

## The AI decades

At some point in the future, one will find extensive discussions about the AI decades. These discussions will be characterized as being within a regime in which AI, Artificial Intelligence, domination over natural science stretched into an ancient past. We live in a time not so informed. In 1988, the year that I earned a PhD in mathematics<sup>1</sup>, there was very little to indicate an emerging problem. While scholarship about natural intelligence was there, it was obscured.

During the same period, scholarship on education was about protecting the integrity of educational institutions. The processes involved in school and in higher education herded young scholars into intellectual pens. Those raising certain issues were discriminated against. Education came to be about conformance and about standardization. Every individual was encouraged to follow prescribed viewpoints. It is true that some independent viewpoints were to develop, but all too often these are defined as a counter point.

The climate in education is a reflection of cultural histories, and some of these histories induced positive outcomes and some did not. Perhaps one might agree that some negative outcomes from education were part of a process that created economic-over-consumption and a blind eye to certain categories of moral-consequence. The point is that a primary force in education was to deny any problem with educational methods, while the trend in society was to recognize a deepening crisis.

As recognized in 2008 by President Obama, the crisis in education was the most difficult cultural crisis faced by his administration. He made public comments. I may paraphrase. Without fixing the processes by which the American citizen is educated, it will be exceedingly difficult to alter the root causes of political and economic instabilities. My view of this crisis in education is addressed in *The Education Bridge*, where a conjecture and a proposal are made<sup>2</sup>. The conjecture is that our educational philosophy is purely supply side with little appreciation of the nature of individual or cultural needs. I trace this

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<sup>1</sup> Prueitt, Paul Stephen (1988). "Mathematical Models of Learning in Biological Systems", is a PhD Thesis, from The University of Texas at Arlington.

<sup>2</sup> Prueitt, Paul Stephen (in manuscript form on the Internet). "The Education Bridge, a Proposal to the American President", is at [www.secondSchool.net/bridge.pdf](http://www.secondSchool.net/bridge.pdf). Accessed January 11, 2011.

view to John Dewey and Charles Darwin. The substance of the conjecture suggests that a different philosophy of education might be centered on the learner rather than on the educational institutions.

Over my life time science has advanced while educational theory has not. The case made in the *Bridge* is that the forces influencing education, and also science, have had some negative consequences. The proposal starts from this case. We may take corrective action using democratic practices. These may be assisted using a form of social network. The public deserves advanced knowledge management tools. Given any natural system the shaping forces may be modeled by utility functions and by principles found in general systems theory. By supporting community-based discussion about these forces, and mediated exercise of community intention, we may measure improvements in governance outcomes.

In simple terms, the purpose of the current system is more to support consumerism, and less as support for an informed citizenry. The ideals we properly associate with education have lost relevance. There are consequences. Parts of the consequences are includes various outcomes. If the Prueitt Conjecture is correct, a vast majority of high school students have developed an acquired learning disability. The evidence is there. Freshmen students reject the notion of learning college algebra, for example. Specific social forces might also negatively influence the evolution of science, even while certain types of gains continue to be made. The question here is about the extent to which some inquiries about nature are not advancing while other inquiries receive abundant economic support.

The reader may seen a thesis suggesting that new lines of thought in education and in natural science have been under supported. Implicit in this suggestion is the proposal to support and develop certain alternatives. In particular we address, in *The Education Bridge*, the potential full remediation of acquired learning disability using a stratified representation of mathematics curriculum. Having this representation available in a digital medium allows an individual student to take responsibility for learning and gives that individual an ability to demonstrate learning outcomes for purposes of accreditation. This turns the educational process on its head. The Second School <sup>TM</sup> is then founded.

Prueitt's conjecture about acquired learning disability is grounded, in limited but

suggestive fashion, in research literatures on learning mechanisms in neural and immune systems. Empirical research is not our only support. Empirical evidence regarding better learning outcomes has been gathered. A method for remediation was developed over the period 1984-2010 and grounded in these same literatures. The proposal is to instantiate this remediation method within a pure public sector controlled infrastructure based on immersive virtual world technology.

The first target is the transition between high school and college. Any sixteen, seventeen or eighteen year old American citizen would have the right to enroll within one of fifty statewide systems. Each of these systems is envisioned as a public private partnership having a specific mission chartered by either the state or federal government.

