

**Introduction to**  
**The American Education Bridge, a Proposal to the American President**

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## **A Few Words, First**

The reader is invited to see into our thesis a desire that the educational system function at a level where deep learning occurs in most instances. Deep learning is related to the formation of individualized inner understanding of self, society, and the natural world. A justification for deep learning may be found in a demonstration that deep learning, of this type, changes the individual in a positive cultural and personal way.

We also see the essential need to not challenge the present system in any way. Individuals working in education are burdened with an imperfect past, and are troubled with requirements that simply cannot be met. The frame with which we see the failures in education is not the most productive. Shifting the frame can be achieved by actually understanding some of the illusion. The old frame is reinforced through inadvertent blame and finger pointing.

The new frame is so completely different that we must not allow the current difficulties to be in play. This frame is defined with neurologically sound pedagogy based on understanding that shallow learning is not in fact learning at all. Learning is always deep.

The *Bridge* proposal envisions a business based economic support system and a next generation virtual world simulation infrastructure. Our purpose is to appear, as if out of nowhere, with a complete solution to individual need for higher education. The sudden appearance of a system that works in ways thought to be impossible will, we predict, cause deep and lasting change in the over all education system.

Various pilots are proposed, or underway, to develop a communication medium based on real time digital handwritten message exchange. This tool creates a low cost ability to conduct the full range of regular class activities virtually. The virtual component will be important in scaling up and extending a classroom based deep learning pedagogy. With new technology and new pedagogy, we create educational process that more fully measures and responds to actual intellectual and formative needs of children and young adults.

A support system and infrastructure will lift social values and increase America's competitiveness in this new century. The results will be positive. The methods of

science are used to support social evolution through our understanding of behavioral science. Because of a far lower cost structure, the *Bridge* will provide open doors accessible to anyone via Internet access.

As a summary we now discuss four core principles.

1) Deep Learning Principles: Neuropsychological principles describe the biological phenomena of deep learning. Biologically feasible models of deep learning suggest that an unproductive perception, developed from school math class, must be set aside while at the same time a productive perception of the concepts underlying higher mathematics is internalized.

2) Normative Alignment: Our requirement that learning be meaningful and deep creates a number of conflicts involving individual sense of self. As a result of long years of school experience, the individual often cannot imagine him or her self as being successful in college. What he or she sees as normal must be aligned with the needs of the twenty-first century.

3) Academic Scholarship: An academic discipline has developed that applies principles of Artificial Intelligence and Machine Learning to systemic intelligence. These principles include a theoretical computing architecture in which deep learning is defined as consequent from algorithmic processes. These algorithms produce a representation of measured systems, through an aggregation of some small set of substructural atoms. Elements from this scholarly discipline will be integrated into a digitally based measurement of deep learning outcome metrics.

4) Digital handwritten Message Exchanges: We have developed a digital architecture supporting digital handwritten message exchange. No real time communication technology, of this type, has been seen in the marketplace, yet. A patent review has been conducted, suggesting that significant intellectual property might be generated as digital media. We see the inclusion of this technology to have two stages. The first is using digital video of handwritten notes as an addition to standard Black Board distance learning toolsets. The second stage will be to use this technology within three dimensional simulation world digital social media.

We advance educational theory while providing supporting technology and foundational principles applicable to the psychological nature of learning. We have, of course, a long ways to go to perfect underlying science, starting with application of behavioral science to educational practice. We recognize that there are questions about whether the common man is capable of being liberally educated. These questions will be fully addressed.

We are careful as we make some observations. Clearly external reinforcement of experience shapes human behavior. We observe that markets control a great deal of current behavioral reinforcement. We observe also that the social use of science is inhibited. This inhibition is commonly felt, and has very deep cultural and anthropological roots. There is evidence that exclusionary selection consistent with private control of behavioral science has lead to some of the problems we face. We conjecture that private control is leading to some specific distortions. We recognize that those who advocate private control over our social and economic systems feel justified in making their case.

Distortion occurs in a non-perfect world, in which we each have a limited understanding. One aspect of this distortion is a common judgment that social engineering by government must be, in all instances, bad. This common belief protects undue private control with a hypothetical that is often treated as if proven fact. However, the use of science to assist in social evolution is placed in contrast with many of the advertising methods now used in economic markets.

