere" which is located in a particular historical time frame. These spatial and temporal settings always shape the nature of our constructions of the world.
- Not only is the world socially and historically constructed, but so are people and the knowledge people possess. We create ourselves with the cultural tools at hand. We operate and construct the world and our lives on a particular social, cultural and historical playing field.
- A key aspect of education in this context involves understanding the nature of these constructions. In the realm of knowledge (the epistemological domain), it is simple-minded and misleading to merely study random outcomes of the construction process—isolated "facts" and "truths." Constructivists are as much concerned with the processes through which certain information becomes validated knowledge as with committing lots of it to memory. They are also concerned with the processes through which certain information was not deemed to be worthy or validated knowledge.
- The teaching and learning process is intimately connected to the research act. Thus, throughout this book I will blur these categories and consistently examine knowledge production and research at the same time I am analyzing teaching and learning. A key dimension of critical constructivism involves the complex interrelationship between teaching and learning and knowledge production and research.
- When critical constructivists produce knowledge, they are not attempting to reduce variables but to maximize (Knoble, 1999) them. Such maximization produces a thicker, more detailed, more complex understanding of the social, political, economic, cultural, psychological and pedagogical world.
- Thus, the purpose of education in this critical constructivist process is not to transmit a body of validated truths to students for memorization. Instead, critical constructivists argue that a central role of schooling involves engaging students in the knowledge production process. A central dimension of teaching in this context involves engaging students in analyzing, interpreting and constructing a wide variety of knowledges emerging from diverse locations.
- Critical constructivists are concerned with the exaggerated role power plays in these construction and validation processes. Critical constructivists are particularly interested in the ways these processes help privilege some people and marginalize others.
- Critical constructivists reiterate the notion that knowledge is not a substance that can be deposited like money in a bank (Freire, 1970) and

taken out when time for its use arrives. In this transmissive theory of knowledge, information is transferred from the teacher to the pupil's mind. In the critical constructivist formulation, knowledge is constructed in the minds of human beings—minds that are constructed by the society around them (Tobin, 1993; Tobin and Tippins, 1993; Geeland, 1996).

- The knowledge of the classroom is constructed where students' personal experience intersects with academic knowledges. A key skill of a critical constructivist teacher involves nurturing this synthesis of personal experience and academic knowledge. Such a pedagogical act is extremely complex, and teachers must work hard to bring the different perspectives together. They reveal how their own perspectives came to be constructed and how the social values, ideologies and information they encounter shape their pedagogies and worldviews.
- In their search for ways to produce democratic and evocative knowledges, critical constructivists become detectives of new ways of seeing and constructing the world. In this context they come to value knowledges and forms of meaning-making traditionally dismissed by dominant culture and mainstream academics. In this subjugated context they use the African American blues idiom to construct "blue knowledge."

I believe that a rigorous and detailed understanding of these concepts will change education as we now know it to something far more compelling and useful. Such understanding will help us produce passionate and insightful scholars capable of changing the world for the better.

Introducing the Concept: What Are We Talking About?

The understanding of constructivism and critical constructivism helps us make sense of the educational world that surrounds us in a rigorous and

thoughtful way. In the twenty-first century, the idea that teachers need to understand the complexity of the educational world is almost a radical proposition in and of itself—many educational reformers see no need for teachers to be rigorous scholars. Indeed, the No Child Left Behind reforms demand disempowered teachers who do what they're told and often read pre-designed scripts to their students. I am assuming in *Critical Constructivism* that such actions are insulting to the teaching profession and are designed ultimately to destroy the concept of public education itself. The study of constructivism and critical constructivism induces us to ask important questions: What is the purpose of schools? How do we organize them for maximum learning? What is the curriculum and how do we conceptualize it? How do we understand the relationship between schools and society?

Such pedagogical questions cannot be answered thoughtfully without the help of diverse theoretical knowledges. Please note that theory is defined here not as that which indicates the proper way to teach but as a body of understandings that help us make sense of education, its social and political implications, and how we as educators fit into this complex mix. In the social theoretical domain, for example, we might ask how does the existence of socio-economic inequality along the lines of race, class, gender, sexuality, religion and language influence our answers to these educational questions? What happens to our answers when we bring an understanding of power to our analytical table? What is the effect of social theoretical insight on the subjectivity and context-dependency of knowledge production? Might, for example, the knowledge emerging here help shape the way we answer questions about the curriculum? In this context we begin to understand the forces that construct knowledge. This is central to understanding constructivism and critical constructivism.

Thus, the insights of critical constructivism change the way we approach the educational act. In transmission-based conceptions of teaching there is

no reason to study the learner. Teachers in such pedagogies are given the curriculum to teach. They simply pass designated knowledge along to students and then test them to see how much of it they remember. In critical constructivist schools, the identities of students matter. Children and young people enter the schoolhouse with extant worldviews, constructed by their experiences and the social contexts in which they have lived. These perspectives actively shape school experiences and learning. Indeed, they help shape all the interpretations students make about the world around them. If teachers are serious about teaching such students, critical constructivists contend, they must gain a sense of these prior perspectives and how they shape students' relationships to schooling.

Any learning must be integrated with these prior perspectives. It is a naïve view of knowledge and cognition that believes that transmitted knowledge deposited in the mind can be later taken out unchanged and uninterpreted. Such knowledges merge in complicated ways to shape idiosyncratic perspectives. Students, like all human beings, see the world from the perspective of previous experiences and knowledges. Critical constructivists study these knowledges, these interactions, and their effects. One of the reasons that I wrote *Teachers as Researchers: Qualitative Paths to Empowerment,* was because of the need for teachers to come up with systematic ways to study and understand the construction of their students' consciousnesses and their effects on their lives in schools. Without such knowledge, teachers can easily retreat into a transmission model of pedagogy (Geeland, 1996; Dougiamas, 2002).

Critical constructivists argue that traditional forms of reason and theory-as-validated-truth often contribute little to answering the most basic questions of pedagogy. How does scientific explanation help us answer the question, "What is the purpose of schools?" Social theory viewed in relation to pedagogical theory in this context profoundly enhances the ability of educators to evaluate the worth of particular educational purposes, articulations of curriculum, and evaluation practices. These theoretical modes help teachers and students escape the well-regulated administered world that unbridled rationalism and scientism work to construct. Critical constructivists use these theoretical tools to sidestep new models of social control that put a choke hold on individual and social freedom, in the process decimating teacher professionalism.

Whether we know it or not, all of us are theorists in that we develop and hold on to particular views of how things are. Such views insidiously shape our action as lovers, parents, citizens, students and teachers. Critical constructivists understand this reality and argue that the social, cognitive and educational theories we hold must be consciously addressed. Such conscious awareness allows us to reflect on our theories, explore their origins in our lives, change them when needed and consider how they may have unconsciously shaped our teaching and our actions in the world in general. Thus, we come to better understand—as great educators always should—the ways the world operates and how that operation shapes education, educational policy, curriculum, the lives of teachers and students, and who succeeds and who doesn't in schooling. Critical constructivists are painfully aware that many forces in the twenty-first century are at work to remove such insights from the realm of teaching. This book works to illustrate the importance of such understandings in the bizarre educational cosmos of the twenty-first century.

While many view constructivism and critical constructivism as theories of learning, I see them as this and much more. Constructivism/critical constructivism involves theoretical work in education, epistemology, cognition and **ontology**. In *Critical Constructivism* I argue for a unified theory where all of these dimensions fit together and are synergistic in their interrelationship. For example, it is hard to pursue a critical constructivist pedagogy without the grounding of critical constructivist epistemological and cognitive theories. In this unified context critical constructivism becomes a *weltanschauung,* a

Ontology
the branch of philosophy that studies the nature of being; that asks what it means to be in the world.

worldview that creates meaning on the nature of human existence. In this way critical constructivism comes to exert more influence in more domains than it has so far.

Point 1: Critical constructivism is grounded on the notion of constructivism. Constructivism asserts that nothing represents a neutral perspective—nothing exists before consciousness shapes it into something perceptible.

Epistemology
the branch of philosophy that studies knowledge and its production.

In this context we draw upon a constructivist epistemology to provide insight into how the pedagogical world operates. Rejecting the rationalistic Cartesian notion that there is a monolithic knowable world "out there" explained by Western science, a constructivist epistemology (I also refer to this as an epistemology of complexity) views the cosmos as a human construction—a social construction. The world is what dominant groups of humans perceive it to be. This complicates our notion of theory. Positivistic/rationalistic theories were simple to the extent that they claimed truth-value on the basis of how they corresponded to *true* reality. More complex, post-**positivistic** theories study the various philosophical and social groundings of diverse theories, learn from them, and understand the social construction of them all. Critical constructivists take this understanding of social construction and add critical theory to the mix. Our pluralistic and multiperspectival (or as I have termed it elsewhere, **bricolage**) orientation is omnipresent, as we seek benefits from a variety of social, cultural, philosophical and theoretical positions.

