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ORGANIZOLOGY, NEW SCIENCE OF ORGANIZATION: A BREAKTHROUGH IN SCIENTIFIC EXPLANATION OF THE WORLD

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ABSTRACT

Science in general--science as a whole--is order- and organization-oriented. It seeks for order and organization and solves numerous problems to find this order and organization in everything it studies. Moreover, it is not a secret that the scientific classification of sciences is a big challenge; science itself needs order and organization. What seems extremely strange in such a situation is that there is NO accepted and recognized science of organization. The main reason for such a situation, certainly looking like a scientific crisis, is the fact that there is NO accepted measurement of organization. My 30 years of research in the fields of organization (not just human organization, but the organization of the world) have led me to stunning results that I have to share with the learned community. Hopefully, my article will deliver the scientific world from this confusion and give birth to Organizology, the science of organization. Organizology, when founded on one basic measurement (as any science should be) brings one basic explanation, simple and elegant, to millions of things, processes, and phenomena no matter how complex they seem. Moreover, it brings order (organization) to the science itself--it installs a perfect order (organization) into the world of science, into the classification of sciences, into the measurements of organization.

INTRODUCTION

It is over 50 years since Oscar Morgenstern offered his Prolegomena to the Theory of Organization [Morgenstern, 1951], and until now, despite armies of researchers in the field, there is still no universally accepted theory of organization. Moreover, in the literature on organizational research today [Maturana, 1981, Gregersen, Hal and Lee Sailer, 1993; Hazard, 1993; etc.], chaos and complexity [Gell-Mann, 1995; Waldrop, 1992, Drazin, Robert and Lloyd Sandelands, 1992; etc.] there is an even more persistent outcry for the creation of the Science of Organization. And still there is no science. To me, this situation certainly looks like scientific crisis, as T. Kuhn would say [Kuhn, 1970], because despite the fact that "a great many quantities have been proposed as measures of something like complexity" [Gell-Mann, 1995], there is just no established and universally accepted measurements of organization.

This article is a breakthrough. It is not like the light at the end of the tunnel. To some, it will look like heresy, to some it will look like Super Nova. My task though is simple. I have to report

to the scientific community the results of my research, and these results can move the whole new generation of scientists to the field earlier abandoned, misread, or just not seen. Welcome to the world of organization scientifically explained by the new science--Organizology.

GENIUSOLOGY, THE SCIENCE OF GENIUS: THEORETICAL FOUNDATIONS, PROBLEMS, AND PERSPECTIVES

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Genius is a strategic advantage (like Einstein). Genius is the savior (like Archimedes). Genius is the future (like Edison). Genius is the glory for the country (like Alexander of Macedonia—Alexander the Great). Genius is the resource bigger than oil and gas resources because genius can discover that gas and oil are not needed (like Roentgen). Genius is forever (like Socrates)…

Aleandr

ABSTRACT

        This article is the founding and programmatic article--the article about a new science: Geniusology, the science of genius. This article is dedicated to all geniuses from the first known genius to those not yet born. It is dedicated to Socrates and Aristotle, to Geordano Bruno and Galileo, to Copernicus and Isaac Newton, to Louis Pasteur and Albert Einstein, to Madam Curie and all those who created the scientific basis of modern civilization. This article is long overdue because, surprisingly, despite much literature on genius, there still is NO SCIENCE of genius. Studying biographies and lives of geniuses makes the phenomenological foundation for science, but descriptions alone never make a science. An intellectual effort is needed to create a new science. There is a need to study geniuses scientifically--not from anecdotes--and then use the gained knowledge for improving and accelerating education and business. This article meets the need. It lays the theoretical foundations, discusses the problems, and looks at the perspectives of the new science--Geniusology.