The challenge has been to explain the proposal. One avenue to this explanation is to suggest that opportunity exists. A three-dimensional virtual world simulation technology exists, in an under-developed form, and might be easily reconstituted in a proper form. This is the same technology that kids know from computer-based games. The specifications of the next generation of this technology go to some length to work only with foundational concepts from computing theory so that all elements will have no intellectual property rightly claimed by private interests. The biography of Prueitt, given as an appendix to *The Education Bridge*, makes the case that this is possible by spelling out eight innovations in terms of pure computing theory. However, the more difficult argument is made that current private interests in information technology make impossible the goals of the *Bridge*, unless these private interests are excluded from ownership in the core elements within the *Bridge's* technical foundations. The argument is at several levels.

An explanation requires a general systems view over generic processes involved in social and biological evolution. But where do we begin the explanation? We might take only a small part of the larger realities and show that in that small part we have established the validity of a more general theory about social and biological evolution. Starting with an assertion about the small part, we use evidence to show the viability of this assertion in the context of the entire system. Our selected assertion is about the nature of AI. The evolution of the academic discipline of AI is part of a complex of

processes. We claim that it has a role in our cultural crisis. A narrow focus on this one process is then illustrative of what general systems theory provides to us. So this is where we begin.

The steps are as follows. In 2011 we live in an intellectual regime where AI is considered to be consistent with the best scholarship. However, AI is easily challenged using science developed over the past decades. The limitations and misrepresentations of AI have also been increasingly demonstrated. Phenomena not explained by the assertions of AI have become well known. For example, facts are emerging regarding the nature of community intelligence.

So what is the problem with AI? AI has been firmly rooted in a mechanistic view of processes where inference is reduced to deduction and induction is regarded as fictional. The paradigm cannot explain natural intelligence.

What we suggest is that induction is not reducible to deduction and that the natural world is not purely deterministic. The best science would attempt to account for observed phenomenon such as the Bell inequality in physics, and other non-Newtonian behavior in physical systems. This cannot be done with AI, because no AI program has experienced physical reality in a complete way in real time. At least the proponents of AI cannot demonstrate that this has occurred. So why has federal funding not followed a better line of investigation? The answer maybe framed in an understanding of group intelligence, and group thinking as seen as causes of multiple national intelligence failures over the past several decades.

Ancient prohibitions against science directing an inquiry into induction and related phenomenon are persistent. But new science may be used to show that intention involves the exercise of an induction that is not Newtonian in nature.

Living intention is not resolved only as local interactions.

The intentional process involves the directed emergence of consequences.

There are elements of memory and anticipation as well as the element of awareness within a present moment.

The collective intention of business processes has power because this intent is coupled with powerful social forces. These forces may be measured and understood by all of the people, as part of democratic governance.

Social processes express as a type of group intention in order to achieve purposes. Thus the expression might be harmful to others. This raises the pragmatic concern governing democratic values, that one person might harm another. Effective understanding of community intelligence requires clear scientific thought. Here also we have an additional concern.

Important scholars, like mathematician Sir Roger Penrose, have addressed the issue of AI using the best knowledge about the foundations of logic and mathematics<sup>3</sup>. But, in response, a certain type of social ugliness is found. A school of thought, centered on AI but often rooted in ignorance, has arisen where ridicule counters proper mention of scholarly work on biological intelligence. The sense of anti-intellectualism found in the public media is one common manifestation of this ignorance. This engrained anti-intellectualism is both a consequence of social forces as well as a future cause of the continuation of the various fundamentalisms associated with consumerism. This is conjectural it is true. Our observations about AI and federal funding practices is that an inferior paradigm about natural intelligence is not funded largely because science itself is set aside by the intention of business processes.

So our claim is that a type of arrogance and self-centeredness drives distortion. Behind this drive are others, including the profit motive and a narrowly crafted idealization of entrepreneurial capitalism. Given these engrained root causes our society embraces fundamentalistic thought. We seek the comfort of the herd where a single viewpoint creates uniformity. Commercial interests play on this comfort, and control our economic behavior. A particular brand of fundamentalism is adopted and propagated as the “best” science when it is not. In general the views of scholars contrary to the uniformity are mischaracterized. Scientific reductionism becomes a blind dogma that is applied to the science of living systems, when clearly there are practical problems with cutting up living systems and suggesting that this fully uncovers the nature of life. This is the nature of

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<sup>3</sup> Penrose, Roger (1989) “The Emperor’s New Mind”, Basic Books

the present distortion.

In the theory we advance, reductionism is practiced within a framework where organizational stratification is used to account for this “whole” and “parts” issue. In other words, reductionism is seen as an efficient method for investigation only within the behavioral rules of an organization. The theory hinges on the notion that organization stratum shapes natural reality through a reification of category, in much the same way as human cognition is shaped through natural language.

