



**2022
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9TH METRANS

International Urban Freight Conference

May 25-27, 2022 | Hyatt Regency Long Beach

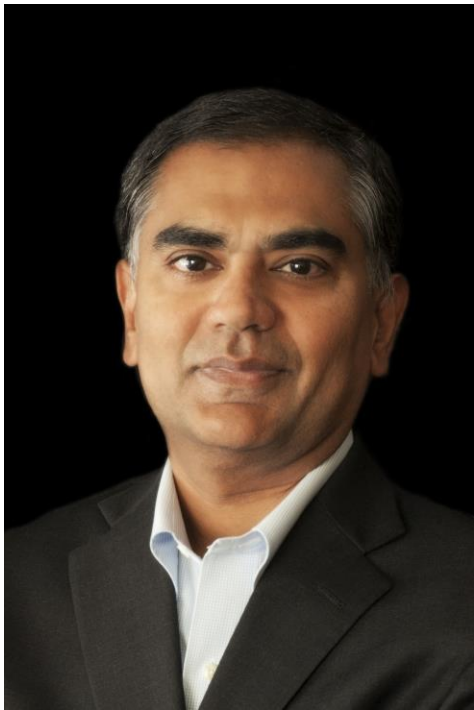


Gamification & Gaming in Last Mile Applications

Opportunities for Collaborative Learning

Our team *(Speaker Order)*

Thank you VREF for funding and engagement



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A Mental Model for “What is the Last Mile Problem”

We think the last mile problem is a "wicked problem"



<p style="text-align: center;">A Wicked Problem <i>Theorists Horst Rittel and Melvin Webber, 1973</i></p>	<p style="text-align: center;">Elements of the problem as seen in "last mile" applications</p>
<ol style="list-style-type: none"> 1) They do not have a definitive formulation. 2) They do not have a “stopping rule.” In other words, these problems lack an inherent logic that signals when they are solved. 3) Their solutions are not true or false, only good or bad. 4) There is no way to test the solution to a wicked problem. 5) They cannot be studied through trial and error. “Every trial counts.” 6) There is no end to the number of solutions or approaches to a wicked problem. 7) All wicked problems are essentially unique. 8) Wicked problems can always be described as the symptom of other problems. 9) The way a wicked problem is described determines its possible solutions. 10) Planners, that is those who present solutions to these problems, have no right to be wrong. 	<ul style="list-style-type: none"> • Stakeholder complexity <ul style="list-style-type: none"> • Numerous user motivations and varying objectives: Consumers, Infrastructure Managers, Planners and Regulators, and Distributors*. • A data problem <ul style="list-style-type: none"> • Multiple "silos" of data ownership and collection • Forecasting problem <ul style="list-style-type: none"> • The probability of returns, misinformation, and missed deliveries • Operations Challenge <ul style="list-style-type: none"> • Balancing costs with customer needs • Optimization for routing that affects the delivery efficiency • Balancing public needs with system efficiency <ul style="list-style-type: none"> • Facing environmental and congestion problem while increasing delivery agility and responding to customers’ demand <p style="font-size: small; margin-top: 20px;">* Source: https://globalcitylogistics.org/home/b-issues-and-challenges-of-city-logistics/stakeholders-relationships-city-logistics/</p>
<p><u>Last mile is just becoming a stand-alone discipline - and needs closer understanding</u></p>	

A Mental Model for Gamification & Gaming (G&G)

We developed a simple “mental model” for this exercise

Gamification	Gaming
Using game-like attributes to encourage participation	Actual activities that use gamification principles
Focused on behavior / psychology particularly competition and engagement	Focused on building skill, strength or entertainment
Examples : Badges, Trophies, Leaderboards, point systems	Examples: LARP, Electronic (console) games, VR, AR, Modeling, Simulation



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Insight: Our education methods have used Gamification for thousands of years

OUR STUDENTS' WORK IS OUR RECOMMENDATION.

ARLINGTON COLLEGE.
W. W. FRANKLIN, PRESIDENT.