Positivism
an epistemological position that values objective scientific knowledge produced in rigorous adherence to the scientific method. It identifies knowledge as worthwhile to the extent that it describes objective data that reflect the world.

Bricolage
denotes a multimethodological form of research that uses a variety of research methods and theoretical constructs to examine a phenomenon.

An epistemology of constructivism has maintained that nothing represents a neutral perspective, in the process shaking the epistemological foundations of modernist Cartesian grand narratives. Indeed, no truly objective way of seeing exists. Nothing exists before consciousness shapes it into something we can perceive. What appears as objective reality is merely what our mind constructs, what we are accustomed to seeing. The knowledge that the world yields has to be interpreted by men and women

who are part of that world. Whether we are attempting to understand the music of West Africa, the art of Marcel Duchamp, the pedagogical theory of Michael Apple, the philosophy of Jean-Paul Sartre, the lyrics of Bob Dylan or the poetry of Audre Lorde, the constructivist principle tacitly stands. For example, most analysts don't realize that the theory of perspective developed by fifteenth-century artists constituted a scientific convention. It was simply one way of portraying space and held no *absolute* validity. Thus, the structures and phenomena we observe in the physical world are nothing more than creations of our measuring and categorizing mind.

In constructivist theory, different individuals coming from diverse backgrounds will see the world in different ways. Imagine, for example, how a German bank teller, an Igbo tribesperson, a Texas rancher and a woman from a small village in China close to the Mongolian border might describe a major league baseball game. It is safe to assume that the descriptions would be quite different and even humorous to individuals who have understood the intricacies of the game since they were very young. There is no question that the backgrounds and expectations of the observer shape perception. Consider how a classroom is perceived by a class clown, a traditionally good student, a burnt-out teacher, a standardized test maker, an anti-standards activist, a bureaucratic supervisor, a disgruntled parent, a nostalgic alumnus or a student with feelings similar to the shooters, Eric and Dylan from Columbine High School. The way our psychosocial dispositions shape how the world is perceived holds important implications for teaching and critical thinking. Each of our students brings a unique disposition into the classroom. Indeed, each teacher carries a unique disposition with her or him.

In this theoretical context students of constructivism might ask:

- How are our constructions of the world shaped?
- Are our psychosocial dispositions beyond our conscious control?

- Do we simply surrender our perceptions to the determinations of our environment, our social, cultural context?
- What does this process of construction have to do with becoming an educated person?

Because people are often unable to discern the ways their environments shape their perception—i.e. is construct their consciousness—the development of modes of analysis that expose this complex process becomes very important in our critical constructivist effort. This is where the term "critical" merges with "constructivism" to form critical constructivism. Thus, we understand the origin of our term, critical constructivism. Critical theory is concerned with extending a human's consciousness of himself or herself as a social being in light of the way dominant power operates to manage knowledge. A critical theoretical analyst who gains such a consciousness would understand how his or her political opinions, religious beliefs, gender role, racial self-concept or view of the goals of education had been influenced by both the dominant culture and subcultures. Critical constructivism thus promotes reflection on the production of self. In many of the undergraduate teacher education courses I've taught over the last few decades, I have attempted to help students cultivate a critical, theoretically grounded view of the construction of their own consciousness as a prospective teacher. Why is it that I have decided to teach? What forces in my life have shaped this decision? How have these forces contributed to the type of teacher I will become?

These questions and many others combined with an introduction to critical theory initiate an introspective process that eventuates in not only self-knowledge but also in cultural and educational critique. As critical constructivist teachers study major issues in education, the students are analyzing themselves and the origins of their ways of making sense of the world. The interrelationship of these parallel studies produces some interesting perspectives, as students come to see various school purposes and

reform movements play out on the terrain of their own school lives. Students come to know themselves better by using these critical theoretical insights to bring to consciousness the process by which their consciousness was constructed. Action to correct what may be viewed as harmful constructions can be negotiated once reflection reveals the psychological, ethical, moral and political foundations of the pathology.

This notion of critical constructivism allows teachers and students a critical consciousness. This involves an ability to step back from the world as we are accustomed to perceiving it and to see the ways our perception is constructed via linguistic codes, cultural signs, race, class, gender and sexual ideologies, and other often-hidden modes of power. Such ability constitutes a giant step in becoming a critical analyst, learning to be an emancipatory teacher, and assuming the role of a producer of dangerous, world-changing knowledge. Critical constructivism, thus, is a theoretically grounded form of world-making. We ask penetrating questions. How did that which has come to be, come to be? Whose interests do particular institutional arrangements serve? As critical constructivists remake and rename their world, they are constantly guided by their critical theoretical system of meaning, their emancipatory source of authority (see another of my books in the Lang Primer series, *Critical Pedagogy,* for more on this topic).

Teachers with access to critical constructivist theory, for example, are empowered to ask typically neglected questions about the socio-political purposes of schooling. In a critical theoretical context they can more clearly discern how education operates to reproduce or challenge dominant socio-political and economic structures. Such theoretical understandings are profoundly important in learning to think, teach and live democratically. Educational purpose cannot be separated from social justice, human liberation, self-direction, resistance to regulation, community building, deeper forms of human interconnection and the fight for freedom. When edu-

cators fail to gain these theoretical frames, schools inexorably become sorting machines for the new corporate order (Weil & Anderson, 2000). Without such informed modes of making meaning, schools tend to reinforce patriarchal structures, Eurocentric educational practices, homophobia and racism. The struggle for the soul of education in North America is playing out on the road before us. Critical constructivism helps us understand the ways that dominant power wielders have worked to create an educational system that benefits the most privileged at the expense of those marginalized by race, class, gender and sexuality.

Objectivism and Constructivism

There is no doubt that our concept of critical constructivism will elicit charges of educational politicization and of tainted, unobjective teaching and research with predetermined outcomes. Critical constructivism asserts that pious protestations of pseudo-objectivity must be confronted. If critical constructivists cave in to such **objectivism**, the possibility of taking a moral stand in education, of seeing education as something more than a technical act, will be destroyed. As they argue that we must keep politics out of education, objectivists misrepresent the basic tenets of critical pedagogy in general. Critics miss the point that teaching and, for that matter, research are never neutral—alas, when we attempt to remain neutral, like Pilate, we support the prevailing power structure. Thus, recognition of the ideological nature of teaching and knowledge production implies that teachers and researchers by necessity must take a position and make it explicit. They do not impose their positions or their interpretations/constructions as truth—of course, students and the researched have the right to reject everything asserted.

Objectivism
the epistemological belief that disinterested knowledge can be produced about any phenomenon simply by following the scientific method.

Along with other advocates of critical pedagogy and critical research, I would maintain that noncritical, mainstream teachers and researchers are every bit as guilty of value-laden teaching and

research as any critical constructivist. To assume a position which refuses to seek the structural sources of human suffering and exploitation is to support oppression and the power relations which sustain it (Freire, 1970, 1985; Perry, 2001). The arguments of objectivists that any teaching or inquiry grounded on explicit value assumptions is subjective to the point of worthlessness are similar to the nineteenth-century ruling-class idea that engaging in social criticism violates a "gentlemanly" code of civility. It is similar to a twentieth-century notion of positive thinking (cf. Dale Carnegie) that views overt oppositional behavior as a form of negativity that is not only politically incorrect but distasteful as well. Indeed, the difference between critical constructivism and objectivism rests on the willingness of critical constructivists to reveal their allegiances and to admit their solidarities, their value structures and the ways such orientations affect their work (Coben, 1998; Cary, 1998; Carlson, 1997; Carlson and Apple, 1998).

It is important to note here that objectivism is grounded on the rationalist myth of cold reason. Such cold reason asserts that knowledge is nothing more and nothing less than the scientific discovery of an external reality. This means that knowledge exists independently of our minds in a never-changing, fixed state. Thus, knowledge (and curriculum) becomes something to be delivered to passive minds. Such knowledge should be freed from human contact—it should retain the same form from the moment of production to transmission into the mind of the learner. Critical constructivism does not seek to replace objectivism with another authoritarian, certain epistemological system. Instead, it is a philosophical orientation attempting to reconceptualize the processes of thinking and knowing.

