My Recursive Introduction to and Journey into Systems Thinking and Its Related Concepts

Jeffrey W. Bloom
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From time to time, I have pondered what events, what people, and what actions have led to where I am now. It is curious how our lives seem to stumble along despite our dreams, our goals, and even our best laid plans. I left high school hoping to be a marine biologist, which I did for a year, then became inspired to teach children, which I did for six years. And, then entered my career as a professor of science education, teacher education, and curriculum studies. In this paper, however, I'm going to try to avoid doing a linear presentation of my life and how I became involved in complex systems and Batesonian ideas. However, for the sake of depth of meaning, I will provide a brief description of my childhood contexts, which I believe set the stage for what was to come. After this introductory description, I have organized my thoughts within a number of thematic strands based on Bateson and complexity.

Early Contexts and the Beginnings of Complexity

I entered the scene as a newborn late in the child-bearing years of my parents and almost two decades after my brother and sister were born. At that point in time, we had a black and white television and a rotary phone. My father worked in a factory operating a metal lathe and my mother stayed home to care for me and to take on the role of housewife that was typical of that time period. Although my father dropped out of school after grade 5 (at the beginning of World War I), he was a genius about all things structural, mechanical, and electrical. He was a 1950's-style techie, limited to TV's with tubes and cars with carburetors and no seat belts. He moonlit by wiring houses, fixing TV's and radios, and doing various handyman tasks. At home, he fixed his car, did all of the house repairs and house construction projects, and repaired any appliance that broke. During my elementary

school years, he excitedly set up a stereo system (the first ones had just hit the stores) with speakers all over the house, then invited all of the neighbors over to stand between the speakers and listen to a ping pong ball bouncing from one side of the room to the other. My mother dropped out of high school after grade 10. Unlike my father, she loved to read and do crossword puzzles. And, she was always on the lookout for something that would ignite my curiosity and passions… from books to chemistry sets, from erector sets to water color. But, both of my parents encouraged me and helped facilitate my interests, and provided a fertile ground for curiosity.

During my father's vacations, we would either take a trip or go stay somewhere for a period of time, which was usually with my aunt and uncle or with close friends of my mother. We also took day and weekend trips. My older sister (who was like a second mom) took me to New York City to see a Broadway play and would regularly take me to museums and the zoo in Philadelphia. Although we were a lower middleclass working family, my needs were met and we had enough money to travel and buy some of the newer appliances that were starting to emerge (e.g., dishwasher). Our trips around the eastern half of the United States did expose me to a variety of different sub-cultures and to a variety of ecosystems. These trips and visits to museums introduced a certain appreciation for the beauty found in nature, the arts, cultures, and the sciences.

At the same time, like many of the less educated people of that time and in that region, my parents had the typical prejudices towards anyone different from their white, European, Protestant backgrounds. Although my parents were not as extreme as some of the people in my extended circle of family and family friends, it was certainly a noticeable characteristic. As a young child, it would have been easy to grow up with the same biases

and worldviews. However, I can remember always being bothered by the expression of bigotry, which was even expressed by a few teachers in elementary school. I can still feel what I thought the children of color must have felt when one teacher in particular expressed her bigotry in our third-grade class. While my aesthetic appreciation grew out of experiences of beauty, my empathy grew out of expressions of ugliness.

Many of the complexity and Batesonian concepts were experienced way before I understood the nature and extent of these concepts. In a way, this experiential background provided for the triggers that resonated with me when I did read or hear about the concepts. So, when you are reading about the thematic strands, I did not necessarily know what they meant until many years later.

Setting the Stage

As I mentioned, my parents provided support and encouragement, as well as experiences from traveling around the eastern half of the United States and with fishing, camping, and exploratory excursions. However, it was the continual support of my curiosity and interests that set the stage for events that were yet to come. Some of these stage setting circumstances included some of the following events.

