Stock the Sticks Business Game: A Market Simulation Experience at UMK (University Malaysia Kelantan)
Stock the Sticks : Business at Class
CASE SERIES – 'A'

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Abstract

"Hey! He made a mistake, exclaimed the students in audience . Yes, mistake it was, indeed as the student playing a supply-chain-management business game (also called distribution game) had not stocked any inventory and to add to the problem, had landed with a backlog of orders. But in a class while playing a business game it will just be a penalty but when it comes to an actual business site, it will be a disaster losing one's share, profits etc. It is based on two novel elements, Problem Based Learning (PBL) and Market Simulation Game, Stock the Stick Business Game. PBL serves as the learning approach and the market simulation game as the source of the (real time) problem set on which the learning approach is anchored. The main part of the course is designed as group work. Each team manages a single firm and sets its individual project and learning agenda. Formal problems are given to the teams in order to direct their learning process.

Keywords: Business game, Market Simulation, Problem based learning

Introduction

We'll first discuss the objectives and the achievements of the project in case series "A", then continue with the actual game play-scene, alternatives to problems encountered , outcome of the game and estimate of its value for the school and students and finally stress some important issues at the project's continuation strategy in further case series.

Objectives of Simulation based learning

The main objectives of the project were to:

1. Develop Problem Based Learning expertise in the School of Entrepreneurship and Business, University Malaysia Kelantan, Malaysia.
2. Develop the course unit content to enable students to assist firms' management with maximum collaboration between them.
3. Develop staff expertise in running a market simulation game.
4. Convert the market simulation game to the Malaysian context
5. Fine tune and test the combination of PBL and market simulation game for undergraduate students.
6. Communicate and disseminate this experience of Problem Based Learning and Market Simulations to students in the class and also to other Business Schools.
7. Use web-based technologies to allow interaction between students, their tutor and the market simulation game.

The Objectives of Simulation based learning is to

1. Learn to apply
   a) Demand forecasting & standard forecast smoothing techniques
   b) Impact of lead time on supply chain – "the delay-trap".
   c) Impact of batch ordering on the wholesaler.
   d) The inflated orders and its magnifying effects in the market phenomenon.
   e) How centralized information mitigates the supplier demand variability in the supply chain (also known as the bull-whip effect).
2. In the post-play discussion, students can learn techniques to control and
   (a) Reduce risk and uncertainty by providing centralized information about demand
   (b) Reduce unstable market situation and variability - i.e. by discouraging price promotions and speculation.

      (c) Reducing lead time by stocking inventory for contingency purpose.

      (d) Encourage establishing strategic collaboration and partnerships--particularly those involving transmission of information.

3. Application of Forecasting techniques wherever necessary should be encouraged.

The Game – Initial Assignment given to the class

1. Out of a total of 84 students, all the students participated in the game and played their role. Their roles were in the form of "pick your chit" form.

2. In order to make the students understand the movement of goods and inventory in the market, it was proposed to teach it by conducting a Business Game in the class. That is the students will play a Business Game, namely *Stock the Stick Business Game* in a Market-simulated environment in the classroom.

3. The game show how the process of outbound logistics from the factory till the consumers.

4. Inventory and backlog activities along the supply chain from manufacturer, distributor, wholesaler, retailer up to end customer will be recorded in a record-sheet.

5. Analysis and feedback will give different learning experience for the students.

Rules of the Game

The class of 80 students was converted into 5 groups comprising of 16 students in each group. Each group would represent :-

