Learning Systems Design

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Times Have Changed

Life in developed and developing regions of the world has changed rapidly and significantly in the last decades forming the crease between the 20th and 21st centuries. Organizations and institutions that have served the needs of people in the past have found themselves in line to be scrapped, redesigned or significantly restructured because of these changes. Educational institutions are premier among this number.

The response to this challenge has too often been to treat existing educational designs as primarily bad designs or failed innovations and to act as if the proper response to the perceived crisis was to fix blame as much as to fix problems. Educators, administrators, students, parents, taxpayers; almost everyone has been found to play a part in the failures of our educational systems. It may be true that parts of these systems 'wore out' or 'broke' over the years, were mismanaged overall, and that energy and resources were lost through inefficient intervention in the operations of the systems. This is not the same as being bad designs or bad innovations.

This might have been the appropriate problem formulation if the significant changes of the recent past had not embodied a dramatic challenge to the dominant guiding paradigms of our social, professional and political lives. Stability, linearity, predictability and control are the hallmarks of the scientized paradigms which collectively have been called the machine age or industrial age and which have apparently served us so well for a very long time. Nonlinear change, complexity and unpredictability are a few of the descriptive attributes of

reality which contemporary paradigms are championing in an emerging world view labeled as the post-modern, post-industrial or information age. (This age might be characterized as an **age-of-design** as well if strategic commitments are made to work towards futures desired rather than away from futures feared and pasts despised.)

New Times Need New Designs

From within a post-industrial perspective a case can be made that our existing educational systems are not failures nor are they bad designs or mismanaged designs so much as that their time has passed concomitant with the Newtonian social paradigms which had been their incubator and for which they were well suited functionally. The challenge for educators therefore is not to fix blame nor to fix old schools. The challenge now is to design new educational systems within the logic and meaning of the emerging paradigms that are more in alignment with and informed by our growing understanding of the complexity and interconnectedness of living systems; our next best approximation of how social organizations and institutions really work.

Dissatisfaction with existing educational systems can be cast as an opportunity for creative and innovative intervention rather than as confrontation with a confusing mess of overwhelming problems as is now characterized by our educational agenda. It is an opportunity to reflect on what learning and education means to us at this time rather than in the time of the industrial revolution. It is an opportunity to imagine or re-vision what new forms our educational systems can take in order to best serve the most important clients of our learning systems, the learners.

Learning Systems Design

In order to get on with this work it is necessary for at least some, if not all educators, to learn how to become systems designers. For educators the task is

twofold and a bit like the perennial chicken and egg question. The need is to engage in **learning *systems design*** in order to engage in ***learning systems* design** or vice versa. Significant leadership in the direction of learning systems design has been made as exemplified by Bela H. Banathy's[1] theories of *comprehensive systems design* in education as well as his hope of helping to facilitate the emergence of a *design culture*.

Learning systems design involves the synthesis of two very important intellectual traditions which are gaining prominence with the establishment of the information age: systems thinking and design action. Systems thinking provides a framework for describing or conceptualizing the complexity, interconnectedness and nonlinear dynamics of institutional and organizational systems, while design provides the action framework for how to visualize and bring into existence, in functional form, teleological systems (i.e. serving human purpose). Of the two, systems thinking is the most developed theoretically. Design is the most developed pragmatically but is in need of the most development conceptually in order to more fully enhance the synergistic potential in combination with existing systems thinking.

Feedforward Learning

Design as learning is quite different from the traditional understanding of learning, for example, using the concept of feedback. Feedback in learning processes is typically presented as positive or negative. Positive feedback is the act of reinforcing learning which is taking a direction that is desirable, while negative feedback is the act of discouragement for the direction being taken. Most of us have experienced this in its most elementary form as right answer, wrong answer learning.

Design learning involves another less known system's process that can best be characterized as **feedforward**; inquiry pulled by volition and purpose. This

concept has sometimes been used to describe forecasting; the ability to predict or guesstimate future states or conditions and is associated with planning. Feedforward in design is very different however. Feedforward in this instance provides a reinforced pull towards directions not predetermined nor fully understood and towards forms only dimly felt but which emerge out of a sense of the aesthetic intent of the client-designer relationship. Design learning is not about discovering correct or incorrect predictions nor about describing reality in terms of truth. It is learning how to imagine and make functional assemblies, whether abstract or concrete, which are grounded in human purpose and volition. Design learning is discovering knowledge at the edge between chaos and order; between the unknown and the known. Design learning is also pragmatic in the discovery and mastery of skills needed to bring abstract concepts into lived reality.

Design Intelligence; Another Frame of Mind

To learn how to design and to be able to engage in design as a pragmatic enterprise takes certain intellectual skills and perspectives which in other forms of learning has been called intelligence. Howard Gardner[2] in his seminal book on multiple intelligences makes a case for appreciating forms of intelligence which expands the limited understanding of what constitutes human intelligence in traditional educational enterprises. His list includes: linguistic intelligence and logical-mathematical intelligence (the two dominant forms in traditional education), musical intelligence, spatial intelligence, bodily-kinesthetic intelligence, and personal intelligence.

A key omission in this list is **design intelligence**. Other researchers however have initiated the making of a case for design intelligence based on the same logic used by Gardner. Nigel Cross[3] has done important foundational work in this area. Greater understanding of design intelligence through insights gained from

using the theories of multiple intelligences have improved our ability to nurture design learning and application.

Why Systems Design?

