

Starting Operations Management with a “Big Bang”: Using Sitcom to Introduce OM
Concepts to Students

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Abstract

This article illustrates an innovative approach of presenting operations management concepts in the first class in an unorthodox and yet entertaining way. The exercise is centered around an episode of the popular sitcom - Big Bang Theory. From our experiences of implementing it in the past two semesters, we found that it has been an effective way of introducing operations management concepts to students in their first undergraduate OM class. Using figures and facts from the sitcom, students could compute productivity measures and appreciate the holistic view of starting and growing a business venture.

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Introduction

In today’s eyeball economy, first impressions are everything. Let us put ourselves in students’ shoes for a while and imagine walking into a classroom full of strange faces in the first week of a long semester. Instead of going through the dreaded ritual of syllabus recital and gimmicks to scare you off, you witness the teacher putting on your favorite TV show—The Big Bang Theory. For the next twenty minutes or so, the whole class keep laughing out loud while observing a startup’s evolution from idea to full supply chain operations inside an apartment. Do you think you will stay enrolled in that class? Now putting on teachers’ instructing hat, we will showcase how a sitcom can do a better job than our regular thousand-word lecturing.

Background

Signed into law by President Bush on November 2, 2002, the Technology, Education, and Copyright Harmonization (TEACH) Act is purported to balance the needs of educators and the rights of copyright owners. The TEACH Act provides many critical improvements over previous regulations, specifically sections 110(2) and 112(f) of the U.S. Copyright Act. In particular, the Act facilitates the performance and display of copyrighted materials for distance education by accredited, non-profit educational institutions that satisfy the Act’s qualifying criteria.

Our use of the episode of *Big Bang Theory* meets all the qualifying requirements stipulated by the TEACH Act:

1. Our university is an accredited, non-profit public higher-educational institution.
2. The use of the video content is part of mediated instructional activities in classrooms on campus.

3. The use is strictly limited to a specific number of students enrolled in the Operations Management class.
4. Our performance of the video is for ‘live’ face-to-face class sessions.

Under the TEACH Act., instructors can engage in a range of classroom-based video performance activities (e.g., the showing of a film clip) without having to secure any additional license or permissions. Nonetheless, we contacted the copyright holder of the sitcom - Warner Brothers Entertainment. In their response, they listed three major conditions that qualify exhibition of their motion picture as the “classroom exception” to the license requirement. We strongly believe our use of the video clip falls within this exception because our performance satisfies their specified conditions: (1). non-profit educational institution. (2). use of only lawfully purchased copy. (3). The performance in the course of face-to-face teaching activities inside the classroom.

The benefits of using film or film clips in classroom teaching are well documented (Bumpus, 2005; Feger & Thomas, 2011; Marshall, 2003) and has been even teased in motion pictures like the *Bad Teacher* (Miller, 2011). Obviously, we can use video clips to pleasantly demote ourselves from the leading role in classroom to supporting role and even sleeping role like the foul-mouthed, boozy Elizabeth in *Bad Teacher* (Miller, 2011). More seriously, “such materials engage students in a way that more theoretical texts, speculative discussions, or even case studies do not” (Marshall, 2003). In using Dr. Seuss to discuss operations management concepts, Feger and Thomas (2011) note that animated movies tap into students’ creativity and encourage students to think out of the box and explore beyond boundaries set by reality. Alternatively, humor creates a relaxed learning environment and helps overcome cultural and linguistic barriers (Brenes Reyes, 2014). Below, we will demonstrate how the marriage of video and humor together in sitcoms turns the classroom into a respectful learning environment filled with laughs.

Methodology

The premise of the episode *The Work Song Nanocluster*, Season 2 episode 18 of the *Big Bang Theory* (Lorre, 2009) is that the entrepreneur - Penny - wants to start a hair berets (branded as Penny Blossom) business, and her brilliant yet geeky neighbors - Sheldon, Lenard, Raj, and Howard - are consulted to reconfigure her manufacturing process and distribution channels. The Episode discusses a plethora of OM concepts including: moving assembly line, supply chain management, work force morale and motivation, e-commerce and logistics, and productivity. Students start learning operations management without even realizing some of the principles were invented more than a century ago. As the episode progresses, viewers are taken through a step-by-step process of growing a start-up interjected with humor and satire. Below, we detail our pause-discuss-go approach and present the discussion questions we developed for the scenes in the episode.