1. Manufacturer's
2. Distributor's
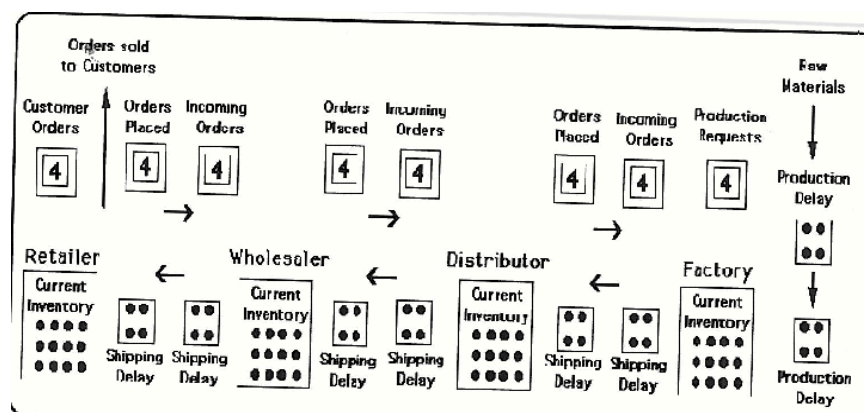3. Wholesaler's
4. Retailer's
5. Observer/Analyst s

Fig : B (i) The Supply-Chain Flowchart
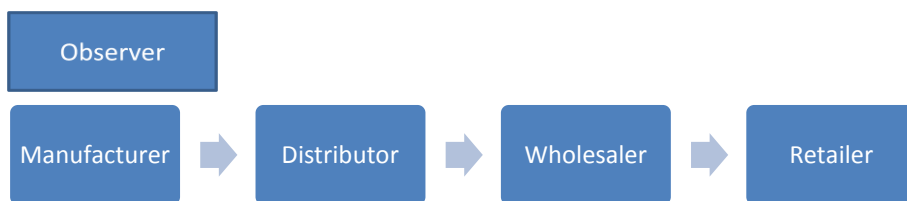
The Stock-the-Sticks Business Game : Notes and Instructions on how to play the game

The purpose of playing the Stock the Sticks game is to provide the participants with hands on experience on the challenges in managing supply chains. The stock-the-sticks business game (or simply known as "Stock the Sticks Game") is a role-playing game, which simulates chaos, complexities, and structural problems in the supply chains. Of course, there is no big stick in the stock the sticks game. The stick is replaced by toothpicks.

Fig :B(ii) The Conceptual Model of Stock-the-Sticks Business Game :- It's not a description of virtual game components; rather

1. Overview of the supply chain system

- In each Supply Chain, there are four positions (teams): *retailers*, *wholesaler*, *distributor*, **and** *factory* (*manufacturer*). Fifth is the Observer/analyst.
- Each position (team) is almost identical in its activity.
- Each keeps an inventory of the sticks (toothpicks).
- Each receives orders from and ships the sticks.
- Each places orders of sticks with the sector upstream.
- There are shipping delays moving downstream and order delays moving upstream.
- Game continues for 6 weeks until time permits.
- Decision period : order decisions are made at each position at the beginning of each week.

2. Basic Rules

- The objective is to minimize total costs of your position (e.g. the retailer, the wholesaler, etc). Relevant total cost is the sum of inventory holding and back-order costs.
- Costs are computed in the following way: (a) Inventory holding costs: U.S. $1.00 per case / week, and (b) Shortage (backlog) costs: U.S. $2.00 per case / week.
- The costs at each position for each week will be added for the total length of the game to determine the total costs (please see game worksheet on the last page).
- No communication between positions (i.e. No information exchange): The retailer should not talk to anyone else, same for the wholesaler, the distributor, and the factory (manufacturer). The ONLY communication between positions should be through the passing of orders and receiving of sticks.
- The retailer is the only one who knows what the customers actually order. They should not reveal this information to anyone else, until after the post-game discussion.
- Supply of raw-material from external source to the factory is assumed to be infinite.
- Initialization: There will be 2 thermocol blocks representing 1dozen cases of on hand inventory of sticks (toothpicks) at the manufacturer's position. Blocks can be used for bulk order, for smaller orders toothpicks are delivered based on count.