The concept of design intelligence provides the how, but we still need to know more about the why. Obviously it is in the interests of educators to be able to design new systems of education given the demands of the times. Consequently educators need to learn how to engage in systems design. What about learning systems design? Should there be a priority for the establishment of new educational programs in *systems design* for professionals who would apply their pragmatic skills and intellectual abilities for clients in addition to the educational field?

For a possible answer we look to the dramatic changes in our personal and professional lives that are a result of our experiences and responses to the complexity, ambiguity and chaos of our day to day lives. The new paradigms of the information age suggest the future will hold more of the same, probably much more. Systems design is grounded in this new perspective and systems designers are by definition prepared to work within this framework including the globalization of many aspects of our lives.

Symbolic Analyst; A New Role For A Complex World

Robert Reich[4] the new Secretary of Labor for the United States, writes about jobs related to this anticipated future. Many of the work roles listed among the traditional categories developed and used by the U.S. Department of Commerce, Bureau of Labor Statistics remain essentially the same as described. He states however that an additional three, based on existing trends or growing needs in globalized economies, have begun to emerge. The three are: routine producer, in-person servicer, and symbolic-analyst.

Of the three, symbolic-analysts have emerged in response to the challenges of a world Reich says is filled with, "complex, often conflicting problem statements and problem solving strategies". It is also the work related role with the greatest potential of value added to effort and for which there will be the most potential for economic reward to the individuals in that role.

This role is very different from the jobs developed in the industrialized decades of assembly line logic. It is not a role that fits a predetermined work activity that can be filled by any interchangeable individual. It is a role whose locus is in the individual and whose instrumental value is in the way the individual thinks. It is more akin to the work of the artisan than the assembly line employee.

Symbolic analysts according to Reich "solve, identify, and broker problems by manipulating symbols." They work on everything from inventions to entertainment. A key aspect is that this role, since it deals with abstraction and information, is global in scope and fits conceptually into global economies, politics and environments. Reich states that "The formal education of an incipient symbolic analyst thus entails refining four basic skills: *abstraction, system thinking, experimentation,* and *collaboration*."

As an example of what job roles a symbolic analyst may find themselves in, Reich uses a matrix consisting of three columns of terms which when connected individually across the columns in any order will name a job which is likely to be filled by a symbolic analyst:

- communications management engineer
- systems planning director
- financial process designer
- creative development coordinator
- project strategy consultant
- business policy manager

- resource applications adviser
- product research planner

Systems Designers as Symbolic Synthesists

Reich's first column is a descriptor column while his second column appears to be the operative action column and the third seems to be a job title column. Again there is an important omission for our purpose in that design does not appear in the second column; the action column (although designer as a title does get listed in the third column). Building on Reich's model but to better illuminate the role of systems designer in this framework, an additional new work role should be added; that of **Symbolic Synthesist**.

This role is inclusive of what a Symbolic Analyst does as presented by Reich but with an additional set of intellectual skills including the ability to form patterns or wholes from the complexity and diversity of information and situations which exemplify the modern work environment. This role is different also in that it does not focus on problem solving per se but focuses predominantly on creativity and innovation; the two major of phases of any design process. Symbolic synthesists as systems designers work in environments of complexity.

Dealing With Complexity

The typical argument about how to deal with complex situations among individuals in disciplines or professions has consisted of *depth* versus *breadth* arguments. Depth arguments are that there is too much to know given all the details in a truly complex situation. The only possible strategy therefore is to know a great deal about a particular aspect of a complex situation that has been carefully delineated in scope (i.e. to become a specialist). Breadth arguments are in support of knowing something about every aspect of a complex situation in order to gain a broad but superficial understanding of the situation (i.e. becoming a generalist). Newer arguments have been to deny that there are any unique

differences between complex situations and to apply well developed generic templates as an aid in identifying the sameness among complex situations as a strategy for gaining insight into principles and laws of complexity.

Systems designers as symbolic synthesists gain an understanding of complex situations through yet another strategy: the ability to recognize or conceptualize unique patterns, forms and wholes in an environment of overwhelming complexity. The ability to recognize patterns in complex situations is probably deeply rooted in instinct; the instinct which allowed us to look across a landscape as

hunter-gatherers and 'sense' if there was danger or opportunity. This same ability at another level is often called intuition. Pilots for instance, under very chaotic conditions, say they fly best "by the seat of their pants" meaning that they apprehend patterns and forms out of complex cognitive and sense data that is flooding in during difficult flying situations. Virtual reality, computer generated multidimensional environments, is being used by stock brokers to give patterns and forms to very complex sets of financial data allowing the stock brokers to *see* or recognize emerging patterns in *real time* and to make investment decisions accordingly.

The Design of Educational Systems

Beyond instinct, intuition and cognition, systems designers as symbolic synthesizers, are challenged to *imagine* or *conceptualize* patterns, forms or wholes that form the essence of modern organizations and institutions serving the needs and desires of complex clients. The pragmatic part of the systems designer's work is to then transform this essence into particulars and details which can be realized in concrete form. The Ability to do both is their strength and contribution to their clients.

Systems designers will play an ever more important role in society. Professionals who work as symbolic analysts and symbolic synthesists are central to our successfully meeting the challenges and opportunities of a new world order. The role of systems designer is therefore essential in the designing or redesigning of our educational systems or learning systems. Concomitantly there is the need for educational systems that can help educate systems designers who are capable of creating learning systems as well as other systems designs. The first step is to begin to engage in learning systems design.

References

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