DYNAMIC BUSINESS ENVIRONMENT AND DEVELOPMENT OF ENTREPRENEURIAL SKILLS WITH THE USE OF THE BISTRO SIMULATION

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Abstract - The paper describes a simulation that represents an active teaching tool which allows players to develop and practice entrepreneurial skills. The simulation allows students to discover, identify, develop, practice, and test entrepreneurial skills in a variety of market contexts. Students learn that the entrepreneur appears to have special personal qualities among which include: internal locus of control, risk-taking, innovation and initiative, ability to solve immediate problems, desire for responsibility and success, need for achievement and control, growth-orientation, power, and aggression. Students' experience with the simulation develops appreciation of entrepreneurship as a leading factor for economic growth and development in globally integrated international markets.

Index Terms - auction, asset allocation, business game, entrepreneurial success, strategic decisions, tactical decisions.

I. INTRODUCTION

Simulations and games have been widely used in college education as they are the most realistic active learning techniques [1], [2]. Various attempts have been made to measure the extent to which simulations and games do capture the essential features of the real-world environment they attempt to replicate [3]. General-purpose simulations can be used in a variety of ways, but tailored simulations use data and terminology appropriate to a particular company or industry that can be only understandable by those familiar with those industries.

According to Morgan and Ramirez [4], active learning aims to enhance the intellectual capacities of students in everyday situations with minimum external help. Brookfield [5] stresses that active learning empowers students to act in rational ways, develops critical thinking skills as they attempt to solve real problems, and allows them to take action in a purposeful and logical way. Games provide a structured environment for learning complex problems. According to Shubik [6], most games in a professional context fall into the categories of teaching, training, operations, and entertainment. Games that replicate and teach models and processes that employ the use of a human in a particular role, actual or simulated are called simulation games. Keys and Wolfe [7] concluded that games are internally valid for a strategic management course and Wolfe and Roberts [8] have argued that simulation games have external validity in predicting future career success of players. Whiteley and Faria [9] concluded that simulation games are effective in improving quantitative skills but not in improving the acquisition of applied or theoretical knowledge. Wellington and Faria [10] suggested that the pedagogical value of simulations should be focused on the development and acquisition of decision-making, problem solving, and interpersonal communication skills.

Even though educators are constantly striving to bring management education closer to reality, learning still tends to focus on two scenarios: lecturing about business; and training in skills [11]. This division means that the context of learning remains artificial and it is difficult to reproduce the characteristics of a working situation in the classroom while at the same time providing development and training of specific skills. Therefore, if the aim of business education is to prepare students for the workplace, in the sense that all learning is meant to be translated back into the workplace, a large gap remains. It is the view of the authors that this gap can be narrowed by the use of business simulation games with a goal of teaching business concepts as well as providing business skill development and training in an undergraduate business program [12]. Therefore, this paper focuses on the experience of the authors in running a game that allows the players to develop entrepreneurial skills while simultaneously learning business concepts and implementing entrepreneurial strategies. The Bistro Simulation is a business simulation which gives the players experience in developing strategies, decision making, team building, and core entrepreneurship skills. The students run their restaurant company in a competitive market setting against other teams. This forces them to take risks and anticipate competitor strategies in addition to developing and implementing their own team strategy. The students run their company in a competitive market setting against other teams.

This paper is based on a simulation game involving five teams of under-graduate students. The game can be run to simulate realistic competitive conditions as much as possible so that the concepts learned and solutions generated can be transferred from the

classroom to the business environment. Students learn that the entrepreneur appears to have special personal qualities among which include: internal locus of control, risk-taking, innovation and initiative, solving immediate problems, desire for responsibility and independence, need for achievement and control, ambition, self-confidence, growth-oriented, power and aggression. Students' experience with the simulation develops appreciation of entrepreneurship as a leading factor for economic growth and development in the more global and integrated international markets.

