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Preparing Leaders to Live in a Virtual World:
A Template to Enhance Effectiveness of Online Global Supply Simulations

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ABSTRACT

We present research examining how teams should be supported in Global Supply Chain Simulations. We utilized three different simulations across multiple courses, and applied a template as the base of our experimentation. We also discuss the process we used to present a uniform experience for all teams across all courses. Student feedback and performances indicate positive student attitudes and team performances.

Keywords: Global Supply Chains, Simulations, Teams, Team Learning

INTRODUCTION

As Rod Tidwell said to Jerry McGuire in the movie by that name – “Show me the money”.

This is the message that investors send to the companies they invest in and this is the message that company executives send to their supply chain management professionals in all functions.

In many texts and presentations authors and presenters take a fairly limited view of the scope / reach of Supply Chain Management as a concept. Often we think of things like Manufacturing Planning and Execution, Logistics, etc. depending on the author(s). In this presentation we would like to take a little broader look at the field.

In our constantly changing global economy, the supply chain touches a very diverse set of international customers and suppliers. The extended supply chain encompasses such diverse functions as R&D, Purchasing, Planning, Manufacturing, Marketing & Sales, Finances, Customer Support, Warehousing, Transportation, etc. Supply chain management includes all aspects of the product life cycle – from “cradle to grave”. Supply chain management includes both forward logistics (providing products & services to customers) and reverse logistics (returning products, service agreements, recycling, etc.). All of these functions are linked together by Business Processes that are managed and executed in Team Environments – many (if not most) of these Teams are Virtual in nature. This is especially true with large. Multi-national organizations. However, the same fits with local, small businesses as well. Just look around and you will see this is quite true.

Operating in a complex cross-functional environment places special challenges for teams but also makes for an exciting and challenging career for supply chain professionals. If managed effectively, companies can strive for and achieve operational excellence across their own organization and the organization of their business partners (Customers and Suppliers as well).

To this end, Business Leaders must have access to, and be able to use, the processes, systems and tools to attain operational excellence both internally and across organizational

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boundaries. Then of course, Business Leaders must have effective Functional, Cross-Functional and Cross-Organizational Teams to identify, develop, configure, implement and improve all the processes, systems and tools that are available to them. This is where our Education / Learning processes and programs come in. There are many stakeholders in these venture: Students, Educational Institutions, Companies, Communities, Families, etc.

In the supply chain the basic objective is often presented to Balance Demand and Supply. In any educational venture, the basic objective of each Learning opportunity is to balance the requirements of the Participants and the requirements of all the other Stakeholders. Sometimes this is not so easy.

You may have watched a movie or TV show about some Legal Preceding. You may also have heard it said by the Lawyers reflecting on an examination or cross-examination scenario: "Never ask a question that you don't already know the answer for." The same fits with an Educational Class – especially if you are teaching supply chain management to Graduate Students or Under-Graduate students that are focusing on other disciplines or career tracks. Still, it is a common question that many of us might ask at the beginning of a course or a training program.

From personal experience, occasionally we may have someone say, "I expect to be in a Supply Chain Management role and want to know all I can to be successful." Or, "I am currently in a Supply Chain Management role and I want to improve my knowledge and skills so that I can be more successful and help the company achieve its goals." On the other hand, we must be realistic and instead the real reasons come out: I am here: "Because it is a requirement for graduation. I am here: "Tom improve my chances for advancement." I am here: "Because my boss is forcing me to do this and I will either lose my job or not advance if I don't do it." I am here: "To enhance my Resume."

Then, just to make matters worse we might ask the question: "What do you expect from me / this course?" Now the real truth comes out. You may get some responses like: "an A", "always available and responsive to questions", "fairness", "fun classes" and such. Occasionally someone might say "very good understanding of supply chain principles, concepts and processes." That's the "Requirements of the Participants" side of the balancing act. Now let us look at the other side. Why are folks really in these Learning Adventures? They are in these programs to meet the needs of all the Stakeholders (including the students) - to improve the finances, productivity and asset management of companies (even non-profits), to improve shareholder / stockholder value, and to help manage the long-term future of the organization, its employees and their families.

To that end, Learning is a Shared Responsibility. Students will often come into the classroom on the first day as empty vessels (glasses in the exhibit below). They expect the Professor to just "fill them up" with knowledge that they can take with them. Well, this is true to some extent but surely not all. The Professor, text, learning management system and all the rest definitely contribute to the learning experience but there is much more. In fact, any course is a Team event. The Team consists of the Professor, the student, and the rest of the Class Members. The Professor brings her / his knowledge and experiences and the rest of the Team brings theirs. This in effect expands our Role in the Learning Process believe it or not. We need to channel all of our resources (including those brought by the Students) to provide a full and complete learning experience for everyone (including the Professor).

