LEARNING AFTER THE END OF KNOWLEDGE: INSTRUCTIONAL TECHNOLOGY IN THE AGE OF INTERPRETIVE MEANING

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ABSTRACT

Learning After the End of Knowledge:
Designing Instruction in the Age of Interpretive Meaning

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The combination of the demise of empiricism and the rise of interpretivism has resulted in considerable instability of conceptual knowledge and skills. Combined with a exponential increase in non-epistemic interpretive knowledge on the Internet, the field of instructional technology has been slow to adapt its methodologies to the new reality. This thesis seeks to understand why the field has been slow to evolve, despite efforts to improve its practices, including the introduction of frameworks such as constructivism.

The investigation begins with the hypothesis that the problem might be located in in the epistemic roots of logical empiricism, which sought to eliminate metaphysics and relativism. The demise of logical empiricism was achieved by the methods of post-analytical philosophers, are appropriated to critique the ontological, theoretical and hidden metaphysical assumptions of the field of instructional technology. Finally the method is used to critique the instructional system design model to conclude that the design component is too heavily constrained to be an effective heuristic for the rest of the process, and needs to be radicalized.

This thesis demonstrates that the post-analytical method is not only an effective critical tool, but also offers constructive ideas for problem solving. It should be adopted not only to analyze and correct current standards and practices of the field but also to establish clearer boundaries and criteria for empirical research, as well as in the task and content analyses used by instructional designers.

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In the Educational Technology department: Bryn Holmes, Saul Carliner both for timely advice and much needed practical support; Laura McEwen for lighting more fires in my belly and encouraging me to develop my insights. Anne Brown, for never missing a beat, she is the shining beacon of the Ed Tech program. Every writer needs a good editor, and I am particularly grateful to Gary Boyd for taking the time and effort to not only combing through the text but for his challenging comments. This thesis is considerably stronger as a result. A very special thanks goes to Johannes Strobel, my supervisor, who understood better than anyone my existential struggle. His easygoing nature, patience and humor while I went through countless iterations, blind alleys and dead ends during my two year gestation is the sign of a true friend and not just a teacher.

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To say that I stand on the shoulders of giants like Richard Rorty, W.V.O. Quine, Donald Davidson, Roland Barthes, Thomas Khun, Paul Feyerabend, Bernard Lonergan, Ludwig Wittgenstein, Michel Foucault, Jacques Derrida and Jean Baudrillard, is an understatement. None of this would have been "theoretically" possible without them.

Finally to my family — my wife Céline, daughter Vanessa and son Philippe, who inspired me more than anyone to try and make the world a better place.

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A note about format and style

The Department of Education at Concordia University specifies APA format for theses and dissertations. However the *Publication Manual of the American Psychological Association* allows for considerable variation to format for materials that are submitted in final presentation form (APA, 2001, p. 321). This thesis is "non-standard" in the sense that it is not a report on empirical research, but rather an essay that is written in a post-analytic style consistent with the ideas presented within it. Forcing a thesis advocating the elimination of rigid presentation structures (in order to better define problems) to adhere to a strict APA journal submission format would have been quite ironic.

Fortunately, my department is progressive and encourages alternative approaches, and the APA manual is sufficiently flexible to permit reader-friendly formatting in final manuscript presentation. However, as of this writing no departmental formatting guidelines have been specified. I am providing here a summary of those variations, all of which were done in the interest of the reader. These reflect a firm commitment to user-centered (and learner centered) design, which should always trump arbitrary constraints.

- The structure reflects the content, and follows a more book-ish chapter heading style.
- In-quote as well as chapter and section introductory quote citations refer to footnotes containing the reference data. This is to ensure that the list of references at the end of the thesis accurately represents the original content and not its embellishments.
- Footnotes appear at the bottom of the page in which they are referenced.
- In-text paraphrased citations contain page numbers where I deemed it would be helpful to the reader.

INTRODUCTION

"In the same way that we need statesmen to spare us the abjection of exercising power, we need scholars to spare us the abjection of learning."[1]

—*Jean Baudrillard*

A Personal Reflection

The insight for this work came originally from a short essay by Susan Sontag, *Against Interpretation* (Sontag, 1964). In her essay, Sontag expounds on an idea that extra-theoretical interpretation of art was taking away from what is essential to artistic communication, that is, the intensely personal relationship between the artist and the viewer. My introduction to Sontag's essay came while taking a rather unconventional undergraduate course in film criticism, one that placed personal affective response first and interpretations based on film theory second. This was a particularly difficult course, as my experience in academic life as a student was to learn a particular "theory" then apply it, as a framework, to interpret knowledge and activity in a way that was appropriate for the subject material at hand. Undoing over 25 years of the standard method of learning took most of the 13 week course.

As a bit of a historical background to Sontag's essay, by the 1960's it had become standard academic practice to analyze artistic works through theoretical explanation. Typically these were Marxist-structuralist and Freudian thematic analyses as well as their variations and derivatives. These analyses, originating in the European tradition of the empirical social sciences, effectively pushed aside and devalued the kind of highly personal and emotionally charged meanings proffered by artistic expression. In other

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1. Baudrillard, J. (1990). *Cool Memories.* Turner, C. (trans.) New York: Verso.

words, artistic intent, both in terms of authorship and the experience of the viewer, was typically subsumed by evidential cause analyses rooted in a hegemonic dominant ideology or psychopathology.

The simple idea that dispassionate and disassociated extra-theoretical analyses were inappropriate for the study of cinema (and other art forms) was a revelation. Its primary effect was to restore personal meaning and emotional enjoyment to the act of movie watching, and on to greater personal admiration and respect for the cinema. This led me to a belief in the value of personal, human-centered experience first and foremost and also to question the role of explanatory theory, scientific or otherwise. Since I have somewhat of a philosophical bent, I explored the role of theory and the relationship to ideology and ideological systems. I had an insight that explanatory "academic" theories might be in intense competition with other forms of culture and personal experience in determining our reality. This belief can be best described in a twist of the famous quote of Karl Marx: it is not who controls the means of production who controls society, but rather who controls the production of meaning.

This intense dissatisfaction with these types of critical theory led me to a sense that individuals might be subjugated to systems of thinking that tell us *what* to see instead of *how* to see. In other words, the real hegemony of meaning might be lurking in epistemologies. This notion was reinforced by the commentaries of Neil Postman, Marshall MacLuhan, Roland Barthes, Jacques Derrida, Michel Foucault, Cornel West, the artistic movements of Futurism, Surrealism, Fluxus and Dogme 95, and filmmakers like Stanley Kubrick and Lars Von Trier, all of whom critique the "benign" instruments of oppression — dogmatic systems of belief wrapped in shiny theories. Despite this new sense of suspicion about all things structural in the socio-cultural constitution of the Self, I

was aware of other, more productive critiques in the natural sciences, specifically with the philosophical and ontological problems of the quantum theory and Darwinism. I felt that the debate over scientific realism vs. the instrumentalism of Bohr and Heisenberg (Fine, 1986), more or less confirmed a belief that the universe is not only unstructured and indeterminate at the most fundamental level, but only becomes determinate once it is measured — by the process of categorizing and rationalizing experience. I also found the debate between Darwinism and creationism fascinating examples of what demarcates science from pseudo-science, and the importance of criteria in that demarcation. This was especially relevant with regards to the fundamental categories of experience that are the ultimate recourse of any logical argument.[2]

The linking of antirealism with post structuralism and other critiques of knowledge was given additional impetus due to my intense interest in Bernard Lonergan, a Catholic theologian and philosopher (who taught right here at Loyola College before it merged with Sir George Williams University to become Concordia), whom I had come to understand and respect for what I call "post-modern Thomism," or rather his reconciliation of Platonic and Aristotelean metaphysics with empirical science, antirealist/antifoundational thinking, and making it all relevant to Christian doctrine. I learned an important lesson about overcoming dogmatism, which was all the more powerful originating from a Roman Catholic jesuit priest. While in no way is this an endorsement for Roman Catholic doctrine or a return to Platonism or Thomism in

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2. It has been pointed out to me that mathematics is an exception, however this brings up the issue of what are the criteria for science, and whether different "scientific" disciplines have different criteria. For example, mathematics may or may not be a science and this might be an issue of "pure" vs. "applied" disciplinary distinctions. While the issue of criteria is a natural consequence of the pragmatic-post structuralist position I advocate, it is beyond the scope of this thesis.

education and instruction, I liberally use many of Lonergan's conceptual arguments from *Insight* (Lonergan, 1970) that strike to the very heart of learning as a *creative* and developmental process. To Lonergan, learning is inextricably linked to an antecedent desire to seek knowledge, and the pleasure one experiences when understanding and meaning converge in the sudden flash called *insight.*

My introduction to Lonergan came through a very gifted and talented teacher, Moira Carley, in an undergraduate course of her own design called *The Creative Self* (Carley, 2005). This course was an introduction to Lonergan's cognitive theory in *Insight* and about the origins of creativity. The course came with a promise that at the end that we would have the tools to self-appropriate knowledge, even in spite of an educational system that tends to deaden virtually any subject. I did not realize what that would mean until about the 8th week, when I had the insight that the unusual structure of the course was to take us *experientially* through Lonergan's developmental theory of cognition.

This was life-changing in a most profound way, as the realization that my own difficulties in formal schooling were perhaps the result of emotionally impoverished psychological theories of instruction that stymied the personally creative process of learning. I immediately suspected the agenda of *content*, that we *had* no choice but to learn what was pushed on us. The emancipation from the sense that *I was not normal* for not being able to conform to what was a defective, demoralizing and repressive system, was, and is, beyond description. There was a tremendous release, as if my own imagination had been imprisoned for 25 years and suddenly set free. I speculated that perhaps the highly creative people, the ones exemplified by their profound insights that changed our perception of reality and humanity for the better, were also the ones that gave free reign to their imaginations, and typically did not do too well in the confinement of formal

education. I was considerably taken in with Lonergan's own insight, and actually went on to do an undergraduate minor in Lonergan Studies.

The grounding of my beliefs in rather non-conformist ideas was not, however the motivation to pursue graduate studies in educational technology. This decision was taken for practical and professional reasons; working as a design-based developer of information and communication technologies I was particularly sensitive to the gap between development of new technology and its adoption. I had begun to perceive this gap as more of a training issue than one of design or functionality. I was convinced that the gap had become so wide that there would be simply more opportunity in leveraging existing technology through training than there would be in making it more usable or accessible.

It is worth noting here that, unlike many of the proponents of the post-Marxist cultural studies approach, I do not perceive science or technology as "evil," but something in which its nuances must be mastered in the same way as language if one wishes to realize agency and autonomy in society. In this sense I am not an unconditional technophile to the extent that what information flows through technology, as forming our beliefs about our reality, is not regulated, controlled or dominated directionally. This is not only a question of accessibility but one of democratization of knowledge production and diversity, which invariably means learning the various grammars of technology if one wants to participate at virtually any level of culture. While I do not believe technology is neutral, neither is the language we use; giving it up would be tantamount to giving up the most basic forms of (human) social intercourse, such as speaking, listening, reading and writing. I view the denial of technology as a form of anorexia or modern monastic asceticism. The neo-luddites and the critics of technology, especially in education, take heed: your self-sacrificial devotion the purity of *langue* and *parole* is not a virtue, but rather

the denial of the pleasures of social participation, and as corollary, the pleasure of learning itself.

My entry into the world of instructional technology was a mixed blessing. On the one hand, I embraced the pragmatic approach of Human Performance Technology (HPT), in that there was a genuine sense that problems of performance were for the most part structural and systemic, and not due to the incompetence of workers that could be reflexively remedied by "training programs." Oddly, it seemed, HPT was (and is) negatively perceived as being the worst kind of behavioristic positivism, but for me it was like understanding the nuance that a bigger engine is not the only way to make a car go faster, and understanding that "better-faster-higher-longer-cheaper" are not the only criteria when it comes to "performance" (Stolovich & Keeps, 2004).

On the other hand, I was extremely frustrated with the processes of instructional design and the learning theories that ground them, as well as the remarkably unproductive and unsatisfactory quality of most research in instructional technology. Everyone, it seemed, was dissatisfied and aware of the shortcomings of the standard approaches, and this was not for a lack choice. The vast array of models, theories, taxonomies and analytical methods seemed to produce a sense of incoherence that bordered on chaos. Being rather suspicious of behaviorism and cognitivism, the alternative framework of constructivism was incoherent and vague — appearing to me as abandoning any sense of the need for getting the job of instruction done. This dissatisfaction with the theoretical foundations of the learning sciences was exacerbated by a tidal wave of academic articles and research data on the psychology of education, most of it so untenable from even the most rudimentary criteria of science, that I felt that

casting horoscopes would likely provide better explanations (with the added bonus of being much faster and cheaper).

Another deception came with "e-learning," which is for the most part an "e-llusion", or just plain "e-boring." I am referring specifically to on-screen textbook replacements that are about as interactive as the foot pedal on a kitchen garbage can (press the foot pedal to open the lid, put in garbage, repeat as needed until full). Given the difficulties in presentation consistency and a visual ergonomics that is roughly one tenth of traditional offset printing printing resolution, I find it truly amazing that the promoters of e-learning can keep a straight face when talking about it. This is not to say that computer based learning is without promise, especially in the case of simulations, collaborative and open platforms like wikis, user centric publishing like blogs or even the general accessibility of knowledge repositories and search engines like Wikipedia and Google. It is precisely these elements that are pushing forward the democratization of the production and accessibility of knowledge that are in turn beginning to usurp the traditional authoritative structures of meaning, and essentially a condition of the subject of this thesis. So there is hope, but it is coming from outside the field.

My dissatisfaction turned to elucidation when I read Jerome Bruner's *Culture of Education*, where I was introduced to the democratic principles of pragmatism, and to the theory of situated cognition and the notion that knowledge does not exist in books but is situated in activity (books are merely evidence of activity), and the idea that knowledge was not static but a dynamic and active thing. I was particularly taken with the research of Valerie Walkerdine in mathematics education, where she explained unequivocally how the problem with knowledge transfer outside the learning context was linked to decontextualized content (Walkerdine, 1997). Content preparation was always a hit-or-

miss or "best guess" proposition, or just not possible, and best abandoned for a true user-centered approach. In other words, one where the contextualization was done by the learner instead of the content or the teacher. This resonated quite deeply with my own experience as an undergraduate with Lonergan's theory of cognition.

With this in mind, I began to formulate an anti-interpretation approach to instruction, which was meant to attack the use of theoretical and exemplar interpretations as the "standard" strategy to evoke meaningful understanding in learners (which, as a central theme of this thesis, is the problem with empirically derived knowledge and empirically created instruction). The idea was to radicalize the notion of privileging the learner's own interpretation, and to take advantage of that gap instead of crushing the Self under the weight of faulty logic systems. However, I quickly discovered that eliminating epistemology was not only unnecessary but likely impossible, since the role of instruction is to recontextualize other epistemologies and not criticize them. What remained to examine the role of interpretation within the instructional process itself.

There was some promise in discovery and problem based instructional design approaches but they all seemed to fail to identify interpretation as an obstacle, let alone deal with it in a constructive manner. In retrospect I understand that the relationship between interpretation and *hermeneutical* approaches was the type of metaphysics that is anathema to the positive learning sciences. It was actually this gap that put me on the track that perhaps *interpretation* itself, as a *functional* component of learning, might be the learning science equivalent of the elusive boson in particle physics. This led me back to Bruner, who mentions the idea of Paul Ricoeur's theory of interpretive action, and on the ethical side, Richard Rorty's pragmatic critique of empirical epistemology.

The link to learning theories and instructional design might not be readily apparent other than what could be associated with a learner-centered or "constructivist" point of view in which I appear to be closely aligned. However, my critique of constructivism should convince otherwise. There is a broader agenda than what constructivism can ever hope to accomplish, as the thrust of my argument pertains specifically to the operational criteria of instructional technology and all of the epistemologies that drive it, with no exceptions for "pet" theories. It makes little difference where the goals of education originate or what tools are used, the role of epistemology as an interpretive engine plays far too great a role to be ignored.

The result of this observation is this thesis, which is an inquiry into the epistemology (or epistemologies) of instructional technology. In the chapters that follow, I will argue that in the post-analytical approaches of intepretivism, there might be a more productive solution to the theoretical and ontological arguments obscuring the primary goals of the field, which I believe (in agreement with constructivism) should be the scientifically informed heuristics for designing and developing learning activities.

Metholodogy

"The dust of exploded beliefs may make a fine sunset."[3]

—*Geoffrey Madan*

The methodology, if you can call it that, is a blend of Rortyan post-analytic (edifying philosophy) and Derridan-like deconstruction, along with some Barthian notions

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3. Madan, Geoffrey. (1934). Livre sans nom. Twelve Reflections. *The Oxford Dictionary of Quotations.* Elizabeth Knowles (Ed.). Oxford University Press, 2004.

of meaning and concept reappropriation. The result is a rather non-traditional philosophical treatise that nonetheless uses language and semantic form that should be familiar to most readers. What makes this different is that I am attempting to follow the example of Rorty's "edification" which is not about attacking the perceived "opponent" with *my* precise, logical and justifiable reason to abandon a way of thinking and replace it with something better. I tend to agree with Rorty that it is rather presumptuous to think that overthrowing an epistemology is possible. History is replete with examples of epistemic overthrow by philosophers who were considerably better skilled than myself, and I make no allusions to having the recipe for a better epistemology. I do, however think I am a fairly good *saucier* — In other words, edification is all about flavor, and the secret is in the sauce.

What the method is not, is a review of literature, nor is it the result of theoretical or methodological (empirical-scientific) observation of the current approaches to instructional technology problems. Instead, it is conversational and opinionated in a postmodern style, but not without the academic rigor of the philosophical approach known as *post-analysis*. Similar to deconstruction, in that differential analysis is part of the technique, is to approach the problems with instructional technology as heretofore not resolvable using traditional referential methods. In this sense, I do not offer a replacement epistemology (as a way to justify the observations and conclusions I present here) more than question the need for structural systems to tell us what should be believed about knowledge and skills, as well as how they are thought to be represented both internally and externally. This involves looking for the kinds of binary oppositions in the archeology of knowledge that are called for in deconstruction, but I tend to draw conclusions that are more pragmatic in terms of resolution.

The Barthian notion of meaning is to show how structures are set up to be intentionally referential and impose meaning subjectively on us without much autonomous control. Wherever useful I try and reappropriate (or rather subordinate) the meanings of several common concepts to show that it really pointless to try and constrain meanings to strict static interpretations. This is not to say that strict interpretation does not have a place, but that using a differential method between concept definitions is infinitely more productive and satisfying in the generation of ideas than just seeking correspondences that only say "Look! What I just said is really the way things are, so my theory must be really true! Really!"

There is no "official" interpretationist recipe, as this would be too constraining on the development of these types of insight. The sauce is a blend of the new school of American pragmatism (commonly referred to as neopragmatism) of Quine, Davidson, Rorty, and the French post structuralism of Barthes, Derrida, Foucault, and a little Baudrillard (for his humor). What neopragmatism and post structuralism have in common is they are non-foundational. In other words, truth is relative to a conceptual scheme (neopragatism), which is roughly equivalent to the effect of semantic and logical structures on meaning as analyzed by post structuralism. Both believe that the use of structures for knowledge has been appropriated to subjugate and control meaning through the management of externally produced interpretations. They also believe it is possible to restore the power imbalance because these structures are essentially man-made, therefore changeable. Both of these schools of thought were deeply influenced by Wittgenstein and Heidegger and their critiques of Cartesian and Kantian rationalism (as well as the more perverse interpretations of Marxism).

The two schools diverge essentially in their lineage, and this is evident in their conclusions. The neopragmatists extend from early American pragmatism (Pierce, James, Dewey), in turn influenced by the British tradition (Bentham, Hobbes, Locke, Mill, etc.). True to their lineage, neopragmatic philosophy is much more results-oriented and focused on practical change that works through the democratic principles of balance of power. The essential difference in neopragmatism is that the thinking of Pierce and to a great extent James are dropped (Murphy, 1990), as their focus on the empirical/ metaphysical debate of the late 19th and early 20th century is no longer relevant. However there is a particular reverence for Dewey (particularly in Rorty) and his focus on the pragmatics of ethical freedom and democracy (Rorty, 2006). Since there is somewhat of a revival of Dewey in the current discourse in education, the astute reader will be able to find his influences, especially in the activity-focused approach for dealing with the more troublesome problems of conceptual knowledge representation. This reflects my adoption of the belief that there should be no distinction between knowledge/activity as well as facts/values. However I feel that Rorty and Davidson refine and expand these notions considerably, therefore Dewey is not referenced directly.

I mentioned previously the influence of Lonergan. Most analyses and summaries describe Lonergan as having a strong affinity for Kant and Hegel. His emergent and immanent theory of cognition and his analytic method is clearly in this tradition. Since Rorty and many of the others that form the basis for my arguments are decidedly anti-Kantian, this may seem a little out of place. What I find interesting in Lonergan is that his hermeneutical stance and critique of rational structures is very similar to Rorty and Barthes. His notion of the "eros of the mind" (1970, p. 474) and the "virtually unconditioned" (p. 280) are inherently compatible with non-foundationalism in that the

relativism of facts is not so much to conceptual schemes but to *thinking itself* as naturally *a priori* to its structured representation. His epistemology is not to seek justification of belief in the accuracy of representation, but rather the dialectic *conversation* between the intrinsically motivated seeking of knowledge through inquiry, and the structuring of knowledge as a human and social activity. This deeply humanistic view uses a very post structuralist style for the explanation of creative insight as the source of knowledge, and to what I sense anticipated the post-analytical approaches of the neopragmatists and the post structuralists.[4]

The Problem

The main idea in this thesis is to show how instructional technology, as an applied science, has been dependent on external "empirical" epistemologies that are essentially not native to its practice. The secondary idea is to show how a naturalistic fallacy disadvantages the *design activity* of instruction through those very epistemologies. To state this differently, instructional technology is essentially metatheoretical through its activities and yet crippled by foreign epistemic constraints that says the practice must be constrained to observables.

The practice of instructional design is really about re-creating theories of knowledge and activity as instruction (or rather *learning activities*) on a case-by-case basis and in a fairly efficient manner. From a pragmatic view, this means that the pressure to produce (after all, technology is supposed to help) leaves little time to be philosophical. On the other hand, applying the standard empirical system models increases the weight

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4. This is most apparent with Jean Baudrillard (but beyond the scope of this thesis).

of front-end analysis largely as an effect of the democratization of knowledge, not to mention the difficulty in choosing an appropriate analytical approach from among the hundreds available.

The criteria for empirical instruction is so contingent on stabilizing conceptual variables that are not controllable, or too costly to control, that it would appear to have returned the field to where empiricism started. In other words, the variety of meanings and the rapidity of conceptual change means there are fewer and fewer stable points of reference with which to build instructional content. In alignment with Quine's position, empirical analysis without an archimedean point is about as productive as looking for angels or monads, therefore no better than the metaphysics that logical empiricism hoped to replace at the beginning of the 20th century.

From an empirical standpoint, the criticism is either the measuring of the wrong things, using the wrong instruments are not being rigorous enough, however the proliferation and refinement of analytical methods have yet to successfully reverse-engineer the recipe for the secret sauce. It is time, therefore, to look outside the box of empiricism, in effect to determine its limits in determining the ontological status of the categories and phenomena commonly referred to in instructional analysis.

The neopragmatic approach towards an adequate philosophy of science is not to critique epistemology in the sense that there can be a justification for knowledge, but rather to the validity and cogency of taxonomic and ontological beliefs as the basis for any research, scientific or otherwise. This approach is not only gaining ground, but many of the current advances in the natural sciences, including what Kuhn refers to as the perceptual revolutions in science (1996) are largely attributed to the need for an adequate metaphysics if the current limits of empirical epistemology are to be overcome.

Traditionally, the ways to talk about metatheory other than the immanental approach (as in Hegel and Kant) on the one hand, and in the set-theoretical approach of structuralism (as in Frege, Husserl and Piaget) on the other, do not exist other than in critique. As the neopragmatists demonstrated in a non-transcendental way, logical empiricism makes for a very weak metatheory. The post structuralists demonstrated much in the same way that structuralism was most unsatisfying and cold in not taking human agency and desire into consideration in its categorical schemes. My idea is that the neopragmatists and the post structuralists together, to form (my definition of) interpretivism, is not only the best way to talk metatheoretical, but that the parallels to the activity of creating instruction leads me to suspect there may be a new heuristic for design lurking in the background.

While my initial conclusion led me to think *analysis* is the problem, it really isn't. The problem is considerably more nuanced in that it is how the results of analysis are constrained for the purposes of expression. This is the age old problem of design in general, and this is largely a question of optics. Beliefs, taxonomies, theories, activities and methods, which are the components of epistemology as a system of representing and justifying knowledge, are like lenses that exact a price in clarity and accuracy of the source of the image when they are compounded together. Because instructional design is (roughly) an ocular reproductive system, it would be preferable to start with clear images to begin with instead of trying to correct for distortions, or trying different combinations of lenses and filters. Essentially epistemology is the extra set of lenses that are not needed in the optical path of analysis when it comes to designing instruction. When epistemology is removed from the optical path, there is less image degradation and resolving power is increased because better ideas emerge when there is more information available. It is

important, however, to understand that the systematic production of instruction benefits from optical assistance. It is simply realizing that a microscope makes a lousy tool for figuring out what to put on its own stage.

To follow through on the optical metaphor, epistemology is very much like a fancy zoom lens that was sold on its versatility, but just can't match the light gathering performance of a fast, fixed focal length lens. However instructional designers are like photographers who are always finding themselves shooting inside under poorly lit conditions and not outdoors where the zoom is ideally suited. While lighting in the form of "subject matter experts" is standard practice, it cannot compensate for having the wrong lens on the camera. The interpretivist lens has fewer elements, and the gain is like getting three or four extra *f*-stops. Not as much artificial light is needed, or extra light might not even be necessary. The moral is that instructional designers need epistemology about as much as low light photographers need a slow zoom lens.

Outline and Structure

In reference to the title, *Learning after the End of Knowledge,* this thesis is structured in two parts. The first part is an exploration of the current trends of knowledge creation and dissemination on the Internet, which links to the contemporary philosophical discourse in epistemology, and by extension, to the epistemic problems that the field of instructional technology must face. The second part develops these ideas by comparing them to the current discourse in the academic practices of instructional technology.

In chapter 1, *Knowledge Epistemology and Meaning* I introduce the concept of "democracy of knowledge" in the current context of the Internet, which includes not only accessibility and quantity, but the creation of knowledge with reference to some criteria

for quality. This sets a grounding for the identification of the overarching purpose of instructional technology as a science of heuristics. From here I define "epistemology," and provide examples from the current context, to support Davidson's claim that the traditional epistemic characterizations of "knowledge" "meaning" and "beliefs" are no longer tenable.

In Chapter 2, *The Improbability of Logical Empiricism,* I introduce the problems of epistemology through the critique of logical positivism, and demonstrate how it continues to dominate the beliefs of North American social sciences. I introduce the analytical methodology of the neopragmatist philosophers who initiated the decline of logical empiricism, and how that decline had a profound effect on all inquiry-based disciplines. I follow with a discussion on the emergence of *interpretivism* as the evolution and synthesis of American neopragmatism and continental post structuralism, and how it may help in resolving some stubborn problems left in the wake of the decline of logical empiricism.