When I was 12-years old, my mother bought me a book that was the first one to change my life: *Lady With a Spear* (1951) by Dr. Eugenie Clark (a pre-eminent authority on sharks) – which ignited my first real passion. I followed up by writing to Dr. Clark about getting more information on sharks. She replied, saying she was too busy, but suggested I write to another shark researcher closer to me in Sandy Hook, New Jersey. A few weeks after writing to him, I got a couple of pamphlets about sharks and a jar full of preserved

shark embryos. This series of events was the beginning of a passion for learning and for pursuing my interests by whatever means possible.

A couple of years later, Woods Hole Oceanographic Institute gave me a live Smooth Dogfish Shark. My father, my high school chemistry teacher (and mentor), his brother, and I drove to Woods Hole, had a tour of the facility, then picked up the shark and drove back with the shark in a 50-gallon drum my father had rigged up in the trunk of his car. It was about a 30-hour trip with no sleep. A few days later, my teacher, who lived around the corner from me, drove me to school and asked how the shark was doing. I said, "not good. All I can do is pray for him." My teacher, said flatly, "won't help." And, that two-word response shook my world… not immediately, but the ripples of disruption to my personal epistemology (in Gregory Bateson's sense of epistemology) grew exponentially over the next few months. This series of events was a classic example of the "butterfly effect," where one small event can have much larger effects. I stopped going to church, and avowed to myself that I was an atheist, and began thinking about my "philosophy" of life. I was still extremely naïve, but that marked the beginning of a life of inquiry and questioning.

Then, a few years later in the beginning of my sophomore year at university, I was helping to greet incoming freshman. Although shy and reasonably naïve, I always tried to extend myself, especially when faced with meeting young women. So, on this occasion, I was talking with an attractive young woman with a strong Georgia accent. At one point early in the conversation, she looked at me and asked me what I thought about the war in Vietnam. Frankly, I hadn't really put much thought into it. And, this little question, led to yet another major shift in my epistemology.

At the same time, pot and psychedelics were becoming more popular. The social and political contexts began to go through major changes. While encountering opportunities to engage with the new drug phenomena, I resisted, but started reading about them. During this time, my father was dying, and I transferred to a small Quaker liberal arts college at the end of the fall semester. I arrived on campus in the midst of a year-long seminar series on radicalism. I was being primed with the recursive patterns of the cultural movements, several series of stochastic events, and a new set of friends. The stage was now set for a whole new life. My childhood and familial outlook, worldview, assumptions, expectations, and so forth were being completely undermined and overthrown. The linear sequentiality of life, the linear cause-and-effect thinking, thinking in terms of black-and-white/right-and-wrong, and all the rest were coming to a crashing end.

The Recursive

As suggested by Catherine Bateson (1994) in her book, *Peripheral Visions: Learning Along the Way*, meaningful and relevant learning tends to be a helical pattern throughout our lives. We may encounter some new idea or set of ideas, which may seem to disappear from our thinking, then some event triggers the re-emergence of the thematic strand, which has been morphing and embellishing subconsciously. This re-emergence is tapping into the recursive nature of learning. Each time these thematic strands loop back, we further elaborate on the ideas with new experiences and new tangents.

I suspect that most of these recursive strands are not memorable. We may not even be all that aware of some of them. However, a few that seem to have had an impact on me will be described briefly below.

During my college years, a popular theme in some courses and outside of class among faculty and students was the interplay between different contexts or systems (we didn't necessarily refer to them as "systems," but they were systems). Vietnam, Middle East, Democracy and Politics, Mind, Spirituality, Ecology, Perception, Reality, Civil Rights, Women's Rights, Racism, and so forth were among the most popular topics that were discussed from multi-contextual views and were themselves the multi-contextual views. Students and sometimes faculty could be found sitting on the grass on campus or in the dining hall talking for hours about these topics. Sometimes we met at faculty homes and at other times in our dormitory suites and rooms. Franz Fanon's *The Wretched of the Earth*, W. J. J. Gordon's *Synectics*, Timothy Leary's *The Psychedelic Experience* (based on *The Tibetan Book of the Dead*), Tom Wolfe's *The Electric Kool-Aid Acid Test*, Abbie Hoffman's *Steal This Book*, Rachel Carson's *Silent Spring*, Paul Ehrlich's *The Population Bomb*, Paul Goodman's *Compulsory Mis-Education*, and Gordon Taylor's *The Biological Time Bomb* were among the more popular "underground" books on campus. These and other books drove many of our conversations. To this day, these readings and bits and pieces of these conversations re-emerge with new connections to contemporary issues and experiences.