        To me, the most striking scientific paradox of all is that those who created all the sciences, those who are the salt of scientific progress--geniuses--have not been scientifically studied. In plain English, it appears that those who are the most worthy of recognition are not scientifically recognized. Those who gave birth to a science did not give birth to the science that would reflect themselves. Those who produced major achievements in science did not achieve to the point of producing a scientific mirror. Those who often gave their lives for science did not give science for their lives. State it in whatever way you want. The fact is stunning. There is no science about genius. A shoemaker without shoes--a famous and very far spread situation--maybe too far, if it reaches the level of genius.

        This article is a tribute to those who have led humanity to light in the darkest years and beyond, to those who have saved millions of lives, to those who have opened eyes to the vastest universes and the smallest micro worlds. Finally, this article is dedicated to the geniuses of the

genius world--researchers and visionaries like Alex Osborn, Sid Parnes, E. Paul Torrance, and many others whose profound works on creativity, creative problem solving, giftedness, and genius have literally paved the way to the foundation of this new science.

SYNERGISTIC POWER OF MULTI–DISCIPLINARY TEAMS

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ABSTRACT

Project teams composed of students from different professional schools harness synergistic power to perform better and learn more in an environment close to industrial practice. Parallel courses are used to teach new product development to graduate engineering and marketing students. In this course, interdisciplinary teams work to design a product and market entry plan. The product has to satisfy customer needs for a price customers are willing to pay.

This paper is focused on the benefits of interdisciplinary teams. They have enriched the learning experience for all stakeholders in numerous ways. First, the level of creativity of the teams has increased with the addition of people who approach problem solving with different mind sets and backgrounds. They ask questions from different perspectives and stir the creativity mix.

Students and corporate clients comment that these teams are much better preparation for application as they reflect the cutting edge of practice. Imagine students and faculty gaining the synergy of thinking about common problems across functional areas. This leads to a much more holistic approach and to breaking out of academic discipline silos.

The synergy generated by the multidisciplinary teams stretches far beyond the students and their particular disciplines. Faculty members in their environment are stretched to think outside the box of their colleagues and discipline. Teams also create change and challenge for corporate clients as well. Perhaps even more amazing is the downstream impacts as it leads to one faculty joining in a grant proposal in another school, or includes faculty from one school in a visit by a professional to another.

The multidisciplinary teams have powered a program in New Product Development to places not dreamed about it at its inception, in the classroom, in the learning community, the school, with corporate clients, and in the university. The potential impact of the synergy has great applications in education and in practice. Companies everywhere are struggling with creativity, synergy, and holistic approaches while education turns out silo bound students. Here is one way to help unleash the power of creativity that lurks within each individual.

INTRODUCTION – A VISION OF SYNERGY

Connection and imagination are two of the key factors that lead to the developments that you are to learn about. The two authors were in a room of the director of the Center for Entrepreneurship and he asked why couldn't the engineering school and the business school work together in new

product development. As he closed the door it seemed the obvious answer was that the professional schools could not.

In the silence of the room thoughts began to buzz around the room and with in minutes the white board was getting filled with words and drawings. The marketing faculty was learning that words were not good enough for engineers, ideas must be illustrated. The excitement led to a vision of a different kind of program for graduate students:

> *A new product program developing team leaders for the new product development process.*

The driving force was the recognition that neither discipline alone nor any other one discipline could launch a program that would develop new product development team leaders. Leaders would need to understand the synergy that faculty only partially understood. Yes, as faculty it was recognized that there were things greater than the disciplines that are studied and practiced. What was it that was unknown? The faculty did not know but intellectual exploration is the business of faculty.

Discussions with administrators offered up many reasons that this program would not be easy. It was decided that to create this program for team leaders would require some careful academic gymnastics. Thus the concept of parallel[i] coursing was born and with it the new product program.

In the shortest form the program at the moment consist of two courses offered simultaneously in the same time and space from two professional schools, (engineering and business) and two faculty members who can and want to work together.

INTERDISCIPLINARY TEAMS – MIMICKING INDUSTRIAL PRACTICE

Interdisciplinary teams are formed using the students from the graduate engineering and graduate business courses. It did not seem so unusual to the faculty but a logical extension of what students described they found at work and what had been observed. However, industry was very excited about this combination of people from different disciplines. Industry has not figured out how to manage these cross disciplinary teams themselves. Executives were most interested in what was about to happen at the university.