Chapter 3 is an introduction to some elements central to the neopragmatic analytical method. I show how this involves the dissolution of classic dualisms through the use of supervenience, genealogy and conjecture. I provide an example of supervenience and conjecture in Davidson's radical interpretation and extend it with post structuralist ideas of difference and genealogy. I then propose to include conceptual schemes as the preferred unit of analysis for better defining instructional problems. Based on these distinctions, I follow with a presentation of my ideas about the fundamental problem of conceptual representation in the absence of epistemology, and how forms of expression, as determining the structure of knowledge, are essentially bimodal.

In chapter 4, *The Dogmas of the Learning Sciences,* I introduce instructional technology as essentially a field of practice that is constrained and restricted by the "dogmas" of

learning and instruction, not by epistemologies, and how the authority of educational psychology is maintained. After a detailed discussion of the dogmas, I discuss briefly the consequences of following them, which is essentially that empirical research is most unproductive when it is used primarily to justify metaphysical beliefs.

In chapter 5, *The Crisis of Discourse,* I examine the recent critiques of instructional technology from both within and external to the field. I then take a look at constructivism as a critique of positivistic instructional design, and how it essentially fails as a replacement epistemology. I account for this due to its genealogical lineage that is ideologically incompatible with the North American epistemic tradition of the social sciences in which contemporary learning theories are based.

Chapter 6, *The Crisis of Methodology,* develops and reinforces the ideas of interpretivism through crises of methodology. These are represented by the problems with goals and the incoherence of analytical and processes used in current practice. As a example of how interpretive analysis works, I dissolve the "art/science" debate of instructional design by showing how "design" supervenes on "engineering" (which is the systematic development, production and implementation of instruction). This is accomplished by showing how design and engineering have incompatible analytical needs (and to a lesser extent what drives their creativity) but depend on a transparent dialectic between them to be successfully integrated activities. I conclude this chapter with a proposal for a radicalization of design.

I conclude by drawing a parallel to another process-based design practice, commercial television, and offer suggestions for what I believe emerges from the liberation of design. I then detail a rough outline for the confirmations that will be needed to restructure the practice of instructional technology.

PART 1

THE END OF KNOWLEDGE

1. KNOWLEDGE, EPISTEMOLOGY AND MEANING

The End of Knowledge

> "The web is a tremendous grass-roots revolution. All these people coming from very different directions achieved a change. There's a tremendous message of hope for humanity in that."[5]
>
> —*Tim Berners-Lee (the acknowledged inventor of the World Wide Web)*

> "Everywhere one seeks to produce meaning, to make the world signify, to render it visible. We are not, however, in danger of lacking meaning; quite the contrary, we are gorged with meaning and it is killing us."[6]
>
> —*Jean Baudrillard*

The "end of knowledge" is a somewhat misleading title. The strategy is to demonstrate in a very simple way how interpretation by inference to a conclusion can be appropriated in such a way to create plausible explanations. For this purpose, "The end of knowledge" is a fitting-room example if one naively follows Richard Rorty's argument that epistemology is no longer a worthwhile subject for philosophers to pursue (Rorty, 1979). Since the common perception and standard definition of epistemology is the study of knowledge, or the system by which meaningful knowledge is created, getting rid of it

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5. Berners-Lee, Tim. (2002) *The Oxford Dictionary of Modern Quotations*. Knowles, Elizabeth (Ed.) Oxford Reference Online. Oxford University Press.Concordia University Library, Montreal. Accessed 18 March 2007. Originally quoted in *The Independent*, May 17, 1999. London: Independent News and Media Limited.

6. Baudrillard, Jean. (1988). Seduction, or the Superficial Abyss. In Lotringer, S. (Ed.), *The Ecstasy of Communication*. (B. Schutze, C. Schutze, Trans.). Brooklyn, N.Y. Autonomedia. (Éditions Galilée, 1987)

could mean that there is no longer any *meaningful* knowledge. What this depends on is the definition of "epistemology" and all of the categories and potential meanings that may or may not be correct depending on the context in which they are used.

Of course knowledge does not go away just because epistemologies, as authoritative or rigorous systems of truth and quality assessment, do not, under any circumstances, have privileged access to a formal reality outside of the human ability to conceptualize it. This is not an issue of whether or not there is a structure to the reality beyond our human constraints, but rather one of access.[7] The end of epistemology in this context is practically unthinkable, and while the quest for the holy grail of epistemology has abated, there is still considerable energy spent in sharpening and tinkering with the tools that have been left in the shed.

However the unthinkable is happening. Traditional authoritative sources of knowledge and its validation are rapidly losing their status as the gateway to the truth just as Roman Catholicism lost its authority as the singular channel to God in the German (and other) reformations. What is strikingly similar in both revolutions are not the iconoclastic personas like Martin Luther or Richard Rorty, but rather the technological evolution that shifted the production of knowledge and control over meaningful interpretation away from the traditional authorities. Those technological revolutions were of course the Gutenberg press that made possible the widespread distribution of the Bible, and the Internet, which democratized knowledge production and dissemination. On the

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7. This is the "non-realist" position, which states that arguing over whether or not there is a reality, or a structure to it only has a political or ideological purpose. Epistemologies just claim to have the recipe for the secret sauce. This is similar to Fine's "Natural Ontological Attitude" (1986, p. 112).

one hand there is a philosophical justification that appeals to the human spirit, and on the other liberation of production, access and use of content through technology.

The result of the cultural and social phenomenon of the Internet is that information is now ubiquitous, vast, fluid, expansive and generative. It has made information not only accessible, but in the second wave of Internet applications known as "Web 2.0," participative and collaborative.

Legions of people have rendered Wikipedia, the on-line encyclopedia that anyone can edit and contribute to, more comprehensive and at least as accurate as the traditional authorities and guardians of knowledge such as the Encycopedia Britannica. There are over 75,000 contributors and more than 5,300,000 articles in over 100 languages (Wikimedia Foundation, 2007).

Not only has Google revolutionized the way information is searched and found, self-publishing in the form of blogs (web logs) has upset the traditional conception of news and opinion as something that has value only if it is authoritative. This is largely a question of context and diversity, and how individuals and communities have the freedom to form their own criteria for what constitutes "meaningful" knowledge. YouTube, MySpace, Technorati, Flickr, syndication and other platforms have all revolutionized the way information is created and shared. This is just to say that the age of democracy of information is upon us, not just in accessibility but also in its production.

There is a good deal to say about this, but there are two things that are of paramount importance to instructional technology. The first is since the advent of Web 2.0 in 2001 (O'Reilly, 2005), the Internet has managed to accomplish what instructional technology could not do in 30. In terms of the sheer number of people who use and

contribute to knowledge for learning, as well as to the accessibility and quantity of information available, is unprecedented since the invention of moveable type.

The second is that the volume and diversity of information makes it extremely difficult to know what is accurate, true or authoritative. In effect, there are huge surpluses of information, and an explosion of meaning — and a corresponding *decline* in the value and quality of knowledge *as it is traditionally defined* — which is to mean authoritatively produced and managed.

I will argue that the first observation is a huge problem for instructional technology and the second one isn't. In both cases are perfect examples of what neopragmatists like Richard Rorty have advocated and foreshadowed for quite some time — that is, the need for authoritative systems to produce knowledge is like a crutch that the institutions of our society depends on in the reinforcement of beliefs that justify their existence. The neopragmatists believe is that authoritative structures of knowledge, which is like saying "my system for knowing and representing the truth is better than *your* system," privileges the institution to the detriment of the democratic ideal of human agency and personal meaning. What the Internet has accomplished in its current form is an unprecedented freedom to find and choose what to believe, and to even participate in the game of meaning. In the not too distant past there was no choice but to be subservient to the interpretations given in order to participate and flourish in most, if not all social contexts. That era is apparently over.

The End of Instructional Technology (as we know it)

There is no question that the Internet is having an effect on education. There is hardly a teacher or textbook out there whose authority has not been challenged by students with a bit of search engine experience. With tools like Google, it is very easy to research a subject and find alternative points of view, or more relevant and up-to-date (as in valid) knowledge. This is just to say that most instructional content and teachers are not just out of date, but can never hope to compete with the web.

The result is that the authority of instructors, subject matter experts and instructional designers, with regard to the creation, selection and presentation of content, has been seriously undermined. Of course this has not thrown educators, academics and instructional designers out of work, but the simple observation that the value of expert "content filters" has diminished greatly.

This is not to say that the Internet has not been embraced be educators as a research tool, and there is considerable room to improve learner skills in finding and selecting relevant information. There is indeed an important role for both education and instructional technology in the development of what are essentially cognitive-interpretive skills. However these skills can be typically mastered in day or a week (definitely not a year or several years). Regardless, most teachers and instructional designers have yet to develop skills at the type of interpretation that is required when there is plethora of meanings for any given content area or field of research, evidence of may be found quickly through the search bar in your web browser.

The epistemic paradigm that we know and grew up with is based on authority, and there is a sense that the learning sciences have created a dependency on empirically derived content. It is certainly easier to grab the school-supplied textbook or find an

authoritative source of information than question quality or potential value in the learning context. In other words, interpretive skills in the evaluation of polysemic knowledge are essentially lacking due to the reliance on authoritative sources. This is much more prevalent in instructional technology as the practice has not evolved sufficiently from its empirical roots, systems thinking, task and goal analyses and "observable and measurable" learning objectives of the Instructional Systems Design (ISD) model. These methods, originating in behavioral and cognitive psychology, just can't deal effectively with categorical distinctions that are foreign to its own ontological structures. In other words, the ISD model is ill-equipped to process and utilize ill-structured and mismatched data. (I will explore this in depth in chapter 5, *The Crisis of Discourse* and chapter 6, *The Crisis of Methodology).*

What is left for instructional technology in terms of what value it can bring to society is rather diminished as a result of this failure to adapt (and not for a lack of trying). For example, there will always be a need for highly specific, contextualized training, but this has never been an unmitigated success. Most organizations rarely require graduate-school trained instructional technologists for the design of course content or training delivery. Expanding outward with more holistic or systemic analytical approaches (as with Human Performance Technology) has also been lackluster, in that many other businesses and academic specialties compete for the process analyses, organizational development, improved communication and worker evaluation that is part of the comprehensive HPT model. In other words, systems thinking is not the exclusive domain of instructional technology.

The one bright spot in instructional technology is the implementation, management and use of technology in support of learning and performance (i.e.,

e-learning). However the deployment of graduate school trained practitioners is overkill as the type of skills required for these types of implementations are typically produced at the community-college vocational level, as it is with other "craft" disciplines such as graphic design and Internet programming.

While it is true that there are attempts to better adapt instructional technology to the new reality with "constructivist" approaches (I use this term loosely at this point), technologists do not appear ready to abdicate the authoritative role of content representation and rigid sequencing in favor of contextual and cognitive skill factors when they are successfully applied (Jonassen & Land, 2000). In constructivism, the traditional behavioral and cognitive attributes of designed instruction, including the instructional goal and selection of content, are largely under user or collaborative control.

While the goals of constructivist instructional design are laudable in the sense that greater learner autonomy and less dependence on formal structures for learning are central themes, the content problem just won't go away. Even when following the constructivist ID example, designers still need to be good interpretive content presentation experts, and need more than ever critical skills in the evaluation of information and how it is produced. In the age where meaning is relative to cultural and social contexts, the idea is that there is a need for good *epistemologists*, in other words people trained in the methodologies, justifications, and representational practices of various systems of knowledge production, and therefore capable of negotiating meaning successfully, is perhaps more important than the cognitive and behavioral specialists that are produced today.

While this might seem to be a rather harsh depiction of instructional technology, it is important to keep in mind that knowledge content and context is not everything. In

other words, instructional technology is not just a knowledge game but one of motor and cognitive skill development as well. However if the mutual dependence on motivation, attitudes, knowledge and skills is true, then it is possible to say that any method of instruction cannot evade the fundamental problem of appropriate content, regardless of the instructional approach or the theory that informs it.

Ultimately the problems that are solved are not content or activity selection problems, but are problems about how instructional technologists create heuristics for problem solving in general (Jonassen, 2005). This "classic constructivist" view stems from the idea of knowledge-in-use, which can virtually always be defined (from the perspective of inquiry) as the solving of a problem. However it is important to emphasize that problem solving is much more than "how-to" instruction, and includes things that normally invoke a goal or seek resolution of some kind. In this sense problem solving can be highly internal to the task at hand. This is to say problems are stated in terms of "content specific," "complexity," or "domain specific" (ibid). As I will discuss in the second part of this thesis, one must take an ontological position to correctly identify problem solving elements, in that they may mean different things depending not only on context, but the perspectives of the learner as well as the instructional designer, and to the extrinsic goals that drive the desire to resolve problems.

These perspectives lead to fundamentally a question of how to manage competing beliefs as a strategy of any heuristic solution. This is not only about better problem definition but about gives value to its resolution. In this type of analysis, the polysemy of beliefs and meaning is a *problem* if the goal is to reach a consensus about instructional value, but presents a *different problem* if the instructional goal is to understand the origins and justifications for having certain beliefs. Each of these problems suggest different

criteria and interpretations for problem solving analysis (as I will demonstrate in Chapter 6, *The Crisis of Methodology*).

The Problem of Solving Problems

The ability to solve problems is not only a matter of identification but especially one of definition. In other words, to define a problem requires an adequate conceptual framework that defines criteria for the meaning of certain words or phrases. All words have multiple meanings, so there is always a risk of misinterpretation, therefore a sufficient amount of contextual information and explanation must be provided. Evidence is also important for solving problems in that information is provided either to support or instrumentally indicate that a problem exists relative to the conceptual framework. There is a risk of misinterpretation here as well (I elaborate on this fully in chapter 3, *Neopragmatic Conceptual Schemes,* and touch on it again from a practical perspective in chapter 5, *The Crisis of Discourse*).

Next, there is the prescription that will be used to solve the problem, which includes choice of methodology. Finally there is the implementation and measurement of results in order to determine if the problem has indeed been solved. Each of these steps also have interpretive risks, such as in the selection of a methodology, whether or not the methodology itself is interpreted correctly, in the creation of solution specifications, deciding what is to be measured and whether that is done correctly, and finally the interpretation of the results. (This is explored deeply in chapter 6, *The Crisis of Methodology*).

If correct problem identification is at the root of problem solving, which appears to be plain common sense, then misrepresenting things conceptually or evidentially through misinterpretation usually cannot be subsequently corrected by other parts of the

problem solving process. Any given methodology for solving problems is primarily about processing tasks internal to it, with the assumption that categories and the ontological status of its parts are well defined. In other words, processes do not ask existential questions. This must be done outside the process itself.

The issue is that processes tacitly represent categorical and ontological distinctions whether or not they are valid. If these distinctions themselves create the perception of *existence* of problems, this evolves into their acceptance and belief. If the problem solving structure (the process definitions and the process itself) is faulty, then it should be fairly obvious that the process of solving the problem will be ineffective. This can even be a matter of perceiving a problem where none really exists. While this may seem somewhat opaque, the point is that the assignment of process categories and the ontological status given to what is input into the system for processing, is essentially a metaphysical exercise. (This will be explored fully in the next chapter, *The Improbability of Logical Empiricism*).

The Problem of Data

Structures, systems, methods, instruments, processes or virtually any form of intentional activity not only depend on "raw" data for input, but use frameworks to interpret that information to mean something that is relevant to the activity, or to discard it. This is the problem of judgment, or what is believed to be true about data. This is not just a question of wise experience or the reality of a given situation, but also what other people and groups believe to be true about it. What is particularly difficult to ascertain is how other people and groups *qualitatively* arrived at their beliefs about data, and how *they* justify them in the creation of structured knowledge. However, the general assumption is

that *knowledge* about data is retained, and that it has value for intentional problem-solving (or to be more precise, goal-seeking) activities.

The validity of data is typically something of value in the solving of problems, which means that there must be a belief in the validation system if it can be reasonably thought to contribute to a certain goal. But if the conditions or the criteria were not known in the evaluation and selection of data, the utility of the resulting knowledge is highly questionable and the validation process is of little use. So the problem of solving problems is not only about valid data, but also beliefs about what phenomena the data represents, once validated, when one does not have direct access to verify for themselves. This is a simple illustration of what epistemology does, which is to be a reliable proxy to direct verification.

What I have been leading up to is this: The problem with problems is epistemological in the sense that *knowledge* contributes significantly and is used widely to solve problems in the empirical tradition. However if there is a lack of transparency and consciousness in how data is collected and how knowledge is produced and interpreted, the risk of making mistakes when solutions are applied are unavoidably big.

In summary, what can be said about epistemologies is that they are good for solutions but not terribly effective at problem definition due to their restrictive ontologies.

Since instructional technology is essentially in the business of supporting and improving the performance of goal-seeking (problem solving) activities, it is doubly crucial to get the content component right, therefore good operating definitions and the limits of epistemologies need to be known.

Defining "Epistemology"

> "One cannot explain words without making incursions into the sciences themselves, as is evident from dictionaries; and, conversely, one cannot present a science without at the same time defining its terms."[8]
>
> —*Gottfried Wilhelm Leibniz*

Generally, epistemology is defined as the study or theory of knowledge. But what does that mean, exactly? Is it something vague like the "nature..., possibility, scope and general basis" (of knowledge) (Hamelin, 2005)? Or is epistemology about how to arrive at truth, beliefs and value, as these things appear to be inextricably linked to knowledge?

The history of epistemology, (at least since Descartes), would indicate that these are all facets of foundational philosophy as the activity of epistemological inquiry distinct from science (Rorty, 1979). The project of philosophy, therefore, is to question whether or not there can be justified beliefs in the existence of the various aspects of knowledge, for what, if not that knowledge is used, *invalidated*, in the vast majority of intentional activities of society on a daily or even hourly basis.

What can be said about epistemology from this rationalist-cartesian tradition is that what is known is *reasoned*, which is to mean that there is an internal, mental process for coming to know. This notion implies the quest for knowledge (or inquiry or curiosity), as the *foundation* for knowledge, in that some internal act of perception, combined with some kind of external confirmation, makes knowledge possible (Lonergan, 1970, p. 322-324). This is just to say that knowledge is thought to be created (some believe developmentally and incrementally) in the mind by way of reference to externals. These

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8. Leibniz, G. (1765) *Of the Division of the Sciences*. Book 4, Chapter 21, in New Essays on Human Understanding, trans. and ed. Peter Remnant (1981), p. 522.

externals can be direct experience or other people's knowledge in myriad forms of expression. (I will elaborate this idea further in the section Ontological Modalities in chapter 3, *Neopragmatic Conceptual Schemes.*[9])

This rationalist definition of epistemology is the study of how knowledge is created and represented internally, as well as how it is structured and represented externally. Richard Rorty defines it this way:

> To know is to represent accurately what is outside the mind; so to understand the possibility and nature of knowledge is to understand the way in which the mind is able to construct such representations. Philosophy's central concern is to be a general theory of representation, a theory which will divide culture up into the areas which represent reality well, those which represent it less well, and those which do not represent it at all... (1979, p. 3)

Aside from the cultural concerns of philosophy, the definition of epistemology as a "general theory of representation" of both social and cognitive domains sounds like instructional technology as well as the psychological and sociological theories and research that informs it. It could even be stated that the "mission statement" of instructional technology is the desire to develop successful methodologies to negotiate between the social and cognitive domains.

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9. This is actually the inverse of the structuralist view, that states roughly that external structures are mapped to internal ones, and I accept this view. However the absence of an account of the origins of ideas and insight as an a priori internal process in structuralism is in large part the post structuralist critique. Rorty's idea is that epistemology can be removed without any negative effect to the cognitive structure, and this is merely a question of moving the *justification* for knowledge from the internal to the external (Rorty, 1979, p. 210). This idea appears to resolve what I perceive to be the most troublesome aspect of constructivism (justification for the ontological status of *structures* by the positive mapping of the mind to external structures).

The End of Epistemology

What is particularly stunning in Richard Rorty's *Mirror of Nature* is that he believes that the search for or the use of these types of theories are "seriously misguided" (1979, p. 7). In other words, like Wittgenstein and Heidegger who inspired him, the abandonment for the search for an ideal all-encompassing or foundational theory of knowledge just creates more problems than it could hopefully solve. There is simply no foolproof way of knowing how and why *the way we know* is the *right* way.

Simply, the problem of epistemology comes down to being unable to escape from the constraints of description and knowing that the very nature of representation is imperfect due to very human limitations. In other words, it makes about as much sense to continue to believe that someday there will be a foolproof method to make knowledge commensurable, and to know the true essence of reality by way of continuous refinement and tinkering with our instruments and our representational structures. This is, in a nutshell, what Rorty means by the "Mirror of Nature" (Rorty, 1979).

Up until recently, giving up an epistemic approach was considered heresy to the empirical social and natural sciences, as their very existence as *authorities* in their subject domains literally depend on it. In effect, to scientists, epistemology is the heart of the scientific enterprise.[10]

This is really a dependence on statistical methodology, where it could be argued that there is value in statistical inference if one adopted a belief in the subjective nature of

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10. I like to think of epistemology as the digestive system of science, rather than the heart, as it takes food and breaks it down for valuable nutrients, and excretes the rest as what Lonergan calls "empirical residue" (Lonergan, 1970, p. 25). Following this metaphor, Rorty's idea of philosophy or science not needing the crutch of epistemology is a bit like trying to convince carnivores to become vegans.

inquiry, as with postempiricism (Smith, 1993, p. 63-64), or limited the scope of generalizable results, as with critical inquiry (p. 112-114). Regardless of whether "truth" is relative to a particular context or use, the accuracy of truth claims can never be fully realized. What happens is that the strategy of the continuous revision of truth claims to increasingly local contexts is like painting one's self into a corner — eventually you run out of space to stand and the freshly painted floor must be smudged in order to get out of the room.

The Intersection of Beliefs and Knowledge

The confusion, it seems, is that getting rid of an idealist sounding epistemology as described here, does not mean getting rid of justified beliefs or knowledge. In other words, beliefs are really not the same thing as knowledge, but are often thought to be. One of the reasons why is that the authoritative methods of knowledge production are relatively less fallible than personal ones. Essentially this is the idea that "many heads are better than one," the division of labor, and the establishment of criteria that can be judged by a larger number people who may not be emotionally involved. Historical precedent, productivity or success in prediction, judged by so-called experts who have dedicated their lives to understanding phenomena or behavior, all represent the data by which epistemic criteria are developed.

All of these factors (and I may not have been exhaustive in my description) as well as the proclamations of experts, can become effective substitutes for beliefs, as there is seldom time or access to the resources, instruments, expertise and other tools that are used in the interpretation of data, or in many cases even access to the data itself. In other

words, the naive acceptance of the production of knowledge, along with meaning in the form of interpreted data, comes from voices that we have learned to respect.

While the intent to carry on the practice of confirming theoretical propositions may have an honest intent, the result is that a successful confirmation of theories becomes the basis for belief only if the theories premises, or the conditions that validate theoretical hypotheses are accepted. Meaning is derived from the relationship to the presentation of data that supports it, insofar that it resonates with previously acquired conceptual models. This is not much different than other methods of generating meaning in that a belief is stated, and inference is drawn from a selection of experiential or existing data.

A good example of how this works is how correlational or inferential conclusions in empirical research identify potential problems that are often generalizable and become incorporated into the cultural zeitgeist, like exhaust gases and global warming, or cigarette smoking and cancer. In both cases there are clear correlations and trends that can give us motivation to do research that demonstrates the the effect of CO_2 on the retention of heat in the atmosphere or tar on lung tissue, to lead us to the confirmation of beliefs. However the result is that entire domains of human activity become dependent on the truth value of these conclusions, when there are any number of undiscovered variables that might give stronger explanations.[11] It is in the *ontologies* and the *categorical distinctions* of classification that beliefs are implied, in that the *status* of what exists or does not exist are inter-related to a great degree, to the epistemology. What happens is that the belief in the empirical reality (the one that is directly experienced) becomes contingent on

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11. This is quite common in medicine, where, for example, stress was thought to cause ulcers when it now generally accepted to be the common pathogen Helicobacter Pylori (Ahmed, 2005), or the link between inflammatory diseases and eicosanoids, where their extremely short half-life and cellular locality resisted discovery until the 1980s (Flower, 2006).

explanations, which are themselves contingent on the ontological status of their conditions (or underlying mechanisms), and not to the reality itself. This is essentially Quine's argument, in his critique of logical empiricism (Quine, 1951).

From this characterization, it is possible, therefore to say that Davidson is perhaps correct in suggesting the link between knowledge and belief is very fuzzy and should perhaps be dissolved (Davidson, 1984a). Essentially, the creation of beliefs does not depend at all on an epistemology, but epistemology is often misused to justify beliefs in things that don't really exist. This is essentially the justification for the elimination of epistemology, as the belief in the dualism of knowledge and belief is one of the key reasons why epistemologies are created in the first place. If there is no distinction, which is to say that to have knowledge is to have a belief, there is no need for an apparatus to refine it. This is, essentially the link to *meaning* — as the intersection of the beliefs and knowledge. Meaning is merely how beliefs *or* knowledge are justified, and a perfect example of how the knowledge/belief dualism is not tenable.

The Two Methods of Generating Meaning

> "The marvellous thing about a joke with a double meaning is that it can only mean one thing."[12]
>
> —*Ronnie Barker*

The two principal *epistemic* methods of meaning generation are scientific and metaphysical. By scientific, I mean the various epistemologies of science that are devoted

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12. Barker, Ronnie. (1977) *The Oxford Dictionary of Modern Quotations.* E. Knowles, Ed. Oxford Reference Online. Oxford University Press. Concordia University Library, Montreal. Accessed 18 March 2007.

to reliability of explanation (and prediction) and the validity of methods that are verifiable from experience. Metaphysical beliefs are those with no recourse to disprove them, therefore it is largely a matter of faith, history or naive confirmations that they become meaningful.

Often, there is no recourse to knowledge about things which there is no way of confirming directly, such as what happens after we die. To metaphysicians these unanswerable questions are the types of questions that naturally come up about existence, therefore are valid questions. For example, law and judgment of crime is largely a metaphysical exercise as it is virtually impossible to define scientifically the notions of "good" or "bad" that obtain across fields and communities of practice.[13]

There are two observations that can be made about the generation of meaning through external representation. The first is that rhetoric, or the logic of language, is used in both empirical and metaphysical epistemologies. This is accomplished by the use of a semantic logic, that argues for conditions to be met for a statement to be considered true. Arguments are therefore a question of convincing or eliciting agreement on the *relative* conditions and their relationship to an explanation in order to accept the truth about it. This is just saying that "the way things are said is more important than the possession of truths" (Rorty, 1979, p. 359).

The second observation is that beliefs are always present, and it is just a question of the priority given to them in the overall scheme of an epistemology. For example the emphasis on methodology often obscures or renders opaque some pretty sketchy beliefs,

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13. This has not stopped some brave souls from trying, like Bentham or Mill's utilitarianism (good = pleasure and bad = pain) (Slote, 2005). However in modern times legal questions and jurisprudence are largely considered a matter of community standards and the collective choice of beliefs that form the social and political identity of nations and states.

and believing in methodological results is a subtle persuasion that the sketchy conditions are really true. In this case the priority is not on the a priori beliefs, but on the epistemic method to infer belief, such as in the belief that statistics is a respectable enterprise.

Despite the rhetorical characterization, epistemology constrains, yet at the same time cannot accommodate all phenomena, therefore what it can produce in terms of meaningful belief statements is restricted (ibid., p. 315). This has not gone unnoticed by groups and individuals with political agendas, as the epistemic structure and its logic can effectively pervert antecedent beliefs by shifting the focus to other forms of persuasion.