LITERATURE REVIEW: LINKING SUPPLY CHAIN FUNDAMENTALS TO EDUCATIONAL OBJECTIVES

Our Global Marketplace is comprised of many types of businesses both small and large.

Shareholder or stakeholder value is created when a business can project sustainable growth into its income or profit stream. This is even true for non-profit businesses as they to require funds to meet their stated mission.

Supply chain management encompasses the Flow of products and services from: raw material manufacturers and Intermediate products manufacturers to end product manufacturers, wholesalers, distributors and retailers. These different firms are connected by transportation and storage activities and are integrated through information, planning, and control activities. In this diverse and fast changing environment, firms cannot consider that they are playing in a “Zero Sum Game” where someone wins and someone else loses. Instead, all organizations must focus on improving cost and service levels throughout the chain so that all partners succeed – this is a key learning dimension that must be grasped by any Student at any stage of their life / career.

In order to meet all their sales objectives, global businesses must develop and effectively market new products to meet localized demand. This means that companies must understand the basic needs of their customers and be able to translate those needs into products and services that meet them. A major challenge is to minimize system costs and maximize system service levels while at the same time, speeding time to market and mitigating the inherent presence of uncertainty and risk. This is not an easy thing to accomplish. Educational programs should help students find optimum solutions to real business problems with the understanding that a solution for today may not be optimal for tomorrow. Markets change, businesses change, economies change. Business leaders must understand how to adapt and respond. Educational programs must provide the basis for this understanding.

The global economy has created an expanded requirement for communication, collaboration and partnerships. This represents a special challenge because companies are now dealing with partners across different languages, cultures and time zones. Complex networks of internationally linked suppliers and customers have replaced simple, local interactions between a few suppliers and customers. Supply chain professionals have to somehow manage these complex relationships to meet their financial goals and key requirements of all their stakeholders. This takes Teamwork – most often in Virtual Networks. Current and future business leaders must be given the educational framework to understand the concepts and processes that can deliver operational excellence across functions as well as the understanding of Team dynamics and tools to help Teams communicate and collaborate to achieve company goals.

Taken together, all of these things frame the basic requirements for an innovative educational experience. Virtual Business Simulations can be used as an effective tool to stimulate learning in a creative / collaborative environment. Such programs should provide:

- Conceptual Understanding
- Communication Enhancement
- Challenging Engagement
- Camaraderie / Positive Team Experience

Let's call this the 4 Cs of Success.

We will review the basic design and approach to some different Simulation Tools in the following section. However there are two common threads that run through each of them.

One Thread relates to Team Development. You can pick up any text related to team dynamics and you will likely find the 4 Stages of Team Development: Forming, Storming,

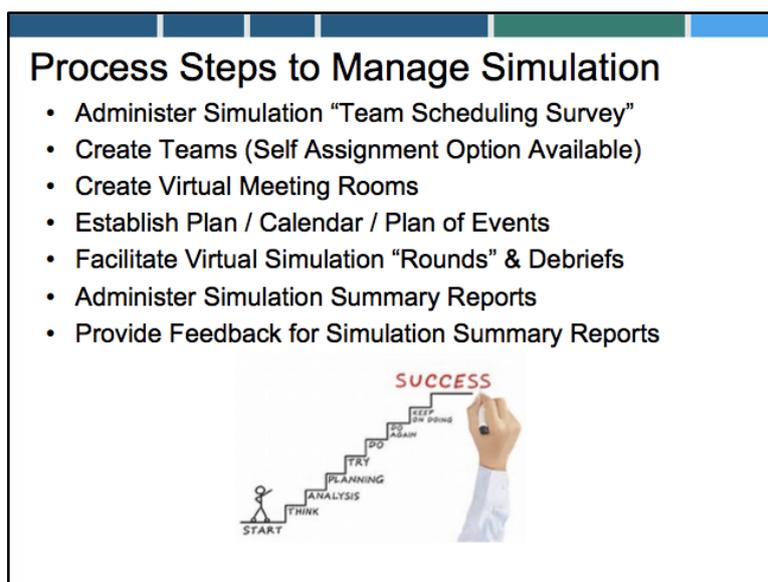
Norming and Performing. In virtual environments the development cycle can be somewhat longer due to the challenges of distance, lack of in-person interaction, scheduling and all the rest. If this is an international team then you have the added dimensions of language and time zones. Well, actually you can have these across borders of the same country in reality. Scheduling presents special challenges to educational teams since students likely have no prior affiliation with each other. Also, usually students will sign up for an on-line learning experience in order to have flexibility to work on things whenever they like. Hum... this can actually lead to some Storming along the way☺. The challenge for the Professor as facilitator is to recognize the challenge and help student teams progress to “Performing” as soon as possible. With that said, students should gain an appreciation for these stages so that they can recognize them in “real life” and have learned strategies for managing each one.