Multiple Perspectives and Transcontextuality

As in the previous sections, multiple perspectives and a sense of transcontextuality had its roots in my liberal arts background and the rather intense interplay between contexts during the late 1960's and early 1970's. The Vietnam War, Racism and Civil Rights, Women's Rights, the politics and corruption in the White House, the impact of music and poetry, the influence of the arts, psychotropic drugs and their influence on thinking and

perception, spirituality, and the quest for meaning were all interacting and providing multiple perspectives from which to examine everything else.

From this point forward, I perceived and examined things differently. As I looped through different activities and interests, I was fascinated with seeing things from different contextual perspectives, examining how multiple contexts were intertwined in any given "issue" or "phenomenon." But, my initial studies with Gregory Bateson, then collaborations with Tyler Volk, and eventually with Nora Bateson, along with children with whom I worked as a teacher and researcher, and along with various friends and colleagues, all of whom pushed me in the direction of transcontextuality and the array of perspectives that arise.

Children naturally think in transcontextual ways. When I came to this realization in 1989—1990, I saw the connection to Gregory's work and called this view of children's thinking and learning *contexts of meaning* (Bloom, 1990; see the "Epistemology, Meaning, & Context" section, below). In fact, this way of thinking seems to be the norm, but it is destroyed as children progress through school, where learning and teaching become lifeless, linear, discrete boxes of disconnected information.

Patterns & Relationships

Patterns and relationships became increasingly significant as I went through my early college years. My increased interest in photography, my inquiries into personal relationships and social dynamics, and our many discussions about the interrelationships between different contexts that comprised the societal and political dynamics and protests of the time led to a developing sense of pattern and the importance of relationship. But, it would be a few years before Gregory Bateson's *Steps to an Ecology of Mind* along with

studying with him for part of a summer, began to put these experiences and perspectives on patterns and relationships into a more cohesive frame.

These ideas began to seep into my teaching of children in the mid-1970's, then my teaching of adults in teacher education programs the late 1980's. A decade or so later, I came across a book, *Metapatterns: Across Space, Time, and Mind*, by Tyler Volk (1995). I looked up Tyler and made contact. It was not long before he visited my university and conducted a workshop on metapatterns, which was followed by yearly get togethers to talk and work on projects together. I began incorporating metapatterns into my research and placing more explicit emphasis on them in my courses. And, then, a few years later, I re-met Nora Bateson and eventually started using her film, *Ecology of Mind: A Daughter's Portrait of Gregory Bateson*. I developed a freshman introductory seminar course called "Ecology of Mind," which was based on working through each "chapter" of Nora's film. Again, the patterns and relationships chapters were heavily emphasized in this course.

Nonlinearity & Systems

Having studied ecology in college (not many colleges and universities had ecology courses at the time) and having worked as a marine ecologist, along with those years in college of discussing and exploring the nature of mind, it was not a big leap for me to spot a relatively new book on a shelf in a bookstore in Greenwich Village (a section of New York City). The book almost leapt off the shelf as I walked by. It was Gregory Bateson's (1972/2000) *Steps to an Ecology of Mind*. A few years earlier while still in college another book leapt off the shelf: *Meditation in Action* (1969) by Chögyam Trungpa. Both books changed the direction of my life and converged around 1973—1974. A few years after reading *Meditation in Action*, I ended up becoming a student of Trungpa's and when I

moved to New York City in 1974 to work as a school teacher, I moved into the residential meditation on West 20th Street in New York City. After the first year, my girlfriend at the time and I decided to attend Naropa Institute, which was established by Trungpa. The course we signed up for, with great enthusiasm, was a *Workshop on Education* with Gregory Bateson. It was there that I was infected with systems thinking and other Batesonian ideas. I also met Lois Bateson, Gregory's wife, and their 7-year old daughter, Nora.

