

EXCELLING IN THE CAPSTONE SIMULATION: AN APPLICATION OF SPREADSHEET TECHNOLOGY AS A DECISION SUPPORT TOOL

Frank B. Markham
Mesa State College
fmarkham@mesastate.edu

ABSTRACT

A wide variety of pedagogical methods have been employed over the years in the presentation of business capstone courses. Most methods have used some combination of case studies, lecture, and term-length projects. More recently, with the advent and widespread availability of personal computer technology, business simulations have been gaining increasing acceptance. The introduction of a business simulation is generally to offer a “hands-on” experience for the student. Therefore, if a capstone simulation is for the purpose of “experiential learning,” then integration of the techniques taught for business analysis should, likewise, be incorporated. This paper presents one scenario of how a business simulation is incorporated into a business capstone course. The simulation then provides the data for analysis using spreadsheet techniques as a basis for decision support.

INTRODUCTION

Computer-based simulation games have been a popular teaching tool in college level business programs since the late 1950's when the first business simulation game was used in a college class at the University of Washington in 1957 (Watson, 1981), (Keys 1990), (Dickinson, *et. al.* 1990). Based on self-reported measures, Tompson and Tompson's (1995) research indicated that “. . . students' interest, motivation, effort, and learning all improve more when they work on computer simulations rather than on more traditional forms of group project assignments.” The use of microcomputer technology and internet based academic activity has increased markedly over the last twenty years in college and university classrooms in the United States. Modern educational games are thought to be effective tools for teaching hard and complex procedures because they use action instead of explanation, create personal motivation and satisfaction, accommodate multiple learning styles and skills, reinforce mastery of skills, and provide an interactive and decision making context (Charles & McAllister, 2004).

BACKGROUND

Clark (1992) developed “A tool kit of 24 MS techniques, tools and approaches . . .” and examined the literature from 1980 to 1990 for the use of these

management science tools in strategic planning. Of the 766 articles he examined, Forecasting (320) and Decision Support Systems (199) where the tools most discussed and represented over 57% of the articles. Both of these areas are of major import to Business Capstone courses in strategic management. Many collegiate level business programs are accredited by professional organizations such as the Association of Collegiate Business Schools and Programs (ACBSP) and the Association to Advance Collegiate Schools of Business (AACSB International). Both member and non-member schools typically consider the standards of instruction espoused by the accrediting agencies in the development of business programs. One expectation of accredited programs is that learning objectives presented in a school's business program will be consolidated into a capstone experience which incorporates a cross-functional, team-based, learning experience.

While there have been several designs developed, many business capstone courses have included (1) instructional presentation by one or several functionally qualified professors, (2) some form of current case analysis, and (3) term projects. More recently, numerous capstone courses have incorporated a hands-on learning experience in the form of an enterprise level simulation. A visit to the website of the Association for Business Simulation and Experiential Learning's (ASBEL) illustrates the widespread existence of simulations with over forty business related simulation packages listed (<http://www.absel.org/>).

PEDAGOGICAL FRAMEWORK AND LOGISTICS

A business capstone course may focus on the long term planning activities of C-Suite level managers (chief executive officer, chief financial officer, chief operation officer, etc.). Such courses tend to center on case studies with a level of analysis that focuses on canned data presented in an appendix at the back of the text. These cases are often based on actual companies; however, the situations examined are often two or more years old and offer little, if any, “ownership” of the products of the student recommendations. This is the situation often experienced in courses entitled “Business Policy.” However, many modern capstone courses have extended the learning objectives to cover the “Strategic Management Process” as defined by David (2009). The Strategic Management Process includes the aforementioned planning activities (David refers to this

as the *formulation phase*), as well as, the two additional phases of *implementation* and *evaluation/control/follow-up*. In order to provide the student with a true experiential learning activity, this researcher believes the student (or teams of students) must experience responsibility for the outcomes of their recommendations.

