Linking operational decision making and financial analysis: an experiment in cross-course cooperation

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Abstract: This paper presents the results of a dual effort to help students connect operational decision making to financial analysis. The paper has two primary objectives. First, it will discuss a method of team teaching that avoids many of the logistical barriers common with this teaching method. The second objective is to demonstrate how the teaching method helped students make better connections between standard financial analysis and operational decision making. We argue the second objective can be generalised for the common disciplines found in colleges of business. The process involved team teaching a single case exercise in two separate classes. In the finance class, students used the case to apply traditional financial analysis to make recommendations about future actions. In the operations class, students used a dynamic simulation of the case to put their financial analysis recommendations into action and watch the impact of those decisions over time. The simulation altered their perspective about decisions made with just the financial data.

Keywords: operations; financial analysis; simulation; systems theory.


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1 Introduction

Some authors argue, with cause, that poor decision making is a result of a lack of ethical education in business (Bennis and O’Toole, 2005). Podolny (2009) notes: “The resentment against the MBA is visible everywhere. The New York Times printed several letters on 3 March 2009, reacting to a news story about the pressure these trying economic times have exerted on the teaching of the humanities. The letter writers alluded to the fact that by studying the arts, cultural history, literature, philosophy, and religion, people develop their powers of critical thinking and moral reasoning. Business schools don’t develop those skills, they argued, which is why MBAs made the shortsighted and self-serv ing decisions that resulted in the current financial crisis” (p.62).

A great deal of literature has been written on this issue, and many business schools are working to embed ethics into their curriculum. While these activities are positive, we feel there is another fundamental issue that needs to be addressed. Business executives have not been trained to connect the decisions they make based on financial analytics with long-term consequences that result from those decisions.

One barrier to helping business students (future business executives) make the necessary connections between financial analytics and managerial issues is the fact that the key concepts are covered in different courses. Many critics of business education (Porter and McKibben, 1988; Steiner and Wells, 2000; Mintzberg and Gosling, 2002; Ghoshal, 2005; Bennis and O’Toole, 2005) have called for business curriculum to take a more holistic perspective of business. In this way, students would have a better understanding of how actions taken to improve performance metrics in one area impact other areas of the business. A major barrier to providing a more holistic approach to business education is that college professors are functionally specialised and not readily equipped to provide a holistic perspective. To address this deficiency some schools are using Team Teaching. A recent search on Business Source Premier yielded over 30 articles on the topic (e.g. Silver and McGowan, 1996; Watkins, 1996; Wenger and Hornyak, 1999). A survey of the articles indicates the approach has merit, and is being used in a variety of situations. Even so, the practice is far from widespread. This may be due to major institutional obstacles as well as personal barriers (Young and Kram, 1996).

Institutional logistics, such as assigned teaching loads and sufficient coverage of core and major-specific courses present a major obstacle to the use of team teaching at many universities. Individually, these issues can be addressed, but in reality, they present a spider web of interrelated issues. For example, virtually every faculty member has a specified number of courses they must teach in a year. In addition, most professors guard
their teaching loads to ensure they have ample time for research or other required activities. So how exactly does one count a team taught course? If we use simple math and say a class taught by two professors would count as a ½ course toward each of the professor’s contracted teaching loads, how do they pick up the odd ½ course requirement? If the faculty member is needed to cover other courses related to a specific major this split load could create other teaching load imbalances. Matching fractional teaching assignments with whole number teaching loads becomes even messier when spread across multiple functional departments, each trying to prepare their own majors for graduation and dealing with faculty teaching, research, and service requirements. These factors may seem petty to those not engaged in these types of scheduling issues, but they present very real complications that must be acknowledged and addressed if team teaching is to become more mainstream.

Another barrier is topic coverage. As anyone who has worked with faculty to “shorten” a course knows, it is difficult for many professors to identify topics they should not be teaching. Nevertheless, it is a necessary issue to address when trying to splice together two classes. The issue was discussed by Atwater et al. (2008) when examining how to introduce system thinking into an MBA curriculum. A survey of several hundred professors, across a wide spectrum of disciplines, found that the majority felt systems thinking concepts were critical but should be taught in another area because there was no room for any new material in their classes.