3. Steps of the game

- Advancing shipping delays.
- Receive (or read) incoming orders from downstream.
- Fill orders + backorders if any (i.e. satisfy demand as much as you can)
- Advance order slips
- **Place orders with your upstream position (the only decision making step)**
- Record demand observed, your current inventory, shipping delay amounts, backlog, orders placed.

4. Tips

- Some critical factors in the management of such systems are demand patterns, information lags represented by delays, and the degree of (or lack of) information exchange among the players. Again, players are not permitted to exchange information for this game. The only pre-requisite, besides your counting skills, is that none of the players have played the game before, or else agree not to reveal the details of the game. Again, I strongly urge you to carefully study this game instruction in advance and familiarize yourself with the game prior to playing.

Refer **Case Series 'B' – The business game play-scene,** for further information on how the game was played by the group of students.

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Stock the Sticks : Business Game Play-scene
CASE SERIES – "B"

Agenda of the Business Game play-scene:-

1. Introduction to the Game
2. Students play the game
3. Conclude with evaluations.

The infrastructure / arrangement for the game :-

- 5 tables
- 1 whiteboard and markers
- Names of groups written on each table
- Thermocol blocks kept on each table.
- Toothpicks – two packs to be kept on manufacturer's table.

1. Introducing the Game to students -

"Pick-your-group" The students are asked to select a paper note (lucky chit) with group-names written on them from a tray carrying eighty (84) chits. The students select one chit each. The 6 groups are manufacturers, wholesalers, distributors, retailers, customers and observers or analysts. The students form into groups. Hence the total eighty (84) students finally fall into six (6) groups with twelve (14) members each. A representative of each group is made to The students are briefed on how to play the game through slides. There is a short revision class on the supply-chain-strategy. They are made aware that :-

- They are producing / distributing sticks (representing finished product).
- There are five sectors : retailers, distributors, wholesalers, manufacturers and consumers.
- Description of each sector :-

    a. Retailers – receive orders from customers and places order with wholesalers.
    b. Wholesalers – receive orders from retailer and places order with distributor.

    c. Distributor receives order from wholesalers and places order with the manufacturer.
    d. Manufacturer receives orders from Distributor and produces the sticks (finished product).
    e. There are two activities to be done, placing an order and note the inventory or backlog.
    f. The flow of order will be from retailer to wholesaler, from wholesaler to distributor and from distributor to manufacturer.
    g. The order is on weekly basis, but the delivery if you do not have the stock in your warehouse, it will take two weeks.
    h. The game will be conducted for period of six weeks.
    i. In the beginning all inventories in supply chain is zero

j. At the end of six weeks period, both the owner and the observer will check the amount of inventory and backlog order.

k. Penalty will be given 1RM for inventory each dozen of chopstick and 0.5 RM for backlog.

2. *Students play the game*

- Orders are received from downstream-from customers to the retailers.
- The manufacturer has to start with a two thermocol blocks. 1 thermocol block represents 1 dozen cases of toothpicks which is simplified for bulk delivery. For smaller orders toothpicks are delivered based on the count.
- Each group (players) must send the order upstream and ship the order. If they cannot, it reflects in the backlog (as shown in the form below). The student representative has to enter in the record sheet manually.
- Each player may re-stock or replenish its stock by ordering from the sector upstream. Nevertheless the manufactures are an exception as they will produce and supply rather than moving the order upstream again.
- After the order is placed, it takes one to two weeks for the order to processed, shipped and received by the ordering party. But if there isn't any finished product ready, then a two week's order delay and two week's shipping delay is expected. That means it takes at least four weeks for the finished products to reach the ordering groups site.

