Deductive Logic

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CIB W117 Coordinator
Fulbright Scholar
IPMA Fellow
Pbsrg.com

Mar 24, 2014

SKEMA Business School
Information Measurement Theory [IMT]

• Natural laws govern reality
• Natural laws govern the change of conditions over time
• No one can override natural laws
• Risk increases when people attempt to overcome natural laws
• When risk increases, observations are inaccurate
• Understanding natural laws minimizes the need to acquire data to understand the unique conditions
Natural Laws

<table>
<thead>
<tr>
<th>Past</th>
<th>=</th>
<th>Present</th>
<th>=</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Natural Laws</td>
<td></td>
<td># of Natural Laws</td>
<td></td>
<td># of Natural Laws</td>
</tr>
<tr>
<td>100%</td>
<td></td>
<td>100%</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Natural Laws are discovered and not created
Conditions Always Exist

Conditions are unique and change according to natural laws
Unique Conditions Are Related

Past Conditions

Present Conditions

Future Conditions

100%
Event [by Observation]

Natural Laws \[=\] Natural Laws \[=\] Natural Laws

Unique initial conditions \[\Rightarrow\] Time (\(dt\)) \[\Rightarrow\] Unique final conditions
Unique Final Conditions are Set by Initial Conditions [No controlling of event, Minimizing Decision Making]
“Deductive Logic and Leadership”
Barrett Honors program

- “How to know everything without knowing anything”
- Minimize transactions by 10 – 30%
- Make learning and thinking faster and more efficient
- Minimize the time to learn by 50%
- Assist people to change themselves and become the best that they can be
- “Time travel without moving”
Components of BV Program

- Kashiwagi Family [Home of IMT]
- Honors 394/494 and CON 500 level academic classes
- Performance Based Studies Research Group [PBSRG]
- LSA [academic/industry interface]
Unique Final Conditions are Set by Initial Conditions [No controlling of event, Minimizing Decision Making]
“No control”

- Control and influence [form of control to alter final outcome] causes risk and transactions
- Decision making accompanies MDC
- Control is not used in the Best Value approach
- BV PIPS is different because there is no use of control
- Cannot override NL
Influence vs. “No Influence”

More Likely to:
1. Believe in luck and chance
2. Blame others
3. Be surprised
4. Be emotional
5. Try to control others
6. Feel controlled by others
7. Be reactive

More Likely to:
1. Plan things in advance
2. Be accountable
3. Have vision
4. Listen to others
5. Think of other people
6. Be at peace
7. Be organized

By Success model, NO control or Influence is reality
Which Model Increases Risk?

Risk Test identifies **NO control or Influence as accurate model**.
PBSRG

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PBSRG

- Created by Dr. Dean
- Supported by wife Judy and Ammon and Aaron
- No approvals sought
- No university funding
- Used $20K to create professional office
- Implemented IMT to deliver construction services
### Industry Structure

<table>
<thead>
<tr>
<th>Performance</th>
<th>Perceived Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td><strong>III. Negotiated-Bid</strong></td>
<td><strong>II. Value Based</strong></td>
</tr>
<tr>
<td>Minimized competition</td>
<td>Buyer selects based on price and performance</td>
</tr>
<tr>
<td>Long term</td>
<td>Vendor uses schedule, risk management, and quality control to track deviations</td>
</tr>
<tr>
<td>Relationship based</td>
<td>Buyer practices quality assurance</td>
</tr>
<tr>
<td>Vendor selected based on performance</td>
<td>Utilize Expertise</td>
</tr>
<tr>
<td><strong>IV. Unstable Market</strong></td>
<td><strong>I. Price Based</strong></td>
</tr>
<tr>
<td></td>
<td>Wrong person talking</td>
</tr>
<tr>
<td></td>
<td>Management, direction, and control</td>
</tr>
<tr>
<td></td>
<td>No transparency</td>
</tr>
<tr>
<td></td>
<td>Manage, Direct and Control [MDC]</td>
</tr>
</tbody>
</table>
MDC Systems Create Confusion, blindness, and reactivity

Owners

“The lowest possible quality that I want”

Contractors

“The highest possible value that you will get”

Minimum

Maximum
Business Model for Experts

Customers

- Outsourcing Owner
- Partnering Owner
- MDC Environment

Vendor X

- Highly Trained
- Medium Trained
- Minimal Experience
“No control”

- Control and influence [form of control to alter final outcome] causes risk and transactions
- Decision making accompanies MDC
- Control is not used in a true Best Value approach
- BV PIPS is different because there is no use of control
- Cannot override NL
Cost Differential with MDC

- 10 – 30 % cost increase
- Profit is minimized by 50%
- No motivation to increase quality and value
- Reactive behavior
- Silo based mentality
PBSRG Grants: 123, $13.3M, 20 years

Started: $180K
Total to Date: $13.3M
Average Yearly % Increase: 28%
Total % Increase: 567%
Number of Grants: 295
# Best Value Research