In fact of the five companies that signed up the first year to support the project four of them specifically mentioned the interdisciplinary feature of the program as being important to them. In this case they were not looking for the development of their project as much as they were looking for the development of leaders. The corporate leaders shared with us that they felt that students coming out of schools of business spoke a different language then those coming out of engineering. They also approached problems differently. There was often dissension and confusion. The clients gave us real projects but made it clear that the funding was an investment in the program. An opportunity to help develop interdisciplinary team leaders was their primary interest.

Originally the teams were an element of course structure. As executives demonstrated their enthusiasm for team leadership in the new product area, it became more of a central focus. The faculty members sought out opportunities to improve the teams. The course really became

opportunity for the faculty to try and help shape the teams and what they were doing in a way that some of the problems might be minimized. In our first cycle some improvements were made. In the current cycle much larger improvements have been made as the faculty members have come to better understand each other's work and can the blend them more smoothly. If you were in the first cycle it was a case where everything was put in the mix and hurried through. After acclaim by colleagues and community and lots of questions by students the program has been reworked for the teams.

BENEFITS

There are a number of benefits to the multidisciplinary teams. The teams are composed of students from the two classes. However they can be from a number of different areas and backgrounds. The Marketing students are from the MBA program and have to meet only two requirements which was to be admitted to the MBA program and taking the prerequisite course of Marketing Management. Thus they could have any number of interests within the MBA program. The only common base was their interest in New Product.

The Engineering students similarly need to be admitted to the Masters pf Engineering Program. They represent a wide variety of engineers, Mechanical Electrical and Manufacturing. The course they signed up for is called Engineering Design and is a required course in the Masters Curriculum. The students in both programs represent a span of ages from those that just completed an undergraduate degree to those in their fifties. They represent a span of cultures, major backgrounds, job experience, and interests.

One benefit of the teams is that they learn the process from more than one perspective. They learn how they can improve speed to market. Once an engineer realizes that it takes a marketing team a few weeks to put together meaningful research then the engineers begin to think ahead. Once a marketing student learns that engineers have an arsenal of things that they can do to help present a concept given a little time, they can work better together. Overall the schedule can get a lot tighter as the project does not sit as it is passed from group to group but keeps moving. The students keep finding ways to make this work quicker and smoother. What kinds of benefits does this provide overall?

CREATIVITY

One of the greatest benefits of the multi disciplinary teams has been the creativity. Students and faculty alike have learned from this creativity. Partially this is due to teams, but much of it was due to the mixtures of people and experiences. For example, in the first year of the program, the idea of using online groups to expand ideation and concept development were innovative and are now being passed on to others through publication.[ii]

In the second year of the program students have shown very different approaches to the parts of the New Product Process coming from their diverse backgrounds.
> Ideation creativity
> Concept Test Creativity
> Presentation Creativity

An assignment form the course shows some of the diverse interests of the students. This assignment was entitled, "What interests you?" In exhibit 1 you get a sense of some of the topics that students presented in the winter of 2004. This assignment shows the diversity of interest in the students. Further it serves to challenge the faculty to think "Are we asking these questions?" Now imagine these people grouped in teams.

Exhibit 1

1. Improving New product Development with Industrial Design -- focusing on involving some non engineers in the design process.
2. Importance of agreement on vision and mission focusing on having a place where all team members can turn to judge progress.
3. Innovations in design that lead to products that are stronger, lighter, and more cost efficient to manufacture.
4. Engaging the customers – focus is on how to you design to engage the customer.
5. Looking to the customers for ideas – focus on how to use customer input in the new product process.
6. NPD Process – what are the steps that can be actually used?
7. Changing Direction in 30 Days – focus good product design and development methods.
8. Prototyping – focus where does it fit into the NPD process and different kinds.
9. Better ways to solve engineering problems
10. The NPD Process focused on the customer – customers needs and need hierarchies
11. Speed to Market – NPD process as supply chain
12. Figuring out latent needs – focus research methods
13. Fuzzy front end – reaching consumers needs and motivations
14. Scheduling NPD – work a plan for NPD
15. Successful Innovation -- introduction to the market
16. Robust design – use of thought experiments
17. Voice of the Customer – what does it mean in application
18. Get this to Market – bringing products to market successfully
19. Develop your product in half the time – alternatives and limitations
20. NPD – next generation improvements

