

Teaching Process Management in Undergraduate Business Schools: How Does Simulation Fit and What is the Best Way To Teach It

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Process Management

- Design
- Implementation
- Management and Control
- Continuous Improvement



Tools, Tools, Tools

- Lean
- Six Sigma
- TQM
- TOC
- Critical Chain Analysis
- Sensitivity Analysis
- Cost-Benefit Analysis
- BPM
- Simulation



Variability

- Strategic Variability
 - Portfolio of Products
 - Portfolio of Projects
 - Effective utilization of resources
- Dysfunctional Variability
 - Things that drive the waste of:
 - Transportation, inventory, movement, expediting, waiting, over processing, defects, products not wanted, unmeet demand

Rajan Suri Beyond Lean: It's About Time 2011 Technical Report, Center for Quick Response Manufacturing, University of Wisconsin-Madison



Myopically eliminating dysfunctional waste may reduce strategic variability

- In non stochastic systems easier to see
- In complex stochastic systems (often driven by the ability to deliver strategic variation), it is often hard to 'see' how elimination of a waste in a specific step will impact the bottom line due to interdependent process steps, each with variability



Why Discrete Event Simulation

- Example of the result of a lean project that removed a FG warehouse in a parts manufacturing SBU
 - Savings of several hundred thousand dollars per year to the SBU
 - Cost of several million dollars/year in missed jig dates to the assembly SBU
 - Used discrete event simulation to determine missed jig dates when the contents of a FG were based on the individual scrap rates of 1000 different part types (50,000/year total of all types)
 - Savings to firm was \$750,000 per year relative to the original situation due to less FG in the supermarket and fewer missed jig dates than when the original FG warehouse was in operation.



So Simulation is needed, who should it be taught to

- IE's, ME's, OM business graduates, and anyone else willing to learn
- Many OM departments have gone to SCM, that is nice, but there is a market for business students with general process management skills



Process Management Center at the University of Idaho

- Partnership with area business and college of business and economics (CBE)
 - Manufacturing, from job shop to continuous flow
 - Healthcare
 - Native American Tribes
 - Service
 - Support and production processes



- Boeing
 - Micron
 - Conagra/Lamb Weston
 - Gritman
 - Glanbia Foods
 - Agrium
 - Potlatch
 - Frontier Communications
 - ATK
- Nez Perce Tribe
 - Vega Dairy
 - U of I
 - OSP
 - Travel
 - AP
 - AR
 - Purchasing
 - Hiring
 - Payroll
 - Waste management



Two Types of Projects

- Both process improvement
- Quality Management
 - Current process flow (value added, non-value added)
 - Gap analysis between desired and actual output
 - New process design to capture delta
 - Control process for the production process
 - Cost benefit analysis/sensitivity analysis, maybe Monte Carlo simulation
- Systems and Simulations
 - Current process flow (value added, non-value added) resource use and cost, entity flow, break downs and durations, step durations by entity, arrival rate and mix, scrap/rework, ... > simulate, verify, validate
 - Gap analysis between desired and actual output
 - New process design to capture delta by changing entity mix, arrival rate, bottlenecks, level loading of resources, resource training/hiring/firing,...
 - Cost benefit analysis/sensitivity analysis, maybe Monte Carlo simulation



Findings Relative to Students

- Students and stochastic nature of business
- Students and assumptions
- Students and data availability and purity
- Students and ambiguity
- Student time management, motivation, and procrastination
- Teaching simulation or statistics, process management, and completing up to ten projects per semester



Mechanics

- Visit to see process, determine scope, and meet project sponsors
- Mile posts
- Mid term visit to determine progress and redefine scope and/or direction
- Visit firm to deliver findings and recommendations
- Complete project and hand in
- Instructor edit and deliver final report
- Pay day



Solutions

- Student interest in projects high due to ability to land jobs due to the experience so motivation seldom an issue
- Presenting to high level management that can hire, motivation is higher
- Mile stones control procrastination and time management to a degree
- A three hour lab every week in conjunction with the normal 2.5 hours of class time for simulation
- ProModel and others willing to let students and faculty use their products for such projects even though they are paid projects.



Problems with a State University and such a Process Management Center

- Risk
- Flexibility
- Handling costs and income
- Rewards to faculty
- Finding projects
- Non compete stipulation



Why Isn't the Process Management Center Competition to Professional Simulation Modelers

- Not doing critical chain projects
- Projects are small
- Output can go to work for consultants and actually hit the ground running



Problems for Partner Firms

- TIME
- Uncertainty



Benefits

- Firms get projects done, all are useful, even if the findings are off a bit, better understanding of process/problem/opportunity
- Firms and students get to know each other and can determine if working there is a possibility
- Students learn.....
- Students get jobs else where if not at the firm
- U of I and CBE selection, retention, hire rates
- Curriculum development, nice circle