Of course, systems are recursive. 29 years later I met Nora again at the Gregory Bateson@100 Conference in Berkeley, California. It was like meeting a long-lost sister. And, we've been working with one another ever since.

Figure 1. Gregory Bateson enacting Shakespeare's Henry V.

But, the intersection of Buddhism with systems is intriguing. I have not put any concerted effort at aligning the two, but my gut reactions and cursory thinking see a great deal of correspondence. Buddhism is not about trying to "make" something happen, but about observing and trying to understand how mind and the world works, while letting go of any particular allegiances to particular beliefs or ideas. At the same time, cybernetics and systems, especially from Gregory's perspective dealt with "mind" as well as with ecosystems and social systems of all kinds. And, I think this is why Trungpa and Gregory got along so well. Both of them were

inquisitive without being dogmatic. They both saw the world as dynamic, and, at the same time, saw that thinking about how the world works required a certain rigor in our thinking processes.

Epistemology, Meaning, & Context

From the moment that my high school teacher seeded the collapse and rebuilding of my belief system, I began to take a more explicit interest in the development of my personal epistemology. Although, at the beginning, I didn't even know the word, "epistemology," I was thinking about my own philosophy of life. And, slowly, I began to realize that I aligned with developing conceptual understandings rather than just memorizing. I was a terrible memorizer, but I did notice how my notes in classes and when studying included diagrams and interconnecting lines and arrows. I *had* to see the *relationships*. I needed to see how everything interconnected as a kind of flow of information.

In college, even though I was a biology major, I found my art history, philosophy, psychology, history (more of a history of social justice), and film courses to be of profound interest. These courses contributed heavily to the details and overall orientations of my epistemological development.

Fast forwarding almost two decades, I began a research study into children's ideas about natural objects and phenomena. As I was analyzing the data with my graduate research assistant, I realized that what I was looking at was what Gregory Bateson had discussed: context, meaning, and multiple perspectives (and double description), as well as children's personal epistemologies. I was looking at the complex interplay of emotions, values, aesthetics, personal experiences, school-type knowledge, metaphors, fantasy,

humor, and so forth. I began referring to this complex as *contexts of meaning*, which were both personal and social (Bloom, 1990, 1992a, 1992b, 1995, 2006). The overall nature and patterns of contexts of meaning were similar across cultures, even though the specific informational details varied. In Canada, children's contexts of meaning related to "forests" contained details about hunting, fishing, cottages, hiking, as well as about trees, flowers, and animals, along with details about emotional and aesthetic reactions. In India, tribal children whose nomadic families live in forests, the details of their contexts of meaning were focused on food and medicines found in forests, as well as their emotional and aesthetic reactions from the perspective of survival. The same sort of cultural variations were found among children in Lebanon (Bloom, Ramadas, Chunawala, Natarajan, & Dagher, 1993—1996).

Empathy & Aesthetics

I always was on the more empathetic side of the spectrum, although I succumbed to social pressures as a child and pre-adolescent, when we veered into the awful treatment of wild animals. But, fortunately, this period did not last long, even when I was witness to the incredibly awful treatment of animals by co-workers in the animal "care" unit of a big pharmaceutical company (when I was in high school) and again by co-workers in a biological and chemical supply company (while in college). Later, I had the final and notable experience of spear-fishing at lunch when I was working in marine biology. I speared a fish. After which, all I could hear was the fish grinding its teeth in pain. I ate the fish and told him, I would never spear or catch another fish. I gave away my spear gun and my fishing equipment, and never killed another fish. These experiences along with my introduction to Buddhism and to Gregory Bateson, anchored my worldview with a strong

dose of empathy. Along with this progression towards increased empathy, I noticed an increase in an aesthetic appreciation, of aesthetic responses, and of aesthetic perspectives of the world around me. However, it's the aesthetic that sees the beauty in the ordinary, the beauty in what might be considered ugly, and the beauty in in-between spaces and places that have been more powerful in terms of my thinking about systems, relationships, patterns, and all the rest.