II. BACKGROUND ON ENTREPRENEURSHIP SKILLS

In the course of their lifetimes many people attempt or at least strongly consider setting up their own business. Many of them try every day, and few succeed in establishing entrepreneurial ventures that survive and prosper. Entrepreneurship has been regarded as one, perhaps the most, significant causal factor in the process of economic growth and development. Hence, differences in entrepreneurship among societies are believed to account for their differential rates of growth and development. According to this belief, those societies that possess individuals willing and eager to perform the entrepreneurial function or role can accelerate the growth and development process; those societies lacking this necessary component lag behind. Advocates of this point of view are most likely to attribute the amount of entrepreneurship within a society to a group of factors that are generally non-economic in nature. According to them, entrepreneurship is most likely to emerge either under a specific set of social conditions or when society has a sufficient supply of individuals possessing particular psychological characteristics [13].

According to a behavioral model of entrepreneurship, behavior is the central and essential element in the entrepreneurial process [14]. Individual's psychological profiles and their actions do make them entrepreneurs. Knowing the behavioral manifestation of entrepreneurship it is possible to reliably, verifiably and objectively measure the entrepreneurial level of an individual. Several studies have been conducted to determine the association between personal characteristics, entrepreneurial behavior, and a successful entrepreneur. Personality based theories of entrepreneurship demonstrate those traits that make them prone to behaving as successful entrepreneurs. The list of traits is nearly endless but includes: internal locus of control, risk-bearing, desire for responsibility, source of formal authority and power, aggressiveness, recognition, creativity, being energetic and ambitious, possessing a high need for achievement, autonomy, growth and independence, and initiative [15].

McClelland's work has been the major contribution to the area of the psychology of the entrepreneur [16]. His research has been based on the *need for achievement*, a strong *desire to be successful* and *need for personal responsibility for decisions.* Closely related to the concept of a high need for achievement is the belief in an *internal-locus of control.* Individuals who cannot believe in their ability to control the environment through their actions would be reluctant to assume the risks that starting a business entails. There have also been a number of studies supporting the idea that *risk-taking*, *power*, and *aggression* are prime factors in the entrepreneurial character and function. Similarly, entrepreneurs are faced with a number of challenges as they try to implement new ideas and solve the resulting problems; their innovativeness is a major issue. Schumpeter [17] felt that *innovation* was the central characteristic of entrepreneurial endeavor. Some authors assess that entrepreneurs possess relatively permanent cognitive processes by which they perceive data, make judgments, and argue that these processes define their problem-solving styles. In addition, some studies also assumed that the entrepreneurial perception of problems and organizational goals is a function of the entrepreneurial problem-solving style. Accordingly, it is believed that innovation and creativity have occurred under many different business conditions and that innovators seem to believe that puzzles are solvable.

This paper describes an interactive-learning instrument and is concerned with the learning processes where students are encouraged to actively participate in a learning process in order to develop specific entrepreneurial skills. The simulation presented is an attempt to model a portion of reality in an artificial situation. It reproduces the social and economic processes in a market system of entrepreneurial interaction. Students assume roles in the system and try to understand how the system operates by participating in it as a member, and an observer and a team player. The learning experience involves a winner, a successful entrepreneur, who has learned enough content and possess necessary skills to win the simulation. This experiment essentially provides a competitive entrepreneurial setting for the learning of subject matter content while at the same time players can learn and develop some of the above mentioned entrepreneurial skills.

III. DESCRIPTION

This single-period game illustrates the complexities of decision making in dynamic environments. Players participate in a game that simulates an auction. They

are expected to bid for raw materials to create menus that can be sold to generate a profit. The optimal number of teams is five but large classes are broken up into teams with each team developing its own strategy. The instruction sheet is distributed to each team and a bid sheet is used by the instructor who acts as the auctioneer. There is no specialized setup required. However, a computer with a spreadsheet package with a linear programming module is needed if the instructor chooses to pursue optimization.

This is a single-period game that provides players with the opportunity to plan and implement a strategy in a competitive environment. The game includes an auction in which players must bid against each other and make tactical changes to planned strategies in response to changes in market conditions created by the auction.

Specifically, players have to: set an initial strategy, decide how to use limited amounts of capital to maximize team performance, interact in a competitive market and adapt to changing conditions in the competitive bidding process, obtain raw materials (food items) through the auction, and use these materials to create menus that can be sold to generate profit. The game also provides the opportunity to demonstrate how markets for raw materials and finished goods interact. The game has both active and theoretical components. Optimal solutions can be found using integer programming techniques. The debriefing emphasizes three areas of lessons learned from the game: the auction, strategic and tactical planning, and the allocation of raw materials.