It is important to emphasise that while the above discussion raises legitimate issues we do not feel that these and other limitations should be used as excuses for maintaining the status quo in business education. In fact, we adamantly agree with the critics of business schools who say we have a responsibility to address the criticisms raised earlier. We are merely providing further insight into the claims that change will be difficult and that merely dismissing these problems as petty faculty concerns will not make them go away.

After wrestling with the above issues for several years, we decided to try a different approach to provide students with a more holistic and cross-functional perspective on the relationship between financial analysis and managerial issues. The approach we used works within the existing course load structure. It also does not require a change in course content; in fact, it is central to the approach that the current topic coverage is maintained. Thus, this approach addresses the topic coverage issue described above. The only change required was that both classes use a common case with an associated simulation exercise that neither professor had previously used. In the next section, we describe the method in more detail.

2 Team teaching separate classes

Two courses were involved: a decision making course taught out of the Management Department and a finance case course taught out of the Finance & Economics Department. It is important to note that we were not only from different disciplines, but also attached to separate departments. In this situation, because of the issues raised above, teaching one course concurrently was not a possibility. In addition, the lock step MBA programme of our school had no room for an additional required course. Working within the existing programme using courses currently taught appeared to be the only realistic option.
Our conviction that current business curricula are not adequately providing an integrated understanding of business was the primary driving force for the development of our approach. After dealing with thousands of students over the years, it had become clear to us that many students failed to see any true connection between the “soft” business areas (i.e. hiring, employee morale, customer service, etc.) and their supposed job of improving key financial metrics. In fact, many students perceived decisions to downsize or cut back on spending as simply the types of tough decisions a good executive makes if it helps the bottom line. While most students readily agreed that short-term thinking was bad, they still could not make key connections between short-term financial solutions and long-term effects. This difficulty in connecting cause and effect when separated by time or space is well documented in systems dynamics literature (Forrester, 1971; Senge, 1990; Sterman, 2000; Atwater et al., 2008).

Because time delays in the real world are very difficult to see and understand, the use of simulation-based training (SBT) provides significant insight into the time delay problem (Salas et al., 2009). By combining a simulation exercise with real-world data, it is possible to bring a significant level of realism into the classroom. For this reason, the exercise described in this paper combines SBT with a case written about a real company.

As indicated above, the topical content of the finance and operations courses essentially remained constant, with one case taking the place of other cases previously used in the courses. The People Express (Holland, 1990) case was chosen for this exercise for several reasons. First, there is a simulation-based game associated with the People Express (PE) case. Given the complexity of the issues being conveyed and the time delays involved in the real world, it was determined that a simulation-based training exercise was required. In addition, the PE simulation meets the guidelines described by Salas et al. (2009). The game:

- is relatively inexpensive, costing about $12/student
- is easy to learn and play
- encourages and facilitates a learner controlled environment
- offers numerous performance feedback measures
- enables a systems-based approach to management.

The People Express case and the simulation are based on a real company and real events. Consequently, the finance professor is able to provide students with a large amount of actual data drawn from the Compustat Database that the students can use in performing financial analysis. In addition, the simulation game has been extensively validated to ensure it performs like the real company when similar decisions and actions are taken as those executed by the executives at PE. All of these factors add to the realism of the exercise.

2.1 The finance course

The finance course is a case course that covers a variety of finance-specific analysis techniques and real-world problems. In an effort to help the students break free of the dominate paradigm of finance (i.e. the goal of a manager is to maximise shareholder
wealth) they are required to read articles that provide alternative views as expressed in numerous recent academic articles (Handy, 2003; Ghoshal, 2005; Bennis and O’Toole, 2005; etc.). These readings were used in part to see if providing these views would be sufficient to help students take a broader perspective when making recommendations based on their financial analysis.