Over the last sixteen years the capstone course taught by this author has evolved into a functionally integrated Business Strategy course. The course, in its present form, includes (1) textbook based lectures presented during the first phase of the course, (2) a second phase which focuses on current events and case studies, (3) the focus of the third phase is an enterprise level simulation and (4) the final phase at the end of the course is a team-based case presentation of a *Fortune 500* company that identifies a single problem or opportunity the company faces and a student-developed strategic plan that addresses that problem or opportunity. In addition to purchasing a textbook, students are expected to have access to a subscription of *Fortune* magazine for the current events phase, register on-line for the simulation, and have completed several identified prerequisites in their coursework. A working knowledge of Microsoft Excel is crucial for analysis of articles, the case, and tracking trends in the simulation.

COURSE PHASES

The first phase of the course uses a basic strategic management text that provides a review of business topics presented in the students' business programs and provides the basis for analysis and discussion during the other phases of the course. The table of contents presents an outline for the case analysis that students may follow in developing their environmental analysis, problem or opportunity identification, and subsequent development of their strategic alternatives and decision making. Most of the textbook chapters provide one or more learning exercises that allow students to practice the chapter's learning objectives.

The current events phase uses articles from a current business periodical. The students develop a one page "brief" that relates the article dialogue to any of the business principles the students has been exposed to in previous courses in their business programs. Additionally, any article discussion that addresses material covered in the capstone course is identified and discussed as well.

Near the end of the first phase of the course, students begin to familiarize themselves with the simulation, study the *Player's Manual*, take two online quizzes, and complete two practice rounds of the simulation (the simulation is reset following the practice rounds). The first quiz covers the simulation's rules and the second quiz addresses their analytical skills, primarily in the area of financial analysis. The second quiz is usually given following the second practice round. While several scheduling techniques have been applied to the course, the current schedule has the phases overlapping by a week or two. Table 1 provides a course layout for a standard sixteen week semester plus a final exam week.

TEAMS

Except for the textbook and current events phases of the course, all assignments are team based and account for approximately one-half of a student's course grade. Five-member teams are lead by a Chief Executive Officer (CEO) and have directors for operations, human resources, marketing and finance/accounting. "Director" is defined in this course as the senior manager for a functional area of the company. The team of directors, in concert with their team CEO, must develop a long-term strategic plan for their simulation company and implement it via functional strategies. The team 's success depends on their development of a competitive advantage in their industry and their ability to maintain it throughout the simulation.

Student teams are formed in three steps. First, all students submit a current résumé identifying their preference for a position on the team (usually their academic major) and an alternate position. Next, the course instructor selects the students for the CEO positions. CEO students are "paid" a point bonus for the course. Each CEO then fills the remainder of the team positions with a requirement to maximize functional (academic major) diversity.

SIMULATION

One very popular simulation available for use in a business capstone course is *The Business Strategy Game (BSG)* and is the one used by this author. In its current version, the *BSG* is accessed and administered on-line and may include up to twelve student teams (companies) that

Capstone Course Schedule

Table 1

Phase	Week ==>	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Text																		
Articles																		
Simulation																		
Presentations																		

make ten annual sets of decisions (years 11 through 20) for an established company. According to the BSG website (<http://www.bsg-online.com/>):

The Business Strategy Game is an online exercise where class members are divided into teams and assigned the task of running an athletic footwear company in head-to-head competition against companies managed by other class members. Company operations parallel those of actual athletic footwear companies. Just as in the real-world, companies compete in a global market arena, selling branded and private-label athletic footwear in four geographic regions – Europe-Africa, North America, Asia-Pacific, and Latin America.

Company co-managers must make decisions relating to plant operations, distribution and warehouse operations, work force compensation, online sales at the company’s web site, sales and marketing, and finance. The challenge is to craft and execute a competitive strategy that results in a respected brand image, keeps your company in contention for global market leadership, and produces good financial performance as measured by earnings per share, return on investment, stock price appreciation, and credit rating.