IV. RULES OF PLAY

Teams are assigned the names "Front", "Back" "Left", "Right', and "Center" based on their location in the room relative to the auctioneer. You are a member of the "Front" (or "Left," or "Right," or "Back," or "Center") restaurant team. The instruction sheet (Figure 1) provides the student with the information they need to plan an overall market strategy. There are many ways to approach the market. You can choose to offer only low, only medium, or only high priced meals, or any combination of low, medium, and high priced meals. The winner is the restaurant team that earns the greatest profit.

The profitability of your strategy is unknown at the beginning of the game since the prices for the raw materials have not been specified. The dynamic aspect of the game requires you to remain aware of the changing environment and possibly modify your strategies to meet evolving market conditions. The prices established by the bidding may have the effect of changing your previously established plans, and, if so, you will have to adjust rapidly.

The following statement is read aloud by the instructor to begin the simulation: "*In a few minutes, I will start an auction market. I will offer raw materials for sale, and you will use the money in your budget to bid for these materials. Raw materials will be offered as long as there are bidders willing and able to buy the goods. Members of each team must choose who is responsible for specific tasks, like monitoring the inventory to see that it agrees with the planned menu offerings, keeping track of the team's money balance, monitoring the other bidders in the market and prices they are offering, and doing the bidding. Only one designated bidder on each team is allowed to make bids. The length of the auction will be about 30 minutes or until each restaurant team runs out of money. There is a minimum bid of $50 per lot of goods. If an item fails to reach the minimum bid at any time then it will not be offered again. For example, if no player is willing to spend $50 for a lot of vegetables, no further vegetables will be offered.*"

V. STEPS OF PLAY

Step 1: The game begins after the instructor, who plays a role of an auctioneer, distributes the instruction sheets presented in Fig. 1 and discusses the Rules of Play. The teams are allowed a few minutes to develop an initial market strategy.

Step 2: At the beginning of the auction, auctioneer may need to solicit a few bids in order to get the momentum started. As the speed of the auction increases, it should be possible to complete a bid about every 20-30 seconds. Towards the end of the auction some teams may have exhausted their budgets. This could result in a single bidder buying large quantities of goods at extremely low prices. A minimum bid of $50 per lot of goods is set to prevent excessive profiteering.

THE BISTRO GAME

You are the owner of a restaurant, and you can choose to offer any combination of the menus listed below. Due to price competition from other restaurants, you will only be able to sell each meal for the given price, but due to the size of the market you will be able to sell all meals that you offer. You need to obtain the food for these meals in a competitive market, and the food will be offered at auction to the highest bidder. Any food that you obtain which cannot be used in these menus in the specified proportions will be regarded as waste and thus cut into your profits. It is your goal to obtain the food you need to offer those meals that will result in the maximum profit for your Bistro restaurant.

MEAL	CALORIE COUNTER	MODERATE MEAL	WAIST WASTER
PRICE	$10	$20	$30
Salad		(1) Vegetable	(1) Vegetable
Entree	(1) Meat (1) Vegetable (1) Bread/Pasta	(1) Meat (1) Vegetable (1) Bread/Pasta	(2) Meat (1) Vegetable (1) Bread/Pasta
Dessert		(1) Sweet	(1) Sweet (1) Fruit
Beverage	(1) Beverage	(1) Beverage	(1) Beverage

The structure of the game is as follows:

1. Examine the structure of the menu(s) and determine which menu(s) you will offer.
2. Purchase the food you need to offer the menu(s) you have chosen. The food will be offered at auction, and you will be bidding against other restaurants. Each type of food will be offered several times during the auction. You have a budget of $2,500. If you purchase $2,500 worth of food, you have run out of money, and you must stop bidding.
3. After the auction is closed, use the food you have purchased to construct the combination of meals that will make you the most money. You can sell all complete meals at the price indicated. Meals may come from more than one of the menus. Food that cannot be used in preparing a meal is considered waste. Waste food cannot be resold or transferred to another restaurant.
4. Calculate the value of the meals that you sold in Step 3. Add any of the original $2,500 that you did not spend to purchase food. Subtract the original $2,500 to calculate your total profit. The restaurant with the highest total profit wins.

