Hidden Dimensions of InnovationQuest

by Bryan Coffman and Langdon Morris

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InnovationLabs LLC
257 Castle Glen Road
Walnut Creek, CA 94595 USA
lmorris@innovationlabs.com
(925) 934-1786
www.innovationlabs.com
Innovation is a method of supporting groups of people to create breakthroughs. In pursuit of breakthrough thinking in any organization, there are aspects of the process that are overt and evident, the visible, and other aspects that are not so obvious even to the participants, the invisible.

The visible elements (the preparation, the activities, the environment) have been described in our white paper entitled “Creating Innovation: Elegant Solutions to Complex Problems through InnovationQuest” in considerable detail. There is a lot more to the art and science of facilitating creative, collaborative processes than what we can see. Here we discuss some of the invisible elements that are also critical to success. We approach this by asking a few questions that are central to our goal:

1. How do new ideas and innovations emerge?
2. How do they adapt over time?
3. How are they managed to produce reliable results?
4. How do large groups of individuals work together to apply and support these processes?

The first question has to do with the science of EMERGENCE. The second question has to do with ADAPTIVE SELECTION. The third question has to do with the science of CYBERNETICS. The fourth question has to do with the psychology of INDIVIDUAL AND GROUP LEARNING, or cognitive science.

How Do Ideas Emerge?

Emergence and Innovation

In the study of complexity scientists have discovered that order is something that ‘emerges’ from chaos. During the last decade “emergence” has become a technical term and a field of scientific inquiry that deals with how new insights and behaviors emerge in large and complex systems, such as organizations. Scientists working in this field have developed conceptual models to help them understand and explain some of the phenomena that they are studying. One of these models is the “sand pile.” (See How Nature Works by Per Bak.)
Imagine a small spout through which dry sand pours onto a table. As more sand falls on the table an inverted cone gradually forms. As still more sand falls, the cone grows. How it grows also explains how emergence occurs.

The sand pile model as applied to the creative process has four components:

- If you add sand to the pile, the pile will build up into an inverted cone and then the sand will begin to roll downward in “avalanches” of various sizes. Each avalanche is an emergent behavior, a spontaneous response to new input (more sand). But when and where the next avalanche will occur is not predictable.

- The flow of sand is analogous to immersion in a design process that attempts to solve a problem or generate a response to a crucial challenge. Because the emergence of new ideas is no more predictable than avalanches in a sand pile, the strategy of InnovationQuest is to maximize the number of relevant activities, experiments, and models produced during a fixed period of time.

- As the avalanches represent possible solutions, the size of an avalanche equals the value of the solution. The value of an avalanche - or an idea - varies as a power curve with its probability: smaller avalanches are more probable than larger ones, while bigger ones are likely to be more valuable, as they represent breakthrough ideas.

- The facilitation strategy is at one level a simple one: keep a steady flow of activities going (keeping pouring on the sand) by staying engaged and immersed in the process and building models to enhance clarification even while continuing to introduce new elements as required to represent the full complexity of the situation. After two decades of designing and facilitating InnovationQuest events, we can estimate pretty accurately how much sand is going to be needed to yield whatever scale and scope of avalanches are required.
InnovationQuest is the purposeful development of the conditions conducive to creating a sandpile. InnovationQuest events are typically created as a ‘specific response’ with the expressed output of ‘idea avalanches’ focused on a given problem or challenge. To create an organizational culture with the conditions for ‘innovation emergence’ as a normal part of doing business requires the transformational elements of our Game Changing System™.

How Do Ideas Adapt?

Adaptive Selection
Adaptive selection is the process of developing new structures or processes that support improved fitness and survival in a changing environment. Applied to the world of innovation and creativity, the principles of adaptive selection tell us a great deal about how to bring forth and select the ideas that provide the best fit, the best solutions to complex problems. According to scientist and author William Calvin, there are six components:

- There must be a reasonably complex pattern involved.
- The pattern must somehow be copied.
- Variant patterns must sometimes be produced by chance.
- The pattern and its variant must compete with one another for occupation of a limited work space.
- The competition is biased by a multifaceted environment giving one pattern more territory than another (that’s natural selection).
- There is skewed survival to reproductive maturity (juvenile mortality or sexual selection). (See The Cerebral Code, by William H. Calvin.)

Applied to the field of ideas and collaborative work among large groups of people, this means that the work process of the InnovationQuest event treats ideas as patterns, and the sequence of activities and the way activities are structured to create and play with ideas follows these rules. Part of the secret of doing this effectively is enabling people to bring forth ideas, and then nurturing a process in which different ideas are comingled, elaborated on, and many are eliminated, without violating the pride of ownership felt by the original creators.
Cybernetics

Cybernetics is the science of effective organizations. It emerged as a discipline during and after World War II, when focused scientific research yielded important theoretical concepts such as feedback, that were then used to create vital inventions such as radar. Cybernetics deals with the behavior of systems, and helps us understand how to design and manage systems to obtain desired and important behaviors and outcomes.

