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THE LEARNING ORGANIZATION PORTFOLIO

Learning as Associative Patterning

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Abstract

Purpose—The purpose of this article is to link the associative learning process of the human brain to the relationship and emergence of really significant ideas on the global horizon.

Design/methodology/approach—First, learning is explored from the viewpoint of the brain/mind, with a focus on the creation of patterns and their relationships to our personal frames of reference. Second, the associations of three really significant ideas are explored, and a pattern of patterns is surfaced.

Findings—In concert with the functioning of the brain, significant ideas emerge in relationship with other ideas that have personal historical significance, i.e., external patterns from the environment are detected, recognized, made sense of and have meaning in relationship with our internal patterns of significance.

Originality/value—Creating an appreciation of the role of patterns in thinking and learning.

Keywords Learning, associative patterning, brain, mind, neurons, patterning, significant ideas, frame of reference

Paper type Conceptual paper

Introduction

Have you ever noticed that really significant ideas appearing on the global horizon have connections to the really significant ideas you've been spending weeks, or months, or years reflecting upon? We might even go so far as to say they are in relationship with each other. They are.

Everything we learn in a sense is patterns, whether repetitious patterns or patterns that provide meaning because of the way we interpret them. As Stonier suggests, "In both the computer and the brain information exists in the form of patterns. The software resides in the computer as a pattern of on/off switches; the mind resides in the brain as patterns of neural connections." Stonier, 1997, p. 154-155) These patterns are groups of neurons with their synapse connection strengths between the synaptic spaces. For example, a single thought like "one" might be represented in our brain by a network of a million neurons, each connected to one thousand other neurons via neurotransmitter chemicals that pass through the synaptic cleft, a space between an axon of one neuron and a dendrite of another. As Kandal notes, "The neural circuits concerned with memory have

synaptic connections that change in strength with learning. This mechanism forms the basis of memory and higher cognitive functioning.” (Kandel, 2006, p. 198).

Strong connections translate into the ease of thought associations or memory recall. In a recent conversation with a West Virginia government executive this feeling of ease was described as “ruts in the brain.” She felt that the more she used a particular connection, or repeated a particular set of thoughts, the easier it was to pull them up. In the course of her work she makes a point of mentally repeating a number of times those thoughts and associated thoughts significant to her job in order to create a “rut.” As Gordon explains, “A key mechanism thought to constitute learning in the brain is reinforcement of connections between neurons that fire simultaneously.” (Gordon, 2000, p. 4) This reflects the meme known in the literature as Hebb’s Rule, *Neurons that fire together wire together*. (Hebb, 1949)

Learning from the Viewpoint of the Brain

Let’s imagine a 3D snapshot that lasts a tenth of a second. This picture (or pattern) is a part of the sequence of coordinated patterns that we call consciousness supported by an associated set of non-conscious coordinated patterns. For example, in this picture I’m simultaneously gardening with one hand, swatting a buzzing fly away from my eye with another, and feeling the warmth of the day and the freshness of the air while visually catching a glimpse of the blue haze of distant mountains and mentally reflecting on the potential value of a knowledge state. In the truest sense, the mind (considered to be the set of three dimensional neuronal patterns within the brain) is multidimensional, and we live every moment of our lives multi-tasking.

During that tenth of a second, visual, aural, olfactory, and kinesthetic sensory inputs combine with mental thoughts and emotional feeling, internal patterns, to create an internal perception and feeling of external awareness. These internal patterns of the mind that express our awareness of the external world are representative of the firing of networks of neurons. As a general rule, the human brain processes at a rate of approximately 10^{15} cycles per second. (Kurzweil, 2005, pp. 123-124). While this certainly represents incredible processing power in any terms, there is an even higher number of signals continuously bombarding us, but many of these come in without being recognized. For example, light waves and sound waves outside the range of our sensors.