Such a reconceptualization, of course, holds profound consequences for teaching, learning, and curriculum development. Aware of the complexity of the knowledge production process and its inherent uncertainty, critical constructivism becomes an epistemology focused on the individual's process of constructing, not reflecting reality. It is a hermeneu-

tic orientation as it views knowledge construction as an interpretive process. Such an interpretive process produces contextually specific, not universal and timeless, knowledge. Such constructivist knowledge is culturally negotiated and, unlike objectivist knowledge, is not produced by isolated individuals (Tobin, 1993; Chiari and Nuzzo, 1993; Taylor, Fraser, and White, 1994; Geeland, 1996; Dougiamas, 2002).

Revealing their solidarities, critical constructivists operate on the counter-**Cartesian** assumption that knower and known are inseparable. Learning from liberation theologians and critical theorists, critical constructivists embrace subjugated knowledges, in the process disallowing an objectivist subject-object dualism. When researchers respect subjugated knowledges and the unique perspective of the oppressed, they, as a matter of course, begin to subvert the relationship of domination that permeates traditional objectivist teaching and knowledge work. It is a relationship of domination that allows for both the manipulation of natural processes to serve the logic of capital (the needs of profit-making) and the manipulation of human beings as the passive objects of social engineering (McGinty, 2001). This separation of knower and known, this epistemological distancing, produces a hidden logic of domination between teacher-student, researcher-researched and knower-known; not content to occupy only the terrain of inquiry, this logic trespasses into the domain of race, class and gender relations (Fee, 1982). Indeed, it is the logic of hierarchy and authoritarianism, not democracy and inclusion.

Cartesianisn
Rene Descartes' analytical method of reasoning, often termed "reductionism," asserted that one can appreciate complex phenomena best by reducing them to their constituent parts and then piecing the elements back together according to causal laws.

Operating within this domain of Cartesian logic, schooling and research have often served the interests of power elites. Critical constructivism, with its commitment to the perspective of the oppressed, seeks to confront such consequences. The view of the objectivist paradigm from above gives way to views from below. Emerging from an understanding and respect for subjugated knowledge, such an epistemological position not only boasts ethical assets but holds scientific benefits as well. The scientific dimension revolves around the hierarchical relationship of

researcher and researched; much of the information gathered by traditional methods is irrelevant because the subordinates being researched, realizing their inferior position, often develop a profound distrust of the researchers interrogating them.

Oppressed groups interviewed by researchers from a higher social stratum often provide expected information rather than authentic data. Critical constructivism's respect for subjugated knowledge helps construct a research situation where the experience of the marginalized is viewed as an important way of seeing the socio-educational whole, not simply as a curiosity to be reported. Such a research perspective is counter-**hegemonic** (i.e., a threat to entrenched power) and radically democratic as it uses the voice of the subjugated to formulate a reconstruction of the dominant educational structure. It is a radical reconstruction in the sense that it attempts to empower those who are presently powerless (Mies, 1982; Connell, 1989; Kincheloe, Steinberg and Villaverde, 1999).

hegemonic
the process by which dominant groups seek to impose their belief structures on individuals for the purpose of solidifying their power over them. Thus, hegemony seeks to win the consent of the governed to heir own subjugation without the use of coercion or force.

Uncovering Elitist Assumptions in the Construction of Knowledge

With this reconstructive imperative in mind, one of the central tasks of a critical constructivist teacher-scholar is to formulate questions that expose the conditions that promote social and educational advantage and disadvantage (Brosio, 1994, 2000). For example, it is obvious to many that when the methods of evaluation of advocates of the competitive, top-down standards curriculum are employed, nonwhite and working-class students do not generally do well—their performance is interpreted as a manifestation of slowness, of inferior ability (Kincheloe, Steinberg and Gresson, 1996). Researchers devise tests to evaluate school, student and teacher performance, forgetting throughout the process that evaluation is based on uncritically grounded constructions of intelligence and performance (Owen and Doerr, 1999).

Critical constructivists know that the advantage of subjugated perspectives, the view from below,

involves what has been termed the "double consciousness" of the oppressed (Steinberg, 2001; King and Mitchell, 1995; Brown and Davis, 2000). If they are to survive, subjugated groups need to develop an understanding of those who control them (e.g., slaves' insight into the manners, eccentricities and fears of their masters). At the same time they are cognizant of the everyday mechanisms of oppression and the way such technologies shape their consciousness, their lived realities. Because of their privileged class, race and gender positions, many educators are insulated from the benefits of the double consciousness of the subjugated and are estranged from a visceral appreciation of suffering (Zappulla, 1997). Contemporary social organization, thus, is viewed through a lens that portrays (constructs) it as acceptable.

Why would such educators/researchers challenge research methods, modes of interpretation, and teaching strategies that justify the prevailing system of education? (Mayers, 2001a, 2001b; Jardine, 1998; Ellis, 1998; Malewski, 2001a, 2001b). What lived experiences would create an ethical dissonance within the minds of such individuals that would make them uncomfortable with the status quo? The oppressed—while often manipulated by mechanisms of power to accept injustice and to deny their own oppression—often use their pain as a motivation to find out what is not right and to discover alternative ways of constructing social and educational reality (Mies, 1982; Jaggar, 1983). Serious consideration of such subjugated ways of knowing transforms forever our conceptions of the relation of the knower to the known and the conceptualization and execution of the research act. The theoretical frames that help critical constructivists make sense of the world are intimately tied to these different ways of knowing. The questions we ask as critical constructivists often find their source in these subjugated epistemologies. Such questions consistently work to expose the elitism that shapes knowledge, the purposes of schooling, the curriculum, and who qualifies as an educated person. Such critical constructivist-based questions can reveal insights that change the world.

Point 2: Knowledge of the world is an interpretation produced by people who are a part of that world. Thus, understanding the nature of interpretation is a central feature of being an educated person.

The study of interpretation in traditional objectivist scholarship was deemed irrelevant. With the coming of the Scientific Revolution in the 1600s and the 1700s in Western Europe, knowers were separated from the known. Existing outside of time and space, scientific knowers could know the world objectively. Thus, they were untainted by the world of opinions, perspectives or values. Operating objectively (without bias), the knower embarks on the disinterested mission of science—the application of reason to the understanding of the environment. There would be no reason for critical constructivism in such a cosmos. There would be no reason to study the knower and the cultural and historical forces that shaped his or her constructions of the world. Indeed, the knowledge produced by knowers who followed the scientific method was not a construction—it was truth. No interpretation was needed in such a heady context.

Subverting the Need for Interpretation: The Scourge of Reductionism

This system of truth production took place within Rene Descartes' separation of mind and matter, his *cogito, ergo sum*— "I think, therefore I am." This view led to a conception of the world as a mechanical system divided into two distinct realms: 1) an internal world of sensation, and 2) an objective world composed of natural phenomena. Building on the Cartesian dualism, scientists argued that laws of physical and social systems could be uncovered objectively by researchers operating in isolation from human perception with no connection to the act of perceiving. The internal world of mind and the physical world, Descartes theorized, were forever separate, and one could never be shown to be a form of the other (Lavine, 1984; Lowe, 1982; Aronowitz, 1988, 1996). We understand now that this

division of mind and matter had profound and unfortunate consequences—especially in questions of education. In all disciplinary domains and especially in education and psychology, this reductionistic science worked to produce oversimplified and misleading pictures of these domains. Such research produced a "thin content" and trivialized education. Education was trivialized in that the role of the teacher involved passing "certified truths" along to passive students whose role was generally to commit such unexamined truths to memory. This perspective of what a "rigorous" education involves is still promoted by conservatives in the twenty-first century.

Contributing to the victory of reductionism and its production of thin content masquerading as truth was Sir Isaac Newton. Newton extended Descartes' theories with his description of space and time as absolute regardless of context—an assertion Einstein would demolish in 1905 with a far more complex view of physical reality (see Kincheloe, Steinberg and Tippins, 1999). Clarifying the concept of cause and effect, Newton established modernism's tenet that the future of any aspect of a system could be predicted with absolute certainty if its condition was understood in precise detail and the appropriate tools of measurement were employed. Thus, the Cartesian-Newtonian concept of scientific modernism was established with its centralization, concentration, accumulation, efficiency and fragmentation. Bigger became better as the dualistic way of seeing reinforced a rationalistic, patriarchal and expansionist social and political order welded to the desire for power and conquest. Such a way of seeing served to despiritualize and dehumanize, as it focused attention on concerns other than the sanctity and well-being of people (Fosnot, 1988).