According to the BSG website, over 60,000 student-teams have participated in the simulation and there are over 4,000 instructor accounts. Further, as of October 2009, 475 institutions world-wide have participated in the previous twelve months (<http://www.bsg-online.com/>). A number of reports are provided for comparison against teams at other institutions.

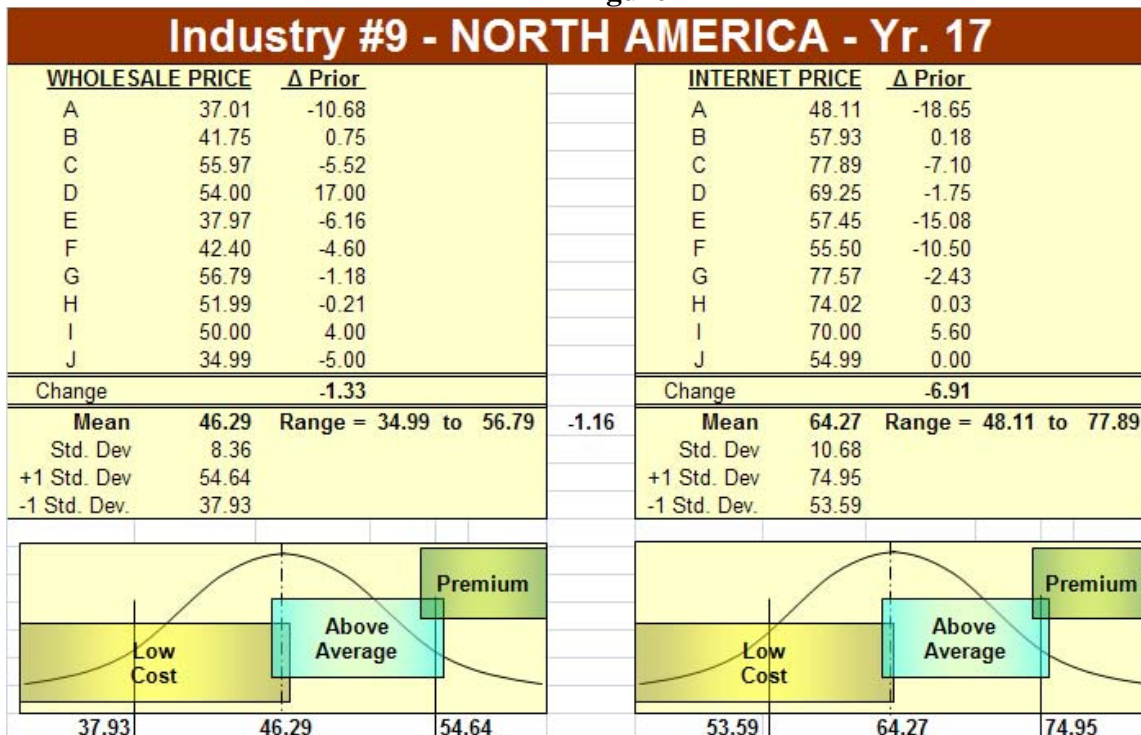
PEDAGOGICAL METHODOLOGY

This author has used the BSG since 1993 with the course pedagogy evolving considerably over the ensuring years. More recently, spreadsheet technology has been introduced as an analytical tool and the forecasting functions have been incorporated into the decision debriefing sessions for the student teams. Examples of the spreadsheet tables and graphs are provided in Figures 1 through 3. The BSG is the data source for analysis; however, the student teams must decide which data are relevant for their analysis. This is essentially the basic requirements of any Decision Support System (DSS).

Following each decision by the teams, several tables of comparative data are provided via various reports generated by the BSG. Selected data of interest is then transferred to an Excel worksheet for further comparison. Students are then debriefed concerning the relevance and importance of the data and shown the instructor’s tables and graphs. Students are not provided with the instructor’s templates – template generation is part of the learning experience.