Figure 2. One of the observational studies Gregory Bateson introduced us to during the summer workshop at Naropa Institute in 1975. Included here: baby raccoons we adopted for the summer and an excerpt from my notebook.

The Development of Complexity in My Professional Work

The previous sections discussed many of the experiences that have contributed to my interests and engagement in the complexity sciences. And, although my official career was in science education, my interests have spanned many different disciplines and contexts. However, in this section, I describe briefly a somewhat sequential development in these ideas within my academic research career.

My dissertation research in the mid-1980's focused on student problem solving of ill-structured biological problems that were based in concepts from evolution, such as

adaptation, form and function, and so forth (Bloom, 1987, 1987 April). Even though I was still influenced by Bateson's work, I had not yet put his ideas into a cohesive framework. But curiously, this research danced around the notions of complexity, including epistemology, transcontextuality, patterns, relationships, recursivity, and so forth. In this study, I primarily used a theoretical framework based in information processing, problem solving, and the nature of scientific thinking. Also, during my doctoral work, I conducted a study of the epistemological dynamics in biology graduate programs, even though I did not make the connection to Batesonian epistemology at the time. In this study, Kuhnian revolutionary vs. normal scientists fostered similar orientations in their graduate students and how these orientations affected thinking and epistemological (again I had not made that connection to the Batesonian conception of epistemology) constructions (Bloom, 1988 April).

As I began my academic career my first study focused on the epistemological orientation towards science and evolution among university education students (Bloom, 1989). I extended this study with one that examined the same sorts of epistemological orientation among scientists in the major university science departments (biology, chemistry, physics, and geology) (Bloom, 1988—1989, unpublished research, but addressed throughout chapter 3 in Bloom, 2006,). Looking back on both of these studies, even though I did not discuss the epistemological orientations of the students and scientists, I was developing a grounding in epistemology that would be expanded upon, but still not referred to as epistemology in my next sets of research studies. In addition, I can see how I was beginning to develop further groundworks in transcontextuality, relationships, patterns, and recursive systems.

Previously, I mentioned my work with children that led to the notion of "contexts of meaning" (Bloom,1990, 1992a, 1992b, 1995). But, again, I did not explicitly connect this work to Batesonian epistemology or recursive and complex systems. However, I did see the connection to multiple perspectives, relationships, context, aesthetics, and meaning. The contexts of meaning framework consisted of a variety of components or aspects that were involved in children's meaning-making and sense-making. These aspects included (a) school-type conceptual knowledge, (b) emotions—values—aesthetics, (c) personal experiences (episodic memory), (d) stories and elaborations, (e) metaphors and analogies, (f) humor, (g) beliefs and interpretive frameworks, (h) morphisms and centrisms (e.g., anthropomorphism, zoomorphism, anthropocentric, etc.), (i) visual imagery in various forms, and (j) transpositions (e.g., imagining that oneself is an earthworm or whatever).

In 1995, conducted a study in which I taught a middle school science class on "floating, density, buoyancy" while audio and video recording each class session. After presenting a few papers on this research, I submitted a version to the *Journal of the Learning Sciences*. While addressing reviewer concerns, I had an epiphany that completely changed the theoretical framework from which I was analyzing the data. This epiphany was the realization that the multi-day student argument about density was a complex, dynamic system that also involved the students' contexts of meaning and other epistemological components (Bloom, 1995, April; 1995, June; 1996, April; 1996, November; 2001).