- The manufacturer takes at least one to two weeks to produce the finished product according to information received from the game instructor. (Refer point (iii) (g) in the above paragraph).
- In the first few couple of rounds the players (consumers, wholesalers and distributors) are found to be at ease initially in the game, as they are unaware of the "delay-trap". They fall in the "delay-trap" if they do not implement a counter trick of inventorying extra stocks to avoid the "delay-trap". But extra orders also lead to another trap the "bull-whip" effect.
- In the later rounds the players become aware of the traps, they understand the tricks in the game and they try to balance their orders and also try to speculate (pre-empt) the consumption pattern and mange their stocks accordingly.
- They do win, but after the initial fall in the "delay-trap".
- At the end of the rounds of orders and deliveries, it was found that students had backlog costs which were high as they included (higher shipping fees for late delivery), additional costs of re-gaining a customer who was lost due to non-delivery of product on time.
- Players are not allowed to generally speak or communicate to each other. They can only place orders and send the delivery to the upstream and downstream sectors respectively.
- The game ends after 6 weeks. The students wait for the observers/analysts to display their observation on the board.

3. Conclude with Evaluations

1. Customer demand increases in week four almost, as the demand/consumption pattern is slowly understood by the upstream groups. They realize the "delay-trap".
2. The retailers order more, each sector follows suit along the chain and the backlog also increases simultaneously as delivery cannot be stepped up at this pace.
3. Eventually the manufacturer steps-up production to fill the backlog and delivery is sent to the distributor and continues further in the chain.
4. This also leads to huge overflow of products (inventory) at each groups table and leads to blocked money and unsold-goods at the retailers end.

Refer **Case Series 'C' – The lessons learnt,** for further information on the achievements and learnings of the class after playing the business game.

Stock the Sticks : The Lessons Learnt
CASE SERIES – "C"

Evaluating the Game

Educational games and simulations are increasingly being seen as a novel way to facilitate student learning and a near-to-real life experience in a simulated environment. Here we can evaluate the learning's of the game namely "Stock-the-Sticks Business Game" played at University Malaysia Kelantan by the third year undergraduate level business management students. This part of the case also discusses the expectations , attitude and achievements of the students towards the game and collaborative working patterns.

Results

- **Refer Appendics** - On reviewing the record sheets and the graph derived from the game, we realize that the students were very new to the concept of learning through the experiential learning methodology.
- **Graph – tips**
  The x-axis denotes the weeks
  the y-axis denotes the total penalty [(total backlog x RM 0.5)+(total inventory x RM 1.00)].

All the groups incurred penalty in terms of backlog and inventory. The highest penalty was incurred by the Retailers group (refer to graph on page 8).

Expectations, attitude and achievements
Verbatim comments are the best source to evaluate the whole program from the horse's mouth.

Business Game Feedback – Groups of Undergraduate Business management course

Name: Subashini D/O Velaitham
Role: Manufacturer
Comment:
This is an interesting game and it will help in the future especially when we start a business. I learned a lot of things through this game such as how to manage inventory and so on.
Q. If this game is related to events in real life situation, then how would you feel?
Ans. I will find some more suppliers to manage my inventory. It is because inventory is important to manage company properly.

Name: Sarah Nur Bt. Mohd Aslam
Role: Manufacturer
Comment:
Interesting, want to play it again if given achance. Makes me feel more aware that every transaction happens and also makes me control what happen in the end.
Q. If this game is related to events in real life situation, then how would you feel?
Ans. Disappointed because I didn't have enough stocks when I was playing, and it can make customers run away to another manufacturer.

Name: Chan Chee Yan
Role: Distributor
Comment:
Interesting, but I think it needs some modification like adding in more internal factors which can make the game more realistic.
Q. If this game is related to events in real life situation, then how would you feel?
Ans. As a distributor I think I need to always be aware about the demand from the wholesalers/retailers. I will make sure that I always have sufficient inventory for my wholesalers/retailer.

Name: Mohd. Akmal b. Abdul Malek
Role: Wholesaler
Comment:
Interesting game and gave me good experience.
Q. If this game is related to events in real life situation, then how would you feel?
Ans. Happy, I had made good profit in the game.