REPORT OF *Miss Fannie Watson*
9 MONTH ENDING *May 17* DEMERITS

DEPARTMENT: *92* REWARDS:

DATE ADMIT: _____

STUDIES	Points Earned	Points Allowed	Grade	STUDIES	Points Earned	Points Allowed	Grade
Primary Department.							
Orthography				Algebra—Intermediate			
Reading				Algebra—Advanced			
Language				Geometry—Plane			
Writing				History—Universal			
Arithmetic				Literature—American			
Geography				Classics—American			
Nature Studies				Civil Government			
Drawing				Physics			
Vocal Music				Latin—Beginning			
Preparatory Department.							
Spelling—Intermediate				Collegiate Department.			
Reading—Nature Studies				Rhetoric—Advanced			
Grammar—Elementary	20	20		Latin—Caesar			
Grammar—Intermediate				Latin—Cicero			
Composition				Greek—Anabasis			
Arithmetic—Elementary				Fine Arts Department			
Arithmetic—Intermediate				Elocution			
Geography—Complete	20	20		Piano			100
History—Texas				Violin			
History—United States	20	20		Mandolin			
Academic Department.							
Word Analysis				Vocal			
Grammar—Complete				Harmony			
Rhetoric—Practical				Musical History			
Arithmetic—Complete				Business Department.			
Algebra—Elementary				Penmanship	20	20	92
				Commercial Arithmetic			
				Book Keeping			

100—Perfect. 90—Excellent. 85—Passing. 80—Fair. Below 75—Poor.



Credit: Photo By: <https://unsplash.com/@Austrian>
National Library, <https://unsplash.com/photos/E3TdQ04ns2s>

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STUDENT ADMINISTRATION

ACADEMIC TRANSCRIPT

Biju Pishu Kewalram 11-MAR-2003
5318 E 2nd Street #123
Long Beach
CALIFORNIA
90803

2702US UNITED STATES OF AMERICA 11157122
Master of Business Administration

Subject Details

Subjects attempted in this course:	Grade	Subject Points
2000 41 ITC525 Commerce on the Info Superhwy		
MGT501 Management Theory & Practice		
2000 71 HRM502 Human Resource Management		
MGT520 Innovation & New Venture Dev't		
2000 81 Approved Leave of Absence		
2001 41 MKT501 Marketing Management		
2001 81 MKT501 Marketing Management		
2002 19 ACC501 Business Accounting & Finance		
2002 49 ACC501 Business Accounting & Finance		
2002 79 MGT510 Strategic Management		
2003 19 FIN516 Corporate Finance		

GRADE POINT AVERAGE: ACCUMULATED SUBJECT POINTS: 48
PROGRESS STATUS: Active Student

Gamification is not just about technology

....But 21st Century technology represents a unique opportunity



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Working Hypotheses

(Subject to research validation)

One approach to the last mile "wicked problem" is the use of Gamification & Gaming (G&G)



Encourages engagement and directing of behavior



Encourages collaborative problem solving



Allows for multiple outcomes to be tested without disproportionate risk / commitment of community resources



Integrates technology in creative learning in the last mile education and job training



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We have set ourselves these research questions

- What role can G&G play as an educational tool, particularly as it relates to last mile problems
- How extensively has gamification and gaming been used in last mile education

And are pursuing these correlated lines of enquiry:

- What are the opportunities?
- What are the barriers?
- Who are the likely beneficiaries ? (Education ? Policy development ?)
- Are broader supply chain considerations like the bullwhip effect in play ?



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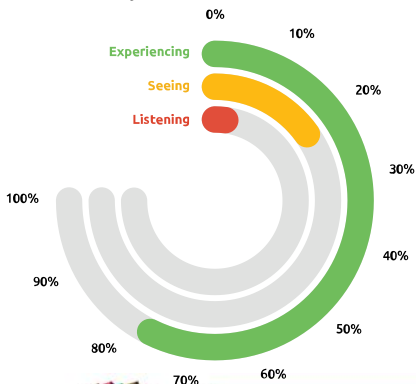
We found examples of G&G in Supply Chain Ed



Credit: <https://inchange.com/business-games/tfc/>

The Fresh Connection is an innovative web-based business simulation game. It engages students in turning around a manufacturer of fruit juices. In teams of 4, students will represent the functional roles of **VP Purchasing**, **VP Operations**, **VP Supply Chain**, and **VP Sales**.

Students get to run their own virtual company. Faced with declining performance, the management team must get the company back on track as quickly as possible. It is a high-pressure environment in which effective supply chain management is the key to success!



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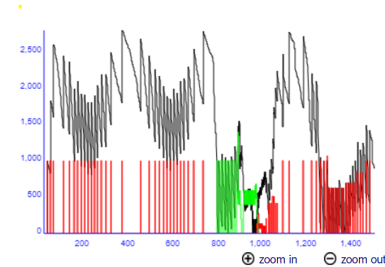
Learning objectives include:

- Forecasting
- Inventory and production control
- Supply network design
- Logistics
- Build internal teams
- Learn how to manage and optimize the carbon footprint of the supply chain
- Supply Chain Risk Management

The Supply Chain Game is an online supply network simulator. To meet different demand patterns in five regions, student teams set production and inventory control parameters, transportation choices, and add new factories and warehouses. The objective of the game is to maximize cash position. The game is designed for use in supply chain electives or core courses that emphasize supply chain management.