Perhaps also additional and deeper processes are shaping our social world. We propose that we in the academy should understand more clearly these processes. An objective evaluation might conclude that there is an untended distortion, from the use of advertising and other means, of our perceptions about our selves. In some cases, the distortion becomes intentional and destructive.

There are very complicated consequences arising from the rapid pace of social interactions, particularly within the Internet. With new science we see that there are elements of a condition that we must grow out of. For example, the fear that government will always misuse behavioral science is complicated by a redefinition of government. This redefinition is tricky and yet is persistent. In the United States, the People are the

Government. This is in theory, but this is also a core Constitutional principle. A simple fact stands in front of us. If we give up our responsibility for self-governance to business processes, we will no longer be a democracy. We will be a “capitalism”, what ever that is. So why do some individuals want business to govern human behavior rather than a government by the people? The answer involves a sense of pragmatism and can be understood as grounded in a coherence perception. It is this coherence that creates the illusion.

We step away from this discussion with an acceptance. The coherence of human perception is sometimes misleading. Coherence can be constructed so that hidden reality is obscured. We can pretend, for example, that capitalism is a form of governance similar in quality to our historical understanding of democratic principles. This pretense is shared within broad parts of our society, and then linked conceptually with various forms of exclusionary selection. The richness of the principles underlying democratic practice is subjugated by disguised sense of individual superiority, and group superiority. This inner cognitive deception can lead to an intellectual rejection of majority vote and the undermining of electoral processes through the use of capital. Understanding this danger leads us to embrace a multi-cultural foundation to democratic practice.

Selectionism leads to other mistakes. Our federal funding of the best science selects what is regarded as the “best” science based on a false sense of competition. The competition is not pure. It is biased by our imperfect history. Economic markets and deep cultural mythology compounds a common assertion regarding the rational nature of scientific determinism. The marketplace of ideas is not governed by the invisible hand of rationalism, but by other forces related to cultural exclusion. Economic forces struggle to maintain economic power. Rationalism is itself placed under critical review, but rationalism itself is not the only concern. The purity of rational viewpoints is compounded by the nature of coherence and the ability to develop a coherent view that is simply and obviously false.

Our examination of science shows intellectual determinism to have a flaw. Whereas physics appears to be deterministic, the actions of free willed individuals seem to be non-deterministic. Determinism does not account for human intention. The flaw may be

traced to the mechanisms through which science is funded and promoted, as well as in a selection of some parts of the spectrum of human traits. The National Science Foundation, for example, funds the “best science”. But this “best” science is defined by a small selection of less than 2%, of scientists. The selected group excludes those who are not at core committed to intellectual determinism. This bias is hidden.

A new science helps us understand how our concept of government might be distorted by a sense of elitism. It is a tricky business, however to shine light on this issue. A worldview often manifests as exceptionalism and placed into a positive light. We start with the competitive nature of our system of education. We develop a model of how our educational system has evolved, particularly since the early 1950s. We suggest that the actual system is functionally designed to exclude certain types of individuals from access to a full liberal education. Much of the rest of the system’s behavior is pretense. Of course, the exclusion is only one property of the system. Many properties of the system are positive.

The effort we make is towards a more formal handling of how system properties develop. There are mechanisms that create systemic properties, both the positive ones and the negative ones. Some mechanisms can serve in various ways, and so the sense of positive or negative is sometimes hard to determine. The mechanisms are natural ones, which are understood with the new science. Unfortunately, they are not understood with the old science. Determinism is blind to the mechanisms involved in free will.

Most of those who use the first generation of knowledge about these mechanisms do it in a clumsy way, often causing significant harm. So the problems we face are exasperated by pragmatics. As part of the set of mechanisms there are compromises. So for example in understanding of the real difficulties in providing a well rounded education to some individuals, one can be backed into an intellectual compromise. The compromise might mistakenly accept the notion that the individual, because of race or other background, has less potential and thus should not be expected to do well in college. This mistake is reasonably made given current circumstances. However, we might also look into a refinement of our understanding to conclude that the individual is a victim of one of the several types of cultural biases. We need some pathway through which a science might

evolve to assist social institutions in addressing these biases.

Nothing ever stays the same. The benefits from positive change might soon be felt at two levels, within our social organizations and within our private sense of self by the individual. As part of this change we see a role for renewing all practical aspects expected from possible universal access to higher education. The goal is to advance the concept and practice of universal education.