Name: Ung Jiunn Terng
Role: Wholesaler
Comment:
The game is so much fun. Although at the beginning, most people weren't really sure about the ways to play but everyone tried their best. Later on when everyone was sure how the game goes, people started making the game more interesting. **Playing business game is a good teaching method as the students will learn things faster when they are involved in it**. It really helps the students to understand easily and in a better way the concepts that are to be taught. After playing this game, everyone knows the importance of inventory management. At the same time it the business game method of teaching plays a dual role – it teaches the students and also makes the class more lively and enjoyable.
Q. If this game is related to events in real life situation , then how would you feel?
Ans. Disappointed, because as a wholesaler one must know how to order and manage the inventory. If there is no method or no initiative to manage the inventory properly, then the business will not survive long. As a final say inventory management is very essential in the supply-chain-distribution activity.

Name: Faiz b. Hussin
Role: Wholesaler
Comment:
It's fun to play the game.
Q. If this game is related to events in real life situation, then how would you feel?
Ans. Afraid because I didn't have enough stocks for my customers and not enough experience. Learning here is easy, I didn't lose anything, but learning as a business man / entrepreneur would have taken away all my fortune.

Name: Kanarajan S/O Munusamy
Role: Retailer
Comment:
I felt happy and enjoyed the game. I got to learn some new things about supply chain distribution in business in the form of a game.
Q. If this game is related to events in real life situation, then how would you feel?
Ans. It will give me a good chance apply my learnings from the game into real life later on. It was a good exposure to me.

Name: Goh Hui Theng
Role: Retailer
Comment:
Interesting, it is helpful when we are involve in real business in future.
Q. If this game is related to events in real life situation, then how would you feel?
Ans. The new experience I learnt from the game is helping me to understand some new practical lessons in business. It will be really very useful.

Name: Kenny Khoo
Role: Customer
Comment:
The game gives a rough idea to the students on the importance of managing the inventory level to achieve economic order quantity and minimizing costs. All in all, it was fun.
Q. If this game is related to events in real life situation , then how would you feel?
Ans. Playing the role of a customer wasn't so stressful as compared to the other roles but still, choosing the right suppliers or vendors is also important for the business' sustainability.

APPENDICES

RECORD SHEET

Team Name :   Please checkoff your position :

☐ Observer

☑ Manufacturer   ☐ Distributor

☐ Wholesaler   ☐ Retailer

Week	Inventory	Back log	Your orders placed
1	50	0	15
2	35	0	26
3	9	0	2
4	7	0	7
5	0	1	
6			

Total			
Penalty			
Cost			

Penalty Cost = (Inventory) X RM 1,00 – (Backlog) X RM 0,50

RECORD SHEET

Team Name :   Please checkoff your position :

☐ Observer

☐ Manufacturer   ☑ Distributor

☐ Wholesaler   ☐ Retailer

Week	Inventory	Back log	Your orders placed
1	0	0	15
2	5	0	26
3	5	0	2
4	5	0	7
5	2	0	0
6	1	1	2

Total			
Penalty			
Cost			

Penalty Cost = (Inventory) X RM 1,00 + (Backlog) X RM 0,50

RECORD SHEET

Team Name :   Please checkoff your position :

☐ Observer

☐ Manufacturer   ☐ Distributor

☑ Wholesaler   ☐ Retailer

Week	Inventory	Back log	Your orders placed
1	0	0	10
2	2	0	26
3	4	0	2
4	4	0	16
5	2	0	1
6	3	2	3

Total			
Penalty			
Cost			

Penalty Cost = (Inventory) X RM 1.00 – (Backlog) X RM 0.50

RECORD SHEET

Team Name :   Please checkoff your position :

☐ Observer

☐ Manufacturer   ☐ Distributor

☐ Wholesaler   ☑ Retailer

Week	Inventory	Back log	Your orders placed
1	2	0	8
2	2	0	24
3	8	0	2
4	0	0	12
5	2	3	3
6	6	2	1