Another Thread relates to the Stages of Organizational Maturity. Again, this type of concept can be found in similar structures in many texts. One structure / format is presented in the following slide which uses an AMR (now Gartner) Text Reference.

Organizations are challenged to move from Functional Silos (every Function for themselves) to a fully collaborative organization that looks for synergies across their own organization as well as the organizations of their key business partners (Customers and Suppliers). Business Simulation Teams can experience this type of dynamic through proper crafting of different simulation “Rounds”. We do this by not allowing communication between Team Members in the beginning Round(s) and then encouraging / expecting communication in the later ones. Intra-Team communication is even allowed in the final Round of the Simulation. This provides a reasonable prototype for Inter-company Benchmarking of business processes. The specifics of the approach will be described in following sections below.

PROCESS STEPS TO SETUP AND MANAGE THE LEARNING EXPERIENCE

The following Slide shows the basic steps we use to manage the Business Simulation experience, grading and reporting of results. We use many different templates in the process and are willing to share these upon request. These steps are the same for any of our Business Simulation Learning experiences.



Administer Simulation “Team Scheduling Survey”

All of the Simulations covered here require the active participation of multi-person teams (usually 4 students optimum). With the Root Beer Business Simulation all four Team Members must complete required transactions in the same session for each “Round”. With the Fresh Connection (and Cool Connection with its emphasis on Supply Chain Finance) Business Simulation, team members can enter transactions separately as long as this happens between the opening and closing of each “Round”. Before each stage / Round, the teams have the opportunity / responsibility to collaboratively plan next steps. Then, after each stage / Round they have the opportunity to collaboratively debrief actions and results. The debrief sessions can be handled in a Professor Facilitated manner – our preferred approach. Each one of these activities / sessions requires pre-scheduling. All team members must therefore be able to establish common meeting schedules as the very first step.

In fact, schedule availability is a key determinant that we use for Team Member assignment decisions at the very beginning.

A Team Availability Survey was designed to record and analyze the availability of each student in terms of day / time during the week. This is very easy to administer and consolidate input from everyone in the class. The Professor takes this information and assigns people randomly to teams according to common scheduling availability. With that said, students are given the opportunity to self-assign to Teams if they have some preferences – such as experiences from other activities or other reasons. An example of how this is used for scheduling purposes is shown in the following Worksheet. This shows a group of Teams that were created to work on the Fresh Connection Business Simulation. Similar structures have been used for the other simulations as well.

Create Teams (Self Assignment Option Available)

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Create Virtual Meeting Rooms

It seems that students often view / expect on-line courses to be asynchronous in nature – they have assignments to do. They submit the assignments. Professors grade the assignments and they all get an “A+” and then on to graduation☺. Well, maybe this is a little exaggeration but you may get the point. In our on-line courses we try to provide a blended learning experience where there is a combination of asynchronous kinds of activities that are augmented with opportunities to inter-personal engagement with other students and the professor. Business Simulations provide a role in this for sure. Virtual Meeting rooms are required to make this happen in an effective way. Now, there are many options here and it is up to the design team to come up with the best approach for each course. We have used two venues – one is Blackboard Collaborate and the other is WebEx. Both are easy to configure and explain to students so that they can then apply utility in Virtual Team Meetings. These meetings are 100% required for running each Simulation. They are also most helpful for planning and debrief sessions during the Semester / Program. Since students need flexibility in scheduling, we create “Open” meeting rooms for each Team as well as an Ad Hoc general meeting room as a kind of Virtual Office. Links to the meeting can also be shared for Guests if this is useful. The following slide shows an example of the Blackboard Collaborate layout. Virtual Sessions can be recorded to support follow-up or

allow non-attending Team Members to review the proceedings.