Once the students have read the introductory material the course moves to financial analysis and forecasting using a variety of common Harvard cases designed to illustrate the material covered. Within this context the People Express case is assigned as a financial analysis project. In an effort to prevent students from using the internet to see what really happened and thus letting that resource guide their decision making, we disguised the case.1 This was done by changing the name to Citizen Air (CA) and editing the case to filter out the pending bankruptcy and any material discussing the decline and fall of the company. We also added five years of financial statement data from Compustat and statement analysis data (percentage statements, ratios, source and use statements, pro-forma statement, growth analysis data, Altman bankruptcy ratios and price data). Finally, students are provided some basic information concerning the analysis of the airline industry The net result of our edits is that students see what any financial analyst would have observed concerning People Express coming into 1985 – their maximum sales year.

The specific assignment for the student is to address the following three financial questions:

1 As Citizen Air ended 1985, they had tremendous revenue growth since their inception. However, other airlines were now seeking to challenge the upstart and reign in the competition. Based on the financial data provided, what is your opinion as to the financial strength/weakness of Citizen Air?

2 Based on the review of the information, do you believe that Citizen Air is poised to continue their growth, maintain their current market share, or lose their market share?

3 What actions would you take to insure that CA continues to be an attractive investment (note the growth in common equity as a source of funding)?

As redefined, this case presents the opportunity to identify and cope with several financial issues related to the airlines industry including:

- traffic growth which depends on consumer psychology
- elasticity of prices
- the cost equation: Labour and fuel
- equipment cycle
- degree of financial and operating leverage which is central to a common investor mistake: failure to consider volatility.

The dominant financial force of this case is the extraordinary growth of the airline, caused largely by their pricing strategy. By this point in the class, students are well aware that growth requires assets, and assets require financing and the acquisition of financing
requires some forethought. Thus the case allows for a discussion of planned and unplanned growth and the underlying causes of the unplanned growth exhibited above.

The case naturally leads to a discussion of the acquisition of assets. The airline has a significant increase in aircraft and other working capital asset accounts; however, due to the company’s low prices the ability of these assets to generate profit is very weak. In contrast the rapid growth indicates that the assets could be generating more profits if the pricing structure was changed even a relatively small amount.

Students rarely recognize the pricing issue and generally focus on cost control when addressing this case. This is despite the initial readings and class discussions about taking a broader perspective. In addition, even though the case itself emphasizes the importance of the people at the airline the elimination of personnel was often mentioned as a logical cost cutting alternative. Across multiple implementations of this exercise, only one group of students has mentioned the idea that the company’s razor thin margins left them very vulnerable to even small increases in expenses, as a percent of sales. While this can be traced to the pricing policies of the company, very few students have made the recommendation that the company raise its prices in their financial analysis paper. We feel this is significant since several sources, including the case itself, have pointed them in the direction of taking a broader view of the business. In addition, after running the simulation EVERY student recommends a price increase.

A key point here is that financial analysis DOES provide tools that can help managers see a way out of this predicament, but the tools by themselves do not point the way. The connections between pricing, employee skills and morale, customer service, and sales must first be made. The question is how do we help students make these connections?

2.2 The operations decision-making course

The students also take an Operations Decision Making course in the same semester as the finance course described above. While this course covers a wide spectrum of decision making topics, the last half of the course is devoted exclusively to systems thinking concepts in an effort to help student think about a business more holistically. Using the Laws of the Fifth Discipline (Senge, 1990) and system dynamics concepts (Sterman, 2000) as basic guides, students learn the fundamental principles of systems behaviour with particular emphasis on the impact of time delays.

Once the basic mechanics of the tools have been covered along with system dynamics principles, the students are assigned a variety of cases to practice applying the concepts and using the tools. Each case is designed to help students make cause and effect connections across a business’s functions when there are substantial time delays. The students are now introduced to the dynamic simulation game of People Express. At this point in the semester, the students have finished the Citizen Air case in the Finance class so they are already familiar with the airline, which is now revealed to them as People Express. The game simulates 10 years of business (if the company does not go bankrupt) and progresses one quarter at a time. At the start of the game, and at the end of each quarter, students have the option of making five decisions related to the business. They can:
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- buy or sell aircraft
- hire or lay off employees
- Increase or decrease the average fare rate
- increase or decrease spending on advertising
- increase or decrease the scope of services offered.