To achieve this goal, we have three pillars; technology, pedagogy and natural science. We have integrated several parts of current social media and advanced several innovations in machine learning, related to a theoretical notion about deep learning. Deep learning is then revealed using neuro cognitive and neuro behavioral principles. Methods through which incoming college freshman deeply learn as illustrated.

We have designed a new system, having a business part and a virtual infrastructure. The virtual system is not far different for those that are used in entertainment. The business system is designed to support education without government control or the need for funding from taxes. The business system and virtual software support universal education by creating a functional bridge between high school and college. The *Bridge* will provide individualized educational access to quality freshman college curriculums.

Individuals acquire an avatar within a three dimensional simulation of a college campus. When on this campus, individuals will be supported in self-directed learning. The details are discussed in the chapters of the *Bridge* proposal.

There are, however many challenges. What might educational processes become in the near future. What is the difference between mass education; as we have it today, and education based on this notion of deep learning? How will the business systems supporting the *Bridge* work? How will the initial phases of the *Bridge* be supported financially?

We must also understand the positive and negative in what we have. Today, we have an educational system that is partially socialized but also strongly controlled by hidden private interests. Business controls education. It is manipulated by business for purposes defined by blind pursuit of profits. For example, the selection of textbooks is

dysfunctional for most individuals. Entertainment works directly against positive educational interests. These dysfunctional elements are sometimes overcome in beautiful and significant ways. However, many millions of individuals are excluded as children from higher education. Part of this exclusion is instrumented by a competitive philosophy that is aligned to philosophical commitments to scientific determinism.

We must be clear. The system works in some cases, for some people. We do see successful outcomes, but the picture is not transparent. Most individuals are not helped by our school system. Most children find direction from social media or game environments, rather than from the school system. For some reason, a celebration of limited and selective success hides a larger failure.

This celebration is part of a control mechanism, and inhibits all purposeful analysis. Data that could be kept on educational outcomes is simply not kept, for example. Why? Our answer to this important question is that a specific belief has developed. This belief is that either universal education is not possible due to human nature or that universal education is not desired. "Science" is then used to state facts about human nature, and to disguise a specific belief. Science is distorted and used to paint an untruth as true.

The celebration is designed to not allow systems analysis an opportunity to gather real data and to develop real facts. But, education is not the only place where we find failure hidden by deception. Failure and deception is active in most of the social, economic and environmental challenges we face. A single crisis under cuts all of these. Understanding why there is a crisis, and overcoming this crisis is a critical next step for humanity.

We must also be clear regarding the causes of our current condition. Consider the belief that human nature will always prevent humanity from achieving democratic governance based on the ideals of universal equality under the law. Is there a view of science that presents us with facts consistent with this belief? The answer is yes; there are those that claim, in the name of science, that human nature is debased to the point where non-democratic control over the masses is necessary. Spiritual teachings are all too often hijacked by an agenda of control. This is certainly true about the Taliban intention to strongly control the people of Afghanistan. Does something similar occur in American and European countries?

The *Bridge* proposals are grounded in a specific thesis; that what we see as systemic dysfunction is not an accident. We have conjectured that there are specific causes involved in producing real mechanisms through which any natural system performs whatever occurs. Part of our thesis is that, over time, social systems induct both negative and positive properties from the individual into the “system”. A model is developed which could produce a clear perception about why our systems evolve into crisis states. The model will be discussed through out the *Bridge* proposal, and summarized as follows.

Complex systems theory is used to regard natural systems as having organizational stratification. As part of this theory, a middle organizational stratum is home for emergent phenomenon arising from an aggregation of substructural parts. An ultra-structure imposes ecological constraints. For example, atoms are organized into chemical compounds. These compounds form under the constraint created by systemic intention. Intention is then seen as a driver of change. There is not only individual human intention, but is a collective expression from all natural systems.

A general model is developed. Intention is a key in understanding social systems. What appears to be not local in nature can contribute to organizational selection through an induction of qualities into the compound. Intention produces an induction through the production of coherence. The natural phenomenon associated with electromagnetic induction is modeled using equations from higher mathematics, and then an analogy is made. This analogy is grounded in behavioral neuroscience to create a model of how the human brain system produces coherent thought. A similar model might be developed which traces that development of improper control mechanisms through the action of exclusionary selection.

Selection mechanisms acting on the constituency of academic communities is discussed in the final chapters of the *Bridge* proposal. A general theory depends on organizational stratification in which, as part of the nature of emergence of coherent form, an induction of properties develops from interactions between the environment and the inner dynamics of that specific system. It is in this interaction that we find a place for system intention.