Establish Plan / Calendar / Plan of Events

You have likely heard of and used a process, we will refer to the Deming Cycle: Plan > Do > Check > Act. It is also referred to under other names as well. In this process you create a Plan. Then you implement the Plan. Then you review key metrics (Check how the Plan worked) and take Action based on the results. These stages actually fit any planning process whatever and we fully employ as a major component of the design with Virtual Simulations in practice. Students must have a clear picture of the journey ahead and we create this in a general planning structure that is then incorporated into the Planning Calendar for the Course Learning Management System. Two Gant Charts are shown below for the Fresh Connect Simulation to illustrate. The first one shows a generic layout and the second one shows some specifics for a recent class. You will see that the Second Planning Worksheet includes specific Milestones for Report Writing. These reports are graded and provided the basis for feedback on Lessons Learned from each stage of the Simulation "Rounds".

Facilitate Virtual Simulation "Rounds" & Debriefs

Once the design is complete the actual simulation Rounds take place. We found that facilitated sessions work well – especially at the beginning. Students will have different levels of ability and experiences with exercises and team activities like this. We usually schedule an introductory meeting with each team and then actively follow the first Simulation Rounds. After that the teams are usually able to work independently of facilitation. In some cases we have weekly follow-up / debrief sessions. This seems quite beneficial. Scheduling is a problem – especially if you are trying to have a joint debrief with multiple teams. However, the recording option is always available to use with students who can't attend in person.

Administer Simulation Summary Reports

While these Business Simulations are done in a Team environment we apply an individual grading approach. Each person is expected to complete one or more Interim Reports and a Final Report that describes their experience and the lessons learned in the process.

We use Microsoft Word Templates to ensure consistency of format. We will be pleased to provide a copy upon request. A copy of the Header Page is shown below which gives insight into major topics that are to be covered in the report. Students are expected to provide detailed narratives and simulation data to support the different sections.

Provide Feedback for Simulation Summary Reports

We looked at the Plan > Do > Check > Act format in relation to the basic design of the Business Simulation process. The same fits with feedback to students on their Learning Experience as reflected in their submitted reports. It is very important for them to receive detailed feedback on each report in order to enhance the learning experience even more. We utilize a standard Template to provide the feedback, which effectively mirrors the structure of the Report Template itself.

The following sections will touch on the overall design for each of the Business Simulation options we have employed. We will provide a general assessment of the links to our course Learning Objectives and also present some advantages and disadvantages of each approach. The intent is not to describe each simulation in detail. If you would like further information on simulation details, then you should contact the supplier directly. We have found our interactions with the professional, technical and customer supply teams of each one quite beneficial.

DESIGN LINKS TO LEARNING OBJECTIVES: THE FRESH AND COOL CONNECTIONS

The Fresh Connection considers Supply Chain Management from a cross-functional business perspective. This actually nicely links in with the overall business process of Sales and Operations Planning. Company leaders must weigh the tradeoffs between decisions made by different functional areas: Purchasing, Sales, Operations and Supply Chain Management. Each of these decisions has financial impact and in this way incorporates the financial perspective as well though there are no traditional financial decisions made in The Fresh Connection. Rather, the system controls the metric calculations and reporting. Of course, each team must be able to understand the financial connections and respond accordingly with future decisions taken.

The following course Learning Objectives are supported through the use of The Fresh Connection business simulation:

- Describe key elements of strategic planning and the alignment of functional strategies to achieve business goals.
- Analyze the principles, and challenges for marketing, sourcing, manufacturing and distribution in a global market.
- Explain the importance of strategic alliances in global sourcing environments.
- Evaluate/justify the mechanisms for measuring performance of global supply chain.
- Analyze approaches and the importance of Team Work in a Virtual environment

These Learning Objectives are supported by the functional decisions that team members make during the course of each Round. A general listing of some that we use in our configuration is presented below. From a design perspective, the simulation is configured to allow simple decisions at the beginning and then add more as teams progress through successive Rounds. In addition, they are not allowed to communicate with each other in the beginning rounds but are allowed / expected to communicate and collaborate during later ones. The intent here is to provide a model for life in a Reactionary / Silo type of Organization to a Collaborative type of Organization. Hopefully the students will see some benefit to the later and will take this with them into real world application.