There are a large number of different reports and graphs students can select and monitor to assist in making the five decisions while running the simulation. In fact, there are far too many tables and graphs for students to monitor them all. The key point is that the students have ample information upon which to draw when making their quarterly decisions. At the end of the simulation run a Summary Table can be printed out that shows what decisions the students made, and when they made them, along with several financial and non-financial results that occurred over the 40 quarters the game was executed. Students are required to turn in a copy of this table and a copy of the Stock Price & Earnings report.

To demonstrate how to play the game and use the various tables and graphs the instructor executes two simulation runs for the entire class to observe. The strategy used by Donald Burr (the CEO of People Express) is discussed and the simulation is run using his basic approach to show that the company does indeed go bankrupt fairly quickly. Then the instructor executes a “do nothing” strategy (i.e. no changes are made to any of the decision variables for the entire simulation run) which actually enables the company to make a small profit and stay in business.

The student teams are then given the primary project assignment to develop and execute a strategy that beats the “do nothing” results related to Net Income and Stock Prices & Earnings by as much as possible. The one restriction on their strategy is that it must be sustainable beyond the end of the game. That is, they cannot increase their end results by taking action that leaves the business in a poor position to compete at the end of the game.

There are two objectives of this exercise. First, give students a chance to observe system principles in action over time, particularly related to seeing how actions they take ripple through the system to shape future actions. Second, give students practice using the tools to articulate their understanding of the observed cause and time-delay effect relationships. Because of the objectives, students are actually encouraged to play the game many times and utilise a wide variety of strategies. While this can result in “gaming”, the issue is moot since the students’ grades are heavily weighted on their explanation of the results rather than the results themselves. In fact, the practice of letting them “game” the system then tie their explanations to sound systems & financial theory works well in helping them make the desired connections across the two courses. For example, by playing the game multiple times and observing the tables and graphs the students make several key connections. The following are excerpts from some of the reflection papers written by the students at the end of the exercise:

“We found that we must hire at a pace that adequately matches our increases in aircraft. When we failed to hire enough new employees the average length of the employee work week went up substantially. As our employees worked longer hours our service quality would drop.”
“Because the firm was so highly leveraged we were particularly concerned about any loss in demand during the early stages of the simulation run. We discovered from several experimental runs that we needed to steadily raise prices to reduce our leverage while simultaneously hiring aggressively to maintain customer service. Failure to do either step resulted in the company going bankrupt within the first few years.”

As the students deduce these connections, they then run into another problem, competition. As PE starts to gain market share the competitor airlines eventually respond by dropping their price and once again, PE’s demand decreases. Here again, because of the company’s narrow profit margins it is very susceptible to decreases in demand so the company can easily go bankrupt.

This is the point in the exercise that the groups typically split in their strategies. Some maintain a low price strategy and grow at a slow rate that does not attract reaction by the larger airlines. Others will pursue a slightly more aggressive growth strategy, but again with an eye toward being a smaller airline serving a niche market. The groups achieving the highest levels of performance are the ones that make the connection with this exercise and the analysis done in their finance course.

For example, one group recognised that their inability to sustain a drop in demand was related to their highly leveraged position. As a result, they use a more modest growth strategy combined with a price increase strategy to sustain their growth rate with some internally generated funds. In their reflection paper they said:

“As expected, raising our price did initially create a decrease in demand, but we were able to survive the drop because we were no longer so highly leveraged. We hired aggressively to maintain a high customer service and eventually demand came back. We then started to increase our scope of service in order to become a full service airline justifying our further price increases.”

The group went on to point out that when done in the right balance of raising price, buying aircraft, hiring, and increasing scope of service they could eventually become the dominant airline with the competition chasing them. At that point, their stock price and earnings reports showed strong sustainable growth.

The value of the exercise becomes very clear during a joint debriefing where we discuss both the Finance case analysis and the Operations simulation exercise. After reviewing the Finance case and their recommendations the students were asked: “What additional insights do you gain from adding systems thinking concepts to your financial analysis?” As students present the common logic comes out that growth in aircraft has to be matched with a steady increase in employees. The increase in employees is necessary to keep the length of the work week down which impacts employee morale that in turn affects customer service.