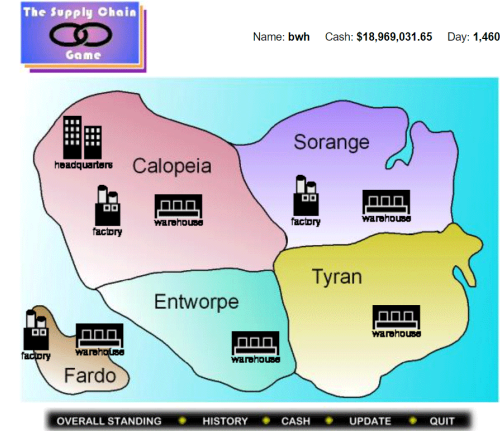
Finished Goods Inventory at or destined for the warehouse in Calopeia, by current location

mail details | truck details



Reset | Data | Clear

■ warehouse ■ mail ■ truck



Credit: <http://responsive.net/supply.html>

- Students monitor their supply network using an intuitive interface accessible through their web browser.
- Students view and download historical data to understand the effects of past decisions and to guide future decisions.
- Students choose which regions they will serve, and which method of transportation will be used.

Warehouse menu for Calopeia

plot inventory | plot shipments

Warehouse is operational.
 Make your desired changes to the table below and then click the **ok** button below the table.
 If you have made multiple changes to the tables above, the outcome could depend on the order in which the changes are implemented. Click [here](#) for more details.

Inbound Shipments from Factories

factory location	shipping method	parameters		
		order point	quantity	priority level
Calopeia	truck: \$15,000.00 per truck, 7 days to ship	0	0	0
Fardo	mail: \$400.00 per unit, 2 days to ship	0	0	0

Outbound Shipments to Customers

destination	fulfillment cost	serve region?
Calopeia	\$150.00	<input checked="" type="checkbox"/>
Sorange	\$200.00	<input type="checkbox"/>
Tyran	\$200.00	<input type="checkbox"/>
Entworpe	\$200.00	<input checked="" type="checkbox"/>
Fardo	\$400.00	<input checked="" type="checkbox"/>

ok
close

Simulation and modelling applied in supply chain management



HAMBURG PORT
CONSULTING



HPC is extensively using simulation for planning and optimizing all types of marine cargo terminals and intermodal rail facilities, particularly to:

- identify bottlenecks
- determine resource requirements
- reduce development and construction cost, and quantify optimization potential
- determine energy consumption and emissions

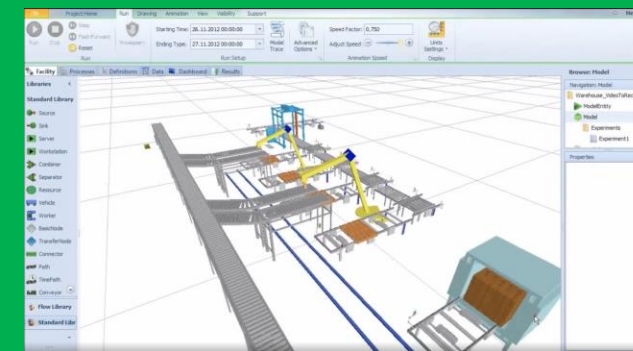
HPCsim provides detailed insights into terminal operations which gives users the ability to physically see in a 3D environment and understand from a multitude of relevant performance figures how changes of input parameters affects capacity, performance, efficiency and profitability of the terminal.



Simio simulation and scheduling software provide the features needed to create supply chain simulation models to study and evaluate the dynamic nature of supply chains. The Simio software is a great-in-class supply chain analysis tool. With the software, you can create supply chain models that integrate both known and random constraints to optimize your plans.



Simio uses your available workflows and analyze how diverse constraints such as a pandemic or a supplier missing specified deadlines will affect your plans.