The main thrust of the neopragmatist argument (the one that precipitated the demise of logical empiricism), is that metaphysical beliefs cannot be eliminated from an epistemology. This is a notion that was brought forth by Quine (1951), and Davidson, (1984b). The main addition by Rorty is that the inverse is true: epistemologies as *truth and meaning-generating systems of belief* can be eliminated, and this may in fact be desirable (Rorty, 1979, p. 357).[14]

What worries Rorty is that it is very hard to break the old mold and way of thinking about knowledge, in that philosophical arguments were based on the "smash and conquer" method for the problems of any given epistemology. His emphatic and repeated insistence is that there is no solution to offer.

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14. While Rorty calls this underlying metaphysics "hermeneutics", which is used, I believe, to avoid a negative association with other philosophers calling for a return to Platonic, pre-Kantian metaphysics. In the same vein, I am avoiding the word "hermeneutics" as I am concerned about the current use of the word in curriculum studies, which is a project to replace logical epistemologies with narrative ones (Gallagher, 1992). Instead, I prefer to refer to this as "interpretationism" as something that can't be as easily mistaken. I also refer to the belief layer as "ontology" as this appears to be compatible with its current use in cognitive science.

This is because the problem is like trying to identify problem solving itself as the problem, and that a better theory about problems that will tell us how to solve them is needed, which in turn requires its own meta-theory about the problems with the problem-theory, and so on, in an endless game of king-of-the-mountain. This is also the problem of infinite regress (which I use to illustrate the problem of modeling processes in Chapter 6).

Rorty states simply that this sort of nonsense can be surpassed with a more humane and gentle approach by stopping and realizing that there are

> more important (things to do) than, offering accurate representations of how things are. It is more important because the notion of 'accurate representation' itself is not the proper way to think about what philosophy does....this is not because 'a search for accurate representations of [...e.g., 'the most general traits of reality' or 'the nature of man']' (sic) is an *in*accurate representation of philosophy. (1979, p. 371)

Those "more important things" are essentially *how* knowledge is used and *how* others are *edified* as opposed to arguing who is right and who is wrong (ibid).

I am essentially arguing instead that empirical methodologies are not needed to determine instructional content as much as there is a need for better optics. This can be had for little or no cost because it is essentially getting rid of something as opposed to replacing it with an alternative that will prove to be just as resource-hungry as the current one. The issue, in effect, is the dependence on the empirical, post-empirical and structuralist epistemologies that some instructional technologists believe are essential to their practice, and how to break the habit.

These epistemologies are all remnants of logical empiricism, which, as I will show in the next chapter, provides an interesting historical illustration of how underlying metaphysical beliefs won't go away even if you try really, really hard.

2. THE IMPROBABILITY OF LOGICAL EMPIRICISM

"When you have eliminated the impossible, whatever remains, however improbable, must be the truth."[15]

—*Sir Arthur Conan Doyle*

"Ninety percent of the game is half mental."[16]

—*Yogi Berra*

To better understand the role of epistemology in the field of instructional technology and the problem of solving problems, some background of the origins and cause of contemporary debate is in order. This may be found in the history of the rise and fall of logical positivism (or more accurately and hereafter referred to as *logical empiricism).* There are remarkable similarities between it and the psychological behaviorism still prevalent in instructional technology. There are important parallels and influences between this history and the emergence of scientific epistemologies as adopted by the learning sciences, specifically behaviorism, cognitivism and constructivism.

The goal of empiricism, and its refinements in logical positivism by Rudolf Carnap and other scientists of the Vienna Circle, was to circumvent the impossibility of confirmation and to eliminate metaphysics (Carnap, 1996). The strategy was simple: two separate classes of statements. These were fundamentally *theoretical* statements and observational statements. Briefly, the difference is that observational statements are

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15. Conan-Doyle, A. (1890). *The Sign of Four.* Chapter 6 in *The Complete Sherlock Holmes.* London: Penguin. pp. 111.

16. Attributed to Yogi Berra's commencement speech to the class of 1996 at Montclair State University, Montclair N.J.

rudimentary subject/predicate sentences with a single verb, subject and predicate, like "the cat is on the mat." Theoretical statements, on the other hand, are what are conceptualized as logic arguments in the form of if...then statements, with the "if" statements being the conditional premises and the "then" statement as the conclusion (this simply means that theoretical statements are tentative and observational statements are not). What was essential to logical empiricism was the belief in arriving at conclusions that did not require conditions, because they were observationally deemed to be true. What this meant was that a theoretical statement must be constructed in such a way that it is itself not an observational term and vice versa (White, 1996). Carnap fully understood the implications of this distinction, but felt that principles of verification, as in rigorous methodology, a formal logic, rules of correspondence and a restricted observational language, would be a hallmark of scientific inquiry (Davidson & Hintikka, 1975).

The idea driving Carnap and others of the Vienna Circle, was to deal with the sloppy science, charlatanism and scientism that couched metaphysical beliefs in theoretical and observational language through faulty logic,[17] in effect, to distinguish between science and pseudo-science. Carnap quite rightly deduced that the difference between unscientific explanations and scientific ones was not just a question of observational verifiability of explanations, but also of the *conditions* that made explanations possible. As Carnap understood, theories built on metaphysical conditions, essentially those that are not verifiable, could not, through a system of inductive logic, produce valid

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17. A good example of how this works is with scientific creationism, which seeks to discredit Darwinism through a modified positivist critique on the one hand, and empirical "evidence" for a literal interpretation of the book of Genesis in the Old Testament of the Christian Bible. An excellent discussion that brings into sharp focus the need for valid criteria of science can be found in (Kitcher, 1982).

observational statements. How this works is simple enough: starting with an observable phenomena and working backwards to its conditions, it could be possible to test for truth with probabilistic inference (statistical logic).

This system could, for example, discern between a theoretical physics that appeared to make metaphysical assumptions, such as the existence of electrons, which were not directly observable (Popper, 1996), and bogus theories like phrenology.[18] Carnap believed that logical-syntactical analysis could identify a metaphysical statement insofar that it is possible, through empirical verification, to determine if a metaphysical statement is meaningless (Sarkar, 1996, p. viii).

This new scientific method would serve to separate the wheat from the chaff, so to speak, and satisfy a rigorous criteria for scientific theories that could withstand attacks from metaphysicians on the grounds of verifiability of unobservables, which became the key criteria for verificationism. These criteria included the methods of induction required for theoretical statements (hypotheses), and the method of reduction required for observational statements (assumptions about what exists). In other words, a good scientific theory follows clear rules of logic to generate hypothetical observations that can be verified, and by working backwards, statements of fact can be logically reduced to the observable conditions, stated or not, that make them possible (Popper, 1996).

The bonus provided by the logical-empirical system was that science had the freedom from metaphysical doubt in three important areas of activity of science, including a method of revision and correction. These were the ability to generate productive enquiry from properly constructed hypotheses, from observational statements,

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18. Phrenology is the study of the shape of the human head and its irregularities to determine character and intelligence.

and from ongoing critique and refinement of the logic. Now that's a well-constructed epistemology!

Hypothetical construction, in particular the kinds found in theoretical physics, requires not only a rigorous system of inductive logic but also must account for probabilistic phenomena. The reason for this is simply that testing hypotheses for things that are not accounted for can be a hit-or-miss proposition. Logical empiricism provides a form of abductive logic, based on statistical probabilities, that allows complex hypotheses and experimental methodologies to provide meaningful results. This is heuristic in the sense that it may not be known what variables need to be controlled, and where trial and error may not be practical or cost effective. In other words, logical empiricism was a reliable scaffold that could make predictions about the existence of underlying and invisible phenomena and mechanisms, and progressively narrow research programs towards verifying their existence. With this method, it was not necessary to provide an account for unknown or unforseeable variables, in that making hypothetical "mistakes" did not mean that experimental results were scrapped or theories invalidated. Instead, mistakes and invalidation provided valuable information that opened up new avenues for inquiry, allowed for the revision of hypotheses and experimental procedures and even theories themselves.

Simply, logical empiricism could expedite the process of scientific inquiry, expand output and continually improve quality and reliability of theories as an epistemic system. In all, a compelling package. So much so that its proponents in the Vienna Circle believed that they had developed the system that would unify science (Carnap et al., 1970). This unification implied other disciplines that appeared to fit the same mold, in that behavior could be quantified, insofar that statistical methods could bring about the

coveted observational statements. The logical first step, and a most interesting development was that the "indeterministic" social sciences of that era could and would adopt this epistemology.

Logical Empiricism in the Theoretical Social Sciences

The "social sciences" are defined traditionally as the group of disciplines concerned with the study of human behavior. The key fields are sociology, psychology and anthropology insofar that they define the dimensions of human existence as external relationships, internal conditions and the history of both, respectively. Further categorical distinctions include (but are not limited to) economics, political science and geography (Hollinger et al., 1998).[19]

The procedure to apply logical empiricism to the social sciences seemed superficially straightforward. First, all metaphysical explanations and theories, in what is called the doctrines of historicism (Popper, 2002), could be swept aside. These were the explanations of human behavior that were based in tradition, or as being rooted in cultures impoverished with respect to the advanced scientific methods and instruments of the day. With a clean slate, it would be possible to observe phenomena and reductively create objective taxonomies, which became the defacto "analytical" statements once

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19. Recent definitions and categorical distinctions, such as in the 2001 edition of the International Encyclopedia of the Social and Behavioral Sciences (Smelser & Baltes, 2001), appear to recognize the critique of logical empiricism through a considerable broadening of what might be included as a social science. For example, the list of disciplines in the encyclopedia is quite extensive and includes History, Linguistics, Philosophy, Science and Technology Studies, Environmental Studies and Urban Studies, to name a few (xxxix-xlv). It is not clear, however if it is the changing definition of "social science" to mean "not necessarily empirical," that warranted these inclusions or if simply a desire to call anything related to human activity as a social science. The justification for the inclusion of non-empirical and interpretive disciplines

experimental and observational agreement could attest to their observational reliability. With these taxonomies in place it would be possible to create hypotheses that could either predict or explain behavior or occurrence. Then, with a growing web of reductively generated and scientifically verified conceptualizations, it would be possible to build models that could inductively show all of the important variables that contributed to larger groups and to even generalize certain types of behavior across fields.

Almost like magic, statistical analytical methods could reliably identify variables in opaque and complex systems, study their interactions and even make predictions of conditional occurrence (correlation) and then on to elaborate causal models (e.g. General Systems Theory of Bertalanaffy and the cybernetics of Von Neumann and others).

Even poor diagnostic results in the social sciences, such as with economics unable to predict the movement of markets, did not deter this conversion from continuing. There was faith that this logical scientific methodology would assist in making the necessary theoretical and taxonomic-conceptual rationalizations and adjustments. There was an admission that social science was young and there was a lot to learn in determining what was coherently true, and these types of pragmatic admissions added credence to the value of this approach. It was believed that increasingly sophisticated models and analytical and statistical methods could render higher resolutions, just like a microscope, to provide new data to feed back into the system in order to improve it. It was definitely better than the

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such as History, Law and Religious Studies (!) appears to be the intersection of these disciplines with the traditional rubrics. The result is no less than 37 categorical distinctions. The introduction continues to add TWO MORE categories, "Modern Cultural Concerns" and "Integrative Issues and Concepts" (in terms of scientific criteria this is not clear). It would appear that "social science" has come full circle and should simply be called the "humanities." Either way, the ideas of the empiricist unification of science as well as the emergence of the post-empirical problem of criteria in the (sic) social sciences appears to have been completely lost on the editors of the encyclopedia in their distinctions.

old system of explanations that refused to let go of superstitious beliefs, in spite of the "empirical" evidence to the contrary. In all, there was not much not to like.

Logical empiricism was so promising based on how well it obtained results, and appeared to be so flexible and adaptable, that one by one the social sciences of psychology, sociology and anthropology fell under its spell.

Logical Empiricism in the Applied Social Sciences

There are two main distinctions in the social sciences that follow roughly how explanations might be applied. These are psychology and policy (Putnam, 2002). While this may seem odd at first glance as "policy" is not a discipline and "psychology" is, the sense that psychology (not the theoretical discipline) has just as broad an application as policy type disciplines, is easy to discern in what is known as "descriptive" and "prescriptive" theories. For example, as an applied social science, the definition of instruction is about behavioral and cognitive change of individuals through the application of the principles of learning (Driscoll, 2005). On the other hand, social science of politics or sociology do not intervene directly with their subjects, but rather inform and influence policy decisions that in turn effect change. The simple way to conceptualize this distinction is to remember that the social sciences are primarily about the study of behavior, therefore any application of the science is generally about *changing* behavior. On the one hand changing individual behavior will have an effect in social behaviors, just as the assumption is that changing social behaviors can be done structurally and without direct psychological intervention through policy decisions.[20]

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20. This is not to say that mass media and other "distractions" (such as drugs, gambling, professional sports, etc.) do not condition social behavior by psychological means.

The principle of abductive logic can be further illustrated with how psychological and political behaviorism were systematized. In the political sense, any theory depends on rather complex structural descriptive models and it is generally agreed that it is nearly impossible to apply global systemic change (Rosenberg, 1998). The approach is to influence systemic change through the manipulation of parts of the system, such as raising interest rates to control inflation.[21]

In the psychological sense, theories recognize the near impossibility of representing individual behavior as a system in its own right, but agree that behavioral change techniques can be applied systematically. The approach is to change internal characteristics through a behavioral modification *system*, such as a high school algebra course. The application, in this case, is to create internal change based on criteria that includes determining and comparing the psychological characteristics of individuals with and without skills in algebra, then prescribing a system that will fill the gap by means of suitable stimuli and reinforcement.

The Philosophical Critique of Logical Empiricism

After about 30 years the edifice of logical empiricism began to show signs of wear and cracks in its foundation. This indicated that it could not stand up to both harsh environmental conditions and the weight of its own structure. There were growing suspicions that its own success and growth, just like any other technological industry started consuming resources, and was changing the epistemic environment in potentially

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21. The application, in this case, is to create a policy based on criteria for inflation that includes an expansion of the money supply that is not directly proportional to productive output, and to a future value of labor that is speculative and unrealistic.

harmful ways. This largely took the form of explanations and theories that were highly improbable and starting to seem a lot like the metaphysics that logical empiricism opposed (Hempel, 1996).

Martin Heidegger puts it this way:

> The sciences will interpret everything in their structure that is still reminiscent of the origin from philosophy in accordance with the rules of science, that is, technologically. Every science understands the categories upon which it remains dependent for the articulation and delineation of its area of investigation as working hypotheses. Their truth is measured not only by the effect which their application brings about within the progress of research.
>
> Scientific truth is equated with the efficiency of these effects.
>
> The sciences are now taking over as their own task what philosophy in the course of its history tried to present in part, and even there only inadequately, that is, the ontologies of the various regions of beings (nature, history, law, art). The interest of the sciences is directed toward the theory of the necessary structural concepts of the coordinated areas of investigation. 'Theory' means now: supposition of the categories which are allowed only a cybernetical function, but denied any ontological meaning. The operational and model character of representational-calculative thinking becomes dominant. (p. 58)

Heidegger, along with Wittgenstein, showed that the battle lines were not necessarily drawn between ideological camps that had the soft instrumentalism and materialism of Marxism pitted against the more functionalist naturalism of western capitalism. While each camp was intent at slinging mud at each other, there was growing realization that the interpretations produced by their viewpoints seemed to be increasingly dogmatic. At the same time, within theoretical physics, a debate was raging over realism that was induced by the Copenhagen interpretation of the quantum theory

(Fine, 1986). The synergy of these philosophical debates fostered a growing sense that the plan to eliminate of metaphysics might not so easy to accomplish.[22]

The watershed moment came with *Two Dogmas of Empiricism* (Quine, 1951). The article avoided the standard critiques of analysis, methodology, logic or induction, and instead focused on the analytic-synthetic distinction. The brilliance of Quine's argument is that he used the same analytical logic as the logical positivists to test not just its theoretical constructs but *the entire system* as a replacement epistemology for philosophy. This was all done without recourse to the old saws of metaphysics and phenomenology or calling for the return to the classics. Instead, and possibly inspired by the debate over realism in physics, Quine showed that foundational assumptions in *realism*, which states that the distinctions made by empirical methods about our physical reality really do exist, is simply not tenable (p.20). Since the notion of the analytical statement, which is to say a sentence that is true without conditions, is dependent on the notion of a reality that is not dependent on our ways to describe it. In other words, that the physical reality is really the way we perceive and attempt to describe. While the realism debate is still raging in one form or another, the simple truth is that there *might be* a reality as perceived, but there really is no way of getting outside of the fallible human sensory and descriptive apparatus to be *absolutely* and *unequivocally* certain.

While Carnap admitted that an independently verifiable reality was inaccessible, he believed that it was possible to get close enough to it with a combination of logic, statistical inference and a reduced "observational language" (p. 23). This was anticipated

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22. For an excellent overview of the rise, fall and aftermath of modern empiricism, see (Sarkar, 1996). Much of the history presented here is derived from this work and I paraphrase it liberally.

by with Quine's second "dogma," reductionism (p. 34). This was simply that it is not possible to arrive at the analytical statement, that is to have a simple subject-predicate sentence that cannot be reduced further. Essentially any statement is the product of an historical ontological framework, and even with a reduced "sense-datum language" (p. 36) as proposed by Carnap, is fraught with metaphysical assumptions about the logic of semantics and symbolic notation. These in turn could be disassociated with the idea of social construction and the requirement for a consentual "verification theory of meaning" (p. 34). In other words, theories built on so-called analytical statements might be able to produce reliable and predictable observations, and even help in discovering the types of hidden variables and properties that appear to be causal for certain types of phenomena, but are essentially ontological distinctions that are obscured from view.[23] What this means is that reduction does not stop with the premises of theories but continue on to the vagaries and metaphysics of ontology that are antecedent to both explanation, theoretical statements and observational statements.

The effect of *Two Dogmas of Empiricism* was dramatic. Since part of the project of logical empiricism was to quash classical metaphysics rooted in platitude and religious dogma, the worse possible insult was to call it dogmatic. In a very short period of time, metaphysics and ontology were legitimized and philosophy of science was resuscitated. Popper was able to refine his criteria for scientific theory and methodology with his refinement of scientific falsificationism from the naive verificationism used by the logical positivists (Popper, 1996), Kuhn could show how ontological paradigm shifts were responsible for scientific revolutions (Kuhn, 1996), and Feyerabend could show how the

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23. Lonergan calls the analytic statement "virtually unconditioned" (1970).

creative act of scientific discovery such as Einstein's special and general theory of relativity depended on ontological reassessments of time that could not have been produced by a scientific epistemological method (Feyerabend, 1988).

The Emergence of Neopragmatism

The decline of logical positivism also brought about the emergence of a new kind of analytical pragmatism, or what Hildebrand calls "linguistic pragmatism" (Hildebrand, 2003), characterized by the writings of Donald Davidson, Stanley Fish, Hilary Putnam, but most strongly identified with Richard Rorty. These philosophers, also inspired by Wittgenstein and Heidegger, took to Quinian antidualism with a vengeance. What distinguishes neopragmatism from its predecessors, according to Hildebrand, is that neopragmatism eschews foundationalist and pointlessly "metaphysical accounts of 'inquiry', 'situation' and perhaps worst of all, 'experience'." (p. 2).[24]

The neopragmatic analytical technique produced two results. The first was to show the untenability of dualisms as an essential part of the categorical structures that theories imposed to make productive analysis possible. In this sense, the categorical distinctions that are made in terms of observable phenomena are essentially ad-hoc and

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24. To Hildebrand, the error of the classic pragmatism of Pierce, James and Dewey was that they used a vague terminology that was hard to pin down and subject to wildly different interpretations, which I believe is strikingly similar to modern constructivism. This is obvious when trying to grasp Pierce's semiotics and Dewey's "experience." However I disagree with Hildebrand's notion that "experience" is essential to pragmatism, in that its elimination was the key to the critique of logical positivism and to the post-linguistic interpretive turn in the social sciences. I claim here that what is essential to pragmatism is the dissolution of dualisms, and to neopragmatism the analytical scepticism that has a lot in common with deconstruction but without the nothingness or irrelevance characteristic of the "postmodern condition" of

therefore subject to revision. The second was to show how epistemology, as a system that produces knowledge, depends on the stability of an ontological substrate.[25]

The result was to infer that the failure of a scientific program to solve human problems might be just a question of believing in the existence of certain behaviors or other phenomena. In a very simple sense, neopragmatism offered a "what if" speculative analysis of what problems might be resolved if some dualisms were dissolved, without resorting to a corny idealism.

Anti-Dualism

Many dualisms have been successfully tackled in this way, such as "fact-value," "scheme-content," "mind-body," "subject-object," or "analytic-synthetic," and so on. The characteristic for a dualism to be successfully dissolved is that one of the two terms is completely abstract and has no physical grounding. For example, "mind," "scheme," and "fact" are abstract human metaphysical concepts, constructed as convenient placeholders for non-physical entities, interactivity or instrumentality. The other term is simpler to be objective about, as it is anchored in a measurable and definable way.

The success of the dissolution of dualisms depends on two principles. The first is supervenience, or the relativizing of the abstract term to an open-ended interpretation of the more "objective" term which is strongly anchored in belief. The second principle is

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some forms of post structuralism. What is important to both is what I perceive to be an marriage of both the American tradition of democratic freedom and the postmodern freedom from epistemological subordination. This effectively dissolves the classical pragmatic functionalism- Marxist instrumentalist dichotomy that is still somewhat pervasive, as can be seen in the post-empirical and critical theory camps (Smith, 1993, p. 11-12).

25. This is indeed very similar to Derridan deconstruction. The difference is that there does not have to be an either/or or binary opposition that determines the choice.

subordination, where the abstract term is dominated by or even replaced by the objective term. For example, it is very pragmatic to say that it is a common belief that each of us has a distinct *body*, that the *value* of beliefs determine their strength, that there is empirical *content* (real things as perceived by the human sensory apparatus), and that any form of expression is a *synthetic representation* of those things (and not the things themselves). The subordination principle is relatively easy to describe and produces statements like: "there is no mind without the body," "there are no analytical statements, just synthetic ones," or "every statement is subjective."

The supervenience principle, however, is somewhat more difficult to grasp. Supervenience accounts for the relationship between physical and non-physical states but it can appear counterintuitive. To say that non-physical states supervene on physical states does not mean that the non-physical state *dominates* or *causes* the physical one but the opposite. However the non-physical state *determines the existence of a relationship* between physical entities (for example, I am related to my cousin and that relationship exists outside any directly observable and measurable phenomena that could link us physically together, other than our common characteristics such as DNA).[26] For the same reasons simple statements such as "spatio-temporal conceptual schemes determine our perceived reality," or that "modal truths supervene on non-modal truths" to say that value systems determine the facts, can be shown to obtain. In each case it is the abstract, non-physical concept that supervenes (the non physical relation) between physical concepts, especially when it can be shown that those very physical concepts permit the abstract concept to exist. In this sense supervenience is an asymmetrical relation.

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26. A good description of supervenience can be found in Teller's Relational Holism (1986).

The point, however, is that the neopragmatists simply played a better game of semantics by showing that ontological systems, in effect, supervene on logical ones, and not the other way around as the logical empiricists had thought (Popper, 1996).

Epistemology as the "Mirror of Nature"

One of the most intriguing and fascinating features of the neopragmatic critique of empiricism is that it did not offer a replacement epistemology. This came to full fruition quite a bit later with Rorty's *The Mirror of Nature* (1979). While Rorty's book was far reaching and very broad in scope, it was in effect about the dissolution of the ontological-theoretical distinction and how one goes about being necessarily hermeneutical when encountering data that doesn't seem to fit any theory.

> For hermeneutics, to be rational is to be willing to refrain from epistemology - from thinking that there is a special set of terms in which all contributions to the conversation should be put-and to be willing to pick up the jargon of the interlocutor rather than translating it into one's own. For epistemology, to be rational is to find the proper set of terms into which all the contributions should be translated if agreement is to become possible. (p. 318)

Rorty's brand of hermeneutics differs from the classical, or romanticist definition of hermeneutics in what Smith calls "philosophical hermeneutics" or "ontological hermeneutics" (Smith, 1993, pp. 133-139). He describes that philosophical hermeneutics is not a replacement epistemology, nor is it the ontological component of epistemology, but rather just what we do, which is interpret what is presented to us, according to an historical, cultural and social hodgepodge of linguistic precedents (p. 138-139). While Smith's definition may seem rather vague, I liken it to what happens when freed from standard, historical or academic perspectives in order to better understand a contextual problem, in effect, what is referred to as "thinking outside of the box."

When an epistemology collapses, either due to to many anomalies or unpredictable or new data, it is necessary to question the ontology, or both categorical distinctions and beliefs about those distinctions, and not just the top level premises of the hypothesis (Kuhn, 1996). The point is not to use an alternative epistemology, or create ad-hoc assumptions, or fudge the data, but simply look at the whole thing with fresh eyes, or in the case of Einstein, completely changing the referent point by which things are measured.[27]

Since epistemologies tend to restrict the kind of "creative" or "reconstructive" freedom that generate productive ideas, they cannot be depended on to answer questions that are essentially metaphysical in nature, and any modification to the underlying beliefs on which the epistemology would be counterproductive (like cutting off your nose to spite your face). This does not mean the elimination of theories but rather just being honest about how ontological or conceptual schemes supervene on our rationalizations (Popper, 1996). Epistemology, in the sense that it is a rigid system for arriving at truth statements, is therefore rather an impediment, or a crutch, or sort of like a way of abdicating responsibility for questionable or improbable methods or beliefs. In other words epistemology is a system of judgment, not a system of inquiry, because it produces primarily statements of "truth." Philosophical hermeneutics, on the other hand, makes us

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27. In relativity, time becomes a very poor measurement yardstick because it is variable in relation to the constancy of the speed of light. What Einstein proved, despite the natural perception of the regularity of time, was that it was a human construction that imposed itself in contexts that could not account for the constancy of the speed of light in different reference frames. This means that measurement instruments are not only highly contextual, but unlikely to directly measure non-physical phenomena of type proven by Bell's theorem (Fine, 1986). It is an interesting point that Einstein himself seemed to have forgotten in his famous critique of the quantum theory *(Einstein et al., 1935)*.

ask and continually refine the questions. In other words, philosophers are not that interested in answers (unless, of course, it is a question of ethics).

In its historical context, logical empiricism was like the promise of perpetual motion or cold fusion or warp drives on *Star Trek*. Theoretically these wonderful things might exist some day, but it makes very little sense to design and build starships *right now*, if all that can be done is sit in them to play make-believe. In other words, the science of logical empiricism was science-fiction. The result is that lots of earthbound starships are lying around, and the project now appears to be salvaging the parts that seemed to work. The problem is that many academic specializations, including instructional technology, still seem to be attached to the ideals of empiricism, even though that promise will not be kept, at least anytime soon.

Life After Logical Empiricism

What can be said about the legacy of logical empiricism is that many parts of it survived, but without the naive or ideological aspects. For example, the physical sciences have continued to be very productive, and there has been an unprecedented "cross-cultural" exchange and interdisciplinary work, in particular bio-chemistry and bio-physics. In fact it would be hard to picture the social sciences without its inductive logic and its statistical methodologies. What changed, for the most part were any claims to universal and permanent truth and an emergent respect for alternative epistemologies and ontologies.