Total			
Penalty			
Cost			

Penalty Cost = (Inventory) X RM 1.00 + (Backlog) X RM 0.50
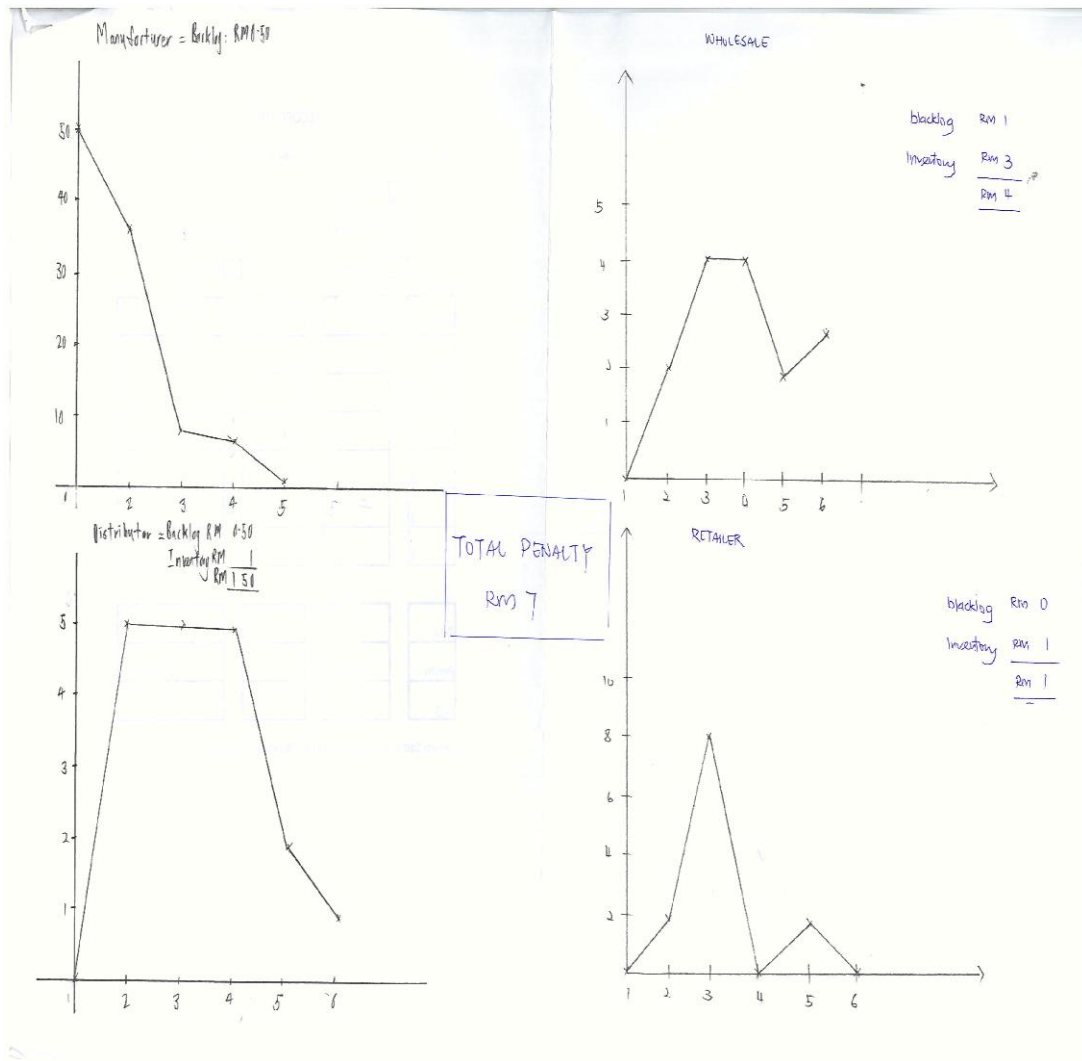
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