Three classes of causes collide, with the necessity of producing real form from the

structure of present resources and the needs of the system, and the affordance of the environment. In biology we say that structure fulfills function during the emergence of compounds from the substance of atoms. This fulfillment follows from systemic intention, in some very general way.

How might society avoid an induction of negative characteristics, from the individual to the whole? Because induction is causing a general failure of the educational system, it is a central focus of systemic elements of the proposed *Bridge* infrastructure. How might the *Bridge* create a new dynamic on the induction of social characteristics? The key theoretical concept is that of a “utility function”.

In systems theory a utility function is thought to have partial control over how a complex system evolves. Formal models that use utility functions demonstrate that properties, such as individual selfishness, are aggregated over time, resulting in specific social characteristics<sup>1 2</sup>. In these models, the properties are thought to be selected for by the utility function.

Let us now look at an illustration of how selectionist processes aggregate individual behavioral characteristics into systemic processes. In particular we may reasonably be allowed to apply the general model outlined above to the specific circumstances creating and maintaining the crisis in American education.

Elitism is often part of how professors of mathematics feel about his or her own knowledge of higher mathematics. In some cases, this elitism changes to a recruitment mechanism. Social groups like “math clubs” is often where a math major becomes a status symbol, rather than as an indication of pursuit of knowledge. Elitism also feeds into a selection of some types of people, those who show tendencies to the same sense of elitism. This selection process may have acted over decades to produce a barrier to higher mathematics. A critical history focused on the creation of this barrier might be developed, but has not been.

Our general theory suggests that selectionist forces maintain a barrier consistent with

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<sup>1</sup> Allingham, Michael (2002). *Choice Theory: A Very Short Introduction*, Oxford.

<sup>2</sup> Epstein, Joshua M; Axtell; (1996) *Growing artificial societies: social science from the bottom up*; from Brookings Institution Press

those forces that created the barrier. A sense of elitism turns off many types of people, and for good reasons. Very common feelings of elitism may explain part of why only a few individuals pursue an understanding of higher mathematics. Let us move to the point precisely. Being a math major becomes a shallow social status symbol, not the sign of deep dedication of higher knowledge of self, society and environment. Mathematics is actually not learned. The barrier is also maintained by a false belief that only a few individual are actually capable of appreciating foundational concepts.

Social mythology must be maintained. Foundational concepts might open pathways to understanding our social flaws. Certain feelings about nationalism or racism may offer additional root cause in the form of stability mechanisms. The individual faculty member's fear of being held responsible may lead to institutional hiding of failure, and a cycle leading to greater failure. The system is protecting what has become a self-induced social deception.

Our analysis sheds light on why the current system is not grounded in a way that would allow fully socialized systems to perform better. We have developed a culture of deception, starting with the doors leading to individualized knowledge of nature and society. As these doors are re-opened, questions develop regarding the proper integration of capitalism and socialism. These questions may be addressed in an intellectual rich core liberal arts curriculum, as defined by *Bridge* professors.

We must be clear regarding pragmatic concerns. We advance a theory based on science and systems theory. Our view of systems science recognizes that specific business structure might create a needed social value. We find utility in this recognition. The Second School <sup>TM</sup> business structure will create a small economic system designed to fund national infrastructure.

The product has huge economic value. The individual might be assisted in a transition between high school and college. Our theory allows us to model social systems in a hybrid way; restricting rational choice to localized interactions and social benevolence to interactions that are not localized. The dual nature, localized and distributed, found in physics is used. This grounding suggests that we have more than good advertising as a means to find long-term success.

We ask if the common good maybe instrumented within a social media. Might a healthy balance between socialism and capitalism be created? Socialism might be seen as an unrealistic pure representation of social value, without considering specific individuals. Free market capitalism, in contrast, might be seen as a pure representation of individual value, without considering social value. Neither model is complete, but both might interact to produce a better educational system. Pragmatism takes us away from either end of the two extremes.

Our path to pragmatism seems clear. The pure representations, socialism or capitalism, are often in conflict with each other. Both representations are combined into a single model only by addressing hard problems in systems theory; e.g., those of non-locality, emergence and induction. For example, the side effects of capitalism, as often practiced, creates social injustice by treating individuals unfairly. The consequences to the individual are often ignored. On the other hand, our sense of social benevolence is misplaced when the inner perceived realities of the “other” individual are not accounted for.