What this amounted to in the social sciences, according to Smith (was the "end of procedures as criteria" (Smith, 1993, p. 53) for arriving at truth statements, or, in other words, the concept of empiricism as some kind of machine that dealt with the inherent

subjectivity and ease in which humans can be mis-led. Smith goes on to identify "at least two broad philosophical tendencies, postempiricism and critical theory (which) have attempted to move into the vacuum left by the demise of empiricism with their own theories of knowledge." (p. 11) (the third option, interpretivism, is discussed separately).

Postempiricism

The postempiricist option was to find the "middle ground" between an absolute relativism, or "anything goes" truth statements and the realist foundational empiricism characterized by logical empiricism (p. 64). This works insofar as there are ways of evaluating evidence of truth claims in academic fields, or in the application of social law. Essentially the relativism is to a community of practice, and the methodologies of arriving at truth claims are thought to be a question of consensus and subject to peer review. It does not matter if procedures differ from field to field (or even from within) insofar as they are instruments, and therefore fallible. Statistical methodologies have even evolved to measure intersubjectivity in the form of inter-rater reliability. Other techniques use cross-verification with different methodologies and by using sophisticated analysis, there can be reasonable inference to validation of one or another procedure. It is possible to say that psychology and sociology in general and education in particular have embraced postempiricism as a best practice, in the sense that there is a heavy reliance on statistical methods in their epistemologies.

The postempiricist option was perhaps the kindest to behaviorist psychology and sociology in that expertise and experience was not only salvaged, but gave new opportunities to develop better methods.

The European response to postempricism

Critical theory is typically associated with the european tradition called "cultural studies" (in the American tradition) or "communication studies" (in the British tradition). This is a loose grouping of theories known as post-Marxism (structuralism and post structuralism).[28] Post-marxism is mostly associated with the Frankfurt School, whereby the project was, roughly speaking, to strip the economics from Marxism to show how dominant ideologies are hegemonic systems that are evident in cultural practice, specifically in mass communication.

Structuralism was a further refinement of Marxist and post Marxist thinking in that it was semiotics, or the systems of signification and knowledge construction that are thought to be the culturally derived and unconscious replication of dominant ideologies. Structural analysis looks for underlying signification (subtexts) in the structure of language (texts) (regardless of the media, all representations, or cultural artifacts as texts. For example, it is considered that all languages have a structure, and that determines what and how categorical distinctions are made. In texts there can be mythologies, story arcs, plot twists, archetypes and subtexts that are common to, therefore independent of, virtually all cultures and languages. Structuralism can even be considered to have developed in parallel to and not just as an alternative to the post empirical social sciences as there are psychological,[29] sociological, anthropological and linguistic variants.

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28. I diverge from Smith who limits his discussion of critical theory to the Frankfurt School and Jurgen Habermas. Structuralism and post structuralism have largely superceded both but are still distinctly from the same Marxist lineage.

29. Jean Piaget is of particular interest as his "genetic epistemology" is structuralist. I tend to think that in the instructional sciences, at least in North America, there is an ignorance of the structuralist orientation of Piaget's constructivism, due to the naive attempts to marry (the ideologically incompatible) constructivism and functionalism (Fox, 2006).

Post structuralism was the direct result of dissatisfaction with structuralism, and often confused with postmodernism. The dissatisfaction with structuralism and other Marxist philosophical orientations was that they were historically deterministic and did not adequately deal with notions of the Self and human agency. The three principal methodologies are "deconstruction," as developed by Jacques Derrida, "genealogy," as described by Michel Foucault, and "textuality," by Roland Barthes. Essentially these methodologies are very similar to post-analytical neopragmatism in that deconstruction demonstrates the ambiguity of the abstract symbolism of language, and genealogy demonstrates ontologies as the historical constitution of multivarate meaning systems and not cleanly derived from structural epistemologies. Barthes is somewhat more complex in that his broad expanse of work does not seem to have a common thread other than a rejection of quantification, or the use of theoretical structures for interpreting social behavior and cultural artifacts.

The interpretive turn

I will only provide a terse introduction to interpretivism for its historical role and its continued critique of the human and natural sciences. I will avoid here any discussion about the "pure" interpretive disciplines such as literary theory and criticism as well as cultural studies and art as they follow a non-scientific (even anti-scientific) doctrine.

The turning point to interpretivism, in my opinion, is the coming together of post structuralism and neopragmatism, which began with publication of Roland Barthes *Death of the Author* (1967), and Richard Rorty's *Philosophy and the Mirror of Nature* (1979). Both embrace analytical-hermeneutic philosophy and metaphysical scepticism, and reject

epistemology in favor of an ontology that is variable, identifiably historical, and free from the control of hegemonic and deterministic structures.

While Barthes and Rorty had different origins and goals, their ethical concerns in the reenfranchisement of the reader (Barthes, 1967) and the democratic freedom that would come from ontological relativism (Rorty, 2006) created a true third alternative. Essentially what holds together Foucault, Derrida, Barthes, Rorty and Davidson is this: when second and third order epistemic structures do our interpreting for us, our self-perception as free agents (to choose what to believe) is diminished. In the case of empiricism, it is the monolithic and deterministic interpretations that muscle in on our own "subjective" human perceptions and feelings and devalue them.

Interpretivism as the Unification of Science?

What is interesting about the end of logical empiricism is that its goal of unification of the sciences is a likely result of its demise. While the debate is still raging over the distinction between the physical and human sciences, many contemporary philosophers feel that the distinction between the natural and social (human) sciences is no longer tenable if one takes an interpretivist position. The view is that while the natural sciences may have a non-human object of inquiry that make them distinct, their practices as a social and cultural institution are as interpretive and as historically defined as any other. It is just the tools and the instruments that are different (Rouse, 1991).[30]

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30. It has been pointed out to me by Gary Boyd that the results of physical science do not actively change underlying generative processes and laws but just their scope, whereas social science alter the ways in which we experience and behave, which adds to their distinct natures. It is possible to say then, that for their instrumental purposes they are interpreted quite differently.

3. THE NEOPRAGMATIC ANALYTICAL METHOD

> "If you understand, things are just as they are; if you do not understand, things are just as they are."
>
> "As long as you seek for something, you will get the shadow of reality and not reality itself."
>
> —*Zen Proverbs*[31]

Educators, or more specifically instructional technologists, have found themselves needing to reassess their practices due to the epistemic pluralism of the type defined in the last chapter, which I claim represents a dependence on the authoritarian model of knowledge production. These practices include the traditional role of education as the gateway to making knowledge accessible, the design of instruction, and the monopoly on assessment and academic certification. By providing an adequate explanation for these practices, or the philosophical reasons why they are believed valid, will help to clarify what the role of instructional technology could and should be in the new post-epistemic age. As I believe this new environment is due in a large part to the neopragmatist-led decline of logical empiricism and on to the democratization of knowledge in general, it might be helpful to explain in greater detail some of their analytical techniques.

As outlined in the previous chapter, the key to the analytical method of the neopragmatists is the dissolution of common dualisms. This is accomplished not by seeking the "middle ground" or by the acceptance of the pluralism inherent in a dualism, but by showing that a dualism is perhaps not as well demarcated as it appears to be.

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31. Unknown.

The two approaches in the neopragmatic method that I introduced in chapter 2, supervenience and subordination, is to understand that the demarcation of the concepts forming dualisms is an illusion of one of two kinds. The supervenience principle is used by Rorty in the dissolution of the mind/body dualism (it makes no sense to talk about the mind as being independent of the body, as the body determines the mind), and by Putnam in the fact/value dualism (values determine all facts). The subordination principle is used by Quine in the dissolution of the analytic/synthetic dualism (all statements are essentially synthetic) and as I will show in later in this chapter, the scheme/content dualism as argued by Davidson (1984a).

The neopragmatists typically use a genealogy of philosophical thought to illustrate that dualisms were mere inventions of explanatory convenience to deal with a metaphysical problem. The other method used by neopragmatist is conjecture as to what the world might look like if the dualisms were reassessed or dissolved.

While Quine was more focused on the analytic-synthetic, Rorty on the mind-body and fact-value dualisms, Davidson stands out for identifying a third untenable dualism of empiricism, which is that of scheme-content. The synergistic effect of these critiques was to question the traditional philosophical conceptualizations of epistemology. This brings up the third analytical method: *radical interpretation*, (Davidson, 1984b), (Davidson, 1984a) and (Davidson, 1994). While this is somewhat controversial and it has not been widely adopted, it is nonetheless a relatively accessible example of how neopragmatic conjecture works, and why I think this is relevant to instructional technology.

Radical Interpretation

Radical interpretation asks the question: What would it be like if one were dropped into a completely alien and isolated culture, one of which no accessible history or records exist, and what would be needed to interpret the language and activities of that culture to one's own? In other words, when starting completely from scratch, what makes utterances understandable and meaningful? Since in this culture, no reference is available for translation, it is necessary to interpret *context*, which is to find some referent in which to associate the utterances of each language. While context provides *evidence,* it is not a terribly reliable method to translate the nuances that depends on prior experiences or transmitted knowledge. Because translation is about what utterances mean in a recontextualized way, the problem is how things like intent, desire, fear, guilt, beliefs and other abstract concepts can be distinguished from or related to the *empirical* context, which is the only reference that is available.

The short answer, according to Davidson, is that it isn't really possible. The reason for this is that all of the abstract concepts are exactly that: abstract. The only thing they can be related to is some scheme for conceptualizing, in other words, a conceptual scheme. In radical interpretation, the scheme is what translates, it is the go-between between what are essentially incommensurable languages. While Davidson's analytical technique was to show how a good portion of knowledge and beliefs (and essentially meaning) are wrapped up in non-empirically verifiable "virtual realities," the result of this thought experiment is that it there is no way to create a theory about knowledge, truth, intent, belief and meaning unless one is completely fluent in language and history. In other words, empiricism, which essentially must come to terms with abstract concepts to have a theory about belief and meaning, is also not tenable, since it depends on physical

evidence in order to be commensurable. This is to show that all beliefs and meaning are essentially relative to the conceptual scheme and not to the empirical context.

While there is considerably more nuance to Davidson's radical interpretation, I use it to make the point that there should be obvious parallels with instructional technology. In effect, as they go about their business, instructional technologists are dealing all the time with the incommensurability of content, contexts and learners, and there are lessons to be learned here.

As recontextualizers, instructional technologists are somewhat like Davidsonian radical interpreters. Any theories about *translation*, in other words the frameworks, taxonomies and methods of instruction that describe what to look for and how things might be represented, cannot possibly be expected to work in the construction of knowledge, beliefs and meaning in learners, without some kind of understanding of the *nature* of conceptual schemes. This understanding is, as I suspect, more important than the methods of justification currently used for the selection of content and activities in the production of instruction.

The utility of this type of hypothetical conjecture is future-think. The bonus is that in this example there is a new unit of analysis, which is to find dependencies of meaning and belief in the abstract conceptual scheme and define them in ways that empiricism and traditional analytical methods in the instructional sciences cannot.

This leads to the third dogma of empiricism, which is the scheme-content dualism.

The conceptual scheme as unit of analysis

Davidson's focus in his essay, *On the Very Idea of a Conceptual Scheme* (1984), is the untenability of the distinction between conceptual scheme and empirical content. By empirical content, he is referring to a belief that there is no such thing as an uninterpreted reality. This is what he calls the "third dogma of empiricism" (p. 189). What he means by a "conceptual scheme" is this:

> Conceptual schemes, we are told, are ways of organizing experience; they are systems of categories that give form to the data of sensation; they are points of view from from which individuals, cultures, or periods survey the passing scene....Reality itself is relative to a scheme: what counts as real in one system may not be in another." (p. 183)

Davidson's argument is that regardless of the existence of a reality that is formal (the unconditioned, pre-linguistic, pre-rational reality of raw sense data), human beings cannot have access to it because it requires commensurability with an extra-linguistic, extra-rational system of representation. While Davidson argues for the untenability of this scheme-content distinction, by way of the limits of language and theory and the "interdependence of belief and meaning" (p. 195), I understand this to be somewhat broader than issues of language statements. Our conceptual schemes are not necessarily linguistic in the sense that spoken and written language and the structure of theory is not the only way to conceptualize. In other words, a more accurate definition of a conceptual scheme can be expanded to mean virtually any representation of any experience or phenomena, real or imagined. In other words: words are not the only language, but other forms of expression have semantic construction as well that can be just as inaccessible. This includes cinema, television, the Internet, music, etc.

The production of meaning, in all of its myriad forms, processes and nomenclatures, and regardless of scale or scope, is only transformative representation, or produced *by way of* a conceptual scheme. The consequence of this radicalization is that if anything is going to be said about our reality in the past, present or future tense, it will be an abstraction, incomplete, and flattened in the sense that it cannot express the fullness of experience. In other words, a conceptualization that only refers to the scheme.

The consequence of this conclusion is that everything attached to epistemology, which are any of the traditional philosophical distinctions of "knowing what" or "knowing how" are *equally problematic*. If this is true, then it will be quite necessary to reconsider all of traditional epistemic distinctions of knowledge and its production.

Internal Schemes

My extension to the analytical method is that interpretive schemes are necessarily internal, variable and bound by affective content that is just as "empirical" as the external referents of sense-data experience.

When trying to make sense of sense-data or knowledge that has been processed in some way, there are obviously a variable number of interpretations being produced by conceptual schemes at any given time.[32] The selection of conceptual schemes vary according to the data, the context, past history, language, education, knowledge, even emotional states, intent and who might be present in the context of selection. As there

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32. This conjecture makes we wonder how something like "learning styles" can ever be taken seriously. The idea that we can predict with any precision learning outcomes with a knowledge of even the most basic conceptual schemes operating on the learning process is like denying the 200 kg gorilla in the room the banana you are holding. In other words, conceptual schemes will do as they will despite our naive sense of control we think we have over them.

may only be partial awareness of the depth and extent of the schemes that are used when makng a judgment or when skeptical, or when learning or working, it is even possible to say that instruction is a guided attempt to privilege some conceptual schemes over others given certain conditions.[33] This is to say that it is not "us" or "we" that interpet, but the acquired and often competing conceptual schemes within "us" that do the interpreting.[34]

The difference, it seems, between the internal process of conceptual scheme utilization and their external origins is emotional content. This can be an attitude towards experience that may or may not privilege the raw feel, and what is a primary, emotional response to it. It is possible say then that the nature of the appropriated conceptual schemes is not only to interpret the raw feel but also as a way to deal with the immediate emotional response. The process is to suppress, substitute and influence (in all cases, to distantiate from) personal "empirical" experience, both internal and external, with appropriated conceptual schemes (Rorty, 1979, p. 373).

This portrait of conceptual schemes as fundamentally *ontologies* is essentialy to show that knowledge, how it is derived and subsequently reinterpreted, is not an easy thing to organize for the purposes of really making any sense of it. Our epistemologies, however, produce mountains of data, conceptual schemes and interpretations, and it would seem that the unconstrained rate and volume of production suggests the traditional ways of making sense of information might no longer be adequate. This is because

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33. What we learn is not how to use or how to privilege some conceptual schemes over others, but how to manage the incommensurability of interpretations by competing conceptual schemes. What instruction accomplishes is to teach the recognition of data and the selection the appropriate conceptual schemes for a given set of conditions, while rejecting others. The notion of human performance is the ability to do this faster and with greater precision and consistency. What is really happening when using this method, is the learning context itself becomes the privileged conceptual scheme, which in turn results in the problem of transfer. A possible alternative would be to design assessments so that "wrong" answers are not really wrong but designed to reflect different interpretive scenarios, not just hypothetical contexts,

"conceptual scheme" can mean almost anything when it is used ontologically as the archimedean point of reference for a truth statement.

The limits of Conceptual Scheme Analysis

I would like to show that it is possible to have an ontological framework that is compatible with interpretivism insofar that its limits can be defined and understood. Essentially a conceptual scheme can talk about other conceptual schemes in terms of what it sees as constraining them but cannot justify their use. The position I take is rooted in a few Wittgensteinian notions from Philosophical Investigations, roughly of meaning being derived from use and the simple directive, "Don't think but look!" (Wittgenstein, 1968, p. 166) and the non-foundational stance that post analytical philosophy takes.

This has little to do with coming up with a replacement epistemology or with better criteria, but rather defining conceptual schemes in terms of their behavior and what they are used for, (which should be acceptable to the constructivist position). I admit that the ontological problem or the "hermeneutical circle" does not go away, and what I propose depends on a few assumptions, or beliefs. These are that a) human perception is fundamentally constrained by space and time (and the biological basis for that perception), and b) that all forms of expression, as abstractions of human perception, determine the content of what is expressed. *This is to say that to assume interpretivism means that*

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which is somewhat akin to the Myers-Briggs style of personality assessment.

34. I really mean this to say the conceptual schemes that are foreign to us, in the sense that we appropriate them and use them as if they are our own. We do have our own conceptual schemes based on our unique experiences, and these are loaded with emotion. When we privilege emotionally decontented conceptual schemes we distantiate our personal, emotion-laden and hermeneutical conceptual schemes. This is what I believe Rorty means when he says that once we strip away the artifice of empiricism we are naturally hermeneutical, as we tend to expose more of our perceptual apparatus, including the perception of our own

what is interpreted must be defined not just in the physical sense but in terms of supervening relations.

In order to make things manageable it is possible to do what conceptual schemes do themselves, which is to reduce dimensionality, or rather, flatten things down in order to make better sense of them by altering spatial (physical) or temporal (non physical) relationships. In another time, when knowledge production was slower and dominated and constrained by authoritative sources of production, it was easy to "expand" the study of knowledge based on an apparent regularity or consistency of conceptual meaning. Historically, what complicated epistemology and related concepts complex were revolutions in authority, such as the split of religion and philosophy and then science and philosophy, the division of labor in scientific inquiry, and now the democratization of knowledge production. With the resulting expansion of knowledge came the phenomenon of incommensurablilty and relativism. Basically the old model depended on an authoritative-institutional ontology that could never anticipate, predict or even accept the undermining of its authority in matters epistemological.[35] While perhaps not intentional, the goal of the elimination of ad-hoc belief systems or metaphysical justification somehow got entangled with epistemology to the point where they seem inseparable, and it would appear that just because logical empiricism is over, the need to disentangle them was lost.

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emotional responses.

35. This is not unlike Derrida's deconstruction. However useful that is in showing that there is no ultimate justification in cultural practice, I would like to think that there is more than *différence* to his anit-foundationalism. We have to do more than critique what essentially is a product of the human condition. Even though we can't really do anything about having access to an uninterpreted reality, we can make it explicit and then try and restructure around it. The best approach I believe come from the neopragmatists, which is to say that the binary oppositions of deconstruction are really not different from the standard dualisms and can be dealt with

When something is flattened it means simply reducing the number of dimensions to two. For example, in the simplest sense a photograph is a two dimensional representation of a three dimensional space. It depends on the illusion of light and shadow to simulate three dimensions, as this is one way in which human beings perceive and interpret depth. This works for other representations as well, insofar that they are all illusions of how space and time are naturally perceived. The "flattening" occurs by way of representational choice, in relation to what is left out. It is also generally accepted that not just the content of representations are interpreted but also what is *not* there, which includes consciousness of form and other contexts of representation (think of the photograph as taken out of the context where it was created and recontextualized where it is viewed) and even of the conceptual schemes that were used in its creation.

So what I am concerned with, in terms of defining an ontology of conceptual schemes, is form and content. This differs from Davidson's definition that says form is the conceptual scheme, and content is the unconditioned reality (as in empirical content). However I see in his conclusion an ontological consequence in the assumption that interpretive schemes exist, and that as forms of expression, their content effectively replaces "empirical" content.

My extension to Davidson's relativism is that all interpretation is relative to *any number* of conceptual schemes, and because those conceptual schemes are entangled and virtually impossible to extract out of expressions, the traditional epistemic distinctions are of little use in making sense of them. The rationale is that if truth is relative to conceptual schemes, and if interpretations are representations that have form and content, then the

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constructively.

relation *must be to other forms and other content.* Conceptual schemes invariably re-produce content by the nature of their own forms, and their content is interpretations.

Conceptual schemes themselves must also be subject to the same effects of formation. So, instead of dealing with "conceptual schemes" as some kind of abstract and mysterious matter like flogiston it is assumed that an ontology is required in order to discuss interpretation.[36] This works if the difference between what something *is* and what something *does* are also considered dimensions of description.

What is elementary to an ontology of conceptual schemes (or even ontologies as conceptual schemes) is also elementary to any form of expression. Without "language," expression is without meaning, but even before that, there must be an assumption that there can be no meaningful expression without perception. This is also a way of saying that content always follows from a form, and form always constrains content.

Ontological Modalities

What is never clear or obvious in the expression of a concept, is knowing what is being referred to when justifying its existence. It is possible to conceptualize by objectifying, which is to give a distinct form by way of distinctions of content, or by determination, which is to describe content by way of contextual form. In other words, conceptualization takes place through describing characteristics as content (what

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36. This may seem somewhat circular and similar to the problem of the "hermeneutic circle" but I mean this in a very simple sense that we can examine conceptual schemes as being content produced by other forms, and as forms in the sense that they themselves formulate content.

something is) or characteristics as formative (what something does).[37] These are simply ontological modalities and it is rarely a matter of clear choice how to perceive them.

The simple example of these two modes are the concept labels "snow" and "chair." There is an easy distinction to make in the physical content of the environment to observe snow as being the same thing under the conditions of winter in different contexts. This leads to theories about how snow is formed, and even to refine its definition as a result, but this is not by which the word snow is initially defined. On the other hand "chair" is not easy to to define based on any consistent intrinsic characteristics. What defines a chair is what it does as a *form* (what it does), which is to provide a surface for sitting. From a naturalist account, how the chair was formed itself as an explanation for its existence is less interesting (unless you happen to be a designer), as inductively it can be stated that most likely somebody made it for its formative purpose.[38]

The ontology of conceptual schemes, therefore, constrains phenomena by way of descriptions of form and content, or multiples of form-content descriptions. Also, a conceptual scheme can create meaning in essentially only four ways.

1. A referent by virtue of its content;
2. A referent by virtue of its form;
3. A referent by virtue of its existence as content determined by a form;
4. A referent by virtue of its existence as a form that determines content.

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37. This is similar to the Heideggerian notion of the metaphysics of presence, Dasein and Temporality. Traditional metaphysical ontologies, as in empiricism, place an emphasis on what is presented, rather than the conditions of their existence. As Claude Debussy has been attributed to saying, music is not just the notes, but the space between them.

38. Design, as an activity, is all about the creation of form.

1 and 3 can be considered related to spatial qualities, and 2 and 4 can be considered related to temporal qualities.

It is in this sense that the human sciences distinguishes with an ontological preference for formative referents as the complexity, irregularity and variety of human activity defies accurate prediction of content.

Any critique of a traditional epistemic conceptual scheme must show untenability based on these four ontological assumptions. This is essentially a negation of what an epistemology objectifies or formulates if it is behaving as an ontology. For example, to say that there is such a thing as a mind distinct from the body is to objectify it conceptually. The mind is said to exist by virtue of its existence as a form that determines content (which is to mirror nature conceptually). The problem with this conceptualization is that the mind cannot be an abstract entity separable from the body. In other words, without regard for its existence determined by another form, and no recourse to physical evidence that the mind produces and contains discrete concepts, or even whether thinking is a content distinction that can be made, the conceptualization of the mind cannot hold.[39]

What this means is that there is now an effective counter-argument to the perceived weakness of interpretivism insofar that without a reliable and dependable epistemology, no science is possible. Since interpretationism is impossible without something to interpret, an ontology of representation is required, and this will suffice for my purpose. What effectively counts as valuable is not a physicalist or realist

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39. The consequence of dissolving the mind-body distinction is not that the mind disappears but just that it throws any subsequent conceptualization that depends on this condition into jeopardy. This is largely the problem with cognitive science, in that it behaves like an ontology when it draws generalizable conclusions about mental states like "working memory can hold 7 items, plus or minus 2" (Miller, 1956).

interpretation but rather the *plausibility* of antecedent forms and subsequent content as *differentials,* especially when dealing with abstractions or abstract systems.[40] The empirical side is not discarded, but rather its limit set to the process of production, or rather the *mise en valeur* of a conceptual scheme.

While this may seem complicated, it really isn't. It just provides a way to justify not using formal epistemologies in order to get a sharper image in defining what is essentially the ontological substrate. It is in this idea that I suspect an adequate philosophy of the instructional sciences may be constructed.

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40. This is how mathematics works as a conceptual scheme insofar that its truths are by virtue of prior and subsequent forms.

PART II

INSTRUCTIONAL TECHNOLOGY IN THE AGE OF INTERPRETIVE MEANING

4. THE DOGMAS OF THE LEARNING SCIENCES

> Why, anybody can have a brain. That's a very mediocre commodity. Every pusillanimous creature that crawls on the Earth – or slinks through slimy seas has a brain! Back where I come from we have universities, seats of great learning – where men go to become great thinkers. And when they come out, they think deep thoughts – and with no more brains than you have...But! They have one thing you haven't got! A diploma![41]
>
> —*The Wizard of Oz (to the scarecrow, on granting his wish)*

It may be useful to apply some of what was defined the first section to instructional technology. To do so is to locate the empirical epistemologies that are found in the learning and instructional theories that inform it, and to then go on to the ontological conceptual schemes that they are built on. While this process is to expose dogmatic beliefs to show how they are metaphysical in nature and prevent change, it is also to explain how an empirical science that does not have an adequate metaphysic insulates its practitioners from critique that will help them adapt and evolve should those beliefs change. The post-analytical method described in the first part serves an adaptive and evolutionary purpose, as the conditions for a conceptual revolution in the learning sciences appear to be remarkably similar as those described by Kuhn (1996).

The OED defines dogma as "what is held as an opinion; belief, principle, tenet; esp. a tenet or doctrine authoritatively laid down by a particular church, sect, or school of thought; sometimes, depreciatingly, an imperious or arrogant declaration of opinion." and "The body of opinion formulated or authoritatively stated; systematized belief; tenets or principles collectively; doctrinal system."

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41. Leroy, Mervin (Producer) & Fleming, Victor (Director). (1939). *The Wizard of Oz* [Motion Picture]. United States: Metro-Goldwyn-Mayer Studios Inc. (MGM).

Dogma, in the sense used by the critique of logical empiricism, is the core belief on which the foundation of the entire epistemology depends. Quine identifies two: the first is the dependence on analytic statements that are largely true without justification, and the second is reductionism (1951). Davidson identifies a third: the untenable dualism of scheme and content, (1984a), which I explained in chapter 3.

Dogma is commonly used in the negative sense as referring to a belief or practice that is an article of faith, unchangeable despite all evidence or efforts to usurp it. The power of the rhetorical critique of logical empiricism by Quine, by using the word "dogma," was to show that the positioning of science as the antithesis to metaphysical belief systems by Carnap and other members of the Vienna Circle, was just as dogmatic. In other words, "dogmatic" was the dirtiest name you could possibly call science. In this chapter, I will take a decidely softer stance on the science of instruction, as historically it tends to be more pragmatic than dogmatic about its belief systems.

Nonetheless, academia has a traditional dual role as a dominant actor in the generation of new knowledge and as the guardian and maintainer of existing knowledge. Subservient to these roles is the responsibility for educating, as it would seem to make sense that those best equipped and trained in knowledge matters would also be in the best position to help cultivate that knowledge. Since I have tried to picture education as a secondary field, which as such shadows other fields with stronger epistemic traditions, its dogma has less to do with maintaining authority over knowledge creation and more to do with maintaining authority over the process of *instruction*. As evidence, the instructional process itself is largely the same across fields, in that the traditional decontextualized infrastructure (schools) and an authoritative teacher, or expert, is the ubiquitous source and often the deliverer of instruction (Bruner, 1996). Essentially, what is dogmatic about

learning and instruction is what allows the learning sciences to continue to be the dominant authority for the transfer of knowledge and skills, which is often confused with a naive survivalist sentiment, or the idea that the primary goal of any institutional structure is its survival (ibid). It is my conjecture, based on neopragmatist ideas, that ironically it is this "defense mechanism" that interferes and progressively dominates the true purpose for having institutional structures of learning, and what will precipitate their downfall if not corrected.