Sample Price Analysis Table for the Wholesale and Internet Markets

Figure 1



Since the *BSG* does not have a “favored” strategy, the comparative efforts of the competing teams must be supported by consistent decision making. As defined by Rumelt, “a strategy should not present inconsistent goals and policies.” Further, strategies must present “consonance,” or reflect the “. . . need . . . to examine *sets of trends*, as well as individual trends, in evaluating strategies. A strategy must represent an adaptive response to the external environment and to the critical changes occurring within it” (David, 2009). Spreadsheet technology, if properly applied should provide the analyst with the tools for effectively identifying relationships in the competitive data and establishing trends based on that data.

As an example, in Figure 1, the prices entered by the various competitors are detailed for the North American Region for one year (year 17 in Figure 1). The spreadsheet functions are then applied to calculate the mean, range, and standard deviation of the year’s price data. Graphs are also provided for visual interpretation of the data. The graphs, however, are standard illustrations and not drawn automatically. The placements of the mean and standard deviations; however, are entered automatically.

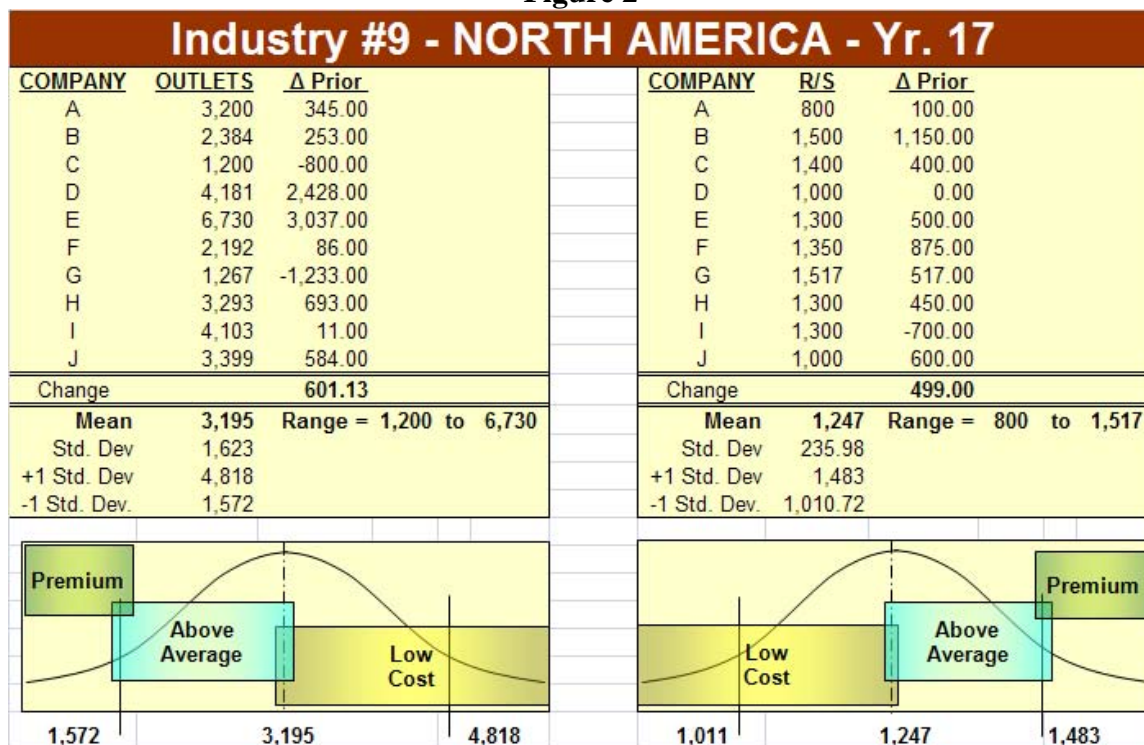
At this point certain assumptions are made. First, the classification for “Premium” priced products is defined as those products that are priced around the “mean plus one standard deviation,” or roughly the upper 17% of the pricing structure. “Above Average” is defined as following a pricing strategy from approximately the mean up to the

lower end of the range for Premium products. Finally, “Low Cost” (teams following a *cost leadership* strategy) should be priced around the mean price or less and may represent 50% or more of the pricing strategies in the market.