HOLISTIC APPROACH

One of the other benefits that the multi disciplinary teams generated was the more holistic approach. Before the winter2003 semester Engineering Design, was not taught with any links to a marketing course. The course was a requirement in the practice oriented engineering masters degree program in the school of engineering. The class had evolved to include team, semester-long, design projects. Student usually proposed design projects related to their jobs or project topics were solicited from the Small Business Technology Development Center on campus. With only engineers in the class, creativity was stifled and much of the new product development process was not covered.[iii] In the new program you have teams that include people who are involved in each section of the New Product development process. Marketing people tend to dwell on the ideation and

concept phases. Engineers tend to want to get an idea and develop it and refine it. The balance led to a much more richer learning environment.

As the faculty have learned where the opportunities to make the approach more holistic and more balanced from the students, and the clients they have tried to develop exercises or assignments that assure coverage of each area. One of the major changes that were introduced this year was a refined screening process.[iv] In this case the faculty learned from observing students and comments from students that people have a tendency to design and employ screens to reach the goals they want. A new program was experimented with that put screen development before ideation and concept development.

The multidisciplinary teams have led to innovations methods of ideation, in screening, and in concept test. The process is being improved with each offering of the class as the students and clients help the faculty learn and expand their horizons. This then leads to a close review of each session of the course.

COMMON CENTRAL MODEL

One of the things that the multi disciplinary teams have caused the faculty to do is to be sure that there is commonality of language and focus. In order to do this the authors have used a common central model. In the first generation of this program this was shown to students on one or two occasions. However, the language and focus areas that industry has pointed out are a problem in multidisciplinary teams. This year the common central model is used at the beginning of each new section to anchor everyone in their location in the process. This then allows for a discussion about what kinds of things that different disciplines have to offer in each phase.

SHARED LANGUAGE

One of the things that corporate contacts have stressed is the need to have a common language for the leaders of product innovation teams. How do you do this? The multi disciplinary teams have helped us to do this as students have helped to figure out the common language using the common processes. Another factor that has helped is the shared reviewing of textbooks.

One of the areas that has required common definition is what is the meaning of words like vision, mission, and scope in terms of new product development process. Students coming from different backgrounds have different ideas about what these mean and so think that they all are speaking about the same thing. This has led to building a vocabulary but more importantly in terms of learning discussing the need for a common vocabulary. In class, vision is used as the passion statement, what would the team like to achieve, mission, is used as the customer oriented statement – what will the customer get out of project the team is working on, and scope is defined as the parameters of the box in terms of engineering and marketing limits that the students are working in.

Other examples of words that need common definitions include target market. Some students seem to think that this is any potential customer, this leads to an explanation of segmentation, and the selection of segments. It is often news to business students as well as engineering students that a target is one of several segments. Further engineering has its own definition of segmentation – fragmenting or breaking apart components to make it flexible which

in application is far removed from markets. Marketing's talks about segmentation as dividing up the population into potential market groups using criteria such as: Demographics, Geographic, Lifestyles, Benefits, Loyalty, and Access. It is the clarification and understanding each others terms that develops better team leaders. It is understanding others' terminology that often leads to creativity.