What gives Education its Authority?

> "Who can endure a doctrine which would allow only dentists to say whether our teeth were aching, only cobblers to say whether our shoes hurt us, and only governments to tell us whether we were being well governed?"[42]
>
> —*C.S. Lewis*

If epistemology can be cast as inherently promoting authority and dogma, and if education has a dogma, then it is necessary to discuss the epistemologies of learning and instruction, which are roughly behaviorism, cognitivism and constructivism. As distinct epistemologies originating in psychology, they have different analytical approaches in how they treat the metaphysical aspects of learning as well as their conflicting ontologies. However all three more or less depend primarily on the same statistical empiricism as psychology and sociology to inductively arrive at their truth statements. Research methodologies are varied, in that there is a mix of quantitative, statistical-qualitative and "action" research. These methodologies are all empirical in the sense that weighted

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42. Lewis, C. S. (1961). *A preface to Paradise lost.* New York: Oxford University Press.

evidence is typically presented in standard academic protocol in peer reviewed journals and conferences, under the assumption that this is the best way to avoid unsubstantiated opinion.

Typically, research quality and results are poor insofar that there has been little or no improvement and even a degradation of learning and instructional performance, at least since the advent of the "information revolution" in the late 1960's, and virtually any peer-reviewed journal or academic association related to the learning sciences and instructional technology dedicates space to this type of commentary. While it is hard to locate a good meta analysis other than the effectiveness of computer-based instruction or distance education *as applied use of technology*, such as (Cohen et al., 1981), (Sitzmann et al., 2006), (Machtmes, 1999), the individual research reports making up these meta analyses are quite limited in scope and any competent researcher can easily point to poor definition of variables, small or too highly contextual sample sizes, reliability issues with instrument design or the overall subjectivity of any empirical design that cannot control its variables. The lack of quality and relevance (as well as quantity) of empirical research has only recently been discussed in the ISD literature, (Huglin et al., 2006). In addition most standard textbooks for instructional design largely justify the preferred use of a particular framework over another based not on empirical evidence, but rather how a given theory might provide a better scientific picture of the learning process, though the use of better contextual or other analytical approaches (Smith & Ragan, 1999), (Driscoll, 2005).

The point I wish to make here is that the adoption of epistemologies outside of its domain and their misapplication does not give the learning sciences very much authority, putting it roughly on par with cultural and communication studies. This is reflected in the

many attacks on the "folk theories" of learning and instruction that are claimed to be really not meeting the criteria for science (Berliner, 2006), (Bereiter, 2002).

This is most unsatisfying for those with a vested interest in the learning sciences, who feel, quite rightly, that learning and instruction is more than communication, semiotics and the replication of dominant ideologies for the purpose of enculturation. The learning sciences, rather, obtains authority mainly by piggy-backing on the historical legitimacy of other academic fields, by its social and cultural role that must replicate itself, and by the administrative structure of society as a whole, insofar that education has traditionally prepared its active and productive participants (Bruner, 1996). This functions more or less adequately simply because socio-cultural knowledge and practice, as they become institutionalized and systematized, have a need to enculturate and indoctrinate into their vocabularies and methods. In academia, where the business is the creation of new knowledge and the cataloguing of existing knowledge, there is an obvious need for transfer of knowledge into practical applications.

The other areas where the learning sciences have managed to hang on (barely) is in teacher training for the school system and a few other non-scientific disciplines, and in the systematic design of instruction.[43]

The threat to the dominance of the learning sciences as defining and defending its boundaries is largely coming by way of the democratization of knowledge as discussed in the first part of this thesis. This is caused not just by accessibility or quantity of knowledge

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43. It is interesting to note that schools of education typically do not train college or university level teachers. This implies that teaching at higher levels does not require training. Unfortunately, this is an all-too-common attitude in other areas of society, were it seems anyone can become a trainer if they possess "expert" activity knowledge and skills. This discussion, while important, is outside the scope of this thesis.

that is available and the ease in which it can be found, but also by the unprecedented participation in the generation of knowledge by people who might have been previously on the periphery or not at all present.

Epistemic relativism, in the sense that there are multiple viewpoints leading to truth and authority of knowledge, is exemplified by collaborative repositories like Wikipedia, whereby anyone can contribute to or edit entries. Pluralism, alternative points of view and even entirely new conceptual schemes are now competing with and criticizing existing authorities of knowledge as well as discursively legitimizing the critique of the politics of choice in the methods of knowledge production.

From the point of view of interpretationists, the democratization of knowledge is legitimized by the neo-pragmatic arguments about the pointlessness of epistemology, as characterized in Rorty (1979), (1982), (2006), and Smith (1993). On the one hand, epistemology, and its ultimate expression in logical empiricism, had been stripped of its authority by the neopragmatists, and on the other, the predictions of anarchy by those who think that systematic ways of consolidating truth are the only legitimate ways at arriving at knowledge, have both come true.

Nowhere is this more apparent than in the learning sciences, which unlike the natural sciences, which have maintained the ability to make useful contributions, really do not know what to do. On the one hand teachers embrace information and communication technology, but on the other is a breakdown of orderly instruction. It is quite simply impossible, in the age of Google and Wikipedia, to know what to teach, or in a constructivist sense, provide guidance. Essentially, and to paraphrase Piaget, *conceptual knowledge is unstable.* And in the 21st century, target learners can easily know more about

some subjects than teachers can possibly hope to provide, keeping in mind that the criteria for the justification of knowledge in learning contexts is barely adequate.

The result is that the domination of academia as the authoritative source and purveyor of legitimate and methodologically rigorous knowledge is likely coming to an end. The learning sciences have begun to adapt, in a somewhat timid fashion, but now must be prepared to face its dogmas head on and accept a new and more flexible role.

All that is left for the learning sciences, it seems, is to show target learners how to search, select and determine the reliability of sources, and perhaps to be better instruments (readers writers and calculators), and even at that educators aren't doing a terribly good job.[44] My argument is that the reliance on external epistemologies to give the learning sciences its authority must be rejected.[45]

The new reality, in terms of society and academia in all of its relativistic and multidisciplinary glory, means that some instruction on how to better interpret all of this competing knowledge is in order. In other words, the learning sciences, by tearing down the illusion that there is such a thing as stable knowledge and that there is a methodological way to recontextualize it according to a theory of learning, can concentrate on what is happening in the learning context, which is effectively interpretation. This is not to say that learning theories are to be dispensed with, but that stripped down to their essential ontologies they become much more instructive as the academic desire to analyze and confirm theoretical hypotheses are now attenuated.

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44. But many talented and gifted educators do this all the time, in spite of a lack of training and support.

45. This is mainly a question of better formulating a research strategy that steers clear of trying to empirically justify its dogmatic beliefs and hiding that fact through unstated and inferential logical assumptions.

Interpretivist ontologies, or rather conceptual schemes, are much more flexible and do not evoke the sometimes painful and life-shattering effects of conceptual revolutions. The obsolescence of theories and the adoption of their replacements dissolve entire bodies of knowledge from current practices that depend on them for creating meaning and for ensuring their survival. The empirical system of institutionalized instruction, which is based on political power, control and the privilege that comes with the right to say what is a fact and what is a fallacy, depends to a great extent in controlling ontology by methodological justification. In this sense, theories and epistemologies do not interpret but are interpretations of beliefs that create meaning by force of logical or empirical justification (whether or not it actually works). If they are stripped away, all expressions become theories, and that instruction, as the natural place for a formal study of interpretation, must concern itself essentially with how this mechanism works.[46]

So from this rather long-winded introduction, here are what I perceive as the dogmas of the instructional sciences, split into the dogmas of learning, and the dogmas of instruction. However not everyone in the instructional sciences would have the same strength of belief about each of these dogmas, or even agree that they are all true. But like them or not, these are the distinctions of the societal structure of learning institutions that determines their power and authority over instruction.

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46. This is the position advocated by Heidegger (1972), and adopted by Rorty (1979).

The three dogmas of learning

1. Learning is an internal, mental and incremental process.
2. Knowledge and activity are distinct entities and have no effective limits.
3. Truths about nature, society and culture can be known.

The three dogmas of instruction

1. Existing knowledge and activity can be abstracted, recontextualized and transferred to people who do not possess them.
2. Acquired knowledge and activity are transferable to legitimate practice and social and cultural contexts.
3. Knowledge, activity and their acquisition can be assessed and certified with a sufficient degree of accuracy.

Learning is an internal, mental and incremental process

Learning, regardless of whether it is knowing that, knowing how, memorization, calculation, motor skill, or whatever, has always been considered an internal process. Generally this is all reducible to mimicry and synthesis or rather the ability to act based on knowledge of perception. In other words, the belief is that knowledge or skills are not inherited or magically appear, but are things that are experienced and subsequently internalized by individuals.

It is also believed that learning is a rational, mental process. This is simply that all perception is processed mentally, then rationalized in the sense that connections are made, understanding occurs and the combined experience is stored away as "memory," to be recalled at a later time, or reproduced as some kind of intentional activity. It is

believed that there is evidence in the experience of understanding, and instinctively that this rationalization is a referential process that involves memory, and that it is not something that is external but rather something that is internal.

The combined experience and history of mankind leads us to believe that knowledge and skill, perceived as such, are constrained and determined by the physical aspects of human development. For example, language communication, the ability to perform advanced math and to ride a bicycle obviously do not exist in newborns. There are literally billions of accounts of the acquisition of these things that begin with simple, basic foundations and gradually get built up and evolve into increasingly sophisticated and complex structures. It is also believed that the process of maturation determines, to a great extent, the gradual process of knowledge and skill, and our systems of education largely mirror this reality.

Knowledge and activity are distinct entities and have no effective limits

The distinction between knowledge and skill is deeply rooted in Western culture, where formalized education received it biggest endorsement from Plato and his star student Aristotle in the academy. Essentially the distinction between knowledge and activity comes from a natural order of consciousness that says that it is possible to know about or explain actions, and even shape our reality.

Knowledge and consciousness are natural byproducts of language and memory, insofar that linguistic expression provides an overlay onto shared human perception. The distinction is further reinforced in that activity and the development of skills appear to be antecedent to (formal) knowledge. For example, the design and use of tools, as a skill in preliterate or oral cultures, did not require sophisticated understanding or a body of

knowledge that is linguistically expressed. Experience, in the form of trial and error predates knowledge, or more specifically, knowledge of the "literate" kind.

The notion of the limitless of knowledge and activity is made possible by the limitations of being human. There is a natural perception of finitude in several key dimensions such as sensory perception, our lifespans, mental and physical abilities and communication. This comes by way of comparison, which is the consciousness of discontinuity, to entities that do not seem to have the same limits[47]. These limitations and this consciousness of human limitations originate in a ground without limits, and the sense that whenever we, as human beings, come to know something, it just expands into other things that we do not know. Simply stated, answers lead only to more questions, and the history of mankind appears to be one long progression of collectively knowing very little to knowing so much that coherent sense can no longer be made.

Truths about nature, society and culture can be known

This is a belief that is driven by the very natural human trait of curiosity. The history of curiosity became formalized inquiry when it was discovered that knowledge could improve some practices, in other words, make accurate predictions. It was this "birth of science," or the discovery of "essences," the idea of "universals," attributed to Aristotle, that permitted the induction of truth statements, or explanations, by their essential conditions.

The formalization of inquiry and its adjuncts in logical construction become epistemology, or what is essentially the conditions that are required to arrive at truths.

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47. This is a restatement of Foucault in (2002).

This began with the natural context (observable reality), and with the development of statistical methods gradually expanded to include human activity.

Even though it is now generally accepted that there is no archimedian point of reference, the concept of truth has never been given up. This is largely for practical reasons in that the evolution of civilization and the structures that were created to manage it depends on a concept of truth and a method for obtaining it. The western (modernist) strategy has been to make truth relative to a particular context, which is primarily culture, social practice or community belief. In other words, it is believed that what can be learned about these truths can be done through epistemic inquiry.

Existing knowledge and skill activities can be abstracted, recontextualized and transferred to people who do not possess them

There are several assumptions about this statement that lead back to natural perceptions about learning and the history of instruction. The first is that it is possible to learn from knowledge and skills that have been abstracted out of their original context. Next is the developmental nature of learning would suggest that there is an advantage in "decomplexing" highly evolved knowledge and skill activities. The belief is that basic concepts and skills must be mastered to a large extent before tackling advanced ones. This is the same common sense wisdom that says learning how to walk precedes the ability to run, or words precede sentences, and so on. Therefore the assumption is that knowledge and activities can be analyzed and decomposed in a way that makes them easier to learn and master, which is to recontextualize them to the person who does not possess them.

The notion of transfer is simply a reflection on the natural, developmental belief in learning that starts with babies knowing essentially nothing but potential for the acquisition (transfer) of knowledge and ability.

The notion of transfer or acquisition, combined with the analytical decomposing of knowledge and skills, implies that knowledge and skill are not one big undifferentiated mass, but a collection of distinct entities that are transferred or acquired. This results in a belief that knowledge and skills as distinct (with clearly demarcated boundaries) become the intrinsic properties of people, in the sense that it adds value to their social and cultural participation and ultimately their status. Modern society believes so strongly in this belief that it evolved into the tenet of democratic accessibility, or that education is a right and not a privilege, and supported by the state.[48]

Acquired knowledge and activity are transferable to legitimate practice and social and cultural contexts

This is the flipside of the second dogma, or simply that what goes in, comes out.

The first part assumes what is naturally perceived, in that internalizing how to read and write is demonstrable by the ability to repeat the activity. In effect, evidence that learning took place. What follows is that civilization, culture and society are possible insofar that it is possible learn and use what is learned.

The second part is an assumption that what is learned will be used, or transferred, (perhaps in modified form), to reinforce the cooperative interdependence between the individual and the larger communities, culture and society in which she finds herself. What this means is that essential skills of cultural and social participation, such as

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48. This belief is so deeply entrenched that it is enshrined in the constitution of the United Nations Education, Scientific and Cultural Organization (UNESCO). From the preamble: "in full and equal opportunities for education for all, in the unrestricted pursuit of objective truth and in the free exchange of ideas and knowledge" (UNESCO, 2004).

communication and the following of structural rules, depend on community agreement in order for society to function.

The evolved assumption is that individuals become productive members of society and will be actively participating in what (Wenger, 1998) calls *communities of practice*. In other words, the individual does not get supported by society inasmuch as he contributes to supporting society by becoming self-sufficient, and can produce a surplus of labor for the benefits that can be delivered in turn to its members (the nature of community and cooperation). That preparation depends upon the legitimization, or the induction of members into largely pre-determined roles and functions, and this responsibility rests naturally in education.

Knowledge, activity and their acquisition can be assessed and certified with a certain degree of accuracy

This is likely the most controversial of my "dogmas" in that hardly anyone in the field of education has failed to recognize the difficulty in learner assessment (and this was the motivation for including the quote from the film The Wizard of Oz at the beginning of this chapter). However the instructional sciences assumes this belief and keeps devoting considerable resources to it for two very good reasons.

The first reason is that society demands it. This is related to the previous dogma in that legitimate participation in various professions involve inherent risks for the breakdown of society due to dysfunctional institutions. For example, matters of health, transportation safety, engineering, to name an extremely limited set all carry expectations that there is a benefit to society for having these infrastructures. If people die because of negligence, lack of knowledge, skills or executive ability, or compromised ethics, then these infrastructures that society depend on will break down. In this sense society

demands ways to certify competency, as this is perceived to be a critical part of the strategies used in the prevention of systemic breakdown.

The second reason is a belief that assessment and certification go with the instruction. The first argument is that education is rigorous enough in its authoritative sources of knowledge and skills and its methods of instruction, that it is in the best position to assess its acquisition. The second argument is that education cannot possibly shadow legitimate practice that tends to vary from context to context, and that induction into legitimate practice is seldom a direct linear path.

Educational institutions, such as universities, claim monopolies on certain types of certification, and this is a dogma that is attached to their authority and power in society. This is reinforced with any number of charts and graphs that universities trot out to demonstrate that a university education results in higher salaries and advantages in hierarchical institutions. These institutions tend to equate leadership with advanced degrees and promote people to higher positions. Many professions require advanced degrees and work in concert with universities to establish criteria for assessment and certification. Universities are also quick to promote the success of their alumni as the progeny of their superiority in matters academic, and this is meant to reinforce the message that the quality of the certificate is measurable by the results it brings to society.

The association of accuracy comes naturally with measurement. In other words, the perceived value of measuring something is only there if those measurements are accurate. In this way, great care is taken in the design and documentation of learner assessment and in grading practices that work towards attaining a certain amount of objectivity (or at the very minimum a reduction in subjectivity). The reason is simple: society expects, as a return on investment in education and assurance of value, a certain

amount of consistency, reliability and fairness in the system. In other words, assurances that not only is instruction tested, but validated and deemed to be reasonably reliable in different contexts.

The consequences of the dissolution of the dogmas

Even though it is possible to show that these beliefs are not tenable on philosophical grounds insofar that they are inherently metaphysical assumptions and not empirically testable, I sincerely believe that this will solve nothing, as the assumption is naturally, "what can be done instead?" or "what better system is there to replace it?" In fact, most academics in the learning sciences are ready to admit that they don't know much about learning insofar that most don't consider it a metaphysical process. This is, in light of the decline of logical empiricism, a fallacy of Quinian dimensions.[49]

As I have stated previously, most theories of instruction are necessarily pragmatic solutions to the metaphysics of learning. However I believe it is more pressing to show the dangers of hanging on to these dogmas when the rug is about to be pulled out from under the learning sciences essentially when other fields are beginning to do a better job. This situation is not unlike how logical empiricism took over psychology and how that field took over the unproductive pre-empirical (metaphysical-theologic) "folk" methodologies of education. While this is not a call to return to pre-empirical practice, it is time to

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49. Oddly enough, the much despised (in the current discourse) radical behaviorism of Skinner (1938) provides the most satisfactory interpretation of the internal, metaphysical process of learning, as it consciously refuses to make any metaphysical assumptions about what is going on inside the "black box" of the mind. Since a positivist inquiry is (and should be) inherently falsifiable, the limits as to what can be explained by radical behaviorism are clearly delimited. Skinner himself admitted that this nuance appears to have been lost on many practitioners of the instructional sciences, who overstepped these boundaries by confusing learning with the acquisition of beliefs, something he did not intend (1968).

reclaim what rightfully belongs to the learning sciences, not as a "psychology" or "sociology" of learning but interpretationism as a viable science that is unique to our field. What this requires is understanding that the dogmatic beliefs described here (as well as the possibility of others) is not a guarantee of survival. In other words, there is nothing wrong with holding these beliefs, but they are based on a terrain that is shifting, which is to say not a very good location to build a permanent structure.

By the same token, if it is thought that more or better science, or relevant research or more instructional design models (replacement epistemologies) will be the cure for the instructional sciences, in other words hanging on to the dogmas by trying to prove they are true through empirical methods, is like rearranging the deck chairs on the titanic. The epistemologies of the learning sciences are essentially built on these dogmas, and the whole structure is likely to sink into irrelevance if the new post-epistemic reality is not acknowledged. This means not another method but an appropriate ontological attitude. That attitude is, of course, to adopt a neo-pragmatic stance and then claim interpretivism as rightfully belonging to instructional technology.

What this means is essentially two things. The first is the importance of metaphysics in not only scientific inquiry and research, but in the creative process of learning and the design of learning, which I will elaborate on in chapter 6. The second is understanding how empirical methods are limited and determined often by untenable and dogmatic beliefs.

If this could be elaborated into a philosophy of science, the first order of business will be to establish criteria for the assessment of empirical research (Smith, 1993). Those criteria would include limits on the types of research that overtly or covertly make assumptions about the ontological status of the dogmas, or seek to confirm their existence

in either their hypotheses or their conclusions. The second will be to give a place to and define more fully an acceptable metaphysics as key in establishing and maintaining ideological, taxonomic and theoretical cogency to the field. The third will be to establish the criteria for theory construction, with the overarching goal of epistemic transparency and relevance to the non-physical process of learning.

The big question, however is not methodological but about leadership in all things epistemological, and how this would appear to be the natural activity of education. This cannot happen unless there is a good philosophy of the instructional sciences, which includes a post analytics that respects the needs of the science, and a science that respects the need for cogency and transparency of the underlying belief substrate that is the metaphysical critique. This is a holistic view, and there are ample examples of how any activity, scientific or otherwise, depends on the *value of its interpretive practices*, rather than epistemologies, for survival.

By being transparent and honest about these or any dogmas, is simply to overcome denial about current practices that do more harm than good, which is an empiricism that either can't deal with or won't accept the non-physical aspect of learning, or more precisely the supervenience relation between the non-physical over the physical.

5. THE CRISIS OF DISCOURSE

> To turn Karl [Popper]'s view on its head, it is precisely the abandonment of critical discourse that marks the transition of science. Once a field has made the transition, critical discourse recurs only at moments of crisis when the bases of the field are again in jeopardy. Only when they must choose between competing theories do scientists behave like philosophers.[50]
>
> —*Thomas Kuhn*

At the beginning of the thesis, I outlined a personal path that led me to a profound dissatisfaction with the various practices of instructional design. This was tempered with a more positive attitude towards the systems-theoretic approaches of human performance technology and Instructional Systems Design (ISD). While this might be due to my background as a designer that specialized in information design as well as its integration into production and usage processes, I was convinced that the learning-theoretical approaches in the learning sciences were generally offering less than satisfactory analytical results for the amount of time and effort required to conduct them. I also wondered if the heuristics I had acquired and refined for over 10 years, augmented with a theoretical grounding in cultural studies and to a lesser extent theology, would not address what I felt was both a poverty of analysis and interpretation (and not for a lack of of choice). Much of the content of this thesis was driven by the desire to find out what made instructional technology different from other fields of design such as graphics,

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50. Kuhn, Thomas. (1970). Logic of Discovery or Psychology of Research, in I. Lakatos and A. Musgrave (eds.), *Criticism and the Growth of Knowledge*. pp.6–7.

typography or architecture, ones that appeared to have fewer analytical methodologies and also much less dependent on them.

My choice to focus entirely on the field of instructional technology was fueled by an idea that the learning theories behind the analytical approaches of the learning sciences were impoverished for a lack of non-materialist explanation, in other words a workable metaphysics for the non-physical aspects of the learning process as well as in the representational practices of instruction. A genealogy of these theories (behaviorism, cognitivism and constructivism, roughly) showed roots in logical empiricism, which was unabashedly against metaphysics.

The goal, then, was to first find an acceptable metaphysics to a science of instruction then articulate it in a way that would be acceptable from within the field of instructional technology itself. To this end, I found resonance in the neopragmatic philosophers, as they were, for the most part, scientists themselves. They were driven by some interesting scientific problems and how they were resolved by revealing ontological assumptions through the unstructuring of epistemology, which was how I perceived was an entirely acceptable way to resolve sticky problems of any kind.

I framed the issue as one of epistemology, in agreement with both the neopragmatists and the post structuralists. Their projects were largely one of demonstrating the mechanism of epistemology in the formation of meaning and beliefs and how a system for justifying knowledge just interferes with many of the goals sought by the practitioners of instructional technology as they go about the activity of designing solutions to the sticky problems of learning and instruction.

This required a method that boldly wagered on interpretivist analytical approaches. These were introduced in chapter 2, and detailed in chapter 3. In the

previous chapter, I began the "deconstruction" of instructional technology, which was an attempt to uncover essential metaphysical beliefs that might be preventing the field from evolving in light of the external pressures it is facing. This resulted in the basic criteria for the assessment of empirical research in the learning sciences and a preliminary plan for the establishment of a future home-grown philosophy of science.

From that groundwork, what remains is to look for signs of change from within the field itself that might indicate that the problems identified and inferred to here are being addressed.

* * *

Instructional Technology as an academic field is at an interesting crossroads. The surging interest in constructivism, through the revival of the developmental theories of Piaget and Vygotsky, the revival of the pragmatism of James and Dewey, as well as growing interest in "postmodern" theory shows that there is a healthy interest in positive change in the form of creative development of new approaches and techniques in the design of instruction, and in the application of new "hard" and "soft" technologies. Within the academic community the largest associations dedicated to the advancement of instructional technology include the Association for Educational Communications and Technology (AECT) and to a lesser extent, the American Educational Research Association (AERA).[51]

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51. Other organizations with important links or history with instructional technology and academia include the Association for Media and Technology in Education in Canada (AMTEC) as well as many other national organizations, the Institute of Electrical and Electronics Engineers (IEEE), the International Society for Performance Improvement (ISPI) and the American Society for Training and Development (ASTD). There are also a multitude of technology application associations for media, computing and distance education.

Interestingly there is very little critique of the purely theoretical or philosophical kind. This is not to say that there isn't any, but that critique is generally embedded in proposals for a new model for the design of instruction. The few outspoken academics taking a more critical approach include (Clark et al., 2006), (Jonassen, 2003), (Hannafin, 2006), (Merrill & Twitchell, 1994), (Reigeluth, 1983), (Richey, 1997), (Seels, 1995), (Willis, 1995), (Willis & Wright, 2000), and (Wilson, 2005).

This commentary is not to infer there is a lack of open-mindedness within this community, but rather to illustrate the difficulty in locating literature that accurately situates and defines epistemic boundaries within the genealogy of instructional technology as an applied science. After an exhaustive literature search and informal discussions to confirm my findings, I moved outside the field to see what was happening elsewhere.

There is a critique of the instructional sciences in other domains of education, typically in educational studies or curriculum development. Here I found a much closer alignment to the current philosophical discourse (as presented in this thesis) with a considerable body of work adapting postempirical thought to education. However much of this work manifested a very strong rejection of science and (or) technology. The result was a sense that their instructional prescriptions were weak, and not as productive as those of instructional technology.

The critical agendas outside of the field of instructional technology tend towards revivals of classical hermeneutics or narrative forms (Kemp, 2006), (Gallagher, 1992), "critical pedagogy" in the classic American pragmatic tradition of James and Dewey (Bereiter, 2002) and (Bruner, 1996), and "critical curriculum studies" in the Marxist tradition of the Frankfurt School (Apple & Bromley, 1998).[52] There is also a growing

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52. The exception is in mathematics and science, where there is a lively and healthy discourse in

body of "interpretivist" literature in education (and even an interpretive studies in education Ph.D. program at the University of Calgary), however in these domains, if technology is ever mentioned, it is usually in reference to the hegemonic instruments of power, or to technological fetishism, hence something that is bad. Since the critique of logical empiricism was not to destroy science but to improve it, I felt strongly that the aversion of technology in these fields was rather misguided. The only glimmer of relevant discourse was found in educational research as it relates to philosophical issues in the social sciences (Smith, 1993). I found that Smith articulated best the genealogy of social science epistemology after the decline of empiricism, which was essentially post-empirical, critical and interpretive philosophical positions.[53]

This disappointment meant looking even farther out, but Smith pointed to literature in the philosophy of science and philosophy of mind. As expected, there is little discussion of educational issues or the epistemologies of instructional technology other than what can be linked via the parent disciplines of psychology and sociology (given that most contemporary philosophers are teachers I find this rather amusing).