Aspects of these incoming patterns may cause random firings, form uninteresting patterns, or create a pattern that has historical significance. In the brain, everything is relative. Every individual has their own internal sets of patterns and their associations that allow them to make sense of the world. Relationships between two patterns are quasi-unique to each individual because (1) the patterns are different in each brain (patterns) and (2) each of us has built our personal frame of reference from different pattern interactions (pattern relationships). The patterns in the brain are a result of our physiology and differing representations and relationships with the world, some of which need to be consistent with the external world and others that are only consistent and integrative within the individual. For example, my sense of the color red is consistent

with the color related to red when I was a child, but it is not necessarily the same color that another individual related to red as a child. However, if I was inclined toward the study of art I might learn to discern many variations of red, expanding my previous associations of the term and color. While still associated with red, each variation would be represented in the mind as a unique pattern. So, while thinking over the long-term agrees with physical reality most of the time, since pattern relationships are built on different sets of experiences and observations each set is situation dependent and context sensitive. This is why the creation of knowledge is unique to each individual, such that if I try to communicate understanding of a phenomenon it doesn't necessarily mean it will make sense to someone who has a different set of patterns and pattern relationships that represent that understanding.

As we gain experience we create neurons as well as new synaptic connections. Thus, "Experience creates new synaptic connections among neurons and also alters existing patterns of connections." (Byrnes, 2001, p. 179). For example, if you bring in a new concept, such as the pattern created when you think about the intelligent complex adaptive system model of organizations (Bennet and Bennet, 2004), it is first associated with other patterns you have in your mind, experiences and the patterns associated with those experiences. The new pattern of ICAS is built on these associations, relationships with other patterns already in your mind that provide meaning. In other words, if the process of learning and understanding creates sets of patterns or larger patterns made out of smaller patterns, it exists in the mind in relationship to patterns already there and in relationship to new patterns coming in from the external world. See Figure 1, Learning as Associative Patterning..

The interpretation and meaning of incoming patterns then are very much a function of preexisting patterns in the brain. As Stonier explains, "Meaning ... involves the integration of a message into the internal information environment of the recipient. Such a process creates a new information unit: the combination of the external information, complexed with the information provided by the internal information environment." (Stonier, 1997, p. 157) Knowledge is created by recursive interactions between external information and the internal patterns of historical significance. Figure 1 lays out the major aspects of these processes. The intermixing of the external patterns with the internal patterns creates recognition, sense-making, meaning, and ultimately knowledge.

The discussion above conjures up a very different perspective of mental health in terms of the physical brain (nutrition), neuron-firing (use it or lose it), and the patterns and pattern of patterns coming in that form the basis of our frame of reference to the world. In regards to these patterns, what does this say about daily headlines focused on death and destruction or the dearth of horror movies emerging in the market place? Recall that the patterns we take in combine with internal patterns of personal historical significance to form the framework for the way we view the world and interpret future incoming patterns. Thought (in terms of patterns) does create reality, and what we learn is heavily influenced by what we know.

Patterns of Patterns

We have defined knowledge as the capacity (potential or actual) to take effective action under varied and uncertain situations. Knowledge, then, is built from our frame of reference (earlier patterns and their interactions) and includes the ability to associate patterns in a manner which leads to insight, understanding and anticipation of correct action. Which brings us back to the supposition that began this building of shared understanding, i.e., that really significant ideas that appear from no particular source have connections to—are in relationship with—the really significant ideas you’ve spent weeks or months or years reflecting upon. For example, here’s the shorthand for two really significant ideas that have come in and out of my attention span for a number of years: more and better to different, and efficiency to effectiveness. Then, more recently, appears this really significant idea of moving from linear to associative processing. What is the pattern of these patterns? First, let’s explore what each of these significant ideas means from our frame of reference.

More and better to different. With the industrial age, the human capability to produce began to catch up with the human ability to want, and get and own what was wanted. Then, as more and more became available, the role of differentiation began to grow, and the cry went out for “more and better and different.” Thus the product-laden world of industrialized nations trudged along, with those that had getting more, those that didn’t have, wanting more, and the gap among the two widening. Then, along came knowledge, or perhaps, the recognition of the value of knowledge, and hand-in-hand with that recognition (slowly, because it required a shift in our frame of reference) the understanding that knowledge was about people. Further, that all people have a creative capacity, and that combining knowledge and creativity directly impacted the bottom line of organizations.