SHARED MODELS

In the program this year the engineering students are exposed to basic models in marketing including but not limited to the following:

> Augmented Product Model
> Channels
> Buyer Type
> Buying Process Model
> Market Entry Planning
> Marketing Mix
> Positioning
> Product Life Cycle
> Supply Chain
> Times Model

Marketing students have been exposed to several engineering models as well

> Engineering Concept
> Quality Function Deployment
> Matrix Methods
> Pair wise Comparison
> Process Selection
> Pugh Method
> Rapid Prototyping

The multidisciplinary teams have to work their way through concepts from multiple fields. In addition they have the ideas of their clients. This means that a mixed group of backgrounds are being challenged with a large amount of material from a variety of sources. The way that graduate students choose to handle this is usually quite creative and productive.

Learning each others models is very helpful in communication and has helped the faculty as well. Engineering has incorporated the extended product life cycle as a framework. Marketing has adopted pair wise comparison as a means of weighting in screening, engineers understand the difference between features and benedits with the Augmented product model and the TIMES model. Marketers are forced to think about deliverable benefits with the House of Quality to give a few examples.

FACULTY LEARNING FROM MULTI DISCIPLINARY TEAMS

Perhaps one of the other synergistic benefits is the faculty learning that occurs. In an ideal course faculty should be able to learn as well as students. In this program the faculty learn in many ways

1.   From their own students
              Resources of the internet
              Program strengths and weaknesses
              Perception of what industry needs
2.   From the students in the other parallel course
              The mind of the other discipline
              Entirely new approaches
3.   From the synergy of the team
4.   From the client
              Product architecture
              Visions of future products
              Issues in design and Markets – US Filter
5.   Directly from the colleague with whom they are working
6.   By association with other faculty from the other schools
              Courses
              Programs
              Colleagues
              New Directions
              Opportunities for growth

CROSS DISCIPLINARY/CROSS SCHOOL

Teams are used through out education and organizations as a way of getting more ideas or more person power into a project. In this case the teams are across the disciplines and so is the faculty. This leads to much more mind expanding experiences for team members and faculty alike.

In one example a team working on developing medical instruments for closed cavity chest surgery ended up taking a marketing professor and another student for a rich two hours in the university anatomy lab deep inside a number of the corpses used there. Everyone learned a great deal about the project, but also a great deal about the potential for information gathering. Imagine the power if not only the engineer knows but also the marketing person understands what the potential decision maker, (Doctor) is dealing with. You can only begin to imagine what was learned.

In another case the engineers were happily working on a rate of flow device for a client to put into a new product. Much effort was spent on thinking about the product and how many different kinds of substances it would have to meter. The marketing team raised the issue how do we know that customers want this? In discussion after discussion homemakers and decision makers could see no benefit in the proposed product. However they got very excited about a slight

adaptation which was an onboard storage reservoir. There was a lot of learning here for engineering faculty as well students on both sides.

Faculty and students tend to naturally stay in their academic silos. Students are part of a program and they want to get a degree and get on with their lives. Faculty members are expected to teach in discipline, research, and often perform service in discipline. There is little encouragement for the mind expanding effort of looking beyond. The discipline boundaries tend to be broken down by the teams and the clients as they look at the whole problem. This opens a Pandora's Box of creative thinking for faculty. The danger in this awakening is that one's silo colleagues, your administration, your profession, may not appreciate anything that you are doing outside the box of your professional school. The most frequently asked question of the authors is, why?

FUELING THE FIRES OF INQUIRY

The answer to the question of, why, is found in the multi disciplinary teams and the excitement for inquiry that they can build. When students ask boundary spanning questions it makes a faculty member think. When thought occurs it often leads to more inquiry, which leads to new ideas and new excitement.

This program has already helped spawn an interdisciplinary minor in entrepreneurship, housed in the business school, the design of a revamped product design and manufacturing program in engineering, a chapter of the PDMA, several external grant applications, some community projects, and several new relationships with companies. Much of this has come about due to the questions that are asked, the thinking that goes on, and the challenges that occur in working with the multidisciplinary teams. It is with the teams that the engineering and the marketing have to coexist. It is not easy and the friction often takes the authors in new directions.