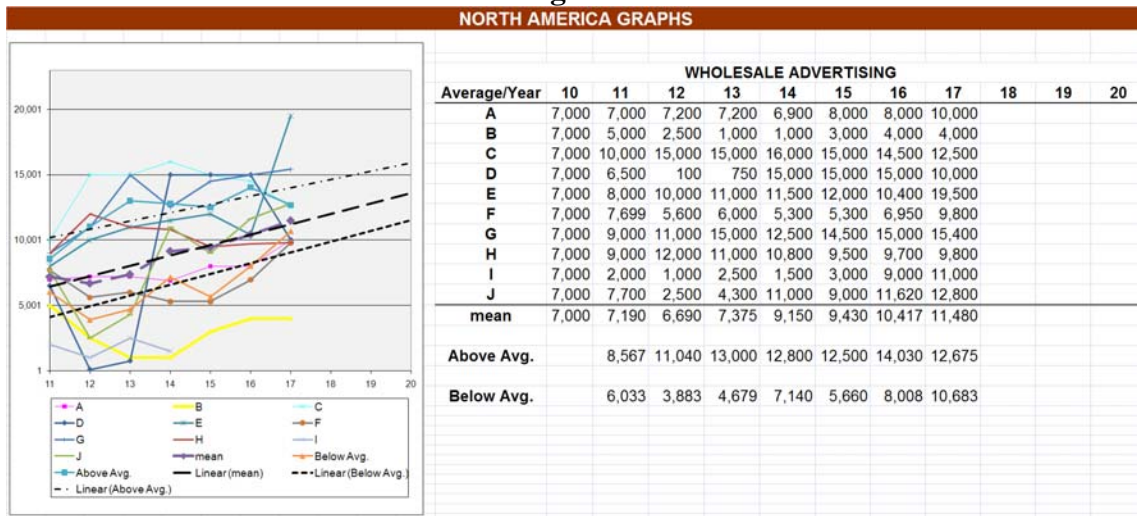
Class discussion is limited to selected data such as pricing, advertising expenditures, styling and quality, the number of retail outlets and retailer support (Figure 2), and the number of models of the product. This discussion serves as an example of the application of spreadsheet techniques and is not intended to be all-inclusive of the analysis the student teams need to consider. Students are expected to develop their own analysis of the decision data of the industry, as well as, the spreadsheet techniques required for their analysis. The teaching point here is that when strategies are implemented with consistent decisions then “consistent strategies” should be more successful.

For example, if a student team chooses a “Premium Price” strategy, then their price decision should be around \$54 (Figure 1) or more and the number of retail outlets selected should be around 1572 or fewer with retailer support of \$1,483 or more (Figure 2). Analyses of trends in the data provide projected change such as the trend for advertising spending illustrated in Figure 3. This type of analysis should be considered for all areas in which the student teams make decisions. Figure 3 illustrates the data for time periods (decision periods) ten through seventeen and projects a trend through the end of the simulation at decision year 20.

Sample Retail Outlet and Support Analysis Table and Graphs
Figure 2



Sample Advertising Spending Trend Analysis Table and Graph
Figure 3



CONCLUSIONS

The spreadsheet techniques discussed here are germane to any DSS and could be extended to any simulation that reports competitive data for comparison of participants. The trend analysis technique can be applied to any simulation that provides comparative data over a uniform number of time periods. These same techniques may be applied to actual competitive situations. Therefore, the skills a student builds in the application of spreadsheet technology in a capstone simulation should bode well for application in an organization following the student's graduation.

FUTURE RESEARCH

The first question that should be asked of any pedagogical methodology is "does it work?" Therefore, the next step in this line of research inquiry will be to explore this question. To that end, a research effort has been designed and data is being collected for confirmatory data analysis. The results of that effort will be detailed in a future report.

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