## #1 Worldwide

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Projects</td>
<td>1,622</td>
</tr>
<tr>
<td>Construction Projects ($)</td>
<td>$4B</td>
</tr>
<tr>
<td>Non-Construction Projects</td>
<td>95</td>
</tr>
<tr>
<td>Non-Construction Projects ($)</td>
<td>$2B</td>
</tr>
<tr>
<td>Projects on Budget</td>
<td>96.7%</td>
</tr>
<tr>
<td>Projects on Time</td>
<td>93.5%</td>
</tr>
<tr>
<td>Largest Awarded Client</td>
<td>ASU</td>
</tr>
<tr>
<td>Total $ Award to Date at ASU</td>
<td>$1.7B</td>
</tr>
<tr>
<td>Testing in Number of States</td>
<td>18</td>
</tr>
<tr>
<td>Testing in Number of Countries</td>
<td>6</td>
</tr>
</tbody>
</table>
Additional Information

- Longest running, largest, most tests, most locations, most industries
- 20 year research program
- First three tests net ASU $100M investment
- 98% customer satisfaction
- 2005 H Bruce Russell Corenet Global Innovation of the Year Award
- 2009 Fulbright Scholar
- 2012 Dutch Sourcing Award (DSA) for $1B Infrastructure Project
- 2012 IFMA Fellow
Definition of Experts

- Metrics
- No risk
- Risk mitigation through transparency
- Planning
  - Use expertise to identify proposed plan
  - Identify risk that they do not control
Plan

• Detailed schedule from beginning to end
• Expertise used in areas where there is insufficient information [II]
• Risk that cannot be controlled [RDNC]
Dutch Implementation

- Over-management of vendors
- Procurement and execution takes too long [12 years]
- Infrastructure repair is critically needed [drivers spend 1-2 hours on road going and coming]

- 16 project, 6 awards, $1B test of best value PIPS
- Goal is to finish 10 projects in 3 years
Results

- Program results: 15 projects finished (expectation was 10)
- Delivery time of projects accelerated by 25%
- Transaction costs and time reduced by 50-60% for both vendors and client
- 95% of deviations were caused by Rijkswaterstaat or external [not vendor caused]
- NEVI, Dutch Professional Procurement Group [third largest in the world] adopts Best Value PIPS approach
- Now being used on complex projects and organizational issues
Canadian Efforts

- University of Alberta
- University of Ottawa
- University of Manitoba
- Wilfrid Laurier University
- Queen’s University
- University of Waterloo
- Western University
- Dalhousie University
- Simon Fraser University
- City of Spruce Grove
- Alberta Infrastructure
Education/Research August 2014
Mission: Increase quality of environmental engineering services
Timeline: 1 year

Projects:
• Yuma: Air Quality
• ASRAC: Water Quality
• Brownfields: Waste Management

Executive Team:
• Teena Ziegler
• Erik Massey
Model of the Future: Performance Information Procurement System (details documented in manuals at pbsrg.com and ksm-inc.com)

1. Selection
   - Identify expertise
   - Dominant Simple Differential (non-technical performance measurements)

2. Clarification/Pre-Award
   - By expert's proposal must be acceptable to user
   - Clarification Technical review Detailed project schedule Resource & Man-power schedule Expectation vs. delivered

3. Execution
   - Risk Management using metrics Quality Control Quality Assurance
HONORS EDUCATION

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System Created to Assist People to See
System Created to Increase Value and Performance
Knowledge Changes People’s Behavior

DEDUCTIVE LOGIC AND LEADERSHIP EDUCATION

“A Revolutionary Change in Thinking”

What is Deductive Logic Education?
Backed by 20 years of research ($13M) and 1,600 tests, an approach using natural laws and common sense allows students to learn faster, improve their ability to perceive and implement accurate concepts and bring tremendous value to society. The new approach speeds up learning, and allows students to understand events up to ten times faster by applying natural laws instead of memorizing and reading huge amounts of data. It allows students to know almost everything without knowing almost anything. The course is now the most popular honors course (top 5% of 75,000 students at ASU).

- 4 years; 17 registered ASU courses
- 600+ students
- 4.77/5 university course rating
- Scheduled course for Fall 2014 at the University of JEC, Mysore India

“Know Almost Everything Without Knowing Almost Anything”

Online Resources and Videos
Successful Student Results:
http://www.youtube.com/watch?v=83Fy9PRy54
http://www.youtube.com/watch?v=K70Yd0jg5zG
Parent Perspective of the course:
http://www.youtube.com/watch?v=H1eHiy6T1qg
http://www.youtube.com/watch?v=H1eHiy6T1qg
Course Companion Website:
http://3undleadership.com
Rate My Professor Kashiwagi [Google Search]

What is the impact on students’ lives?
Changes Lives: Students learn the value of their parents’ and teacher’s experience and expertise. They can utilize the expertise of experts and minimize addictions, depression and rebellious actions that most students go through due to the lack of simplistic understanding of life. Their minds are freed to explore the world at a much faster speed and comprehension. The class package contains curriculum ranging from general concepts for all student focuses, to more specific Industry topics. Material is divided into several core modules covering the logic, leadership and different applications. The package can be utilized as an online coursework or as an in person class curriculum. The curriculum includes:

- Video lectures with Dean Kashiwagi and Dr. Jacob Kashiwagi
- Accompanying PowerPoint presentations
- Activity Instructions
- Exams, quizzes, and assignments
- Instructor guidelines

Supporting Industry research
The Performance Based Studies Research Group (PBSRG) is a group of researchers and educators at Arizona State University that have developed a Deductive Logic and Leadership Model to reduce cost and improve value. The model is based on leadership principles and aims on driving accountability and efficiency through the use of measurement.