Typical Purchasing Function Decisions

- Payment Terms (weeks)
- Trade Unit
- Agreed Delivery Reliability (%)
- Delivery Window (hrs.)
- Quality (High, Medium, Low)
- Supplier Development Projects (yes / no)
- VMI with Supplier (yes / no)

Typical Operations Function Decisions

- Raw Material Inspection (yes/no)
- Number of Pallet Locations in Warehouse
- Number of Permanent Employees
- Number of Shifts
- Intake Time (days)
- Capital Equipment Utilized for Operations
- Preventive Maintenance Level
- Breakdown Training Program (yes / no)
- SMED Action (Yes / no)
- Increase Speed (Yes / No)
- Outsource Finished Goods Warehouse (degree)

Typical Sales Function Decisions (By Market Segment)

- Service Level (%)
- Shelf Life (%)
- Order Deadline (cutoff time)
- Trade Unit
- Payment Terms (weeks)
- Promotional Pressure
- Promotion Horizon (long / short)
- VMI Project (yes / no)
- Product Range and Shortage Rules (by Market)
- Forecast Change (By Market)

Typical Supply Chain Function Decisions

- Safety Stock Components (weeks supply) by Product
- Lot Size (weeks supply) by Product
- Frozen Period for Production (weeks)
- Production Interval (days)
- Safety Stock Finished Products (weeks supply)

You can see from the list of decisions above that participants have a fairly broad span of control over many cross- functional areas. All of the decisions have some type of impact on company profitability and asset management effectiveness. The ultimate composite results are measured from a company finance perspective.'

DESIGN LINKS TO LEARNING OBJECTIVES: HBR ROOT BEER GAME

The HBR Root Beer Game considers Supply Chain Management from a cross-supplier distribution network. The cope is fairly limited as it relates to replenishment of finished products throughout the distribution network from Manufacturer through to the final Retailer. Each supply chain partner makes decisions related to the amount of product to purchase or make to support their immediate "customer". Company leaders must weigh the tradeoffs between different ordering strategies. There is a cost of carrying inventory and a cost of stock-out leading to backorders. The team's objective is to minimize the total cost of both throughout the linked supply chain. As with the Fresh Connection, the system controls the metric calculations and reporting. Of course, each team must be able to understand the financial connections and respond accordingly with future decisions taken.

The following course Learning Objectives are supported through the use of The Fresh Connection business simulation:

- Describe key elements of Supply Network planning and the importance of Cross-Functional collaboration to achieve business goals.
- Analyze the principles, concepts and challenges for developing sourcing, manufacturing and distribution strategies in a global market.
- Evaluate/justify the mechanisms for measuring performance of global supply chain.
- Analyze approaches and the importance of Team Work in a Virtual environment

These Learning Objectives are supported by the stock replenishment decisions that team members make during the course of each Round. In our selected Configuration, each simulation Round spans a 35-week planning and execution time horizon. Supply partners enter order quantities for each week and orders must be placed by all team members at the same general time. This is different from the approach in The Fresh Connection. From a design perspective, the simulation is configured to allow customization of the Demand Profile at Retail and some limited selection of planning and delivery lead times and information visibility (see examples in the Slides below). The earlier Rounds are configured to provide a model of an unresponsive supply chain with little information sharing. In later Rounds more

information access is given and lead times are shortened. Team members are not allowed to communicate with each other in the beginning rounds but are allowed / expected to communicate and collaborate during later ones. The intent here is to provide a model for life in a Reactionary / Silo type of Organization to a Collaborative type of Organization. Hopefully the students will see some benefit to the later and will take this with them into real world application.

Although the decisions are somewhat limited there is a great deal of learning that can take place as students explore such concepts as: Demand Forecasting, Push vs. Pull distribution strategies, Inter-company communication of demand and supply plans and results, replenishment lot sizing, etc. The decisions made have direct impact on supply chain cost and this is the metric used by teams to check their cumulative success

RESULTS

At the beginning of this paper we brought out the critical question we ask of students “Why are You Here?” We also talked about the need to balance the needs of the students with that of all the other Stakeholders in our learning adventure. To this end we need to provide and active and engaging learning experience for the students that results in their gaining knowledge and skills to be successful in any role the serve in any company / organization they are part of. We have found that addition of Business Simulations to our programs definitely enhances the On-Line Learning experience for both the students and the Professor.

And by the way: Why Are We Really Here?

- To provide an Interactive Learning Environment 
- To Stimulate Enthusiasm and Understanding of Concepts 
- To Support the Total Success of Participants and their Companies / Businesses 

DISCUSSION AND CONCLUSIONS

Fresh Connection: Advantages

- Easy to access and administer in a virtual learning environment
- Excellent support from the Fresh Connect Global Team
- Comprehensive functional scenarios with flexibility to select depth and complexity
- Excellent documentation and training
- Ability to customize application for each separate team



Fresh Connection: Disadvantages

- Complexity of Scenarios can provide challenges for some learners – the weakest link governs the performance of all
- Cost of access can be challenging in a University environment
- Delayed response (feedback) to individual decisions (Rounds are closed after all team decisions are made)



REFERENCES

References available upon request.