The Beer Game on Steroids (BGOS)

Example Course Plan for Students

Typical Instruction Approach

- Students participate in the original role-playing version of the Beer Game in-person in class.
- Students build the original Beer Game in BGOS and replicate the behavior seen in the in-person game.
- Students run additional scenarios on the original Beer Game to observe more dynamics.
    - Ex: Impose additional demand patterns (20% increase, 30% increase, 10% increase followed by a 20% decrease).
    - Ex: Slow down or speed up the processing times at each entity in the chain.
- Students expand on the original Beer Game to add several entities to observe more dynamics.
    - Ex: Add an additional distribution center in the chain.
    - Ex: Add a second factory in the chain with its own distributors.
- Students write a report of their findings and what they learned.

Example Analysis Syllabus for Students

Beer Game on Steroids Project Overview

- Learning Objectives:
  - Discover basic “physics” of supply chains.
  - Apply this knowledge toward management of risk in supply chains.
- Examples:
  - Where is the best place in the chain to reduce inventory?
  - Under which conditions does a “long” supply chain perform better than a “short” supply chain?

BGOS Project Activities

- **Review the model equations:**
  - **Factory**
  - **Warehouse**
- **Build the basic Beer Game supply chain (4-entities):**
  - **Factory → Wholesaler → Distributor → Retailer → Customer**
- **Calculate the steady state order levels and inventory levels for all entities:**
  - **Customer orders = 100/week**
  - **Customer orders = 300/week**
  - **Compare to simulation results from BGOS**
- **Introduce a 10% increase in orders at Week 10:**
  - **Calculate the inventory levels for all entities for Week 10 through Week 15.**
  - **Compare to simulation results from BGOS.**
- **Introduce a 20% increase in orders and a 30% increase in orders.**
  - **Compare simulation results to the 10% bump scenario.**
  - **Describe the differences and discuss the implications.**
  - **From the behavior seen with the supply chain response to 10%/20%/30% increases in orders, what can you generalize about supply chain "physics"?**

BGOS Project Activities

- **Create the following 5-entity supply chain:**
  - **Factory → Wholesaler → Distributor → Regional DC → Retailer → Customer**
  - **In response to the 10% bump scenario, is performance better or worse for this 5-entity supply chain than the normal 4-entity Beer Game supply chain? Explain.**
- **Create the following 3-entity supply chain:**
  - **Factory → Distributor → Retailer → Customer**
  - **In response to the 10% bump scenario, is performance of this 3-entity supply chain better or worse than the normal 4-entity Beer Game supply chain? Explain.**
  - **In response to the 10% bump scenario, is performance of this 3-entity supply chain better or worse than the longer 5-entity Beer Game supply chain? Explain.**
- **From the 2 questions above with the longer and shorter supply chains, what can you generalize about supply chain “physics?”**

BGOS Project Activities

- **Using the normal 4-entity Beer Game supply chain, reduce the inventory at each entity in the supply chain individually (using the 10% increase scenario):**
  - **Given your knowledge of the underlying simulation model, how are ways that you can reduce inventory at each entity?**
  - **From the behavior seen, what can you generalize about supply chain “physics?”**
- **Using the normal 4-entity Beer Game supply chain, speed up the response time at each entity in the supply chain individually (using the 10% increase scenario):**
  - **Given your knowledge of the underlying simulation model, how are ways that you can speed up response time at each entity?**
  - **From the behavior seen, what can you generalize about supply chain “physics?”**
- **From what you have learned on this project about supply chain “physics,” answer the following questions:**
  - ***For the questions below, assume you can change any input variable for any entity in the supply chain.***
  - **For any length supply chain, what would you recommend as a risk mitigation strategy if a 30% bump in orders is expected to occur 10 weeks from now?**
  - **What would you recommend as a risk mitigation strategy for a long supply chain (>10 entities) that experiences wide variation in customer orders at the retailer?**
  - **How does your answer to this question change if the supply chain experiences only minor variation in customer orders at the retailer (i.e., demand is very constant)?**
  - **In the normal 4-entity Beer Game supply chain with the 30% increase scenario, what single change would you make to the structure to minimize its risk (i.e., change inventory policy at Distributor, change response time at Factory, etc.)? Please explain your reasoning for the single change.**