To summarize, it is not the lack of criticism but the chasm that appears to separate the current philosophical discourse in the social sciences and instructional technology. The crisis, therefore, is not the lack discourse or a lack of alternative methodologies, but a lack of a singular vision that integrates theory and practice in a much broader fashion than is currently the case, and which I hope I am contributing to.

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the form of "radical constructivism" from mathematics and science (Glasersfeld, 1995) and (Slezak, 2000). Alas, space and time does not permit an adequate treatment here.

53. This thesis owes a considerable debt to Smith for providing the missing link between the neopragmatism of Rorty and educational practice.

Alternative Design Models as Critique

As I stated earlier, the main strategy for critique in instructional technology is in the plethora of alternative design models, much of these attributed to the emergence of constructivism as an alternative epistemology. For the sake of brevity I will only discuss in detail the one model that made claims to the interpretivism in the style of Wittgenstein and Rorty, R2D2. I will also discuss briefly some points made in Barbara Seels *Instructional Design Fundamentals: A Reconsideration.*

R2D2

One of the only critiques of instructional technology from a (claimed) alignment to the interpretivist perspective is in fact a critique of instructional design methodology, called the Reflective, Recursive Design and Development model (R2D2) in (Willis, 1995). Willis' concise and well written introduction identifies the foundational and empirical epistemology of most instructional design models as the focal point of the interpretivist critiques coming from Wittgenstein and Rorty (generally picking up ideas from citing Smith (1993).

However Willis very much missed Rorty thesis and Smith's definition of the interpretivist position, which is that epistemology just gets in the way of the task of solving problems. Willis insists that the "collapse of the empiricist's objective-subjective dichotomy" (1995, p. 21) is the issue, when in fact this never really was an issue with empiricism (Sarkar, 1996) which was resolved as far back as Aristotle. As I have identified and explained in chapter 2, the demise of *logical* empiricism was due to the collapse of the *analytic-synthetic* distinction. Objectivity had nothing to do with it. "Synthetic" is just another word for being dependent on subjective or abstract premises. The collapse of

logical empiricism was due to the impossibility of making claims to a method at arriving at true analytic statements as the solution to metaphysical justification for knowledge, and little else.

In addition, a "constructivist-interpretivist" instructional design model is somewhat of an oxymoron. Interpretivism is firmly against epistemic structures *period.* This means any method of knowledge production that is not explicit about its representational practices. (This necessarily includes structuralism, from which I contend constructivism is derived.) While R2D2 does recognize that a more naturalistic, less rigid methodology for designing instruction is better than the linear process model, its justification, by evoking post-analytic philosophy and interpretationism was misguided.

However in (Willis, 2000) the pseudo-Rortyan rhetoric was dropped for a closer alignment to other "Constructivist Instructional Design" (C-ID) models (p. 5-6) and the adoption of a general set of "design principles" as described in (Jonassen, 1994). In an about-face Willis seeks inspiration in Aristotle by aligning constructivist principles with the concept of *phronesis* as "situated in a context and [is] dependent on that context. It is practical wisdom rather than abstract universal wisdom." (p. 8). So moving from postmodernism (if meant to refer to post structuralism, which is a critique of structuralism), is a desire to return to classical metaphysics. Willis then states that design is in fact, "idiosyncratic and unique" and context driven, and that "Understanding that context is an important aspect of successful design work." (ibid). This is tantamount to dropping a scientific approach to producing instruction altogether, which I contend never really was an issue.

There is still a profound denial to Rorty's idea of giving up epistemology however, by calling his components "flexible guidelines"and then aligning them as the defining principles for all C-ID models (Recursion, Reflection and Participation) (p. 9).

Recursion for Willis means *iterative*, as in loops, which is just a way of saying that you go through steps, not once, but many times until you get the desired result, as if linearity is the new "evil." The next guideline is "Reflection," to which Willis admits is "difficult to explain" (p. 11). His approach is to describe what it is not, and that is "technical rationality" (ibid), which is apparently the method of carefully defining problems and then applying precise solutions based on research, as the definition of positivist doctrine. Not only does Willis appear to be misinformed about positivism (logical empiricism, in this thesis), but "reflection" has little to do with lack of ill-formed perception of problems. In paraphrasing Schön, he calls this "reflection-on-action" and "reflection-in-action" as an "artistic [and] recursive process in which each effort to solve a problem that has not yielded to routine solutions is a trial that presents a reflective opportunity." (all quotes p. 12). I suspect that what he really means is to "think", and not "reflect".

He goes on to state that "In the constructionist (sic) view, our perceptions, appreciations, and beliefs are rooted in words of our own making that we come to accept as reality." (ibid). While I fail to see the link anywhere in his explanation to anything remotely reflective, it would appear that Willis means that you should think more about the context to get a better definition of the problem. It could also mean that when an ill-structured design problem is encountered, one should reflect on one's own experience, history and intuition to come up with an ad-hoc (non-scientific) solution. The second

sense would not be entirely wrong, as this is how other design disciplines appear to function.

The third flexible guideline is that design is participatory. I interpret this as being against the authoritative expert characterization of the designer and more in favor of user (or rather learner) participation in the instructional design process (ibid). However this becomes somewhat unclear as he goes on to say that "the designer is part of a team, that collectively can accomplish much more than when each person is a full participant instead of an object of study." (p. 13). He then goes on to compare this to ethnographic research, where the subjects and the researcher are integrated as equals (ibid). What is particularly striking is that not only is design a fundamentally collaborative activity in its analytical and productive practices, where teams divide labor among different specialties, but the notion that learners are somehow "subjects" or subjected to designed instruction, and that letting them participate in the design process is supposed to make instruction less subjective. This is a failure to recognize that pilot or usability testing, formative evaluation and other forms of feedback are in fact participation in the design process.[54]

Despite this rather naive depiction of design, or what instructional design should be, the point is that the issues with instructional technology cannot be reduced to just the methodology of instructional design. Instructional design is not constrained so much by its production methods but rather by its epistemological beliefs. Essentially epistemologies blind design analysis to possible interpretations about reality, of which stakeholders, learners, subject matter experts and historical accounts have different conceptual schemes (I will expand on this further in the next chapter).

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54. Even the APA manual strongly discourages the use of the term "subject." (APA, 2001, p. 65)

In defense of R2D2, there is a worthwhile attempt at a reduction of complexity in the standard ADDIE model to three "focal points." (Willis & Wright, 2000, p. 5). This effectively means there are fewer transformations, hence fewer opportunities for incommensurable translation between steps in the process. However I am concerned about "iteration" as just reintroducing those steps.[55] In addition, it would appear that Willis' distinctions in the types of knowledge as epistemic/phronetic is almost on the right track, even though the choice of analogy (epistemic in the platonic sense and phronetic in the aristotelean sense) is somewhat inverted (p. 9). The interpretive point of view considers that all knowledge (once it is expressed, in my version) is theory-laden, therefore related to a conceptual scheme and not the empirically verifiable reality (Davidson, 1984a), (see "Defining Epistemology" in chapter 1, and "Radical Interpretation" in chapter 3). There is a distinction in how *meaning* is generated (truth statements), however, and maybe this is what he is really trying to say. The other possible sense intended by Willis is the intrinsic/extrinsic distinction or the static/dynamic ways in which phenomena can be defined. Again, the interpretivist position is that any phenomena is impossible define in terms of extrinsic properties without differential analysis, which is to say that all knowledge is in activity and never static (see chapter 3). Willis is saying that it is physical or situational context that defines truth statements, without considering this important distinction. However this is just shifting the point of reference from the empirical reality to a virtual one that is referenced by context, and as I have previously discussed in defense of Davidson's hypothesis, does not work.

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55. This is not unlike the difference between reduced instruction set and complex instruction set computing (RISC vs CISC), where (roughly) fewer instructions but more iterations make for a smaller, more efficient and faster microprocessor.

"Instructional Design Models: A Reconsideration"

In (Seels, 1995), the reconfiguration of instructional design as a domain of instructional technology (as followed in this thesis and defined by the Association for Educational Communications and Technology in 1994) was solidified. The book was, and is, a milestone in the disambiguation of the various categories of instructional design into Instructional Systems Design (ISD), Message Design, Instructional Strategies and Learner Characteristics. The book is a collection of contributed articles about the fundamentals, or the necessary elements, theoretical and procedural, of these categorical distinctions.

There is a strong emphasis in the book on paradigmatic change as at least one of the important issues in the mid 1990's was the rapid emergence of the Internet, and it appeared that the A/V crowd in the basement and the ISD gang on the upper floors of the education building were not ready for its impact (p. 5-7).[56] At the same time the emergence of constructivism appeared to resonate with the distributed and holistic nature of the Internet and its hyperlinked web.[57]

Several chapters are dedicated to critique of the existing distinctions as the implications of the new categorical structure catalyzed the experts. These include *Reinventing ISD* (Chapter 4), *Instructional Design Theory and a Changing Field* (Chapter 7), *The Impact of Constructivism (and Postmodernism) on ID Fundamentals* (Chapter 11), *and Constructivist Values for Instructional Systems Design: Five Principles Toward a New Mindset* (Chapter 13),

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56. I use this metaphor because my working life began in the basement in school AV departments as a technician before the Internet revolution.

57. I note here that the Internet is not mentioned once in this book, however it must have been on everyone's mind in 1994 as it was just beginning its first stage of rapid commercial growth.

however most chapters make reference only to theoretical and research practice for each of the books three sections.

In a similar way to Willis (2000), there appears to be some confusion about the epistemic paradigms as there was (and is) considerable residual influence of psychological behaviorism prevalent in the standard Dick & Carey/Robert Mager ISD systems approaches to designing instruction. This is particularly apparent in (Osman-Jouchoux et al., 1995) whereby it is claimed that constructivism has an underlying postmodern epistemology (p. 142). While I doubt today that the authors still believe this, I attribute the gaffe to the bandwagon effect (everything was constructivist all of a sudden, including postmodernism). However there are some valid insights. For example the idea, coming from Thiagarajan and Rowland, that "ID sometimes imposes unnecessary constraints upon itself" (p. 144) and that the "Traditional ID models succeed largely because the provide for the management of a team of workers enagaged in a complex project" (ibid) and "*Appreciate the value-ladenness of all analysis*" (p. 150). Also the definition of postmodernism is rather vague but (paraphrasing Hlynka and Yeaman [1992]) "a focus on constantly rethinking our beliefs, tools and technology" (p. 142) is a step in the right direction. Unfortunately this characterization would not be expanded on how this relates specifically to clarifying constructivist principles (it can't, as I will contend later they are not compatible).

The critique is however still focused on methodology, analytical needs assessments and revision of goal and task analyses. In particular is the apparent constructivist aversion for content analysis,

> "Don't expect to 'capture' the content in your goal or task analysis. Content on paper is not the expertise in a practitioner's head...the only remedy is to design rich learning experiences where learners can pick up on their own the content missing between the gaps of analysis." (p. 149)

This, along with the notion of emergent goals, is what I consider the main misperceptions of constructivism that many people in the field hold. Finally in the conclusion,

> "At a time of such basic re-thinking about the nature of cognition, it is hard to be dogmatic about what teaching strategies comprise the 'optimal' design in any subject matter." (p. 154)

Despite the fact that there has been no "re-thinking about the nature of cognition" since Descartes and Locke (until Quine, Putnam, Rorty, and perhaps Lonergan), as well as the problems of empiricism worked out by the neopragmatists and the French poststructuralists some thirty years prior to the compilation of this book, the suggestion that one should be dogmatic strikes me as rather odd.

While the book has many similar examples, the conclusion is the same with R2D2. It is still flogging the dead horse of system methodology, with little reference to how designed instruction is supposed to work as a science. In addition to the confusion over epistemology, I contend that it is contributing to, rather than clarifying the incoherence about *what informs* the *science* of instructional technology.[58]

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58. For a good example of theory incoherence, see the standard textbook for instructional theory used in the curriculum of instructional technology (see Driscoll, 2005).

The Critique of Theory and Taxonomy in the Literature

> 'When I use a word,' Humpty Dumpty said, in rather a scornful tone, 'it means just what I choose it to mean—neither more nor less.'
>
> 'The question is,' said Alice, 'whether you can make words mean so many different things.'
>
> 'The question is,' said Humpty Dumpty, 'which is to be master—that's all.'[59]
>
> —*Lewis Carrrol*

The lack of coherence in theory and taxonomy appears to be the concern of Seels in *Taxonomic Issues and the Development of Theory in Instructional Technology* (Seels, 1997). In this article Seels manages to clarify the theoretical distinctions by following "Trenholme's Categories" (p. 12)[60] as being essentially "positivist, critical and interpretivist." Seels provides a reasonably accurate positioning of the modern instructional epistemologies into these categorical distinctions

> Behaviorism and cognitive science are associated with the positivist approach, cognitive science and constructivism with the interpretative (sic) approach, and constructivism and post-modernism with the critical approach. None of these approaches is associated with one paradigm exclusively. Postmodern approaches to theory can reject traditional components such as definitions, taxonomies, principles, laws and propositions because they look for the meaning of a concept in its 'use in social practice.' Thus postmodern critical theory tries to explain the uniqueness of a concept in its context rather than its universality. (p. 13)

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59. Carrol, Lewis. (1871). Through the Looking Glass and what Alice Found there, In Roger Lancelyn Green (ed.), *Alice's Adventures in Wonderland and Through the Looking-Glass, and what Alice Found there.* pp.190.

60. Trenholm, S. (1991). *Human Communication Theory.* Enghlewood Cliffs, NJ: Prentice-Hall.

This is mostly accurate in that behaviorism is indeed associated with logical positivism, (logical empiricism), however it is debatable whether constructivism and and cognitive science are interpretivist. However her description of "critical theory" is very good in that her list of components include most of the components of epistemology, even though found in the "postmodern" category (what she likely meant was *postempirical*).

Again it would appear that there is some confusion over what is epistemology. A more accurate genealogy of instructional epistemology would read like this:

1. Psychological behaviorism is an epistemology of logical empiricism.
2. Cognitivism follows from the rejection of logical empiricism but keeps much of the statistical research methodology intact. It is a postempiricist epistemology.
3. Constructivism also follows the rejection of logical empiricism but in the tradition of continental philosophy. It is a structuralist epistemology.
4. Critical theory is a refinement of Marxism that looks uniquely for the reproduction of the dominant ideology in the superstructures of culture. It is a naive critique of modernism and postempirical in the continental tradition.
5. Structuralist epistemology parallels the postempiricism of the social sciences in the United States. It offer a more "constructive" analysis than critical theory. There are structuralist critiques of cognition, sociology, anthropology, psychology, economics, and so on. Structuralism is a further refinement of Marxist theory, in that the "superstructures" of critical theory are dropped in favor of just plain "structures."

6. Post structuralism is a critique of structuralism in that the latter does not account for meaning and human agency. The critique is that individual is subsumed by the external imposition of epistemic structures.
7. Neopragmatism (the missing component in Seels model) is a critique of postempiricism. Interpretivism is (as I propose) a combination of neopragmatism and post structuralism.
8. Postmodernism is not an epistemology but an artistic movement.

(see Chapter 2, "The Improbability of Logical Empericism")

What follows in the book are different schema for ordering conceptual schemes. These are theories; which include "levels of theories," their criteria, and types (p. 13). Types of theories are further broken down into taxonomies, conceptual frameworks and theoretical systems (p. 14). Taxonomic theory is further broken down into "domains" "taxonomic classification" and simpler "classification schema" (ibid). Following this is a discussion of taxonomic classification principles (taxonomic schema) (p. 15).

Seels then goes on to explain how taxonomies, when used with conceptual frameworks — the only example of a conceptual framework is simply "communication theory, that "gain even more meaning due to the clarification of their relationship to other constructs and taxonomies." (p. 18). These "interrelated concepts (are) called a theoretical system, which has more power than either the conceptual framework or taxonomy alone because it can both explain and predict." (ibid).

To explain how these things are different, Seels states that while they all "link concepts" it is the "degree of development and nature of the links" (ibid). This is not explained except to introduce more distinctions ("conceptual systems" and "conceptual

structures" which are defined as "visual or verbal models"). However "conceptual frameworks have less explanatory power than theoretical systems which establish relationships deductively and inductively." (ibid). Also they "both systematically define relationships and guide empirical research." (ibid).

Seels is not done yet. She goes on to further refinement, "Theoretical systems, however, interrelate taxonomic description and conceptual models to the extent that propositions and principles..." [these are more newly introduced and unqualified terms] "...can be deduced or induced from each other and verified empirically." (ibid). Finally Seels summarizes by stating that "these three types of theory can be compared on the basis of their output. Taxonomies yield categories. Conceptual structures specify relationships through models or descriptions, and theoretical systems link propositions and principles with categories and models." (ibid). The summary is clear enough, however there is a vague use of terminology. It is not clear if she meant to use "conceptual models" instead of "conceptual structures," or perhaps "conceptual structures" instead of "models"?

Not only is this schema rather opaque and unnecessarily complex, but I have failed to find anything even remotely addressing the real issues that I have hopefully identified in the previous chapter.

There are two possible explanations for this. The first is that the various conceptual schemes of the instructional sciences (theories, models, taxonomies, frameworks, etc. as introduced in her article) are sufficiently incoherent that this was an honest attempt to make sense of them, and this was based on similarities and differences as well as intended use. The second is that Seels perhaps lacked sufficient time to properly

work this out and clarify her conceptual definitions, as there is evidence she is a highly skilled taxonomist, and this is admittedly no easy task (for non-philosophers, at least).

The conclusion is that this is an excellent example of the problems that epistemologies bring with it, in that unsuspecting victims can get caught in the black hole of infinite regress in what is essentially trying to define an ontology (and the topic of the next chapter).

Constructivism as Critique

Constructivism is essentially different from, but contains elements of both behaviorism and cognitivism. Constructivism turns outward from the internal processes of learning by bringing in the social and cultural dimension, and a belief that this dimension supervenes on not only inner states but behavior. What this means is that mental states and behavior do not occur in a vacuum but are part of a larger social and cultural environment that interactively "constructs" its reality. These beliefs originate in both the formalism of (Vygotsky, 1978) and the structuralism of (Piaget et al., 1991), and (Piaget, 1970). In their work, these developmental psychologists primarily demonstrated how knowledge and skills mastery was a gradual process of internalization limited by human development from childhood on to adulthood.

The similarity to behaviorism is in its treatment and extension of what is inherently metaphysical. While behaviorism believes that internal states are inherently unknowable, constructivism extends this to include the external reality, insofar that both are impossible to verify and any explanation of them is metaphysical. Regardless of whether or not an explanation is metaphysical is to construct belief, and even though it may originate as an individual's idea, it is largely a question of socio-cultural dynamics

that allows explanation to be accepted and consequently assimilated by other individuals. Those dynamics can also include empiricism, insofar that it can be described as s social or cultural instrument that in turn constructs fairly reliable knowledge.

Like behaviorism, constructivism holds a dependence on inductive methods to infer a correspondence between inner states and external reality through social and cultural activity. In this sense, constructivism is about the production of an interpretive ontology that correlates both mental states and behavior to social and cultural constructs. Constructivism, as a "pure" epistemology, makes no formal claims to prescriptive theory in and of itself and does not provide much useful guidance in theory construction.[61] This does not preclude that theories are not produced by the constructivist ontology insofar that many theories of social and cultural determinism, relativism and learning theories have been created from it.

The similarity of constructivism to cognitivism is in a belief that knowledge acquisition is bound to the limitations of mental processes on the one hand, and that there can be a "science" of representation on the other. To situate constructivism in this way, it will be useful to look at its ideological origins as a way to set the groundwork for change.

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61. One must turn to radical constructivism for this. (See Glasersfeld, 1995).

A short genealogy of ideological thought

> "Philosophers have hitherto only interpreted the world in various ways; the point is to change it."[62]
>
> —*Karl Marx*

Traditional instructional design, is an applied science grounded in empirical-behaviorist social sciences. The behaviorist social sciences are in turn firmly planted in the North American and British tradition of "naturalism" (Sellars, 1927), (Kim, 1988). This is in contrast to the European (continental) grounding of social sciences in structuralism rooted in the dialectical materialism of Marx and Engels. Constructivism of the Piagetan and Vygotskian kind extends out of the continental tradition.[63]

While there are many flavors and variants of the Marxist ideological epistemology they were effective ways of dealing with classical metaphysical issues of power and authority. In contrast, American ideology was, and is, traditionally pragmatic in that compromise and democratic social consensus would always trump any metaphysical claims in the process of solving problems (Kim, 2003). In contrast, continental ideological approaches were dialectically materialist in that the redefinition of social hierarchies would trump metaphysical claims to power in the process of promoting social change. American ideology did not have the problem of historical or metaphysical justification of

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62. Marx, Karl. (1888). *Theses on Feuerbach.* Appendix K, In Freidrich Engels *Ludwig Feuerbach and the End of Classical German Philosophy [Ludwig Feuerbach und der Ausgang der klassichen deutschen Philosophie].* Moscow: Progress Publishers.

63. Constructivism can be considered to have originated in Kant, but this is just a question of how "constructivism" is defined and used in the context of the learning sciences. According to Korsgaard, constructivism in the Kantian sense is that concepts "are the names of solutions of problems, problems to which we give names to mark them out as objects for practical thought." (Korsgaard, 2003, p. 113). While this seems precisely what constructivists are aiming

political power (as in traditional monarchies and their birthright claims to power and property rights) as an issue. This was largely due to the grounding of its social system in opposition to metaphysically justified political structures (constitutional authority and the guarantees of the American Bill of Rights). Therefore original American philosophy, specifically the pragmatism of Pierce and James, were more concerned with coming up with practical solutions to the metaphysical problems of maintaining the viability of the democratic system instead of changing it. (Rorty, 1966), (Shook & Margolis, 2006).

European philosophers, on the other hand, despite multiple wars and revolutions, were still preoccupied with social structures that seemed to maintain rather than resolve traditional power structures that were mainly justified by metaphysical historicism. The European approach to solving social problems, then, was one of critique — the metaphysical nature of social hierarchies in the maintenance and promulgation of power in *all of its forms*. In other words, Americans had already experienced the perceptual revolution and could move on, while Europeans were seemingly unable to shake off a deep sense of cultural despair over its ongoing struggle with its metaphysical imperialism.

Without regard for the capitalism vs Marxism debates, the American way demands functionalism in the sense that any descriptive or explanatory theory is pretty well useless unless it has some kind of practical problem solving value. Likewise, the European way demands instrumentalism in the sense that solving problems is fine as long

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for in terms of an analytical approach to instruction, the Kantian sense of constructivism is to guide moral and ethical action, metaphysical issues that are just not routinely discussed in the learning sciences. This is why I align the learning sciences appropriation of constructivism with the metaphysically sanitized instrumentalism of Vygotsky and the structuralism of Piaget. Korsgaard indeed argues that the notion of a functional constructivism of this kind is rather impoverished as we need "conceptions of the right and good before we know how to apply the (constructivist) concepts." (ibid).

as it is understood that the perception of utility of any theory as an interpretive instrument is determined by a correct perception of power structures. In a nutshell, the American way prioritizes the solving of problems first, and the European way says that it is largely a matter of changing the perception of the problem before solving it.

The noble goals of empiricism in both traditions were largely motivated by a *pragmatic* desire to be impartial or objective in a way that would eliminate metaphysical hierarchies on the one hand, and to provide practical solutions that were not tied to a particular ideology on the other.

The point of this terse depiction of American and European ideological traditions is to show how different ideologies are used in the definition of "problems" as well as how they are methodologically solved. Logical empiricism did not only fail with its naive approaches and assumptions about metaphysics, but once its scientific method became a powerful force for change, became ideological, essentially filling the metaphysical vacuum with an inversion of the principle of inductive inference (Popper, 1996).

Constructivism as an Instrument of Change

> "As soon as questions of will or decision or reason or choice of action arise, human science is at a loss."[64]
>
> —*Noam Chomsky*

The problems of Marxist ideology, which essentially is about solving the problem of change, manifests in the current critiques of instructional technology, but not explicitly

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64. Chomsky, Noam. (1978). *The Oxford Dictionary of Quotations*. Knowles, E (Ed.). Oxford Reference Online. Oxford University Press. Concordia University Library, Montreal. Accessed 18 March 2007.

framed this way. The demise of logical empiricism and the tentative first steps at adopting what are a collection of alternative epistemologies (such as constructivism) resulted in considerable existential debate over the entire field. Much of this debate is how to best proceed in the world of epistemic relativism, mainly with attempts at either shoehorning constructivism into a systemic prescription or the opposite, which is how to make a functional-genetic cognitive or behavioristic constructivism. Most of the issues and concerns have been of a practical nature, and ask questions like "how will constructivism preserve instructional goals" or "how will constructivism measure and assess learners" or "how does constructivism define and create content" or even "how must the process change to reflect constructivist ideals." Early attempts at creating instructional design methodologies based on constructivist ideas have been perceived as unsuccessful, spawning considerable hues and cries from the traditionalists proclaiming that in practice (and as poorly interpreted) just does not work (Clark & Estes, 1998) and (Clark et al., 2006) when the functional criteria of external stakeholders are clearly the motivation for the critique.

The desire to adapt constructivism as well as the critique of constructivist theories of instruction essentially comes down to the preservation of functionalist ideals. This is apparent in several recent proposals such as "functional contextualism" (Fox, 2006),"situated cognition" (Wenger, 1998), (Lemke, 1997) "cognitive flexibility theory" (Spiro et al., 1988), as well as other cognitive approaches to constructivism (Winn, 2004).

However, the misinterpretation and misrepresentation of constructivism in the field gave the appearance of "anything goes," as the bandwagon effect meant that everyone was trying to adapt their own worldviews under the banner of change (which in the mid 1990s happened to have CONSTRUCTIVISM printed on it in very big letters).

In other words constructivism appeared to be anything that was NOT behaviorism or NOT cognitivist (Seel, 2001), (Cronjé, 2006), (Merrill, 2004). At the same time, an apparent aversion to any political or ideological association with "change" which was presented as soft instrumentalis, such as "agenda building," as the route to solving structural problems in the field (Richey, 1997).[65]

The structuralist tradition from which my caricature of constructivism is linked, is fundamentally a critique of the ideology of materialism but with an instrumentalist stance, which means the analytical tools are useful insofar that they identify problem-solving concepts in a given context, as a result of giving up the notion that those concepts are naturalist or positivist.

My intuition (for a lack of a good historical reference, most accounts all seem to begin with "constructivism is hard to define...."), is that constructivism in the learning sciences became popular mainly for having an appearance of being a more sophisticated instrument than the ideological critical theory of Althusser, Habermas and the Frankfurt school, while at the same time focused on the critique of positivistic behaviorism and cognitivism.

A possible explanation for the critique of constructivism, insofar that it has failed to clearly define adequate prescriptions, is that it is fundamentally incompatible with functionalism. The problem is not a lack of theoretical clarity as in (Fox, 2006) and (Seels,

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65. This is yet another example of how epistemology fails to address the existential issues of instructional technology. While suspicious of "agenda building" as just being an emasculated ideology to avoid a negative interpretation, it appears that Richey is trying to describe the constructivist elephant blindfolded. The result just adds to the lack of coherence in instructional technology.

1997) but rather an ignorance of its origins as a critique of materialism, with its origins in *Socialism: Utopian and Scientific* (Engels, 1892).