Exploring these origins of Western scientific modernism, critical constructivists maintain that we can better understand how "what is" came to be, how education and schooling took their form. Continuing in this context, Descartes and Newton, along with Francis Bacon who established the

supremacy of reason over imagination, laid a foundation that allowed science and technology to change the world. Commerce increased; nationalism grew; human labor was measured in terms of productivity; nature was dominated, and European civilization gained the power to conquer in a way previously unimagined. This is the aspect of the modernist Scientific Revolution that we hear about in the subject matter of school. The problems of reductionism and rationalism are rarely referenced in such content knowledge. The rise of modernist science was closely followed by a decline in the importance of religion and spirituality. An obsession with progress supplied new objectives and values to fill the vacuum left by the loss of religious faith. Even familial ties were severed as the new order shifted its allegiance to the impersonal concerns of commerce, industry and bureaucracy (Aronowitz and Giroux, 1991; Bohm and Peat, 1987).

Rationality was deified, and around the scientific pantheon the credo of modernity was developed: the world is rational (logocentric), and there is only one meaning of the term. All natural phenomena can be painted within the frame of this monolithic rationality, whether we are studying gravity, rainbows, street gangs or teaching. The victory of reductionism was almost complete—nothing complex was noted in the relationship of the knower to the known. Reductionism remains dominant to this day, mowing down all challenges—not the critical constructivist challenge I hope—with charges of irrationality and antiscientific perspectives. It's important to note that perspectives advocating recognition of complexity and the constructed nature of knowledge have made some inroads over the last fifteen years. Such success, however, has been met with a bellicose reaction from the defenders of the positivistic/reductionistic faith. We see that fight in the first decade of the twenty-first century in the passage of No Child Left Behind legislation and the top-down imposition of content standards. In this context, critical constructivism and the contextualized view of school knowledge it pro-

motes will not be welcomed by reductionists in educational leadership positions.

Such leaders and their allies who advocate standardized forms of educational reform do not question the Cartesian-Newtonian-Baconian premise that first and foremost science is a "fact" provider—facts that need no interpreting. Scientific research provides us, they insist, with indisputable knowledge. In this epistemological universe, values are subjective opinions that have little role in world research and education. Operating on these premises, scientific managers have objectified the teaching workplace, focusing on measurable factors related to the bottom line of productivity. The examination of human values as represented by John Dewey's assertion that education must be pursued as an ethical imperative does not fit into a view of education based on such a reductionistic notion of science. Why all this fuss about complexity, reductionism, knowledge production and epistemology, advocates of reductionism ask, when we all know that science has simply provided us with the truth? The job of teachers is simple, they tell the world. Just deliver the truth to students. The talk about interpretation is a silly waste of time.

The Power of Interpretation: Understanding Critical Hermeneutics

Engaging in critical constructivism always involves the interpretive act, making sense of the complexity of everyday life and the data it constantly throws at us. Critical constructivists are profoundly appreciative of the power of critical hermeneutics. If hermeneutics involves the act of interpretation, then critical hermeneutics involves understanding how power inscribes the word and the world to shape the nature of how human beings make sense of it. In other words, critical hermeneutics is directly concerned with how power enters into the interpretive act. Critical constructivists start with the premise that all being in the world of human beings is an interpreted form of being. This holds profound epistemological implications, as all knowledge is socially constructed in a dialogue between the world and human consciousness. Educators who understand that knowledge and interpretation are inseparable terms work to enhance their interpretive ability. Indeed, the ability to generate rich and compelling interpretations is a key to producing more rigorous forms of knowledge and pedagogy.

Long concerned with the theory and practice of interpretation, hermeneutics is a form of philosophical inquiry that focuses on the cultural, social, political and historical nature of research. Hermeneutics maintains that meaning-making cannot be quarantined from where one stands or is placed in the web of social reality. Thus, in a hermeneutic context, interpretation is denaturalized in the sense that certain events and/or phenomena do not imply a particular interpretation of their meaning. Interpretation is far more complex than reductionists assumed, far more a product of social forces than Cartesians admitted.

Thus, critical constructivists focus great attention on the act of interpretation in research, appreciating the distinction between describing a phenomenon and understanding it. Informed by hermeneutics, critical constructivists understand that any act of rigorous knowledge production involves:

- Connecting the object of inquiry to the many contexts in which it is embedded
- Appreciating the relationship between researcher and that being researched
- Connecting the making of meaning to human experience
- Making use of textual forms of analysis while not losing sight that living and breathing human beings are the entities around which and with which meaning is being made
- Building a bridge between these forms of understanding and informed action
- Understanding that rigorous teaching always involves applying these concepts to any subject matter engaged in the classroom.

Critical hermeneutics has engaged in a dialogue with the tradition of critical theory. Extending our previous conversation about critical theory, it is always concerned with the ways power operates and the ways various institutions and interests deploy power in the effort to survive, shape behavior and gain dominance over others, or, in a more productive vein, improve the human condition. Realizing that power is not simply one important force in the social process, critical theory understands that humans are the historical products of power. Men and women do not emerge outside the process of history. Human identities are shaped by entanglements in the webs that power weaves. Critical hermeneutics emerges in the dialogue between hermeneutics and critical theory's concern with power and social action (Jardine, 1998; Kincheloe, Steinberg and Villaverde, 1999; Smith, 1999; McLaren, 2000).

In this hybrid context, critical hermeneutics pushes interpretation to new levels, moving beyond what is visible to the **ethnographic** eye to the exposure of concealed motives that move events and shape everyday life. As critical hermeneutics observes the intersection of power and omnipresent, prereflective cultural meanings, a sensitive and rigorous understanding of the social world begins to take shape. Critical hermeneutics takes the concept of **historicity** to a new conceptual level, as it specifies the nature of the historicity that helps produce cultural meaning, the consciousness of knowledge producers and teachers, the construction of the research and teaching processes, and the formation of human subjectivity and transformative action. In this interpretive context critical theoretical concerns with **praxis**-based notions of social change are more easily addressed, as social action informed by thick description and rigorous understanding of a social and political circumstance is made possible (Lutz, Jones and Kendall, 1997; Zammito, 1996). In this critical hermeneutic process we begin to get down to the forces that move events. We begin to uncover what schools and other social institutions hide about how the world actually works. What we learn in this

Ethnography
a form of social and cultural research that attempts to gain knowledge about a particular culture, to identify patterns of social interaction, and to develop interpretations of societies and social institutions.

Historicity
the human state of being in the world, our place in space and time and the way it shapes us.

Praxis
an activity that combines theory and practice, thought and action for emancipatory ends.

context can be quite disconcerting—but why bother learning at all if we're not trying to get an honest picture of the phenomena in question?

In the first decade of the twenty-first century we are far better acquainted with these interpretive dynamics than we were before the paradigmatic changes of the last four decades.

The arguments put forward in this paradigm shift assert that:

- There is a distinction between the world and our linguistically driven interpretive perception of it.
- Eurocentric/American, patriarchal and elite class inscriptions can be found on most of what schools reference as "validated knowledge."
- All phenomena can be viewed from multiple vantage points—perspectives gained from these vantage points change the ways we understand phenomena.
- There will always be new and unanticipated vantage points from which to view the world—thus, meaning is not as stable as we once imagined.
- All knowledge is part of larger processes that are in flux—as the process evolves, the knowledge once thought to be stable changes along with it.

While many scholars have come to understand these paradigmatic dynamics, such a change should by no means be seen as universal. As previously maintained, there is still tremendous resistance to such a new way of thinking about knowledge and, in turn, education. Hermeneutics promotes a **dialectical** notion of understanding that seeks to free knowledge production from the authoritarian explanations of the certified experts—whether they are the religious elite of the medieval period or the scientific elite of modernity. In the modernist context hermeneutics resists scientific explanations that reduce the world to what is objectifiable, i.e., expressible in mathematical terms. This focus on understanding and interpretation rejects unilateral experiences of all kinds

Dialectics
understands that knowledge is not complete in and of itself. It is produced in a larger process and can never be understood outside of its historical development and its relationship to other information.

that too often eventuate in oppression via the hyperrationalization of lived experience. Such explanations are couched in the monologic of correct and incorrect answers—a way of researching that subverts critical analysis as it imposes meanings. Such material is packaged for easy consumption. No interpretative activity is necessary, just throw it in the explanatory microwave, heat, and insert into one's memory.

Hermeneutic understanding, unlike rationalist, reductionist explanation, does not launch a preemptive strike against other ways of producing knowledge. When I argue in *The Sign of the Burger: McDonald's and the Culture of Power* (2002) that McDonald's can be understood as a **semiotic** phenomenon in its strategic deployment of cultural signifiers, this does not mean that George Ritzer's McDonaldization thesis is wrong. Indeed, the two ways of interpreting McDonald's seem to me quite synergistic. Critical hermeneutics asserts that meaning is consistently multiple in nature (Reason and Bradbury, 2000; Madison, 1988; Lester, 2001). In a culture infiltrated with the ideology of the superiority of scientific explanation, such multiplicity seems to many inherently lacking in standards.

Semiotics
the study of the nature and influence of signs, symbols and codes.