Figure 1: Instruction Sheet

Step 3: The auctioneer uses the bid sheet that contains all the items listed in the menus and contains enough raw materials to make each menu once (Fig. 2). This bid sheet should be repeated several times to assure sufficient raw materials are available in the market.

The bid sheet requires that the auctioneer record the name of the buyer and the amount paid for each lot of goods. The reason for the team names is to simplify this recording requirement. This information can be used to audit the teams to make sure that no team overspent the allotted budget, to identify the market characteristics of the items offered for sale, and to observe how the market clearing price changes and whether prices increase or decrease in order to analyze dynamic characteristics of the market.

BISTRO SIMULATION BID SHEET

ITEM	QUANTITY	BIDDER	PRICE
BREAD/PASTA	100		
VEGETABLE	100		
MEAT	100		
SWEET	100		
VEGETABLE	100		
BEVERAGE	100		
MEAT	100		
BREAD/PASTA	100		
VEGETABLE	100		
BEVERAGE	100		
MEAT	100		
SWEET	100		
VEGETABLE	100		
BREAD/PASTA	100		
FRUIT	100		
MEAT	100		
BEVERAGE	100		
VEGETABLE	100		

Figure 2: Auction Bid Sheet

Step 4: Once the auction is over, an auctioneer gives the teams a few minutes to create complete meals with the raw materials they have purchased and to calculate the profit made by making and selling the meals. The winning team is the one that achieves the highest profit.

Step 5: The allocation process can be enriched by awarding each team an additional lot of each of the raw materials, an extra lot of vegetables, an extra lot of meat, and so forth. This usually will have the effect of changing the optimal solution and requiring students to reconsider allocation strategies.

Step 6: It can be identified whether team members have found the optimal mix of outputs for their individual set of inputs. This requires a portable computer with a spreadsheet package that includes a linear programming module. When teams report their available raw materials and the costs associated with them, the spreadsheet can then identify the optimal solution.

Step 7: If the game is used to demonstrate integer programming, students can be given until next class period to find the optimal solution using linear programming techniques, either by hand or on the computer. The instructor should request from each team an inventory of available goods in order to verify the inventory against the bid sheets and calculate the optimal solutions prior to the next class. To demonstrate the sensitivity of solutions to the mix of input, students can be asked to find the optimal solutions for different combinations of inputs.

VI. DEBRIEFING

The debriefing is an important part of this game since it allows the players to reflect upon their actions and identify lessons learned from this game. The debriefing should be done in three major areas: (1) **The Auction:** In this part of discussion, the dynamic interaction between participants should be stressed. The role of information flow in the market and how to learn to adapt and selectively filter ambient information for relevant factors like price can be discussed. An examination of the nature of a competitive market environment is a very important element of the debriefing, and the information on the auctioneer's bid sheets shows how prices changed throughout the auction and how different bidders reacted to these changes. (2) **Strategic and Tactical Planning:** Though the players may have made strategic plans prior to the beginning of the auction, the auction process creates a dynamic environment that requires this strategic plan to be reviewed in light of changing market conditions. This part of the discussion can focus on the need for using feedback from the market to modify existing strategic plans and how changing conditions can change a team's initial strategic plans. This section of the debriefing can be used to stress the need for market participants always to be aware of their surroundings. (3) **The Allocation Process:** The allocation process can be approach either on a simple intuitive basis or through the use of mathematical programming to identify the optimal solution for any given set of inputs and prices. By assigning additional raw materials to augment those purchased during the auction, the instructor can illustrate the sensitivity of optimization to the mix of inputs and how changes in a mix of inputs can change the optimal mix of outputs. Changes in the market which change the mix of inputs illustrate the integrated nature of all market processes on the success of the firm.