The goal of structuralism is to merely show how meaning is structurally determined. Its analytical method is largely to show this over time as a *developmental process*. However this is just a perceptual instrument. The difficulty it seems, is understanding that this only sets a direction for change and does not offer a prescription for its implementation, other than rhetorical persuasion, to accept the validity of its point of view. In other words, constructivism in the Kantian sense of "concept in use" definitions takes on an entirely different character when distorted by the structuralist viewpoint, because the Kantian definition is reductive to the naturalism that is thesis to structuralism's antithesis.

The interpretivist point of view, coming from Rorty and Barthes, is that the postempirical and structuralist approaches, by not having good confirmation hypotheses, cannot create valid prescriptions beyond highly situated contexts and leave out some important elements such as morals, ethics and desire. These metaphysical attributes are powerful internal motivational factors in problem solving and decision making especially in ill-structured domains. In effect, the same problem as behaviorism manifests itself in that the already tenuous inference of motivational states to external behavior is skipped in favor of *structures* as the placeholders for socially determined moral and ethical systems. While this stance may seem natural, the post structuralists and neopragmatists wonder where the Self-as-agent and democratic enfranchisement (respectively) are situated. All this it seems, for a profound distaste for essentially the non-measurable and creative (as different than constructive) aspects of the motivation to learn and the coming to understanding.

What can be said is the lack of generalizable explanations that were problematic in logical empiricism cannot be restored as "soft" instrumentalism. The only way out is to drop epistemology altogether if the goal is to create functional prescriptions of constructivism. In other words, to be successful means to drop it, much in the same sense that Marx thought that communism would no longer be necessary once the revolution was complete. It is effectively only a means to an end.

Since design in the general sense of the word is about functionality, *constructivism of the structuralist kind can never aspire to have an adequate instructional design methodology, without it becoming something else entirely*. This is precisely why neopragmatism and poststructuralism offer prescriptive *possibilities*, because any previous or alternative epistemologies, regardless of ideological stripes, are inherently untenable when reduced to their ontological assumptions.

In other words, to effectively move beyond the critique of structure is not to offer another structure to replace it. The debate is not whether one structure is better than another, *but whether or a structure is really needed to justify beliefs.* This is the essence of the idea of human agency, democracy and freedom, that once realized will show that the scaffolds of knowledge are no longer necessary in a mature society.

In the tradition of the Jeffersonian ideological model, neopragmatism says that the interpretive power is restored to the individual but this is a question of balance, and delegation of that power to balanced structures of authority. In the tradition of the Marxist model of collectivity, poststructuralism says that the restoration of interpretive power to the individual is effective insurance against domination of any kind.

In both non-foundational approaches there are strategies and principles, as well as rules for executive judgment, but without perceptual limitation. In critique, this is the

other way around: The redefinition of perception resulting in previously held beliefs is a form of perceptual limitation, but considered the means by which perceptual freedom is obtained. If (structuralist) constructivism is put in the same category, then there is no choice but to move beyond it, as its job is nearly done. Any successful functionalization of constructivism *must be post structuralist* and not a return to platonism, classical hermeneutics, traditional pragmatism, Kantian rationalism or any other pre-empirical epistemologies.

The Jeffersonian ideological model implied the importance of responsibility and maturity that comes with constitutionally enshrined democratic freedom and individual rights, and not only the power sharing structures that were created to ensure that ideal. In the debate of the theoretical or epistemic foundations of instructional technology, this is essentially how to balance the need for knowledge and skill representation for instructional purposes, with the primary goal of creating autonomous, enfranchised and responsible agents, free of the baggage of externally imposed beliefs. This is essentially what is meant by Rorty in *Take care of Freedom and Truth Will Take Care of Itself* (Rorty, 2006).

What I suspect, and what I hoped to illustrate in this chapter about the crisis of discourse, is that the subjugation of perception and belief has been delegated to a system that has a very difficult time dealing with a reality of polysemic beliefs. Essentially epistemologies like structuralist constructivism — as critiques of other epistemologies — depend on the stability of an ontological substrate (and mainly how that is maintained dogmatically through empirical means). If that substrate begins to crumble, then a crisis of discourse will occur if all that can be discussed is the method of justification for holding certain beliefs, and that includes.

6. THE CRISIS OF METHODOLOGY

"Works of art make rules; rules do not make art."[66]

—*Claude Debussy*

"Art is a jealous mistress."[67]

—*Ralph Waldo Emerson*

The "art" and / or "science" of design

There is an age-old debate over whether design is "art" or "science" or some kind of unique synthesis. This debate has not escaped the discourse in the field of instructional technology, which has tended towards the science side in that it is grounded in the applied social science of education. In the last chapter, I characterized instructional technology as dependent on epistemology. What follows are examples from the application or prescriptive side of the field. This is to see how this dependency on epistemology is interfering with health of the patients, so to speak.

The first order of business is to determine whether it makes sense to cast instructional design as a science. This entails a discussion followed by a review of literature and the program curricula that train instructional technologists for any evidence that "design" is a creative activity. I then take a brief look at goals (as used in the context of instructional technology), and follow with a discussion analysis from the perspective of

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66. Attributed.

67. Emerson, RW. (1860). *The Conduct of Life.*

the needs of design, and then from the perspective of the developmental process of instruction.

The position I am taking is that design, instruction and learning are creative endeavors that might use science as an instrument but can't possibly use a scientific method to systematize the creative act of designing instruction. In this sense instructional technology is a lot like architecture.[68] However architecture (at least the less mundane kind) does not solve building and space problems so much as offer ideas about art, history, anthropology, sociology, psychology, physics, engineering, biology and the environment and integrates them into a functional monument. Architecture, in other words, is an interpretive science that makes no distinction in the value of human scientific, social scientific and non-scientific epistemologies for its creative inputs. This is not to say that architecture is without constraint in engineering or building sciences, but that architects are neither engineers or physicists. They do need to adequately interpret these practices, however. I really do not see much difference between architecture and instructional technology, other than the latter having considerably less constraint from the physics of structural engineering.

The fairly recent and generally accepted categorization of instructional design as part of a larger framework called "instructional technology" (Seels, 1995, p. xi-xii) is to say that it is an applied science (technology) of instruction. I view this taxonomic distinction as somewhat of a compromise in order to include Instructional System Design

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68. Despite this conjecture, there is a misconception of architecture as one of the remaining bastions of Modernism. While the Aufbau/Bauhaus movement embraced logical empiricism, there is virtually nothing interesting about it, at least compared to the "postmodern" school.

(ISD), which is essentially a methodology to create instructional content based on a systems theoretical approach. ISD is characterized by models that include to a large part the entire process of instruction, from the establishment of need, to the determination of content and its production, its implementation in the learning context and a feedback or evaluative method to measure efficacy and to make corrections (Smith & Ragan, 1999, p. 7).

The actual design of instruction itself is only a small part of the overall system, but it could be said that the entire system is something that itself can be designed, which can be somewhat confusing. The Association of Educational Communications and Technology (AECT) places anything that has to do with design, whether that is instruction or systems or whatever, under the general rubric, "Design and Development." It can be said that the design of systems is quite technical and makes good use of scientific principles of observable and measurable data in the formation of its models. One can also say that the actual design of instructional content is an area that has resisted attempts at making it scientific, but this is not the point. By placing the design of instructional content (instructional design) under instructional technology is to essentially claim that is (or should be) shaped by empirical enquiry. But as any designer knows, in actual act and practice empirical research rarely produces useful (as in generalizable) knowledge other than confirm that designers don't use empirical analysis very often (Visscher-Voerman & Gustafson, 2006).

To add to this confusion is the common perception that instructional technology is about the application of other hard technologies to instruction, such as with audio-visual and computer aids. While AECT includes "school media and technology" as a sister division to "Design and Development" to cover both hard technology (computers

and equipment) and media content, unfortunately many people equate instructional technology as being only about that. What does not help is that many educational institutions perpetuate this misconception and tend to dedicate considerable resources to the management and promotion of hard and soft technologies, which leaves "instructional design" as a mere adjunct activity.

I make these distinctions to account for two problems. The first problem is the ongoing difficulty of instructional technology in actually improving or enhance formal learning outcomes in a predictable, evolutionary or progressive way[69] (however I must emphatically state this does not mean the failure of hard technology in education). The second is that instructional design or instructional systems design has evolved little since the late 1960s and early 1970s with Mager's *Preparing Instructional Objectives* (1984), Bruner's *Toward a Theory of Instruction* (1966), Bloom's *Mastery Learning* (1971), Gagné's *Conditions of Learning* (1977), and Dick and Carey's *The Systematic Design of Instruction* (1978). This is largely because there aren't any better models, despite considerable effort to replace them.

Design in the Literature and Curricula of Instructional Technology

The art/science debate manifests itself in the academic literature of instructional technology simply to improve the scientific and empirical nature of the practice. The approach appears to be to distance instructional practice more from craft-based folk theory rather than art (Clark & Estes, 1998), (Bereiter, 2002). Others look at it from the epistemic perspective (Van Den Akker et al., 2006), (Banathy, 1992), (Cronjé, 2006), (Fox,

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69. However we still do a way better job than the prescriptions offered by educational and curriculum studies, in my opinion.

2006), (Hannafin, 2006), (Jonassen, 1997), (Merrill, 2004), (Spector et al., 2005) (as well as professional associations dedicated to the science of instructional technology such as the *International Society for Performance Improvement*, and entire publications such as *Instructional Science*). It is one of my goals to cast this as not only uninteresting, but unproductively missing the point.

The situation from the point of view of training of instructional technologists or designers is not much different. The latest available document on the state of instructional design curricula is from Winn (1995). However the article did not survey programs per se, but reviewed older literature to state that in general, programs have a "heavy emphasis on 'how to it' and less on 'why-do-it' [that train instructional technologists] in the practical skills of doing instructional design, message design, writing software and so on is a major force in shaping any instructional technology curriculum." (p. 2). However for Winn the intent of the article was a need to incorporate learning theories as in "perceptual and human factors theory, cognitive theories of learning and theories of how knowledge guides the way people interact with their environment." (p. 14) into the curricula. In other words, according to Winn, it was not the creative aspect of design that was missing, but rather better prescriptions based on the behaviorist, cognitivist and constructivist epistemologies.

A brief review of the five graduate programs in instructional "design" offered in Canada (as listed in the AECT curriculum database, which may be incomplete) show that indeed theory has been introduced, however no indication that design is somehow a distinct activity from the more practical engineering/development aspects of *production* (Concordia University, 2007), (UBC, 2007), (University of Calgary, 2007), (UNB, 2007), (University of Saskatchewan, 2007). There are 100 programs listed as offering

"instructional design" in the United States (AECT, 2006) (however some duplicates and dead links were found). A quick ad-hoc survey of programs from that list show essentially the same engineering focus as their Canadian counterparts.[70]

In this sense it would appear that indeed, instructional technology is a "unified science," in the blurring of the design and engineering development distinction, However the stated focus of the above sources are essentially perpetuating the belief that instructional design is about the constraints of production processes and empirical research that also support the epistemologies of learning.

This suggests that there are consequences for analytical and process methodologies, if design is to be radicalized in the way that I suggest. To start off, it will be important to discuss what drives both: *goals*.

Design as "Outside of the Box" Thinking

In this sense, design (in whatever guise) is not something that can be classified under a rubric of "art" or "science" because it is neither and at the same time it can be either or both. To borrow from the constructivist argument, it is what design *does,* as part of and as the result of its *activity*, that determines what it *is*.

Simply, the goal, or the result of design is to create the interpretive interface to things that will be used. It does so by knowing about how objects, symbols and activities are interpreted, and through its own practices, takes practical affordances and constraints and interprets those to create an interface that will achieve an *intended use* goal.

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70. As a call for future research, it would be valuable to find out how instructional technology curricula compares globally, and especially to other process-deliverable design practices such as industrial, environmental, graphic, interior design, and architecture.

While this might seem controversial in the sense that systems themselves can be designed (ISD, for example) which means essentially the selection of functional components and how they fit together, I contend that this is really something different, which is in fact, engineering. The distinction and perhaps the confusion stems from the fact that systems design is about the *successful* definition and interfacing of its components. However the creation of automata, which is to mean any autonomous, mechanistic processing, is not the domain of design, but of engineering.

The difference is that engineering works from specifications and design does not. Design *produces* specifications, in effect, from *criteria.* In this sense the *interface* between design and engineering is the *specification,* in effect a conceptual scheme (see chapter 3), and it is created by the designer. The principal criteria of design, as stated previously, is the goal of intended use. Therefore, analysis from the design perspective serves a different master than from the engineering perspective. In this sense design is always looking "outside the box" to the future (how will this be integrated?) and to the past (how has the problem been solved before now?) and to other contexts (are there similar problems in other communities and cultures?) for inspiration. In other words design is about creating a hypothesis, a "what if" scenario. In contrast, engineering analysis is to take the "what if" scenario and look at the hardware and available materials to determine if the design can be realized (and at what cost).

Design and engineering are always pushed forward in tandem, whereby new tools, better materials and procedures provide an expansion of design opportunities. Yet unfulfilled solutions to design problems push forward the expansion of engineering solutions. However in the day-to-day symbiotic relationship, creative design is about *imagining* what does not exist, and creative engineering is about *creating* what does not exist.

In other words, design essentially lives in the abstract, whereas engineering lives in the concrete (no pun intended). The creativity of both practices is to push the envelope of the possible beyond the mundane constraints of what can be imagined, and what can be realized, respectively.

My argument is that the crisis of methodology is due to debates that intend to unify design with *engineering*, to treat them both equally as empirical "science" This is essentially the dualism of art and science, and it is strikingly similar to the analytic/ synthetic distinction of logical empiricism. If this distinction is untenable, as I believe it is, it should be dissolved.

Redefining the Process

> Achilles had overtaken the Tortoise, and had seated himself comfortably on its back.
>
> "So you've got to the end of our race-course?" said the Tortoise. "Even though it does consist of an infinite series of distances? I thought some wiseacre or other had proved that the thing couldn't be done?"
>
> "It can be done," said Achilles. "It has been done! Solvitur ambulando. You see the distances were constantly diminishing; and so–"
>
> "But if they had been constantly increasing?" the Tortoise interrupted "How then?"
>
> "Then I shouldn't be here," Achilles modestly replied; "and you would have got several times round the world, by this time!"
>
> "You flatter me -- flatten, I mean" said the Tortoise; "for you are a heavy weight, and no mistake! Well now, would you like to hear of a race-course, that most people fancy they can get to the end of in two or three steps, while it really consists of an infinite number of distances, each one longer than the previous one?"
>
> "Very much indeed!" said the Grecian warrior, as he drew from his helmet (few Grecian warriors possessed pockets in those days) an enormous note-book and a pencil. "Proceed! And speak slowly, please! Shorthand isn't invented yet!"[71]

A process, in its most simple definition, is a sequence of events whereby something gets transformed. The interpretivist line of thinking state that a process isn't the observational evidence of things changing but its *description.* This distinction is similar to Davidson's third dogma of empiricism, (the content-context distinction), (Davidson, 1984b) or Ricoeur's notion of interpretive action (Ricoeur, 1976). Essentially, their conclusions are that what is known and believed to be true is relative not to the physical evidence, but to conceptual schemes. In this sense a process is a conceptual scheme, and when I use the word "process" or "model," I am referring not to an actual observable activity but to its *description.* This characterization will be useful to focus on the effect of interpretations of activity, rather than static concepts, into descriptions and models.

A process generally describes an activity that is generative or creative. To be more specific, something is produced by the process. A scientific way of describing a process is a transformation by way of synthesis, and that energy is expended for the synthesis to occur. Processes are both ways of *describing* naturally occurring transformations, and as ways of *prescribing* transformative action.

In the first sense, naturally occurring transformations are interpreted into logical explanatory statements of relationships between entities that in turn become the conditions required for the transformation. In the second sense, the prescription, explanatory statements about entities and relationships are interpreted to create an intentional process, that if implemented, would be able to produce a *predictable* or a desirable transformation. In other words, processes are a convenient construct for the rationalization or formalization of activity, natural or intentional.

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71. Carroll, Lewis. (1895). *What the Tortoise Said to Achilles.* Mind 4, No. 14. p. 278-280.

Processes as typically thought of as linear, meaning they have discrete steps that follow one after another, like steps in a recipe. Processes can also be broken down to show other interdependent processes (these are usually called *systems).* The classic view is that processes are mechanical in the sense that required elements and activity are deemed to effect the transformation that the process describes.[72]

Describing or prescribing a process is really not much different than other forms of theoretical description, but with one big difference: descriptions of transformative action can be rather complex and can require a good deal more elaboration, which is why models tend to be created.

Instructional design, or more specifically Instructional Systems Design (ISD) is often characterized as a system, model or theory that produces instruction (Merrill & Twitchell, 1994). The different ISD or ID models (of which there are many) typically describe a linear path divided up into (more or less) discrete processes such as "analysis," "design," "development," "implementation," and "evaluation," which is the familiar ADDIE model. Regardless of methodological differences or what the individual components are named, instructional design processes utilize resources in the transformation of existing knowledge or activity which, in turn, transforms the learner by way of induction.

If all of the data gathered in a needs assessment are then synthesized to create a lesson plan, textbook or even an entire course with a test at the end, it is possible to

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72. There are of course many more ways of describing processes and systems. The overly simplistic description here is not meant to take away from a huge body of work in systems theory and other holistic or non-mechanistic process descriptions.

visualize a huge gamut of possible raw materials and transformations as well as the interdependencies between them.

As discussed in the previous chapter, the difficulties in creating taxonomies based on theoretical or epistemic ground has largely created incoherence in the ontological status of various entities that are concerned with learning, knowledge, activities and production. This has resulted in literally hundreds of alternative models, that are essentially ad-hoc taxonomies that might shed some light and help clarify many of the ontological ambiguities inherent in the competing epistemologies of ID, ISD and learning theories. By ad-hoc taxonomy, I mean the segmenting and classification of parts of the design process that occur when models are designed become a de facto ontology, even though it might not have been intentional on behalf of the modeler.

The effect is the creation of belief in the taxonomy, ad-hoc or not, is the way things really are. If the radical interpretivist position is taken, in that beliefs are relative to conceptual schemes (Davidson, 1984a), it is the conceptual scheme itself that creates the taxonomic problem, maybe because taxonomy is *the* problem of process description in the formation of design specifications. My use of Lewis Carrol's *What the Tortoise Said to Achilles* was meant to illustrate this point: that the tendency to perceive and create problems based on logical constructions when they may not be there to begin when the distinctions are erased.[73]

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73. Nowhere is this more obvious than in how prescriptive analysis results in deficiency interpretations (Taylor & Strobel, 2006). For example, the taxonomic distinctions made in the field of learning disabilities is a result of a deficiency interpretation, just because of an appearance of attentional or cognitive processing difficulties when compared to a normalized sample. Once the process of dividing learners into categories based on apparent difficulties without adequate criteria for what learning really is, it is difficult to stop making further distinctions based on context, subject material, family, etc. in a sense, infinite regression.

In this example, Carrol is referring to Xeno's Paradox, which is the classic problem of infinite regression. In the original parable, the tortoise challenges Achilles to a race across the room, only to win because he poses a logical problem. That is, in order to get from one point to another exactly half the distance must be covered first. In order to cover the remainder of the distance, half of its distance first, and so on, in an infinite regression, therefore unable to ever reach the other other side of the room. This creates an illusion that motion is not possible, yet common sense says it *is* possible.

Carrol's liberty with Xeno's story has the tortoise conveniently inverting the problem to show how standard inductive logic (Modus Ponens, in this case, which states that if A is true and B is true, then C must be true) can be shown to be equally paradoxical and problematic. This is a logic problem, one in which underlies the limitations of description, and not a problem with the empirical reality (which I am sure could care less about how people go about carving it up into conceptual chunks). In other words, the apparent complexity of instructional design, as the sheer number of taxonomies, frameworks, theories and models can attest (Seels, 1997), may not be there in the sense that it is only an illusion, created by a form of infinite regression. In other words, ignorance of the interpretive effect of the epistemologies of *learning* makes it appear that more constructive instructional design is impossible when instinct and experience says that it is. In fact, good classroom teachers don't need and seldom use instructional design models because they are too difficult and time-consuming to implement, yet instruction and real learning happens without the models just fine.

To resolve the problem is not to eliminate processes or to come up with a better model, but to step back and apply a relatively simple holism much in the same way that it is relatively simple to solve Xeno's paradox. That is, no matter how many times the

distance between two points can be divided, they all add up to one, and this is precisely my point about instructional design models: no matter how much instructional design is systematized and redefined to include (more or less) complexity, it all must add up to the singular transformation of the learner. The conclusion is that just because it is possible to divide up the distance between two points does not mean that those divisions are really there. They are just instrumental projections, meant to provide convenient milestones to tell us how far along we are and how far we have to go in the process.

In other words, the overall goal of instructional design is to get from point A to point B (the transformation of the learner) by way of (mediated by) the transformation of knowledge and activity into content. From that idea a few core assumptions about the process can be made, as follows:

1. There will be content (knowledge/activity or conceptual schemes).
2. There will be a learner.
3. The transformation of content is related somehow to the transformation of the learner.
4. There is a learning context.[74]

If any of these assumptions are removed, the process definition of instructional design is not only lost, it would be some other process. In other words, these core assumptions form the minimum criteria for any model of instructional design.

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74. It is interesting to point out that learning and instructional theories are primarily focused on the last three assumptions and only secondarily deal with the first. This is due to the fact that questions of content, typically epistemic and ontological considerations, vary considerably from domain to domain and usually thought best to be left to the "experts." This only adds to the argument that the epistemologies of the learning sciences don't do much for design.

What is interesting is that the singular purpose of instructional design and its core assumptions are the "I" in ADDIE. This means it is possible to go little further and postulate that "implementation" must be the dominating and determining element for anything that comes into contact with it. In other words the "whole" is the goal of instruction, which is *change in the learner*, and that any subprocesses should always be subservient to the "I". However this is not how instructional design is typically modeled.

Modeling processes and larger systems is nothing new, but nonetheless systems theoretic approaches such as Systems Inquiry (Banathy, 1992) can be beneficial here to illustrate how a key process, as a focal point, has a supervening relation on any number of subprocesses while not necessarily containing them. In other words, the tendency to put supervening relations inside a larger process leads to an illusion that they are intrinsic properties of the larger process, where in real life no such definable "boundaries" exist.

The example comes from the familiar linear and sequential instructional design model, which gives (more or less) equal weight to the ADDIE subprocesses, where the output of one subprocess feeds into another. The first subprocess is analysis, the results of which are fed into the design subprocess as metrics (parameters). The result is a design specification, which is then fed into the development subprocess. The content is assembled, which is then delivered to the implementation process. The results of which are then evaluated in the final step.

With very few exceptions, alternative ID or ISD models offer variations on the ADDIE theme. Other elements are introduced, or the sequence is altered, or iteration and recursion is added. While not all models specify all the subprocesses or their process methodologies, there is typically an assumption that analysis will determine the needs of

the process and that some form of evaluation will provide evidence that the investment of resources in the process was worthwhile.

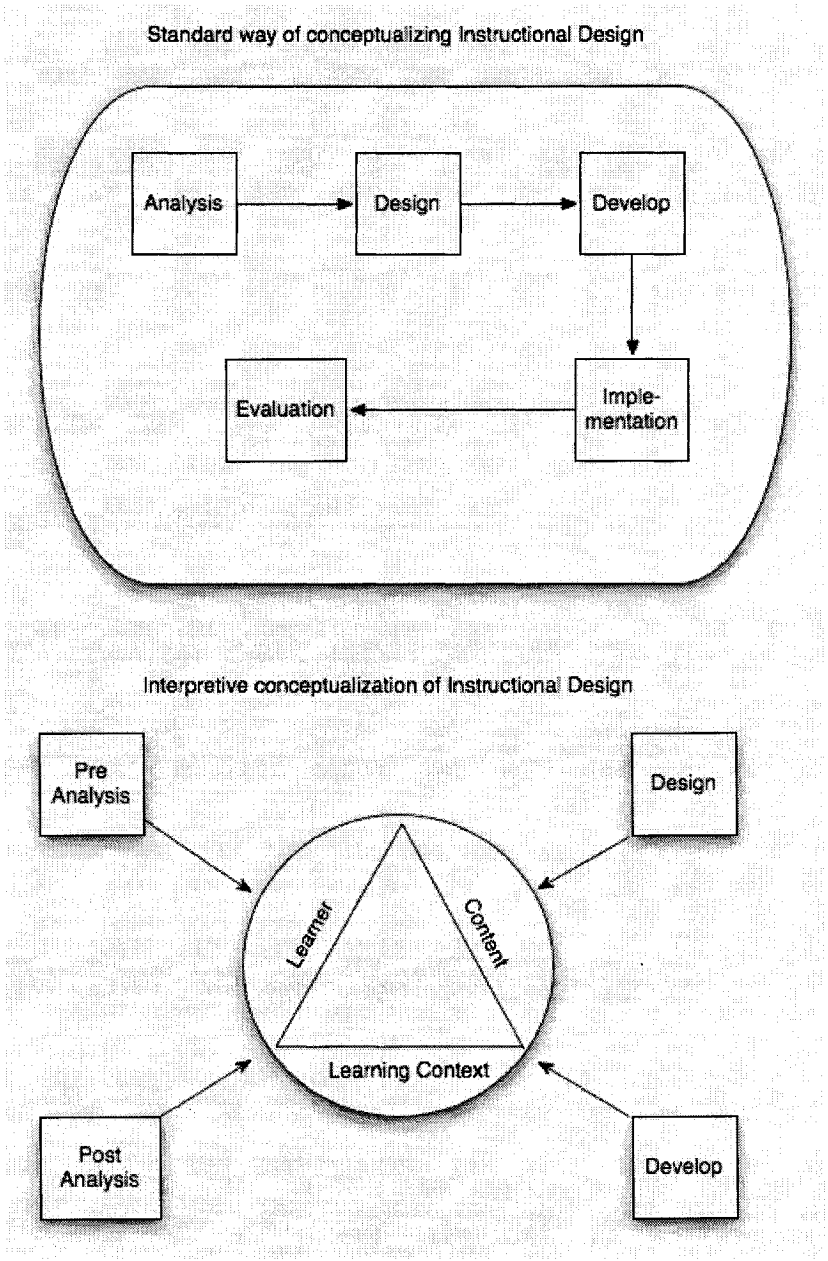

Figure 1: Empirical vs. Interpretive instructional design processes

Subprocesses other than Implementation, while technically optional, are added for both practical reasons and as a result of various theories about learning. For example, "Evaluation," (which is really post-analysis) by way of measuring the change in the learner or the effectiveness of the design, is not an essential component and is present to provide evidence that the resources expended resulted in a desired change in the learner. "Design" and "Development," are also non-essential but justified by the belief that content (or the learning context) can be organized in a methodical way that enhances learning. The same can also be said for "Analysis," which is primarily there to provide guidance for the other processes, based ideally on empirical identification of factors deemed to be contributing causally to the instructional process. Each subsystem is meant to support the core assumptions in that they must add value to the main process.

Additions to the process of instruction should enhance, facilitate and render more effective or efficient in what it changes. However, if sub- or supporting processes are competing for resources and also have their own agendas, there is a risk of diminishing, rather than enhancing instruction. For example, it is a common criticism that instruction is often designed to suit the needs of evaluation. Behavioral limitations, such as the old saw of "observable and measurable" instructional objectives and other beliefs about learning and instruction, as well as the difficulties in identifying appropriate desired outcomes, have the effect of rendering instructional implementations subservient to the analysis subprocess. Finally, the lack of adequate resources for design and development subprocesses, which manifest themselves typically as inappropriate or untested design and production methodologies, will invariably weaken instructional implementation.