Thus, critical constructivist scholar-teachers informed by hermeneutics become rigorous researchers of context, perspective and discourse. Drawing on the concept of bricolage, they understand that they must use multiple research traditions and theoretical tools to understand the way these factors influence how we make sense of the world around us. Bricoleurs appreciate that any research that fails to account for these dynamics cannot produce a complex, thick and textured picture of a phenomenon. Empirical, quantitative studies that take these factors into account move toward the criteria of rigor. Teachers who understand these dynamics move toward a new realm of educational quality as they break free from the reductionism that stupidifies in the name of edifying.

Point 3: Interpretations cannot be separated from the interpreter's location in the web of reality—one's interpretive facility involves understanding how historical, social, cultural, economic and political contexts construct our perspectives on the world, self and other.

The knowledge that critical constructivist researchers produce is grounded on the assumption that the world is shaped by a complicated, web-like configuration of interacting forces. Knowledge producers, like everyone else, are inside, not outside, the web. As previously mentioned, the knower and the known are inseparable—they are both a part of the complex web of reality. No one in this web-like configuration of the universe can achieve a godlike perspective—no one can totally escape the web and look back at it from afar. Indeed, critical constructivists argue that we all must confess our subjectivity; we must recognize our limited vantage points.

To recognize how our particular view of the web shapes our conception of social, psychological and educational reality, we need to understand our historical location. Reductionistic, cause-effect educational research tends to ignore the way our historicity works to construct our consciousness; as a result, our concept of social activity and of the educational process is reduced to a static frame. Traditional reductionistic forms of curriculum development ignore this web of reality and its impact on the production of knowledge. Curriculum and instruction in this context are delivered to passive students as truth, as free from construction by human beings from particular points in this web of reality.

Thus freed from a spatial and temporal location in the world, the reductionistic, positivistic researcher feels empowered to make predictions, to settle questions, to ignore the dialectical process in which all social activity is grounded. From this perspective, linear mathematics controls variables, eliminates extraneous perturbations, and paints a Norman Rockwell portrait of the schoolhouse (Doll, 1989; Slaughter, 1989; Capra, 1996; Lemke, 1993, 1995). Obviously, the type of knowledge and curricula produced by reductionistic science is very different from the information produced by critical construc-

tivist educational researchers. This is a point missed in most discussions about education—where does the knowledge of school come from? What are the assumptions embedded within it? What roles do such knowledges play in shaping our consciousness?

From the perspective of Ilya Prigogine, the 1977 Nobel Prize winner in chemistry and proponent of complexity and chaos theories, reductionist, pseudo-linear science distorts the knowledge we construct about the world (Prigogine and Stengers, 1984). Prigogine and the analysts of complexity realize that pseudo-linear simplicity does not work. A so-called extraneous perturbation (an outside change), falling into the complex interactions that we have referred to as the web of reality, can produce an expanding, exponential effect. Inconsequential entities can have a profound effect in a nonlinear universe. The shape of the physical and social world depends on the smallest part. The part in a sense is the whole, for via the action of any particular part, the whole in the form of transformative change may be seen.

To exclude such considerations is to miss the nature of the interactions that constitute reality. Critical constructivism's complex reconceptualization of research and the knowledge it produces does not mean that we simplistically reject all quantitative forms of empirical science. Many questions in the world and in education involve counting, figuring percentages, averages, means, modes and so on. It does mean, however, that we conceive of such empirical questions as one part of the web of reality, that is, the interactive configuration of the world around us. A critical constructivist reconceptualization of knowledge production means recognizing, as John Dewey did decades ago, that the knower and the known are intimately connected, that a science that separates fact from value, purpose and belief is a pseudo-science divorced from the complex, lived world of human consciousness. Such a reconceptualization reminds knowledge producers that we can display our content and argue for its value but always with hesitation, a stutter, a tentativeness—

never as the final truth (Besag, 1986; Doll, 1989; Briggs and Peat, 1989; Lemke, 1993, 1995; Aronowitz, 1988, 1996; Kincheloe, 2003).

Complexity theory posits that the interaction of many parts gives rise to characteristics not to be found in any of the individual parts. In this context complexity theory studies the rules shaping the emergence of these new characteristics and the self-organization of the system that develops in this autopoietic (self-creating) situation.

So why bother with all of these issues of constructivism, epistemology, research and complexity theory in something as simple as teaching skeptics may ask. The reason is that all of these features tacitly shape the nature of public conversation about teaching, and they covertly shape how all of us view the purpose of schools. The models of teaching we are taught, the definitions of research that support our inquiry, the angles from which we view intelligence, and the modes of learning that shape the way we think all emerge from these issues of knowledge production. Like reality itself, schools and classrooms are complex webs of interactions, codes and signifiers in which both teachers and students are interlaced. Just as complexity theory asserts that there is no single, privileged way to see the world, there is no one way of seeing the classroom, seeing intelligence, or seeing teacher or pupil success. In the present era of top-down standards and standardized instruction, there is one and only one correct way to see all of these concerns. Critical constructivists find that frightening and socially destructive.

Critical Constructivism, Context and Complexity

On one level, the notion of the web of reality is merely a metaphorical way to describe the importance of context in the construction of knowledge and human consciousness. The more we understand the various contexts in which teaching and learning take place, the more we appreciate the complexity of the processes. The more of these contexts with which educators are familiar, the more rigorous teaching and learning become. I am not arguing here for rigor for rigor's sake. The problems of teacher education are multi-dimensional and are always embedded in a context. The more work critical constructivists studying cognition produce, the more it becomes apparent that a large percentage of student difficulties in school result not as much from cognitive

inadequacy as from social contextual factors (Wertsch, 1991; Lave and Wenger, 1991; Kincheloe, Steinberg and Gresson, 1996; Kincheloe, Steinberg and Villaverde, 1999; Snook, 1999). Teachers need a rich understanding of the social backgrounds of students, the scholarly context in which disciplinary and counter-disciplinary knowledges are produced and transformed into subject matter and the political context which helps shape educational purpose.

In positivistic schools, learners' lives are decontextualized. When we examine the contexts and relationships connecting learner, culture, teaching, knowledge production and curriculum, teachers are moving into a more complex paradigm. In this "zone of complexity," learning is viewed more as a dynamic and unpredictable process. As a complex, changing, unstable system, it resists generalized pronouncements and universal steps detailing "how to do it." Complex systems interact with multiple contexts and possess the capacity for self-organization and creative innovation. Each teaching and learning context has its unique dimensions that must be dealt with individually. Our understanding of educational purpose is also shaped by the complexity of these contextual appreciations. Teacher-educators who are aware of this complexity embrace an evolving notion of purpose ever informed and modified by encounters with new contexts (Capra, 1996; Schubert, 1998; Kincheloe and Weil, 2001).

Critical constructivist teachers act on these contextual insights to not only help understand the various educational knowledges but to grasp the needs of their students. In the critical constructivist orientation, such concerns can never be separated from the socio-political context: macro in the sense of the prevailing ***Zeitgeist***; and micro as it refers to the context immediately surrounding any school. Critical constructivist teachers listen for marginalized voices and learn about their struggles with their environments. As such, teacher-educators delineate the contextual effects of the contemporary political context shaped by corporations and economic interests; they build deep relationships with local communities, community organizations and concerned individuals in these settings. With this in place, students gain new opportunities to learn in not only classrooms but in unique community learning environments. Here they can often address particular socio-political dynamics and learn about them in very personal and compelling ways (Vavrus and Archibald, 1998; Thomson, 2001; Grimmett, 1999; Cochran-Smith, 2000; Hoban and Erickson, 1998).

Zeitgeist
German word for spirit of the times.

Critical constructivist teachers place great emphasis on the notion of context and the act of contextualization in every aspect of their work. When problems in their teaching arise, they stand ready to connect the difficulty to a wider frame of reference with a wide array of possible causes. When pedagogical problems fail to meet the criteria of an archetype, these teachers research unused sources and employ the information acquired to develop a larger understanding of the interaction of the various systems involved with the problem. When teachers fail to perform such an act of contextualization, students get hurt.

For example, a student who is doing poorly in school may be viewed as lacking intelligence. Upon contextualization, teachers may find that the student is disturbed by a problem at home or by an undiagnosed illness. His or her lack of academic success may have nothing to do with the question of ability. When teachers do not contextualize, they tend to isolate various parts of a pedagogical circumstance and call each a problem (Bohm and Edwards, 1991). They tinker with components of the problem but never approach its holistic nature. Educational data, for example, derive meaning only in the context created by other data. Context may be more important than content. These insights change the way educational professionals approach their work.