In the midst of this previous study, I also began to delve into the dynamics of learning as a non-linear system that was similar to the learning dynamics in the evolution of organisms. In this particular "thought-study," I primarily used the work of Stephen Jay

Gould (1996) and Gregory Bateson (1972/2000, 1979/2002, 1991) to formulate a model of learning based on variation, non-linearity, and non-progressivism (Bloom, 1998, April).

At about this time, I began focusing on patterns and metapatterns, which was stimulated by a return to Gregory Bateson's (1979/2002) work and to the work of Tyler Volk (1995) and his book, *Metapatterns: Across Space, Time, and Mind*. In this work, I developed notions of pattern thinking and metapatterns as (a) subject matter that leads to transcontextual understandings, (b) analytical tools for research across and between contexts, and (d) design tools in teaching and across diverse contexts (Bloom, 2000, April; 2001, March; 2002, April; 2003, March; 2004; 2004, April; 2004, October; Bloom & Volk, 2007; Bloom & Volk, 2012; Volk & Bloom, 2007; Volk, Bloom, & Richards, 2007).

In the midst of my work with patterns and metapatterns, I also began to expand on and integrate complex systems concepts with a more comprehensive framework based on Gregory Bateson's as well as Nora Bateson's work and the compatible work of others. In addition, I began utilizing this new expanded conceptual and theoretical to my education classes (at undergraduate and graduate levels) and in a university-wide freshman seminar, which I named "Ecology of Mind" as an introduction to university learning, but more importantly to complex systems thinking. Within the umbrella of complex system thinking (which has to do with multiple interacting living—social systems), I included relationships, double binds, patterns—metapatterns, context, cybernetics, aesthetics, mind and ecology of mind, epistemology, difference, changeability, biological ecology, abstraction and map is not the territory, as well as a variety of social, political, economic, and political issues.

Throughout all of my teaching I began focusing heavily on teaching in ways that manifest what I am teaching. So, that teaching about complex systems had to involve

teaching in ways that manifest complex systems rather than teaching in the traditional linear, lecture fashion. I valued the schismogenesis that arose in classroom communities, as encouraged emergence of new directions and inquiries (Bloom, 2012a, 2013).

My research also expanded to complexity and creativity (Bloom, 2014), the nature and dynamics of relationships in teaching and learning (Bloom, 2012b), and the implications of Batesonian ideas on qualitative research (Bloom, 2016). In addition, and since joining the International Bateson Institute, I have opportunities to extend my thinking to how systems learn and get unstuck in therapeutic and schooling contexts, as well as within the context of addiction (Bloom, 2017). All of this research has opened up new perspectives on the transcontextuality of systems and how learning is a major factor in stuckness and non-stuckness of living systems – from the individual to social and institutional as well as within all living organisms from the individual to the ecosystem.

Final Thoughts

We experience random thoughts, events, and connections all of the time. And, in some instances, these stochastic occurrences lead to the emergence of some "thing" (i.e., event, area of interest, relationship) or to a bifurcation or deviation in our thinking or life path. Most wash away like silt in a river. But, then there are others that seem to have made a *difference*.

Stochastic or random event and bifurcations occur all of the time. What

Excerpt from:
"Observations at a Laundromat"

middle-aged couple sit and stare in different directions
wandering in little fickle hidden worlds…
he breaks the cool silence – "gotta cigarette?"
then, off to "Bronco"-buster-pinball
filling space of missed moment of muddled awareness.

a familiar almost-lover's face appears among the crowd
an exchange of updated soon forgotten tidbits
… then off into the night
leaving behind the whirling colors
of human hearts and human minds
awkwardly awaiting clean sheets.

if I had not taken a job in New York City? What if I had not met my girlfriend at the time? What if I had chosen to follow another spiritual path? What if I had not picked up *Steps to An Ecology of Mind* or *Meditation in Action*? Would I have ever met and studied with Gregory Bateson? I could have taken any number of actions and made all kinds of decisions, but I ended up winding my way through a maze of possibilities and then spending part of a summer studying with Gregory.

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