Efficiency to effectiveness. Connecting this to the industrial age concept of more and better to different, the focus was on efficiency, which could help bring in more dollars based on more products that were different and better than competitors’ products. Then different began to move into a customer’s individual wants (focus on individual people), so a certain amount of play had to be designed into efficiency processes to allow for individual differentiation of products. Today knowledge itself has become a major vehicle for creating value, competition is global, and change and complexity have become everyday thoughts, producing changing needs and wants. To be effective, the organization must be a complex adaptive system, one that can adapt and respond quickly to a surprise-prone environment. In this framework, learning becomes critical, and for sustainability an organization must learn faster than the environment changes. Effectiveness therefore is directly correlated to how well an organization learns and applies what it is learning.

Linear to associative. By linear we mean sequential processing in terms of cause and effective. This approach to thinking and acting was the foundation of the industrial age whether we think in terms of products, engineering or decision-making; for example, linear extrapolation in logic-based decision models. Yet it is becoming clearer as the environment becomes more complex that linear thinking and causality is less capable of

handling the new world where cause and effect are entangled with interaction and emergence. In contrast, while the mind is certainly capable of linear processing, the natural processing mode of the human brain is associative (as described above).

If we look at the mechanical perspective of the industrial revolution, we consider these three aspects: causality and linear processing, the economic capacity of providing more and more goods as demanded by customers, and the striving toward efficiency created by competition. More and better products were facilitated by industrial efficiencies, and efficiencies were developed because of the ability to connect cause and effect to linear processing. Simultaneously, more and better products and efficiencies enabled by linear processing supported the shift to different.

There is also a pattern across “different,” effectiveness and associative in terms of their focus on the individual. “Different” moves from a production, product focus to a customer focus. “Effectiveness” is necessary for survival (in response to difference) because of the increasing dynamics and complexity of the environment (in response to the expansion from more and better knowledge to different knowledge, or innovation). This concept moves to sustainable effectiveness since effectiveness determines performance and sustainability determines survival, or long-term effectiveness. As discussed above, in a dynamic world effectiveness is dependent on learning, that which happens in the mind. The importance of associative processing is growing because of the existence of complexity and, while the mind has always been strongly associative, since the age of the Greek philosophers it has been trained linearly. Now it must think both ways in order to create effectiveness in a changing, uncertain and complex world.

While each of these changes can be separately described in linear terms, their movement together toward a greater relationship with people can best be described in associative terms. “More and better” moves from a product focus to “different,” a customer (people) focus. Efficiency, a mode of generation, moves from a dependency on machines to a dependency on learning (people). And “linear process” expands from a primarily learned focus on cause and effect to the natural associative process of the human mind (people).

Collectively, these movements represent a value shift that is driving a new way of understanding about the way we learn, think, and act. In this context value insinuates some level of improvement as seen by the individual, the organization, or the world. Having expressed this connection, why did we link this pattern of patterns to value? In the frames of reference from which we began this paper, there are learned patterns suggesting value in difference, value in effectiveness and, in a CUCA (increasing change, uncertainty, complexity and anxiety) world, value in associative thinking. In addition, both authors’ frames of reference place people with their knowledge, energy, experience and capabilities at the center of progress. Therefore, any patterns or pattern of patterns consistent with these frames of reference would be associated with value concepts.

In concert with the functioning of our brains, significant ideas (patterns) emerge in relationship with other ideas (patterns) that have personal historical significance, i.e., external patterns from the environment are detected, recognized, made sense of and have

meaning in relationship with our internal patterns of significance. As we more clearly recognize the interconnections among patterns of significant ideas that emerge in each of us as individuals—and as a global community—we can begin to make sense of our path into the future.

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