As is often the case, John Dewey wrote decades ago of these contextual dynamics. In the second decade of the twentieth century, Dewey observed that many thinkers see knowledge as self-contained, as complete in itself. Knowledge, he contended, could never be viewed outside the context of its relation-

Postformalism
a socio-cognitive theory that blurs boundaries separating cognition, culture, society, epistemology, history, psychoanalysis, economics and politics.

Technicalization
the focus on technique or how to do things rather than why to do things.

ship to other information. We only have to call to mind, Dewey suggested, what passes in our schools as acquisition of knowledge to understand how it is decontextualized and lacks any meaningful connection to the experience of students. Anticipating the notion of a critical constructivism and a **postformal** cognition, Dewey concluded that an individual is a sophisticated thinker to the degree to which he or she sees an event not as something isolated "but in its connection with the common experience of mankind" (Dewey, 1916, pp. 342–43). To overcome the reductionism that has plagued education and allowed for its **technicalization** and **hyperrationalization**, critical constructivist educators must take Dewey's insights into account.

Critical constructivism and the development of a consciousness of complexity

Hyperrationalization
the application of reason alone to analyses of the world in lieu of emotion, affect and concerns of worth and justice.

Understanding the importance of the web of reality and its larger connection to the importance of context leads critical constructivists to a consciousness of complexity. A consciousness of complexity involves gaining an understanding of the complexity of the world. Such a consciousness appreciates the fact that:

- Things-in-the-world often involve far more than what one notices at first glance.
- Things that appear isolated and fixed are parts of larger, ever-changing processes.
- The way one perceives an object may change dramatically when one encounters it in another context.
- Knowledge of the world is always shaped by the position of the knowledge producer.
- Ignoring relationships that connect ostensibly dissimilar objects may provide us with a distorted view of them.
- Windows into revolutionary new understandings may be opened by exploring the contradictions and asymmetries of the social, physical, psychological and educational spheres.

- Profound insights may be gained by attending to the experiences of those who have suffered as a result of a particular social arrangement or institutional organization.

These features of a consciousness of complexity move us to a higher-order thinking, a new level of awareness.

Teachers, students and educational leaders who develop such a consciousness can reshape their scholarly lives. In the process they can take charge of their own learning and refuse to be passive recipients of knowledge produced within the culture of the technical expert. When teachers gain a consciousness of complexity, they are ready to not only model such a consciousness for students but also to assess whether their school districts, schools and classrooms are working toward such an appreciation of complexity. In this context they can decide whether or not districts, schools and individual teachers are getting the help they need to enact a critical constructivist pedagogy. In this way teachers with a consciousness of complexity can design rigorous and creative forms of assessment that go far beyond the grading system and standardized-test-based school assessments now being used. Such teachers would view assessment as just one more topic to research. Using their sophisticated research and knowledge work abilities, teachers could ask a variety of questions about the workings of schools that would provide insights into school quality and, most importantly, practical understandings to be used in improving teaching in specific contexts (Zeno, 1998; Marzano and Kendall, 1999).

One of the most important features of higher-order cognition in general and critical constructivism in particular involves an awareness of and comfort with ambiguity and uncertainty. Part of a consciousness of complexity involves an awareness of the "complexity of self-production" or the multiple dimensions of our identities. This form of knowledge helps teachers understand where their views of educational purpose and teaching come from and what socio-cultural forces have made them who

they are (have constructed them). With such understandings, teachers and students can consciously decide who they want to be, how they themselves view the teaching, learning, and knowledge producing processes. In relation to this self-awareness and the accompanying quest for self-direction, a consciousness of complexity involves the analysis of ethical questions of purpose. In this process, those seeking self-direction become focused on the effort to develop a moral compass to help guide their quest for empowerment. Such a compass does not always point in the same direction, as it is a path-finding device aware of ambiguity and the need for contextual awareness (Progler, 2001).

Thus, the direction, it gives—much like the message, from the gods Hermes delivered to mortals—are always subject to interpretation. As hermeneutics informs us, the actions in the world such interpretations suggest are never clear cut and obvious. Again, a consciousness of complexity does not mean that we fall into an impotent relativism where courageous action in the world is subverted. Instead, our actions are informed by multiple perspectives and ways of seeing, insights that empower teachers, students and educational leaders to act in thoughtful, reflective, moral and just ways. With such a consciousness, teachers can make decisions and take actions that include all participants in the quest for a socially just, inclusive, rigorous and useful education. The cognitive alienation inherent in viewing things-in-themselves, being directed to isolate objects of study from the larger contexts and processes of which they are a part is challenged by a consciousness of complexity (Karunaratne, 1997). Critical constructivism, of course, promotes the cultivation of such a consciousness.

Teachers and students deploying a consciousness of complexity learn logics of argumentation, modes of developing compelling interpretations, and other ways of thinking more clearly. As teachers work to cultivate such higher orders of cognition, they provide students with alternative modes of meaning-making and new universes of choices in the effort to

answer questions about the social and physical worlds. Such teaching can begin early in a child's schooling as early childhood and elementary teachers engage in analytical activities similar to the types outlined in the philosophy-for-children programs. Expert teachers operating in this critical constructivist context use their research skills to construct such rigorous learning activities as seamless parts of the everyday lives of their students. At their best, these expert teachers design higher-order academic lessons that are so natural to their students' lives, they don't even know they're engaged in rigorous learning (Newland, 1997).

Learning proceeding in this context as a natural part of living sets the affective stage for problem-detecting and problem-solving, the acquisition of important content, and the exposure of limiting assumptions such as, "that's just the way school is, there's nothing we can do about it." Operating in such a comfortable setting, students learn to be researchers as a normal part of their lives, they learn to use abilities acquired in a previous context in a new domain. Contrast such pedagogies and forms of consciousness with those promoted by top-down technical standards and other reductionistic pedagogies. In critical-constructivist-driven pedagogy, the atmosphere of the school changes, the disposition of students toward learning is revolutionized, the dignity of the profession of teaching is resuscitated, and the educational expectations for teachers and students are significantly raised (Newland, 1997). The school environment transmogrifies from one of punitive memory work to one of an exciting pursuit of a consciousness of complexity. Such a consciousness allows teachers and learners to analyze, understand and act intelligently in new situations.

Point 4: The "critical" in critical constructivism comes from critical theory and its concern with extending a human's consciousness of herself as a social being—critical theory promotes self-reflection in relation to social power and its ability to align our self-perceptions and world views with the interests of power blocs.

Critical constructivism is grounded on the Frankfurt School's formulation of critical theory, in particular, its attempt to explore how consciousness is tied to history. Guided by such concerns, critical constructivist teachers and researchers inspired by critical theory seek to expose what constitutes reality for themselves and for the participants in educational situations (Kincheloe and McLaren, 2000; Hinchey, 1998; McLaren, 2000). How do these participants, critical constructivist teachers ask, come to construct their views of educational reality? Critical constructivist action researchers see a socially constructed world and ask what are the forces that construct the consciousness, the ways of seeing of the actors who live in it? Uncritical researchers attempt to provide accurate portrayals of educational reality, but they stop short of analyzing the origins of the forces that construct actor consciousness. Without such information, critical constructivist teacher researchers maintain, emancipatory action is impossible. Descriptions of educational reality outside the boundaries of the socio-economic cultural context hold little meaning for educators concerned with social justice and ethical action.

Why are some constructions of educational reality embraced and officially legitimized by the dominant culture while others are repressed? (McLaren, 1989; Lincoln and Guba, 1985; Denzin and Lincoln, 2000). This is the type of question that critical teachers/researchers seek to answer. Indeed, the essence of critical constructivism concerns the attempt to move beyond the formal style of thinking which emerged from empiricism and rationalism, a form of cognition which solves problems framed by the dominant paradigm, the conventional way of seeing. Like Einstein's physics, critical constructivist researchers attempt to use their understanding of the social construction of reality to rethink and reconceptualize the types of questions we ask about the educational enterprise (Yeakey, 1987; Noblit, 1984, 1999; Kincheloe, Steinberg and Tippins, 1999; Willinsky, 2001a, 2001b).

Constructing a Critical System of Meaning

A central theme of these reconceptualized questions involves the inquiry into whose constructions of reality prevail and whose ought to prevail. Michael Young (1971) argues that the dominant definitions, the official ways of seeing in schools, are constructed realities that benefit some groups and not others. The ways that schools distinguish bright from stupid, good citizenship from bad, model behavior from disruptiveness, good work from bad work, are constructions that emanate from those in a position to induce less privileged actors to grant their consent to the dominant definitions. Much of the inquiry into education commences without an attempt to construct a system of meaning on which to ground analysis of the questions it pursues—it merely accepts the unproblematized assumptions of mainstream scholarship and research. Even when we do attempt to construct a system of meaning to ground our inquiry, it may be intellectually immature if we neglect an analysis of the hidden ideological forces that define our methodology, shape our logic, anesthetize our ethical sense and shape our questions. Without attention to such concerns, our inquiries lapse into an irrelevancy and a myopia that constrain the educational possibilities offered by empowered, insightful teachers (Yeakey, 1987; Cochran-Smith and Lytle, 1993, 1998).