- 1600+ Projects Tested
- $5.7B of services delivered
- 98% customer satisfaction
- 41 industries where our model has been tested
- Seven countries tested
- Projects in 16 states

Who is the founder?
Dean Kashiwagi, Ph.D., P.E. is a professor at Arizona State University’s School of Sustainable Engineering and the Built Environment, Director/Creator of PBSRG, and CIB W117 coordinator. He is a world renowned expert in best value research. His credits include the creation of the IMT, PIPS, and PIRMS processes.

In his main publications, Information Measurement Theory and Best Value Standard, Dr. Dean details the conception, history, and application of the IMT and PIPS processes. These textbooks are companion to the class courseware, and can be purchased at the link below:


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Urban Systems Engineering Bldg., Rm #230
651 S. University Drive
Tempe, Arizona 85281
www.PBSRG.com
# Deductive Logic Class Results

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Created</td>
<td>Dr. Jacob Kashiwagi</td>
</tr>
<tr>
<td>Start</td>
<td>Fall 2009</td>
</tr>
<tr>
<td>Honors Program</td>
<td>Spring 2011</td>
</tr>
<tr>
<td>Student Growth</td>
<td>2-120 students</td>
</tr>
<tr>
<td>Total # Students Taught</td>
<td>700+</td>
</tr>
<tr>
<td>Instructor Rating</td>
<td>4.82</td>
</tr>
<tr>
<td>Course Rating / Rate My Professor</td>
<td>4.77 / 4.87</td>
</tr>
<tr>
<td>Attracts Various Majors</td>
<td>Business, Psychology, Engineering, Design, Education</td>
</tr>
</tbody>
</table>
Rate My Professor

“Deductive Logic and Leadership”
Case Studies

• Jim Hiramatsu, American Coatings, Honolulu, HI: Best Value environment made my competitors really good [from non-performers to high performers]

• Ken Beler [Entergy]: high performer brought in who does not do low bid work, minimizes cost by almost 40% on $8M work; also brings in blackballed contractor; performs well in best value environment; then given work in traditional environment and goes bankrupt
CL Performance at ASU
## CL Business Outcomes: Costs

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MSA Baseline</td>
<td>$12.29M</td>
<td>$10.81M</td>
<td>$11.96M</td>
</tr>
<tr>
<td>Growth – Out of Scope</td>
<td>N/A</td>
<td>N/A</td>
<td>$1.15M</td>
</tr>
<tr>
<td>Value Add</td>
<td>N/A</td>
<td>$0.43M/yr</td>
<td>$0.98M/yr</td>
</tr>
<tr>
<td>Net MSA</td>
<td>$12.29M</td>
<td>$10.38M</td>
<td>$9.83M</td>
</tr>
</tbody>
</table>

*see appendix for details*
# CL Business Outcomes: Reliability & Satisfaction

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># of Major Outages</td>
<td>N/K</td>
<td>37</td>
<td>11</td>
</tr>
<tr>
<td>% Uptime</td>
<td>99.802</td>
<td>99.989</td>
<td>99.998</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>3.6 (max 4.0)</td>
<td>3.71 (max 4.0)</td>
<td>3.81 (max 4.0)</td>
</tr>
<tr>
<td>% of Tickets within SLA</td>
<td>94%</td>
<td>97%</td>
<td>97%</td>
</tr>
</tbody>
</table>
### Business Outcomes: Technology

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% Network supported</td>
<td>89%</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>(Not at end-of-maintenance)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% 1Gb- Wired Connections</td>
<td>57.0%</td>
<td>71.5%</td>
<td>96.0%</td>
</tr>
<tr>
<td>% Wireless(n)</td>
<td>9.0%</td>
<td>8.7%</td>
<td>92.6%</td>
</tr>
<tr>
<td>IT Spending Ratio</td>
<td>6/94</td>
<td>26/74</td>
<td>56/44</td>
</tr>
<tr>
<td>(New vs. Maintenance)</td>
<td></td>
<td>(New vs. Maintenance)</td>
<td>Includes New Growth Includes Wireless-n</td>
</tr>
</tbody>
</table>
Conclusions

• IMT is the “thinking of the future”
• LSA will be a link between industry and the Deductive Logic and Leadership effort
• LSA will facilitate internships
• PBSRG will seek research efforts with industry partners
Best Value Education

Linked in
Dean.kashiwagi@asu.edu
Youtube
Pbsrg.com
ksmleadership.com

Jan 11 - 15, 2015
Tempe, AZ
2015 Best Value Education and Training

PBSRG.com
Research partnerships

Inexpensive training at site
www.ksm-inc.com