So we see a science that has evolved while denying certain specific natures, including the nature of life. The reasons for this are complex and rooted in history and in human nature. Part of this complex might be seen in the rise of fundamentalism, or what came to be called “mono-coherence”. As suggested, the alternative to fundamentalism is found in the new theory.

In *The Bridge*, mono-coherence is contrasted with the notion of multi-coherence.

As part of this new language, we reveal a linkage between fundamentalism, certain business practices, AI, and federal funding. These are all mono-coherent, since one set of assertions is used to judge a crisp notion of correctness. As a bottom line, federal funding has been causing a distortion of natural science, placing the strongest assertions of pure scientific reductionism in the drivers seat. Science has become exceedingly narrow as a consequence. It is more of a religion and less of a clear minded cultural investigation about natural reality. Diversity is limited in practical ways.

The solution path is to create a public sector communications medium, to be used in education, health information management and public governance. This is the nature of the *Bridge*. The medium’s data processing architecture is stratified in such as fashion that advanced knowledge management tools are made available to social networks. In essence, the social network creates a common form of knowledge representation that then acts like the biological mechanisms in individual human memory and in individual human decision-making. Science might then become less elitist and more fully enriched by common use.

The distortion of one school of thought by others is not merely of a political and

philosophical nature. Individual systems of thinking; from which viewpoints arise, are dependent on the formation and use of natural language. In fact, some distortion is a natural and essential part of how the mind works. The human mind seeks coherence in how the parts of our world view fit together. This sense of coherence often leads to rejection of information that would create challenges to the viewpoint. In simple words, we filter our experience to fit our worldview. This is done via the formation of categories, what we call “reification” of the particular as a member of a specific category. Language can and does deceive us, and in the case of fundamentalisms, we became trapped in a specific system of words. Memory becomes even more selective.

Schools of thought influence each other as inconsistency arising from individual experience is managed by neural mechanisms seeking coherence<sup>4</sup>. Let us look at an illustration. A young scientist might face the following dilemma. He or she holds a viewpoint. It is good that the company that he or she works for does makes profit. Consistent with this viewpoint are a lot of facts that have to do with employment. A specific dilemma arises. AI theory is vague regarding certain issues on the nature of natural intelligence. Program management demands precision in predicting the value of a funding proposal. The consequence of this dilemma is natural to predict. It becomes easier to distort of the results expected from AI than to square the difficulties with shortsighted demands of funding agencies.

*The Education Bridge* talks about how various conceptual distortions are shaped and continues to shape educational practice in the United States. The *Bridge* asserts that the orchestration of a spectrum of current views on psychological and social life may be traced to a common set of distortions. These distortions are a natural part of the human cognitive process. Conceptual distortion is seen as a naturally occurring by-product of natural language use. Because this is not commonly understood, negative historical forces are allowed to manipulate our common social understanding. The nature of AI is now seen as an illustration of something far more common. The *Bridge* is an attempt to straighten up our understanding of AI and other polemics.

There are practical aspects. A polemic is a mythology designed to disallow inquiry. The

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<sup>4</sup> Pribram, Karl (1991) “Brain and Perception”, Erlbaum Publishers

language used within the AI paradigm allowed very little appreciation by federal government agencies regarding the means by which biological intelligence is achieved. Both industry and government agencies had dissenting opinions, yet funding decisions were primarily motivated by business consideration; e.g., how to sell what to whom. This motivation by purely business processes is observed to be factual by almost everyone. Our work has explained why. The utter domination of AI in its sphere of influence could not have occurred were it not for a larger orchestration of our beliefs about human nature. The nature of the orchestration may be seen as an absence of correct understanding about the multi-coherent nature of physical reality.

*Stratified theory* is part of new language where the notion of orchestration is seen as illustrative of how individual or group intention is expressed. The *Bridge* technology recognizes that orchestration is through a set of mechanisms. Of course, the nature of mechanisms may have positive or negative results. The mechanism itself may become used in various ways. Our thesis about AI, specifically, has been that political and business processes amplified conceptual distortion caused by human language. The result is simple to state and to observe; e.g., the AI paradigm fostered a business process designed to obtain a lot of money from the federal government. Mechanisms arose that served purposes other than those claimed to be served.

The lessons learned include our appreciation of the need for the public to be aware of the knowledge from science. We are hopeful. This awareness now, shared via social networks, could change our political processes.

The development of support mechanisms might serve to undo the social damage from AI as well as develop and communicate new and better science to the public. Social networks might develop proper political power, and even the political power of each individual human being. Special interests groups would be easy to form and dissolve. Capital formation and responsible entrepreneurship might be freed from confused and dysfunctional regulation as a new 100% secure process infrastructure replaces the current Internet.