Thus, teachers and scholars informed by critical theory seek a system of meaning that grants a new angle, a unique insight into the social consequences of different ways of knowing, different forms of knowledge and different approaches to research. Inquiry and the knowledge it produces are never neutral but are constructed in specific ways that privilege particular logics and voices while silencing others. Why do science and math curricula in the United States, for example, receive more attention and prestige in public schools than liberal arts? (Brown, 2001; Barton and Osborne, 2001; Roth, Tobin and Ritchie, 2001). Critical constructivists searching for the way power helps shape individual

and social consciousness uncover links between the need of large corporations to enhance worker productivity and the goals of contemporary educational reform and standards movements to reestablish "excellent" schools (Horn, 2000; Horn and Kincheloe, 2001). They discover relationships between the interests of business and the exclusion of the study of labor history from Western schools (Kincheloe, 1995, 1999). They expose the connections between the patriarchal Eurocentrism of educational leadership and definitions of classics that exclude the contributions of women, minorities, and non-Westerners to the literature, art, and music curricula (Powell, 2001; Rose and Kincheloe, 2003).

Power regulates discourses; discursive practices are defined as a set of tacit rules that regulate what can and cannot be said, who can speak with the blessing of authority and who must listen, whose socio-educational constructions are scientific and valid and whose are unlearned and unimportant (Lemke, 1995). In the everyday world of teachers, legitimized discourses insidiously tell teachers what books may be read by students, what instructional methods may be utilized (Madeleine Hunter, Success for All, etc.) and what belief systems, definitions of citizenship and views of success may be taught. Schools may identify, often unconsciously, conceptions of what it means to be educated with upper-middle class white culture; expressions of working class or non-white cultures may be viewed as uneducated and inferior. As a result, teachers are expected to sever students' identifications with their minority group or working class backgrounds, thereby alienating such students through the degradation of their culture.

Thus, the culture of schooling privileges particular practices and certain methods of discerning truth. Foucault argues that truth is not relative (i.e., all world views embraced by different researchers, cultures and individuals are of equal worth), but is relational (constructions considered true are contingent upon the power relations and historical context in which they are formulated and acted upon). This

is a central tenet of critical constructivism. The question that grounds our attempt to formulate a critical constructivist system of meaning to ground our pedagogy and social action is, If what we designate as truth is relational and not certain, then what set of assumptions can we use to guide our activities as professionals, to inform our questions as cultural workers? (McLaren, 1989; Pinar, 1994; Rasberry, 2001).

Liberation Theology and the Critical Constructivist System of Meaning

This is why developing a system of emancipatory meaning is so important. This is why liberation theology is so central to our attempt to develop an emancipatory system of meaning. Liberation theology, with its roots deep in the Latin American struggle against poverty and colonialism, morally situates our attempt to formulate an explicit set of assumptions, an ethical starting line from which to begin our formulation of educational questions. Liberation theology makes no apology for its identification with the perspectives of those who are excluded and subjugated. Proclaiming their solidarity with the marginalized, liberation theologians work alongside them in their attempt to expose the existing social order as oppressive and unethical. All aspects of our emancipatory system of meaning and the scholarship and pedagogy that grow out of it rest on this notion of identification with the perspective of the oppressed. Accordingly, one of the main goals of critical constructivism is to reveal the ways that dominant schooling serves to perpetuate the hopelessness of the subjugated (Welch, 1985). On the basis of this knowledge, of their "dangerous memory," strategies for overcoming such oppression can be developed.

Glossary

Bricolage—The French word, *bricoleur*, describes a handyman or handywoman who makes use of the tools available to complete a task. Some connotations of the term involve trick-

ery and cunning and are reminiscent of the chicanery of Hermes, in particular, his ambiguity concerning the messages of the gods. If hermeneutics came to connote the ambiguity and slipperiness of textual meaning, then bricolage can also imply imaginative elements of the presentation of all formal research. I use the term here in the way Norman Denzin and Yvonna Lincoln (2000) employ it in *The Handbook of Qualitative Research* to denote a multimethodological form of research that uses a variety of research methods and theoretical constructs to examine a phenomenon (see Kincheloe and Berry, 2004).

Cartesianism—the philosophy and scientific method of Rene Descartes. Descartes' analytical method of reasoning, often termed "reductionism," asserted that one can appreciate complex phenomena best by reducing them to their constituent parts and then piecing the elements back together according to causal laws.

Complexity theory—posits that the interaction of many parts gives rise to characteristics not to be found in any of the individual parts. In this context complexity theory studies the rules shaping the emergence of these new characteristics and the self-organization of the system that develops in this autopoietic (self-creating) situation. As the complex system is analyzed, complexity theorists come to understand that it cannot be reduced to only one level of description.

Dialectics—understands that knowledge is not complete in and of itself. It is produced in a larger process and can never be understood outside of its historical development and its relationship to other information.

Epistemology—the branch of philosophy that studies knowledge and its production. Epistemological questions include: what is truth? Is that a fact or an opinion? On what basis do you claim that assertion to be true? How do you know?

Ethnography—a form of social and cultural research that attempts to gain knowledge about a particular culture, to identify patterns of social interaction, and to develop interpretations of societies and social institutions. Ethnography seeks to make explicit the assumptions one takes for granted as a culture member. Ethnographic researchers make use of observation and interviews of culture members in their natural setting, their lived contexts.

Hegemonic—the process by which dominant groups seek to impose their belief structures on individuals for the purpose of solidifying their power over them. Thus, hegemony seeks to win the consent of the governed to heir own subjugation without the use of coercion or force

Historicity—the human state of being in the world, our place in space and time and the way it shapes us. Such a concept is very important in constructivist and enactivist theory.

Hyperrationalization—the application of reason alone to analyses of the world in lieu of emotion, affect and concerns of worth and justice.

Objectivism—the epistemological belief that disinterested knowledge can be produced about any phenomenon simply by following the scientific method. If the method is followed rigorously, no values, ideology or other human perspectives will undermine the objectivity/validity of the knowledge produced.

Ontology—the branch of philosophy that studies the nature of being; that asks what it means to be in the world.

Positivism—an epistemological position that values objective scientific knowledge produced in rigorous adherence to the scientific method. It identifies knowledge as worthwhile to the extent that it describes objective data that reflect the world.

Postformalism—a socio-cognitive theory that blurs boundaries separating cognition, culture, society, epistemology, history, psychoanalysis, economics and politics. Postformalism transcends much of the cognitive theory typically associated with Piagetian and many other theories of cognitive development. While more positivist cognitive science has associated disinterestedness, objectivity, adult cognition and problem solving with higher-order thinking, postformalism challenges such concepts. Postformalism links itself to the concept of alternative rationalities. These new rationalities employ forms of analysis sensitive to signs and symbols, the power of context in relation to thinking, the role of emotion and feeling in cognitive activity, and the value of the psychoanalytical process as it taps into the recesses of (un)consciousness. In the spirit of critical theory and critical pedagogy, postformalism attempts to democratize intelligence. In this activity postformalists study issues of purpose, meaning and value. Do certain forms of cognition and cognitive theory undermine the quest for justice? Do certain forms of psychological research cause observers to view problematic ways of seeing as if they involved no issues of power and privilege?

Praxis—an activity that combines theory and practice, thought and action for emancipatory ends.

Semiotics—the study of the nature and influence of signs, symbols and codes.

Technicalization—the focus on technique or how to do things rather than why to do things.
Zeitgeist—German word for spirit of the times.

CHAPTER TWO

Power and Knowledge Production

Critical Constructivist Pedagogical Purpose

Point 5: The key elements of a rigorous education involve understanding how our consciousness is constructed, subjectivity shaped, and identity produced—here rests the theoretical key to critical constructivism: the role of power in these processes of self-production and, in turn, epistemology and knowledge production.

Cartesian-Newtonian-Baconian Modernism over a period of several decades in the seventeenth and eighteenth centuries, these three thinkers laid the foundation for the western scientific way of viewing the world. Such a mode of understanding would enable scientists to both describe and control the outside world. The foundation established by Carter, Newton, and Bacon allowed science and technology to change the world.