We act when we believe we know best, and thus often harm the other individual. Good intentions are often overcome due to an absent of complete knowledge. Because of incomplete and misleading information markets sometimes do not work. Distortions in the marketplace are due to the absence of complete knowledge. Nowhere are failures such as these more evident than in education and health care. On the other hand, we have great successes and are part of an advancing civilization.

Our pragmatism is guided by a specific theory. Stratification theory is posed as a means to better model educational, economic, or environmental systems. It is a new theory, but the principles may be seen arising in enterprise oriented transition systems, often called “service oriented computing”<sup>3</sup> software systems. We also see this theory in physics, chemistry and biological systems. A central principle is based on electromagnetic coherence and on the science regarding how emergence forms in natural systems. This science is to be developed in the context of social systems. In simple terms, transaction

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<sup>3</sup> Prueitt, Paul (2009) - "The Service Engine: Structured Communication using Modern Service Technologies" SOA Magazine, <http://www.soamag.com/I30/0709-1.asp>

logics are sought which indicate how services are to be defined and fulfilled.

The work ahead is profound in its difficulty. If we are to create the pragmatics that we seek, we have some considerable work to achieve. We have new tools, however. The service-computing model often produces value within enterprise systems attempting to make coherent the reality of supply chains and purchase agreements. Real economic interaction is not this simple; however. Logics imply rational coherence and yet often fail to resolve instances where there are structural conflicts.

Part of how we might achieve our goals is through virtual infrastructure. We will use technical means to provide a three dimensional avatar world having high degrees of informational security and in-world monitoring. This world serves a dedicated purpose, both in the management of education and in the delivery of services.

One part of this technical means involves the nature of coherence. In particular we develop a technical means to measure the individual coherence of a transitioning student. Multi-coherence is defined as a complex phenomenon having the ability to form field coherence and to then shift from one field coherence to another. Why is this essential to our strategy involving deep learning of higher mathematics?

Creating a new perception to replace a perception that is less productive is served by having knowledge representation tools where shifts in viewpoint are facilitated. This capability is offered to the individual and to the educational institutions themselves.

Our technical means models a shift from one sense of coherence to another sense of coherence. Why has this been part of the design?

Academic learning is not merely a linear adding of facts, but rather the gaining of insight about a field of study. Deep learning is learning that transforms the individual in the presence of knowledge. This knowledge is handed down from past generations. This means that learning involves changes in the neuro-architecture. A neuroscience-based model of individual thought is built into the *Bridge* architecture<sup>4</sup>. This model is

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<sup>4</sup> Prueitt, Paul Stephen (2012) - "Digital Instrumentation and the Measurement of Experience" Accepted: 2nd International Symposium on Integrating Research, Education, and Problem Solving (IREPS 2012) included as a Focus Symposium in the 3rd. International Conference on Society and Information Technologies (ICSIT 2012), Orlando, USA, on March 25th - 28th, 2012

connected to standard knowledge representation formal languages, primarily resource description framework language<sup>5</sup>.

Let us move to a bottom line, and conclude this introduction. So why is coherence so important to our architecture? The answer is simple. Most individual high school students have a false belief about the value of higher mathematics. The false belief is the single most powerful means to maintain the barrier that most individual find from math class. This belief has to be abandoned and a new belief developed if educational experience, about higher mathematics, is to provide a specific value to the individual.

Deep learning methods are incorporated into a virtual infrastructure. We cannot merely seek to add something for the individual, but in a real sense we must allow a change in how the individual sees him or her self. The individual is supported in developing an understanding of self, within a system that will allow this development within systemic constraints imposed from the community of scholars. In the case of mathematics, a community of mathematicians agrees a set of focus topics. This set is represented by names of topics, illustrations of specific topics, and common understandings about how topics are inter-related.

The infrastructure, if developed as designed, will function both with social objectives and free market dynamics. A network of specially shops will provide economic support for the *Bridge* infrastructure. We have focused our thought on how local communities might gather for coffee, or for health related teas. As social media develops, teleconference rooms function to connect the high school student into the system. Once the virtual connection is made, the individual has potential resources far exceeding what the average American student currently has.

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<sup>5</sup> Prueitt, P. (2001). Foundational Paper on the Transformation of Knowledge Ecology to a Knowledge Economy, Knowledge Management Consortium Institute Journal, Vol. 1 Issue 2