A useful comparison can be drawn from motorized transportation. The automobile (or more accurately the *driving activity*), can be considered a process for getting

things and people from one location to another. An automobile has various subsystems, such as propulsion, steering and braking, and controls that are essential for the car to move, maneuver and stop moving. Each of these subsystems can be considered competing for resources (space, mainly, and perhaps the attention of the driver) and each subsystem carries with it weight that comes with an added fuel consumption cost.

Consider that each of the subsystems has a unique goal that can be in conflict with the main process. For example, the braking subsystem is in direct conflict with the process of getting from point A to point B. Brakes do not contribute to the need of forward momentum, which is a requirement of the process, so in essence they are optional. However not being able to stop due to the nature of the environment in which the car operates might actually prevent getting to point B, so it makes good sense to have them. The added fuel consumption and space that is used due to the braking system is considered a worthwhile trade-off, even though it does not directly contribute to moving the car forward.

Finally, if not enough resources are committed to any of the sub-processes, getting from point A to point B might be inefficient, slow or dangerous enough to make the process not worth the energy cost. By the same argument, non-essential instructional design sub-processes are retained mainly because they are a worthwhile trade-off when the larger environment is considered.

At this point, I have not really added anything to the debate over the instructional design process. As I stated in the previous chapter, critiques in the form of alternative instructional design models begin with similar conceptualizations and then go on to construct what should be a better process or system model. My project is to arrive at a re-conceptualization that should be obvious: *it is not what it is that is important in describing a*

process and modeling it, it is what it does. This can be extended to say that what a process does, ultimately determines what it is. The standard way is backwards: which is to figure out what it is, divide it up because it appears to be dividable, and then wonder why productive work can't be achieved by using it (Popper, 1996).

By going back to the automobile analogy it is possible to reinforce this logic — it is not the descriptive properties of a car that makes it a car, it is getting people and things from point A to point B. This can be extended further to say that the effect of having this activity modifies the environment (road networks and traffic control systems are created, for example) and in turn, the automobile's properties are modified and continue to evolve due to environmental contingencies (the need to stop and avoid accidents, for example).

What should be clear is that there is a supreme activity that fixes basic requirements, but it is the *effect* of the activity itself as it interacts with its environment that determines the evolution of its intrinsic properties. Since intrinsic properties are inherently variable, it makes little sense to use them as definition. The alternative is to define things according to what they do, which conveniently solves the problem of infinite regression (the bad habit of dividing things up into smaller and smaller chunks). It is the naiveté of the implicit ontological behavior of logical description. Or what happens when epistemology is expected to stand in for serious thinking about metaphysical issues, like those that pop up when logic problems create distractions of the kind that interfere with the goal, which to Achilles, was getting to the other side of the room.

To reiterate, what instructional design does is transform a learner inductively through the transformation of knowledge and/or skills and/or or an environment. Its base requirements, which are more or less fixed, are the learner, content and a learning context. Its extended properties (such as analysis, design, development and evaluation) are

in turn determined by a dialectic with the environment which is evolutionary and adaptive. This is important for my argument insofar that it uncovers where and how often transformations take place, which in turn shows where and how often interpretation is likely to occur.

The problem with modeling is essentially trying to make static of what is moving, and even with dynamic models and chaos theory all that is being done is attempting to better mirror nature. However there is promise in using models as a learning tool, if only to demonstrate the flawed nature of epistemic representation.

Instructional vs. Process Goals

> "Whether we like it or not, the ultimate goal of every science is to become trivial, to become a well-controlled apparatus for the solution of schoolbook exercises or for practical application in the construction of engines."[75]
>
> —*Aharon Katchalsky-Katzir*

The traditional way to characterize applied science is that it is an informed and rigorous method to solve problems. Instructional technology can also be characterized the same way – it is supposed to be a scientifically informed methodology to solve problems in learning, instruction and/or performance.

This implies several things: that there is an analytical method to pinpoint the problem, there is an analytical method to concretely arrive at instructional goals, there is an analytical method for determining content requirements, there are constraints regarding deployment and there is a development or production process. Typically there

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75. Katchalsky-Katzir, A. (1963). Nonequilibrium Thermodynamics. *International Science and Technology*. p. 44.

is also some kind of feedback and correction mechanism that provides formative information to ensure that quality control is maintained. So far, this does not look much different than other applied sciences like dentistry or engineering or anything else that produces a product or fixes a problem.

The difference is in how problems and goals are defined, and how much analysis or information is gathered in order to create instruction in a systematic way. By this I mean that typically the system and methodology for producing instruction is not about effecting change in the learner than it is about the preparation of environments and the contents of that environment that will (hopefully) effect change in the learner. This is reflected in the domain definition for the "Design and Development" division of the Association for Educational Communications and Technology (AECT) as follows:

> Promotes the quality and effectiveness of teaching and learning through the acquisition and application of knowledge, skills, and dispositions to design conditions for learning, develop instructional materials and experiences and evaluate the adequacy of instruction and learning. (AECT, 2007)

What is not explicit in this definition is what the whole thing is supposed to be used for. In other words, what is the ruler by which quality, effectiveness and adequacy, (in other words, *value statements*) are measured.

If all of the possible problems and variables that must be controlled in order to achieve these any of these goals are considered, it is possible to cast the entire activity as one of metadata management. It is in the metadata, or everything that is outside the actual learning process itself that defines instructional technology as an applied science. This implies that 1. there is an analytical methodology for arriving at the metaknowledge and 2. the analytical methodology anticipates and corrects deviations by reference to

some goals that are either intentional (learning goals or outcomes) or intrinsic to the various process methodologies themselves.

This is another way of saying that the goals of the entire applied science of instruction is to solve a specific instructional problem, and nothing more. Every other goal simply dilutes this prime objective.

Design Goals

"It is the theory which decides what we can observe." [76]

—*Albert Einstein*

Design, in its most general sense, describes a creative process that takes into consideration prerequisites and constraints in order to influence a (productive) outcome. Instructional design, for the most part, makes the claim that learning outcomes can be influenced and measured in a way that is scientific, or empirically significant. The interpretive disciplines such as art, literature and communications also play a role but typically are secondary in importance.

The rigorous and diligent categorization of observed experiential data, interpreted through a perceptual framework or "theory," is the defining feature of both logical empiricism and educational practice (not just instructional design). This is achieved through analytical methodologies that identify the ontological elements of learners, content and environments, and how they should be interpreted.

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76. Quoted in Werner Heisenberg, *Physics and Beyond: Encounters and Conversations* (1971), pp.77.

The main argument for treating instructional design as an empirical practice is that virtually all instructional design models have an analytical component and that empiricism is sufficiently rigorous and reliable in its methodological approaches. The link to learning theories is strong, and differentiation is largely a question of shifting the unit of analysis. For example, in behaviorism it is the observable and measurable behavior that constitutes a desired performance, in cognitivism it is information processing and finally constructivism (loosely) it is the contexts of which knowledge and activity emerge. It does not matter if the process is linear (front-end analysis) or non linear or participatory (Willis, 1995). At some point content and activity are analyzed. It also does not matter if analysis is qualitative or quantitative — the results are decisively empirical — which is to say based in direct experience.

From the interpretivist perspective, any attempt to abstract or explain any type of phenomena empirically is interpreted through a quilt of historical contexts: a patchwork of personal experience leading up to culture and society and its institutions or "communities of practice." At the basic level theory is an ontological system of differentiation and classification, leading up to higher level theories of rational activity and explanation. Theory, in the social and natural sciences, are meant not only to describe or predict but to provide explanatory meaning. It does not matter if the resulting expression (interpretation) is intended as instruction or not: this what Rorty calls the inescapable "theory dependency of data descriptions. [therefore, we must] ... accept that there is no (such thing as) theory-free interpretation." (Smith, 1993, p. 24).

Logical empiricism and its successors more or less depend on a) making correct ontological assumptions about the object of enquiry, its characteristics and its behavior, and b) correct assumptions about the *measurement* of a set of characteristics and behaviors

have been made. Making the right distinctions and classifications (ontological and taxonomic) when we do science always lacks certainty and is essentially a metaphysical exercise. Equally difficult is analytic reductionism, which is mainly about creating a reliable method of measurement. From an interpretivist position, measurement actually constrains and prevents anything *new* that can be learned (Feyerabend, 1988), which is ironically contrary to the spirit of instruction.

Design invariably involves content and its delivery to a learner. It does not appear to matter if the design process is authoritative, participatory or self-directed; the objective is to acquire knowledge and/or a skill, and this invariably involves a theory that is most likely a number of statements of fact intended to be truth statements. The unstated goal of the empirical approach to instruction is to make learners analytical and reductive themselves.

This is done by the selective isolation and elimination of a large chunk of sense data and other (most likely wrong for a given learning context) ontological possibilities that exist in the context and the learner and replacing it. In effect, empirical instruction is about training people to see things that correspond to a theoretically derived truth statement, which is, when first encountered, an abstract concept for the learner.

What happens is the goals of empiricism too easily become the unintended instructional goals for learners, which is training to be a measuring and interpreting instrument of theory, once an instructional designer has been assured of the truth-value of the content produced as instruction. The analytical statements of the instruction then becomes the reference by which educators calibrate learners when measuring knowledge and skill. This approach is even apparent in so-called "interpretivist-constructivist" instructional models like ICON (Black & McClintock, 1995), (which I contend in the

previous chapter such a representation is not tenable). In other words, it is not how learners interpret themselves as a goal of instruction, but how well learners can be made to fit into preconceived notions of knowledge and skills (that are at best built on faulty assumptions).

Instruction, as theory about a given subject or domain of study, is in direct conflict with the learner's own theories (which can be deeply embedded as beliefs) and without sufficient cognitive skill in the negotiation of dialectical conflict, only makes the matter of interpretation worse.

What is particularly striking about this description is that there is a huge gap between the beliefs about the context in which ID analysis is conducted and the learner, once the ID process has run its course. What fills in the gap, in effect what controls the existence of the ontology is the epistemology, for both the designer and the learner. The effect is that the analysis is not working *for* the designer or *for* the learner, but rather the designer is at the service of the epistemology of the content, and subsumes the learner as a consequence of the process. This is because the epistemology needs to produce a given analytical result, whether that is knowledge or a particular skill or a combination of both.

The result of what is evaluated in the learner is the ability to negotiate, adopt and replicate sense-data interpretations of a given epistemology, and not what personal sense-data or even alternative and equally valid beliefs actually describe.[77] In addition to the incommensurability of the learner's history and sense experience is the beliefs of the

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77. There is growing evidence that this is the case. In particular the work of Valerie Walkerdine, a situational cognitionist, whose research with girls and mathematics education shows that even top performing students could not make change in a grocery store. Her conclusion is that learners only apply what they learn in the learning context, in other words the only place that knowledge and skills associated with mathematics is in another math class (1997).

designer of the instruction, who has perhaps unwittingly delegated control of the interpretation of contexts, and is therefore just an instrument of theory. As a matter of course, few instructional strategies deal with learning contexts and the dialectical negotiation of meaning (Laurillard, 2002). These strategies are a reaction to bad theory construction.

What I am leading to is the idea that a good theory of instructional design is that it is meta-theory, in the sense that learning theories provide the interpretive frameworks for the transformation of knowledge and activities into prescriptions. These prescriptions, the result of interpretive analysis, eventually become packaged as instruction once processed through several other transformative stages until it reaches the learner. Designed instruction is a form of theory construction, which is simply what is the best way to learn what or learn how a given subject. In other words, a theory or epistemology about instructional design is a meta-theoretical activity.

As a meta-theoretical activity, design analysis is ideally nothing more than problem analysis. As I have stated in chapter 1, this is the essential problem — how to create a methodology for solving problems based on and designed for other people who themselves need to solve problems. While this sounds simple, it is an extremely high order skill, and one that requires an adequate way to deal with metaphysical issues inherent in content and activities.

Radical Instructional Design

On the one hand, instructional systems design with its process modeling and systems approach works relatively well as an engineering solution to the problems of analyzing and producing an instructional solution. On the other hand, the process produces an instructional product (content and strategies) that I have characterized and personally witnessed as problematic and less than satisfying. Most of us, and I mean "us" by those who have a vested interest in the applied learning sciences, and those people to whom our designs are thrust upon, and the sponsors who keep us employed, have experienced it in a way that begs the question why it seems impossible to create *emotionally* satisfying instruction other than by sheer luck or accident.

By comparison to television, which, at the commercial network level, has a considerably heavier process methodology than instructional design, manages to keep audiences glued to the set, even through the inconvenience of scheduling and the annoyance of advertising breaking the flow of attention. What makes a series or show good or bad is what comes *before* the production process. To state this another way, bad ideas make for bad television, and it has not much to do with the production process. The television production system itself is about quality control or rather production values, of which there are only expensive and cheap versions (other criteria come into play but they are reduced to cost considerations. The corollary is that vast sums of money do not make bad ideas good, and as far as I know, there is no science of "good ideas." On the other hand a good idea can transcend the limits of low cost production processes and succeed in spite of low production value. So the factor determining good or bad television is not money, and it is not with how the system works to maintain quality control.

Of course television is the same as designed instruction in that what determines a good show from a bad one is highly subjective. However in the case of instruction this is really a poor excuse, as there are ways of establishing criteria and subsequently measuring the impact of instruction for agreed-upon success or failure as generally instructional technologists have a closer relationship to the consumers. And by this I mean independent of how well instruction is rated on the so-called "smile sheets" (the instructional equivalent of the Nielsen ratings). So in a sense, poor learner experiences *are* subjective but learning outcomes are *not* if their assessments are done well (Kirkpatrick, 1994)

The notion of the poverty of ideas is nothing new in television, as the expansion into cable access effectively upset the traditional balance of power from the networks to independent channels that invested in good ideas instead of hardware, production processes and distribution infrastructure. Until cable networks came along, the big three American networks did not have to invest in ideas for content because people did not have a choice other than to turn off the TV. It would be easy to say that there is an equivalent "poverty of ideas" in instructional technology, but that is not my point. The field is losing ground to the competition, and just like television, losing out to the Internet, which is proving to be a better idea when it comes to content. This is because giving ideas free reign in the creation of content is usable *in ways that cannot be anticipated or judged,* which is not unlike the argument used to justify the disassociation of knowledge and its application in our institutions of learning.

People are turning off their TVs and they will turn off education in even greater numbers than they do now. Instruction alienates too many people, and leaves too many behind — it is not too hard to imagine what will happen when there are viable

alternatives that will surpass the low standards that are in place now — and it will not be easy to abdicate responsibility by blaming lack of resources, learners, governmental and market pressures or whatever. In effect, the system is not to blame. It is in the restriction of ideas that select the inputs, and create the plans, and draw up the specifications for the engineering or production department. This is within the grasp of the field of instructional technology, who unfortunately seem to have abdicated responsibility in favor of the ideas coming from epistemologies that aren't even native to the field.

What are needed are good scriptwriters, in effect, and less technicians. Also creative people are needed inside the production planning department that know how to interpret the script into something that is produceable, in other words creative directors and producers that know how to foster hard solution creativity and understand the need to maintain an original vision. This not only happens routinely but the television (and film) production industry is organized around these principles. How this can be achieved in instructional technology is alluringly simple, and that is to free design analysis and instructional specification from its epistemic moorings, and the nonsensical belief that design (or learning for that matter) can be quantized (controlled systematically).

I do not believe that any other design-based practice kills creativity quite like instructional technology. However the difficulty in making this type of statement is that in other fields, the "artistic" component varies enormously from one area to another. This is also a problem from the engineering perspective, where there is considerable appropriation of the word "design" to mean "engineering." Hence the idea for Radical Instructional Design.

Radical Instructional Design means getting to the root of design as the creative act of solving the problem of creating creative problem solvers. While that appears to be a

mouthful, it means that once there is a realization of the meta-process nature of design within the field of instructional technology (as widely accepted even in other engineering-oriented fields like architecture) is that Lonergan style learning outcomes become congruent with the design process as *idea-generating*. In effect, Lonergan's *Insight* is all about where ideas come from, and his particular insight was how this seemed to be driving the learning process itself *before* the external and structural formalization of knowledge. In other words, radical instructional design, as the idea generating activity for the subsequent engineering production of instruction, mirrors Lonergan's theory of learning. With this conception, the goals of instructional design, the goals of instructional content and the intrinsic goals of learners are in perfect alignment.

While this sounds great it does not solve the problem of practical constraint. However this is what science and instructional technologists already do exceedingly well. As I will outline in my conclusion, the task will be to develop an *interpretive* philosophy of science, as the study of the "design-engineering" (integration) dialectic, as well as other supervening relations of learning and instruction. There are clues that this might not be so hard if the field of instructional technology is willing to accept that design and engineering activities are fundamentally different (but compatible), with different analytical approaches, different inputs and different outputs.

CONCLUSION

The issue to me is that the elimination of metaphysics not only makes for bad instruction but also makes for poor designers for the same reasons — the richness of possible learning experiences are curtailed even before the constraints of process engineering, as functions of time and cost constraints, muddy up the high level goals that stakeholders want and instructional technologists seek to fulfill. In other words, ideas are frowned upon by the empirical epistemologies that require a reduction to physical facts. This makes it very hard to promote ideas like Lonergan's theory of cognition, which cannot be reduced to what is valued most in learning, which is the pleasure derived from the tension and release of inquiry through insight, or arriving at an idea (1970).

What drove my personal inquiry was not that there is a poverty of ideas (and there appears to be in most of our designed instruction, at least the ones that follow the current theoretical prescriptions), but to understand how instructional technology effectively suppresses ideas in the creation of content. Why is it that a good book, a good movie or a good TV show (despite the inconveniences of advertising and travel and time), can hold our attention, but not a textbook, a classroom lecture or some e-learning? Why is there a problem of transfer? Why don't extrinsic motivators work? Why is it so hard to apply what is learned?

The result of this inquiry, which is not framed this way, was meant to be an experiential narrative, to take the reader himself, who should be familiar with the field of instructional technology, through the often confusing and incoherent world of learning theories, at arriving at some interesting and plausible ideas that might be worth pursuing. This thesis was really about exploring the consequences of a science without metaphysics,

and to arrive at the "idea" idea. This personal exploration led to some interesting revelations.

The first was that it is not a problem of theories providing interpretations, and not allowing us to think for ourselves, but the revelation that epistemology can be a diversionary device that is often used to justify unstated beliefs. The next revelation was to find in the neopragmatists a way to preserve theory but at the same time dispense with the meaning-producing apparatus of epistemology. This is essentially to strip down the system to its belief framework, the "conceptual scheme." The third revelation was to find that the neopragmatic approach is not a throwback to platonism, thomism, romantic hermeneutics, phenomenology or any other pre-rationalist system. It is completely compatible with a scientific approach and is not ashamed of technology. In other words, it is a potentially productive way out of the problem, and not just critique.

The solution is deceptively simple, yet hard to grasp if one thinks that having an epistemology is the only way at arriving at justified knowledge, meaning and beliefs. In other words, the neopragmatists show how to refine a problem and come up with some specifications for its resolution, which is more than I had hoped to accomplish when I started this inquiry.

What this allowed me to do, and I hope this was sufficiently cogent, was to show how the out-sourcing of our knowledge justification system to foreign interests, while providing convincing evidence that these "foreigners" spoke the same language as the instructional technologists, might have been a big mistake. While appearing low-cost and low-effort, the field effectively lost control over what it was permitted to believe, especially with regards to the metaphysical problems that designers of all stripes face in the execution of their work. In effect, the theories of the learning sciences, all of them

successors of logical empiricism, are not ours, and seemingly as nobody was looking, set themselves up to appear indispensable.

However I am not calling for outright divorce from empiricism and the theoretical foundations of the learning sciences as much as I am interested in putting it them on a leash. This first step requires making a stand, and boldly proclaiming independence from theories that are self-serving in their analytical approaches as well as their interpretive explanations that handcuff designers and impoverish learners. To believe that an empirical epistemology can help the design process is science fiction and not science. It does not make sense that even theoretical physicists and other practitioners of both the natural and human sciences (having taken the lead from Newton, Einstein, Bohr, Darwin, Weber, Lévi-Strauss, and others) understand the limits of empirical or other epistemologies, and how they must be effectively undone when the problem is ill-structured or when the data no longer fits the process model, effectively how to learn something NEW, which is what is often lost sight of in instruction. It goes without saying that other design fields embrace the power of unstructured analysis in the generation of ideas, which is what we naturally do when learning.

In these other fields that incorporate a design element, the real issue is one of interpreting ideas into specifications, and *design integration*, or how an idea is carried through to its production and execution with fidelity. I contend that instructional technology has done well at modeling design integration, but failed miserably at the task of idea generation because the empiricists threw the architects in with the plumbers, in a manner of speaking, which was not healthy for either group. The effect was that engineering was elevated in stature but design was diminished to the point that it is now difficult to distinguish between the two in virtually all instructional design models (all

models put design as integral to the process where I contend it should be separate, like in other design fields).

The final revelation is that there is a potential solution to the design "problem," and this asks the question: How can creativity and "design sense" be cultivated for the purposes of instruction? While one option is to examine other successful design practices that integrate technology, I believe that the synergy of the neopragmatic and post structuralist analytical methods open the doors themselves to tremendous creative possibilities by drilling through the fallacies generated by epistemic structures and calling their bluff.[78] These approaches are not epistemological in the sense that they tell us what to see, but rather, they are heuristics that *show us how to look.* Since heuristics are what I believe to be the singular purpose of designed instruction, more than any other design field, a radicalization of design is justified and warranted. I sincerely hope this simple idea is not lost on the reader.

As a designer coming from another field — graphic design — I found it funny that the field of instructional technology does not model its creative practices or allows itself to be informed by other design practices but seeks inspiration in psychology. While my argument in this thesis point to foreign learning theories and their antecedence in logical empiricism and *its* project to eliminate metaphysics, I found it sad that the entire field seemed to be in denial of what is now encouraged in even the "pure" sciences. Every domain has moved on, it seems, to a healthy relationship between metaphysics and empiricism and the new style of "non-epistemic" philosophers are effective, respected, and help to stimulate creative solutions to the existential dilemmas all productive sciences

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78. In *The Wizard of Oz*, when his true identity was discovered proclaimed, "Don't pay any attention to that man behind the curtain!" (Leroy, & Fleming, 1939)

encounter. For that I have no explanation for the disapproval and absence of higher order philosophical criticism in our field, other than what could be attributed to self-consciousness over a lack of training and skill in matters philosophical, or an inferiority complex about being the "poor cousins" of academia. If the field of instructional technology is impoverished metaphysically, it might be because it took its own prescription and does not want to accept that the medication has only a marginal effect — while at the same time too busy conducting research on better pill bottle designs to do anything about it.

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This thesis is unconventional and somewhat of an experiment. Producing a philosophical analysis in a technology program that emphasizes empirical research and the practical applications of designed instruction was risky. This is in the sense that the empirical emphasis on instructional technology research leaves little room to discover and and understand the essential needs of the design activity, which I have emphatically insisted is a priori to empirical confirmation. I did not need to conduct any empirical research as this obviously would have not been able to explain much without an a priori idea that the process of instructional design was missing the a priori. In this sense, my thesis is really just a needs assessment for the entire field of instructional technology.

Essentially the need of designing instruction, as well as any other design activity, is primarily freedom from epistemology for the act of conceptualization (among other things). What this means is conceptual creativity is found in the a priori of knowledge, which is in the extra-rational, unstructured raw feels and sense-data that are abstract and internal, therefore not easily researched empirically. While it may be true that there are

no pre-linguistic interpretations, this does not imply that there is not a closer relationship between the internal source of ideas and the unstructuring of what are essentially ad-hoc and abstract conceptual schemes. In other words, in order to design successfully requires both the metaphysical and the physical, however the creative, abstract, imaginative generation of ideas is much closer to the non-physical aspects of interpretation than empirical science.

My strategy then, was to demonstrate that not only the design activity, but the production of knowledge and the theoretical foundations of the learning sciences are not well served by empirical confirmation as it disadvantages the creative process. Problems require metaphysical reflection and unstructuring if the questions that a field asks of itself and of others are to be better defined. If this type of analysis is not integral to practice, the choice of empirical problem solving methods and the confirmations they provide are nothing more than a negative dialectic, which is a criticism of its objects of analysis and an impoverishment of the interpretive experience. The post-analytics of the neopragmatists and the post structuralists is a legitimate attempt at redressing the deficiency model of empirical analysis.

The experiment is an attempt to demonstrate how an interpretivist post-analytical method works to first unstructure some given truths in order to find out the hidden beliefs, and whether or not being told what to see and believe is an effective problem solving strategy. The justification for this approach comes from a simple idea that learning, in and of itself as an internal, creative process, essentially must follow the same path. The same can be said for the design activity itself.

As I have tried clarify, the learning sciences, and subsequently the practice of designing instruction as an application of that science has its process in reverse. This is

simply that learning is not how external structures are mapped internally and become congruent, but rather it is the process of insight, as generating ideas *about the possibility of external structures* that in turn motivates activity, which results in knowledge. What instructional designers do now is start with knowledge, work backwards through a designed activity, and hope that the logic of the structure and its characteristics will be retained and used by learners.

But what is really operating in this method is the reliance on the empirical justification of what are essentially refinements of other ideas (which are still hypothetical possibilities of structures), which effectively denies the pleasure that is experienced when one arrives at an idea on his own. This denial of pleasure also stymies the desire to confirm and test the possibility that the idea has correspondence to external structures. When learning happens naturally, the desire for the confirmation of ideas stimulates positive activities. Those activities in turn motivate the refinement of ideas, and success means epistemic and institutional structures are built, as well as formalization into documented knowledge. In other words, the history of learning and knowledge and the entire gamut of human activity does not start with formal structures, but *ideas about them.*

This is to say that there is a powerful motivational force created by the highly personal *possibility* of structure that comes in the form of an idea, and ultimately this manifests itself as a desire to learn more about how structures are formed, and what are essentially the ideas behind them. The intuition is that the sourcing of ideas can become an effective analytical approach to the content problem in the design of instruction

What should be obvious here is that the current instructional analyses do not look for ideas but facts. I contend that most people can do better (learning *what* and learning

how) on their own, and right now there is more and better choice available through the relatively chaotic and unstructured Internet.

Where designed instruction can do better than just sourcing relatively well-confirmed and quality-assured knowledge and activities, is in problem solving and executive skill. In other words, virtually any activity that requires a degree of autonomous situation assessment, confirmation, decision-making, action-taking and reflection. The real test of these skills are when situations and problems are ill-structured, or when a large number of supervening relations compete with the given facts. In other words, solving these types of problems requires ideas that cannot be systematically produced, otherwise there would be considerably more automation than is currently the case. This is essentially what makes human activity valuable in the larger social sphere (and why mindless jobs pay so little), and this requires an active metaphysic.

What this means is that instructional design analysis should be about how ideas are the starting point for all knowledge and activity as preceding the facts. Designed instructional activities should follow the same path as this is how knowledge and activities are created in the real world without the benefit of academic support, which in turn provides evidence that there can be such a thing as effective learning.

To bring the discussion full-circle, and my desire to produce this thesis, is also where I believe instructional design should now focus its developmental efforts. In consideration of Lonergan's ideas about the creative process of learning, and inspired from Susan Sontag's final sentence in her essay *Against Interpretation*: [79]

In place of an epistemology, we need an erotics of instruction.

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79. The actual sentence is, "In place of a hermeneutics we need an erotics of art." (Sontag, 1964).

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