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The Game

Credit: <https://forio.com/app/showcase/near-beer-game/>

How to Play

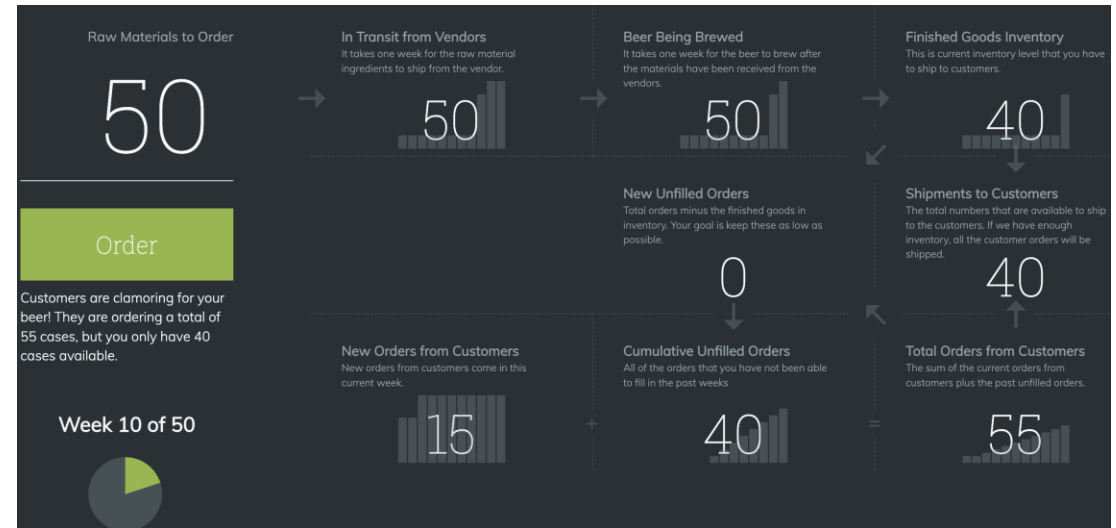
- Enter the amount of raw materials in the order field and click "order".
- It takes 1 week to order the materials, 1 week for your order to ship, & 1 week to brew the beer. After these 3 weeks, you will have beer to sell to your customers.
- Try your best to keep the Total Customer Orders & the Finished Goods Inventory in balance. You don't want excess inventory, or to have unfilled orders.
- If you do not meet the customer demand for a week, the unfilled orders will carry forward to the next week as demand.



The Near Beer Game

The game is simple, you have perfect information about your customer demand. For the first 2 weeks you know your customers are going to demand 10 cases of beer per week. Then they will increase their demand to 15 cases.

Your Goal: Match your Finished Goods Inventory to Total Customer Orders and balance your production pipeline. You have 50 weeks to succeed. Return the system to equilibrium, so that 15 cases of beer are available in finished goods inventory week after week. You have 50 weeks to accomplish this objective. Accomplishing this is much harder than you might think!



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We'd love your
input.

Please
participate
from home!

<https://www.surveymonkey.com/r/GG-Survey-INUF22>

OR

Scan the QR code to access the survey



Next Steps...

- White Paper
- Convene Hackathon / Workshop – include both G&G and Freight professionals
- Community pilot using G&G



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Thank you & please reach out



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Appendix



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Some examples of G&G we found:

- <https://www.scmglobe.com/multi-player-supply-chain-game/>
- https://www.reddit.com/r/BaseBuildingGames/comments/mbn96j/logisticssupply_chain_games/
- <https://www.newscientist.com/article/mg25033372-600-the-best-logistics-games-that-make-supply-chains-fun-no-really/>
- <http://www2.open.ac.uk/openlearn/supply-chain/index.html>
- Example: <https://www.anylogistix.com/features/supply-chain-simulation/>
- Example: <https://www.anylogic.com/supply-chains/> (go down to multiple)
- <https://www.riverlogic.com/blog/supply-chain-simulation-what-you-need-to-know-in-2020-beyond>
- <https://www.wolterskluwer.com/en/expert-insights/supply-chain-simulation-what-you-need-to-know>
- https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjIpcvi6d_3AhUoH0QIHT1EB8cQFnoECDUQAQ&url=https%3A%2F%2Fwww.simio.com%2Fapplications%2Fsupply-chain-simulation-software%2F&usg=AOvVaw0F6Lf5BMkS_Kd-0FnjBWGj
- <https://www.simul8.com/applications/supply-chain-and-logistics/>
- <https://web.mit.edu/jsterman/www/SDG/beergame.html> -
- <https://forio.com/app/showcase/near-beer-game/> (demo)
- <https://inchainge.com/business-games/tfc/>
- <http://responsive.net/supply.html>
- <http://responsive.net/ebeer.html>
- <https://www.hamburgportconsulting.com/our-expertise/simulation>



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