ATTRACTING CORPORATE CLIENTS

It is the teams that often attract the clients. Not a specific team as at the time that they commit their project and their funds they do not know who is on the team. It is the idea of the boundary spanning team. In fact clients have told us that one of the best things that they get out of the program is the out of the box ideation. Clients have trouble getting their own people to cross boundaries even where they have innovation centers. The synergy of the disciplines stacked together across a variety of cultural and corporate backgrounds makes the program interesting and beneficial to them.

ENDNOTES

(i)   Authors, ventures in Team Teaching: The Parallel Coursing Strategy" Proceedings of the Marketing Management Association, Proceedings, Chicago, March 2004.

(ii)   Authors, "Graduate Students Teach Faculty the Benefit of Ecommerce in the New Product Development Process." Proceedings of the Marketing Management Association, Proceedings, Chicago, March 2004.

(iii)   Authors, "Marketing Enhances Engineering Product Innovation." Submitted to ASEE, June 2004.

(iv)   White Paper, for, PDMA

THE THREE LITTLE STARTUPS:
A TALE OF NETWORK SECURITY

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ABSTRACT

With the ever-increasing demand for accessibility and information sharing, organizations are faced with providing means to protect and secure one of their most valuable resources, organizational data. This, however, is no simple task as security threats arise from both inside and outside the organization in the form of viruses, attacks, probes, data corruption and unauthorized data access and replication. In this paper, the author weaves network security into the tale of the "Three Little Pigs" to explain the importance of proactive network security measures through the development of a layered approach to security administration. As each of the "Three Little Pigs" observed in the original fairy tale, a protective house is built out of strong materials that require careful planning and quality construction. This light-hearted slant to a very serious subject uses each "pig" or security instance to discuss specific threats and vulnerabilities that a network administrator faces and the measures that can be taken to protect the system.

THIS MUST BE HEAVEN AND OTHER STORIES ABOUT NURTURING CREATIVITY IN A BUSINESS CLASSROOM

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ABSTRACT

Imagine a business class where students initiate a sing-along as part of their formal presentation; and all twenty enthusiastic students stand to join in a chorus of "We Are the World" and continue singing and humming throughout the rest of the class. One student observes later about the singing that she really enjoyed it because it was "so empowering." And during the same class session they all dive into making sketches that reflect a time in their lives when they were feeling most creative. Then—without exception--show no hesitancy about sharing and explaining their sketches to the rest of the class. One graduate student felt compelled to deviate from writing her final paper to engage in a project that was more meaningful to her. She wrote:

I realize that by taking this class that I have been ignoring a huge part of my creative self. It could be why I've felt so at odds lately. I've expressed my love of writing before and also my frustration over having to write. Thinking about this, I decided for my final project to do something that I have always wanted to do, something I talk endlessly about doing, and something that I have all the equipment for—sewing. For my final project, I have done my best to sew a dress.

Was I dreaming? No, but there have been many times when I thought I was in heaven since student engagement with the subject has been so intense and compelling. Being part of this learning adventure has been the most fun I've had in a very long time.

As one student wrote on the evaluation form, "Fabulous class…life changing/bending/altering!" And another wrote, "Awesome class concept. Moved me into more of a concept of where I am and where I want to go."

Strategies I have used to help students connect with their creative juices include: improvisational acting; dance; meditation; storytelling; writing poetry and creative briefs; drawing; listening to music; and watching filmclips, among others. Exercises designed to encourage introspection and reflection have also been utilized.

Questions that I am exploring include: how can creativity facilitate teaching business skills? What happens in the classroom when this kind of learning occurs? What classroom conditions foster creative expression in students? Why is this important? What kind of things can go wrong? What strategies can help create this kind of magic? What are some important lessons learned?

I have a framed painting in my office done by one of my students as part of her final project. It is entitled, "Whole Self," and is related to our conversation about ways of bringing one's whole self to work. It is a colored painting of her smiling face and hands, raised and open, reaching

skyward as though to embrace the magic that life is bringing her. It is a reminder to me of how much joy this class has brought me. I am excited about the creative spirit that I have observed in my students and can hardly wait to explore it further with them next year and, hopefully, every year after.

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