VII. DETERMINATION AND STUDENTS' PERCEPTION ON SUCCESSFUL ENTREPRENEURIAL SKILLS

The Bistro simulation was played in fall semester of

2017. There were 45 cadets who participated in playing the BISTRO simulation. In this part of discussion, students were asked to list all the skills that made them to be successful in this game. Each group was provided with a list of the entrepreneurial skills: *the need for achievement,* a *desire to be successful, a need for personal responsibility for decision, an internal-locus of control, risk-taking, solving immediate problems, initiative and innovation, growth-oriented, power, and aggression.* All those skills were discussed at the beginning of the semester when students studied the role of different resources in contributing to entrepreneurial success and economic growth.

At the end of class, the players were asked to discuss in groups which of the entrepreneurial skills were exercised and which they considered as to be critical to the success of winning the simulation. A short in-class survey was also distributed to the participants after the game was played to obtain responses to which of the entrepreneurship skills were considered to be critical to entrepreneurial success and which skills were exercised. The survey results of are presented in Table 1.

Entrepreneurial Skills	Percentage of Positive Response	
	Important	Exercised
Power	100%	100%
Need for achievement	100%	100%
Risk-taking	100%	100%
Desire to be successful	90%	100%
Aggression	90%	100%
Initiative and innovation	50%	30%
Need for personal responsibility for decision	40%	40%
Solving immediate problems	40%	30%
Growth-orientation	30%	20%
Internal-locus of control	0%	0%

Table 1. Students' Positive Responses on Entrepreneurial Skills as Important to Firm's Success and Entrepreneurial Skills that Exercised

Based on responses that were provided, we noticed that entrepreneurial skills that were perceived as important or critical to a firm's success were exercised. When asked if they would change their strategy after playing the simulation, 80 percent stated that they were satisfied and therefore they would not change their strategies and did not become more innovative or initiative, solve immediate problems, and exercise more internal-locus of control or growth orientation. Some of the students responded that the simulation was informative and allowed them to practice entrepreneurial skills and understand the importance of those skills. The students learned that those who were able to "exercise the ability to solve immediate problems," "show a growth orientation" and focus on "internal-locus of control" were more successful than those students who were more "power", "need for achievement" or "risk taking"-oriented. They all agreed that balancing all those skills was the best strategy for winning the game.

CONCLUSIONS

The Bistro simulation introduces students to a dynamic market and shows them how market conditions can result in tactical changes to strategic plans. It is a single-period game that can provide participants with an improved understanding of an auction market as an allocation process. The game further demonstrates the use of mathematical optimization to find optimal solutions. The relevant research provides strong support for learning and teaching strategies which actively involve students in the process, and for those activities which accurately simulate those skills to be learned. Our experience in this relatively small pilot study with the Bistro simulation leads us to conclude that it offers an opportunity to satisfy both of these objectives. Our positive experience with the simulation has persuaded us to integrate this simulation into the structure of our regular courses.

The advantage of the simulation game was that elements of the "real world" were simplified and presented in a form which could be contained within the classroom. The attempt was made to simulate realistic competitive conditions as much as possible so that the concepts learned and solutions generated could be transferred to the outside business environment. The skills enhanced included strategy development, time management, team building, and negotiation skills within teams. The players developed critical thinking skills that will better prepare them to plan future strategies as well as learning to apply the theories and models explored in the classroom setting. There was also the benefit of discussing strategic decision issues which arose in the implementation of different decisions. Overall, the problems encountered and decisions to be made represented the actual business environment and therefore could be used to enhance the critical thinking and problem solving skills of managers in the workplace. They are able to develop and practice the following entrepreneurial skills*: the need for achievement,* a *desire to be successful, a need for personal responsibility for decision, an internal-locus of control, risk-taking, solving immediate problems, initiative and innovation, growth-oriented, power, and aggression.*

In conclusion, games have benefits over some traditional teaching methods, but it must be stated that they should not be used as an exclusive alternative form of teaching and training because it cannot be guaranteed that all the lessons being taught are actually apparent. Games and simulations are best used when used to complement teaching and training methods, to act as an example, or to reinforce lessons. They should not be used purely for the sake of including a game or a simulation in the training or educational program. Without a specific purpose, the

game or simulation ceases to be interesting and becomes a waste of time. Teaching entrepreneurial skills with the use of game or simulation can be a successfully accomplished in a classroom setting.

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