Health informatics might serve to decrease health costs and improve health services. Software might be for public use as opposed to a cause of economic dependency and wasted time. The value developed from the AI discipline, and there are many values

that were developed, might be combined with new thinking about human and social intelligence for the purpose of serving democratic institutions around the world.

Let us look again at our lessons learned. This specific instance regarding AI is one of several illustrations of the nature of orchestrated human intention. For example, it is possible that an individual AI worker may simply believe that the work he or she is doing is good science. With very little cross pollution between AI and natural science, this is entirely possible. However, in other instances the orchestrated intention may be simply bad human behavior. Some types of mechanisms may be claimed to serve one purpose, and yet serve another purpose. Collectively we have allowed these bad human behaviors to become dominate in our mainstream. We all feel damaged.

The solution path involves a separation of social narratives into lines of thought, and proper reference to scholarly literatures. This creates a social discussion about social values. So how do we more down this path?

The *Bridge* technology has the means to represent human knowledge as computable ontology and to move this representation back and forth between text or symbolic representation. This is done through stratification of topic descriptions, expositions of knowledge in symbolic, audio or textual form, and associative mechanisms. As is discussed in detail in *The Education Bridge*. the “stratified” architecture maps to our understanding of the neural architecture involved in human cognition. Access to the technology is made available within the educational infrastructure, as a public service not encumbered by any commercial activities.

This solution requires the availability of social networks equipped with knowledge management tools. The social networks might then develop ontological representations about purposes and outcomes. We, the People, take charge of our democratic processes so that we produce the solutions to the many crises we now face.

The issues we face are like layers of an onion. Each issue reveals another version of underlying mechanism. An example may be given. The social need for college education often serves the professional goals of individuals stuck as employees in a dysfunctional system. Coping mechanisms develop and are linked together to create a self-governing community whose intention is to protect jobs. The task of education is

overwhelming and so is set aside. The stated purpose of college is undermined by a practical need by an individual to work forty years and retire. The example is illustrative or what might be overcome, given the existence of the *Bridge*.

Once the knowledge management capacity of the *Bridge* is available, stakeholders may undertake cultural remediation. We may look to ourselves to create and implement a better world. The new directions will come from social networks whose ability to develop knowledge representation is used to make corrective actions. New direction will also come from the young people, many who now feel alienated by the practices of schools and colleges.

Underlying themes in *The Bridge* are seen in our proposed development and use of mechanism. Mechanisms in the biology of the individual, and in the sociology of communities, are mimicked to the degree possible in a computing architecture for three-dimensional simulated internet-type social network environments. The computing architecture is deemed "purely public", so that private interests do not invade or control public sector function. Local, tribal, state and federal governments regulate the mechanisms that govern this interaction. This is nature of a public sector supported by a dedicated infrastructure and a specific private sector.

This new communications architecture is based on a theory in science; called *stratified theory*. In reading *The Education Bridge*, we find that the new science is foundational to specific methods and practices in teaching. The pedagogy is called "demand side". It is contrasted with the current educational philosophy, the one that is clearly failing to serve the nation. We argue in *The Bridge* that young people are showing profound intelligence in rejecting much of their experiences from school and college. They are looking for a new path, and the *Bridge* presents this path to them.

The *Bridge* has a specific implementation plan. For-profit corporations are to be established in each state with a compelling charter that requires specific support of associated public sector infrastructure. The plan for the *Bridge* uses a notion of a pure public sector, having no private sector hidden powers. We suggest a private sector hand in causing public sector dysfunction. We note also that the means through which the private sector causes difficulties is aligned with the fallacy of the AI paradigm and the incorrectness of our educational paradigm.

Ultimately we find complex mechanism and understanding of how and why there is, and has been, a crisis in American education. The mission of the *American Education Bridge* is then defined as the design and implementation of a “virtual real world,” owned by fifty pure public state and pure private sector partnerships. Virtual world technologies will to be re-factored, deconstructed, and re-created based on stratification theory, to produce ultra stable and provably secure human communication mediums.

If the *Bridge* is created, these virtual-real-worlds will connect natural science to real world applications that are NOT driven and designed by and for business processes. The notion of a pure public sector is then realized as supportive of democratic governance, and is done so in such a way that capitalizes on private ownership over some part, but not all parts, of the products available to an advancing human civilization <sup>5</sup>.

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<sup>5</sup> For more reading on this work, see the home page of [www.educationWorlds.com](http://www.educationWorlds.com)