A key concept in this field is “variety.” Variety in cybernetics is much like “diversity” in living systems theory. Diversity is needed for a living system to thrive.

To achieve success in a highly competitive and rapidly changing marketplace, a company must develop a large variety of behaviors, which requires the ability to develop new ideas and choose among them.

- If everyone in a company reads the same thing, thinks the same way, and has had the same experiences, how can they possibly generate new ideas? Few companies are actually so homogeneous, yet many corporate cultures promote sameness by making it personally risky to think or act with new information.

- Conversely, if there’s too much diversity and no way to bridge the diversity to find new solutions, the result is either a group-think sameness, or destructive chaos.

- The bridge is catalysis, or the ability of any one among a diverse group of players to catalyze each other’s thinking and modeling towards integrative solutions. This is more than the ability to “play well together,” it’s the ability to use each other’s ideas to create new ideas, rather than using each others’ ideas to justify one’s own position or as a weapon in a debate. Catalysis is hard for people to do mostly because of fear and ego attachments. At its core, the best catalysis is play.
But too much catalysis will also either cause complete homogenization of the idea pool, or lead to the chaotic emergence of one idea after another after another without any convergence on a solution. Diversity and catalytic ability must be balanced on a knife edge of possibility to yield valuable solutions. (See At Home In the Universe by Stuart Kauffman for a deeper introduction to autocatalytic behavior of emergent systems.)

Cybernetics applied to organizations tells us that feedback remains as important in business as it is in military technologies. There are two types of feedback of interest to us:

- Positive feedback allows groups to ramp up quickly to an optimum solution set.
- Negative feedback enables groups to orient their solutions around specific goals or performance criteria.

Vantage points, immersion in complexity, and multiple iterations of work create positive feedback. Groups build models and fold the results back into the construction of more models, adding new perspectives when necessary. The universe of activities that can be iterated to develop and build complex models in an InnovationQuest event.

- Testing allows groups to bring their models to heel and see if they hold the promise of generating the desired behavior that is defined as the goal.
- Incubation and orientation give perspective, and dampen runaway feedback or suspend and reframe in situations where positive feedback cannot ramp the solution up to optimum.
- Lag times are tightened up to compress the acceleration and attainment of the goal.

All of these factors come into play when designing and facilitating creative decision making processes.
The Psychology of Individual and Group Learning

People have worked together since the emergence of the first humans millions of years ago. In spite of all that practice, there are still some important success factors that haven’t found their way into common use. For example, just because you have a group of people together in a room does not mean that they can actually accomplish any useful work. In fact, as the task you ask them to do grows more complex, the likelihood of useful results diminishes. It was Neitzsche who commented that madness is the exception in individuals but the rule in groups.

What this means to us is that carefully designed and facilitated processes follow “learning pathways” that enable individuals and groups to create a meaningful context for their work, and then create solutions within that context, all while avoiding the many pitfalls that lurk in wait.

A common shortcoming in group work is inadequate or insufficiently large context. Groups of people rarely go beyond the existing contextual framework even when they know that they need to find a solution that is not within the existing context! Hence, a robust process must “provoke” them to go beyond their existing way of looking at the world by both giving them new information and asking them to do something with it so that they can assimilate it and apply insights back to the issue in question.

Another pestilent pitfall is “groupthink,” a hazard that commonly besets groups. A properly designed worksession avoids groupthink by preventing the adoption of the first apparently good idea that comes along, a phenomenon we call “premature convergence.” (See Groupthink by Irving Janus.) InnovationLabs has formalized many of these processes in a methodology for designing and facilitating InnovationQuest events.
Conclusion

While creativity and innovation are often seen as nebulous or intangible there is both an art and a science behind their purposeful development. There are distinct and definite patterns which can be created to produce the conditions necessary for large groups of people to produce ‘unusual’ results in short periods of time.

InnovationLabs principals have, over the last 20+ years, experienced a wide range of conditions and environments in which to test the ideas mentioned here. Every organization has a unique way of adapting to market conditions and competition. Innovation and creativity, applied purposefully, has a place in the full spectrum of strategies - from more conservative in nature (survival oriented) to more aggressive approaches (growth oriented). We use the science of emergence, cybernetics, adaptive selection and individual and group learning to work with organizations to craft InnovationQuest events that allow appropriate solutions and innovation to emerge to specific challenges.

In addition to the concepts, tools, and methods described here, InnovationLabs has developed and offers detailed approaches concerning the management of R&D and innovation in both technical and non-technical settings. Many of these are described in the recent book, Fourth Generation R&D: Managing Knowledge, Technology, and Innovation (John Wiley & Sons, 1999) co-authored by Langdon Morris.

Additional White Papers on related topics, and more information on our services, may be found at our web site, www.innovationlabs.com.

Langdon Morris - lmorris@innovationlabs.com
Bryan Coffman - bcoffman@innovationlabs.com