As the groups with the best results present their strategies, the value of connecting to the finance class becomes apparent. By looking at their leverage positions and the asset and financing requirements of growth as discussed in the finance class, students can make good informed decisions about growth, pricing, asset acquisition (that includes employees as assets and not as cost centres) and consequently increasing the scope of service. These students then use the insight to grow their airlines to become the market leader. Even the students that have taken the safe and easy way out in the exercise see the value of using the financial analysis in conjunction with the operational issues of
customer service and employee relations to guide their decisions. The following comments taken from three student papers demonstrate how insights change as they move from a traditional analytical perspective to a systems perspective.

- We ran a couple of games using the suggestions from the finance class. These results were nowhere near as successful as our end game. Although we made it through to 10 years, we were only at $20 million/quarter rather than $600 million. *We focused too much on financials and not enough on load factor, demand growth, and competitor’s fares.* Using the simulation and applying system thinking allowed for more creative answers to questions we had not even thought of in the finance class. There were still things that happened we could not explain, but the simulation allowed us to better connect cause and effect across several variables over time.

- In our finance class we suggested the following:
  - Set price close to competition then lower over time to look more attractive to consumers.
  - Increase the load factor. They were flying too many planes with empty seats.
  - Scale back employee benefits.
  - Hire employees with airline experience and decrease cross utilization.

  When we tried to play the game based on our financial recommendations we would bankrupt the company. *After playing the simulation we found several factors to be very important that we had not considered in our financial analysis. For example, employee turnover was critical. We had to keep that low in order to keep customer service high.* Therefore we needed to ensure that employee work weeks were reasonable and suggestion that would hurt morale had long term competitive ramifications. We also learned that, contrary to our initial thoughts, a load factor that was too high resulted in customer satisfaction decreasing. We concluded that overbooking was what allowed us to have such a high load factor, but that caused customers with tickets not to get on flights. In the end a more reasonable load factor was more sustainable.

- Our recommendations for Citizens Air were:
  - Control growth to maintain core competencies
  - Raise price closer to market
  - Sell planes to build net income
  - Decrease profit sharing
  - Implement a variety of HR strategies to reduce costs.

  When we ran the case strictly according to our case recommendations our EPS and share price were higher, but our revenue, Net income, market value, and market share were better with the strategy developed from playing the simulation repeatedly. *Primarily we learned from the simulation that high levels of customer satisfaction and strong word of mouth recommendations were powerful mechanisms for generating revenue and net income. We had not really considered these factors in our financial analysis.*
3 Summary and conclusion

This paper presents the results of an effort to help students connect financial analysis to operational decision making. This paper has two primary objectives. First, to discuss a method for team teaching that evades some common barriers. Second, demonstrate how the process helped students better understand and appreciate the connection between standard financial analysis and operational decision-making from a systems thinking perspective. The systems simulation allowed students to see the time delay impact of their short-term “financial solutions.” The process involved team teaching a single case exercise in two separate classes.

3.1 Implications for student learning

Based on student responses the approach provided them with valuable insights. First, it allowed the students to see how financial analysis can lead managers to make the “obvious” decisions to cut costs and reduce spending since these have the quickest impact on poor financial performance. However, through the simulations, they were able to make long-term connections. For example, the students learned using the simulation that the safe, cost cutting approach did have the desired impact of improving financials in the short term, but left them in a poor position to compete long term. As the employee workweek grew longer due to having too few employees, customer service started to decline, which eventually led to a decrease in demand. If the students waited too long to start hiring they would go bankrupt very quickly, but even if they realised their error and tried to hire aggressively to offset their initial downsize they ended up with too many new employees and customer service continued to decline eventually leading to bankruptcy.

Through this exercise, students came to recognise that the analysis they did in their finance course was neither good nor bad, but simply informative. The key to its value is how they used the information. The same analysis that led them to downsize could also be used to guide better long term decisions once they were able to “see” the more complex causal connections that enabled them to create a more financially healthy and sustainable organisation. They also start to see how seemingly good intentioned actions backed by analytical analysis, can lead managers into downward spirals that make them feel desperate to do whatever is necessary. They also discovered the impact of “delays” in the system. Thus actions generating immediate results often generated longer-term unintended consequences.