Critical constructivists maintain that **Cartesian-Newtonian-Baconian modernism** has been trapped in an epistemology that locates truth in external reality. Teaching and producing knowledge in this context often have become little more than an effort to accurately reflect this reality. Indeed, Cartesian thought has been seen as simply an inner process conducted in the minds of autonomous (abstract) individuals. The thoughts, moods, understandings and sensations of the individuals are separate from their histories and social contexts. If thinking is to be seen as a mirroring of external events, the need for

Using their skills as knowledge workers, empowered teachers engage students in a mutual process of research and knowledge production that can be used in particular contexts. Thus, scholar-teachers transcend the limitations of positivist visions of education and teaching that de-skill them, take away any need for scholarship, and induce them to ignore the socio-political and cultural dimensions of teachers as knowledge deliverers. Positivist models and the technical standards they support treat teachers disrespectfully and content simplistically.

Advocates of critical constructivism would respect teachers enough to engage them in a conversation about why specific educational reforms would or would not be helpful to them in their professional activities. Such advocates would also open a dialogue about the way such proposals view curriculum content. Questions that would naturally arise in such a conversation would include:

- Is content simply a collection of truths to be passed along to students?
- Is content produced to be questioned?
- What is the teacher's responsibility when confronted by a body of content?
- What are the unstated epistemological assumptions in a body of content?
- What is the relationship of the content to knowledge production?
- Do standards imply a particular relationship between pedagogy and knowledge?
- Does the role of teacher as knowledge worker change the relationship between teachers and content?

If we are serious about improving teacher education and American education in general, we cannot allow epistemologically naïve, top-down, technical standards reforms to disempower teachers and remove them from the educational conversation. It does not seem wise to mandate simplistic, decontextualized content standards and then provide teachers no help in accomplishing them. Critical

constructivists understand that this is the worst of all possible worlds. A central feature of a critical constructivist education involves investing in various forms of teacher education that improve teacher scholarship, research ability and pedagogical skills. From classwork in teacher education to research projects to mentoring relationships, teachers must be provided with help in their efforts to develop a new intellectual rigor. None of the talk about educational reform amounts to much if teachers do not assume a new, more scholarly role. In this context teachers and teacher-educators must rethink their own practice, generate new conceptions of student outcomes, and develop engaged pedagogies they have never experienced before. Serious educational reform demands these ambitious reassessments. They will not take place without large-scale social commitment. It is the task of critical constructivists to make a compelling public case for the need for such commitment.

With such public commitments, empowered teachers will have the opportunity to reflect on their skills and pedagogical practices, to engage in research in their subject areas and in the communities surrounding their schools. In such an empowered context, teachers can extend their personal knowledge of students in order to diagnose their academic needs, talents, and personal concerns. In this way more customized and caring experiences can be devised for students, especially those who have been previously ignored in the system. Such reflection, research knowledge and personal insights are then combined with social and pedagogical theoretical knowledge. In this analytical context, empowered teachers formulate their teaching purposes and strategies for attaining them in particular contexts and with specific students.

The Critical Constructivist Teacher Knowledge Base

In this critical democratic framework, teachers take charge of constructing their own pedagogies and educational philosophies. They become detectives of new modes of analysis, new forms of knowledge

production and new ways of teaching. A rigorous teacher education grounded on these critical constructivist insights produces educators with a powerful knowledge base:

- Teachers possess an expert knowledge of the liberal arts and sciences, understanding the historical development of disciplines and the various schools of thought within them. Teachers gain a facility to view the discursive aspects of ways of seeing within the disciplines and how these dynamics affect knowledge production within different fields. Weaknesses of the disciplinary arrangement of knowledge are also understood.
- Teachers learn to promote the welfare of their students. Teachers are attuned to students' physical and emotional well-being, as they understand the social and psychological contexts that exert an impact on them. Aware of the importance of making connections with students, teachers develop this ability with students from all backgrounds, dispositions and performance levels.
- Teachers appreciate the complexity of the ways students learn and develop. In this important domain, teachers analyze educational and cognitive psychology and the ways these disciplines interrelate with teaching and the development of educational goals. Understanding the historical and discursive development of the fields of study, teachers explore cognitive activity and learning in a variety of cultural settings. Teachers are cognizant of the constant interaction between psychological assumptions and the way the classroom is organized. A central feature of such studies involves a continuing analysis of human possibility and the development of new cognitive abilities and better ways of being human.
- Teachers both understand students' conceptual development and create ways to facilitate it. A central role of critical constructivist teachers involves identifying the way that students' prior knowledge interacts with academic and other

newly encountered knowledges to shape their view of a specific phenomenon in particular and the learning process in general. Based on these insights, critical constructivist teachers gain the ability to help mediate students' confrontations with the world. Concurrently, such teachers play a hermeneutic role as they help students make sense of and interpret these new encounters in light of their old constructs (Taylor, Fraser and White, 1994).

- Teachers become knowledge workers capable of a variety of research methods depending on the context encountered (Kincheloe and Berry, 2004). Thus, they can produce information and access information to help them better perform their pedagogical tasks. Aware of the politics of knowledge and the changing nature of information production in the twenty-first century, teachers develop interpretive abilities to discern the ways various knowledges are produced, who produced them, and the reason for their production. In the new information order of the twenty-first century, teachers' facility as knowledge workers becomes a basic pedagogical skill. Using such abilities, teachers become aware of the cultural pedagogies produced by television, radio, popular music, the Internet, video games and movies, and their impact on themselves and their students.
- As part of their role as researchers and knowledge workers, teachers study the community surrounding the school for a variety of reasons. In addition to understanding the social and cultural context that immediately surrounds the school, such research enables collaborative efforts with various community members. The integration of school pedagogies with community and institutional expertise is an important aspect of rigorous teacher activity and educational reform.
- Teachers are experts in pedagogical methods and strategies for teaching and classroom management. Teachers learn to use different methods in different contexts and with differing

students with differing needs. Practitioners learn new educational technologies and how they can use such tools to achieve their pedagogical goals.

- Teachers achieve profound expertise in the contextualizing disciplines of education. As they learn about the historical, social, cultural, political, economic, psychological and philosophical contexts that frame education, they develop the important ability to understand the genesis of educational policy and purpose so they can better participate in the public conversation about education. With such skills they are better equipped both to evaluate the curricula and goals they are given and to join the negotiations about such mandates. Such contextual knowledges are central to their self-empowerment.
- Teachers become scholars of education in a democratic society, exploring the ways that an unequal distribution of power and resources insidiously undermines the performance of some students. In this process teachers become scholars of power and justice as they study the complex relationship between educational policy and the pursuit of social justice. In this context teachers understand a variety of manifestations of diversity, analyzing the way race, class, gender, religion, ethnicity and sexuality affect students, teachers and administrators. Cognizant of these effects, teachers are better able to address the problems that emerge when these diversities intersect with the school.
- In light of these expanded abilities and higher expectations, teachers become evaluation experts. As such they develop and utilize a variety of assessment techniques to better understand the impact of their pedagogy. With such knowledge they are better equipped to self-criticize and to monitor student learning so as to continuously update, revise and improve curriculum and instruction. Critical constructivism helps teachers see such evaluation issues as inseparable from their facility as knowledge workers and researchers. They are simply applying such inquiry skills to what is occurring with their students in their own classrooms.

Critical Constructivism and Informal Out-of-School Pedagogy

If understanding all of these aspects of the knowledge base were not enough, critical constructivists understand that to create a powerful pedagogy in the twenty-first century they must think of education as something that goes on both inside and outside the school. In the present era of electronic **hyperreality,** critical constructivist educators argue that dominant power's media-based curriculum teaches young and old people alike about the world from a right-wing perspective. A key purpose of any critical constructivist curriculum involves understanding the way regressive ideologies shape both in-school and, especially important now, out-of-school education. In this information-saturated context, it is the duty of critical constructivists to develop methods of studying the cultural pedagogy of hyperreality and its corporate-produced curriculum. Critical teachers carefully monitor and document such a curriculum and its social and political impact. Teachers, educational researchers, political leaders, parents, and students must be empowered to expose the corporate curriculum and to hold corporate decision-makers and their politician allies accountable for the pedagogy they produce.

Hyperreality
Jean Baudrillard's concept of the contemporary cultural landscape marked by the omnipresence of electronic information. In such a landscape individuals begin to lose touch with the traditional notions of time, community, self and history.

As critical educators develop methods of analyzing the ideologies of corporate pedagogy as encountered in movies, TV, video games and cyberspace, we must use them to produce a body of information that activists can draw upon. As criticalists gain a more sophisticated view of the ways cultural pedagogy operates, we are better able to expose race, class and gender oppression and even rewrite popular texts when the opportunity presents itself. Critical constructivist analyses can be used to ground strategies of resistance that understand the relationships among cultural pedagogy, the production of knowledge and the construction of subjectivity.