3.2 Implications for teaching

The approach overcame many of the typical barriers to team teaching by working within the established curriculum. Hence, issues related to fractional teaching loads and dealing with institutional logistic problems created by working across departments and majors were avoided. In addition, our approach did not require making substantive changes to courses and essentially allows participants to continue teaching their standard material. In institutions with these obstacles it provides a means for professors to integrate their course materials in a meaningful way with a relatively small change in how they teach their courses. This should help overcome resistance due to issues related to requiring course preparation changes and/or altering topic coverage.
While the example here focused on operations and finance it should work equally well with any combination of classes that meet the following conditions:

- There are a significant number of students taking both classes at the same time.
- The participating professors are willing to use the same case/subject matter and coordinate topic coverage in a way that facilitates the necessary connections across their classes. They should also be willing to conduct a joint debrief in a unified class.
- The participants are comfortable combining quantitative issues with non-quantitative concepts.
- There is a simulation programme that allows the students to condense time so students can see how cross functional issues play out in the face of substantial time delays. Toward that end, at least one of the participants must be comfortable working with simulation exercises, and using them to make connections across complex issues.

The above conditions are somewhat restrictive, but should not prove onerous. For example, a student taking both classes in the same term is common in lock step MBA programmes, and is not at all uncommon in non-lockstep programmes. It should also be noted that it is not necessary for 100% of the students to be in both classes. However, there does need to be enough to ensure some students in the case class (e.g. Finance class) can be assigned to each of the groups in the simulation exercise.

The need for a dynamic simulation is also not that difficult to fulfill. The People Express Simulation already discussed is one option. In fact, the PE simulation could be used to combine several different classes because it includes elements related to marketing and human resources making it possible to include classes covering these functions as well in the exercise.

In addition to the P.E. case there are other business simulation games that focus on a holistic view of business. For example, Strategy Dynamics (www.strategydynamics.com) also offers a game related to a growing mobile phone business (Mobile Phone Subscribers Microworld) designed to help students connect marketing strategies with operational issues like customer service and constrained resources. Strategy Dynamics also offers a game focused on Restaurant Management that could tie in a hospitality management course and a Professional Services simulation that could be used with a Service operations or marketing class.

The key differentiator to this approach when compared with other mainstream applications of simulation and case studies is that:

- The material is taught in multiple classes in the same manner the instructors have always covered it. In short the professors do NOT need to change how they cover their material.
- The specific exercise can be covered in 1–2 classes not requiring a major investment in time dedicated specifically to the exercise.
- The simulations are fairly inexpensive running about $12–15 per student.

Of particular value is the fact that this methodology can be applied where team teaching a single course is not a viable option. In addition, because this approach requires relatively
minimal changes to the way professors already teach their classes, it should reduce some resistance to a team teaching approach.

Criticism of standard business practice continues. Porter and Kramer (2011) recently wrote: “A big part of the problem lies with companies themselves, which remain trapped in an outdated approach to value creation that has emerged over the past few decades. They continue to view value creation narrowly, optimising short-term financial performance in a bubble while missing the most important customer needs and ignoring the broader influences that determine their longer-term success” (p.64). The role business education in these problems must be recognised and addressed. To that end it is imperative that business professors find innovative ways to address these legitimate concerns. While we are not naïve and do not mean to propose that this approach will “solve” the problem we do feel this approach provides another viable methodology for better integrating business curricula. At a minimum, we hope the approach discussed here stimulates other ideas and insights on how to capitalise on technology, overcome common logistic barriers and move business education into the 21st century.

References


Notes

1 The authors obtained permission from Harvard Business Publications to use a disguised version of the case, provided that the students were required to purchase the original case as a part of a course packet.

2 The People Express Simulation is available from Strategy Dynamics Inc. Information about the simulation and how to purchase it can be found at: http://www.strategydynamics.com/microworlds/people-express/