Scene #1 (time 01:26 to 02:30):

Sheldon performs the three-knock ritual and attempts to deliver a package to the final recipient - Penny. Sheldon adamantly insists on obtaining Penny's signature so that he is fully indemnified and bear no liability.

The conversation between Sheldon and Penny reveals certain legal aspects of third-party logistics. Namely, bailment entails a relationship in common law where a physical possession of chattels is transferred from the bailor to the bailee. Sheldon is entrusted by UPS for the final delivery of the package, regardless of the value of the contents of the package. the instructor can pause the video playing here and ask students the question: What does the signature signify?

Scene #2 (time 03:00 to 04:00)

Penny enthusiastically shows her business venture to Sheldon and is only met with an accountant's scrutiny. Based on her current way of running her business, Sheldon quickly

projects a bleak picture of only \$2,600 in terms of annual profit before tax. Finally, IRS is brought into conversation and the future for her business becomes even darker. The examination of Penny's current business model sets up the stage for later application of operations management techniques. This scene also establishes the pre-optimization benchmark metrics. The instructor can pause here and ask the class to compute labor productivity (20 Penny Blossoms per day) and profit margin (50 cents per unit). Further, students can be asked the question: how will the current president's tax reduction plan will benefit small business owners like Penny?

Scene #3 (time 05:10 to 07:15)

Sheldon uses the classic time-motion study to inform Penny of the exact labor productivity figure - 4.9 Penny Blossom per hour, which translates into her daily earning of \$5.19. Using the low earning figure as the leverage point, Sheldon moves on to educate Penny on interchangeable parts and how to set up assembly line in an apartment.

This scene presents the best opportunity to show students how Henry Ford's invention can boost productivity and can even be adapted from Detroit to the living room. We manage to contrive the following discussion questions:

- Why is Sheldon using a timer to measure Penny's operations?
- Who is Honoré Blanc? How did he contribute to the mass production movement?
- How many Model Ts could Henry Ford's moving assembly line deliver per year?
- Why did Lenin, the founder of the U.S.S.R., want to do business with Ford?

Scene #4 (time 07:30 to 10:30)

Lenard, Raj, and Howard hear singing as they are about to leave for a movie. They walk in on Penny and Sheldon singing the rhythmic sea-shanty work songs to self-motivate

and boost productivity five times higher than before. They turn to science and offer ways to expedite and smooth the process.

This scene exactly answers Penny's earlier question to Sheldon: how are we supposed to set up machines and conveyor belts in my apartment? The instructor can stretch students' imagination from the work song to the famous Hawthorne effect — an improvement in worker productivity generated by the psychological stimulus of being singled out and made to feel important.

Scene #5 (time 10:45 to 15:20)

Leonard creates a youthful-looking website for the product, and gets an immediate return - an order of 1,000 flowers for an upcoming GLBT parade in New Jersey. Reasoning that Amazon offers a one-day rush order, Leonard offers the same. The gang starts to work selflessly into the night. Hearing some negative talks on the factory floor, Sheldon spit out the golden quote of "the labor force is a living organism that must be carefully nurtured".

This scene highlights the importance of the interface between operations and marketing. Internally optimized process alone does not sell the finished goods. Ultimately, it is the marketing e-commerce channel that reaches the customer base and creates orders. At this point, students can be directed to Amazon's website and let them browse through the benefits and offerings of *Amazon Services*.

An interesting hypothetical question can be asked here is "If Leonard, Raj, and Howard decide to unionize, how will Sheldon handle the collective bargaining?"

Scene #6 (time 17:25 to 18:00)

Upon completion of the order of 1000 Penny Blossoms, Penny shows her appreciation by generously offering to share her profit with employees. Howard reminds her that 20 cents of out of every dollar she makes is the whole profit margin. waking up his laptop to print shipping label, Leonard realizes that another order of 1,000 flowers has been placed.

Exhausted, the gang decides not to continue and heads off to bed. With the exception of Sheldon who, in the full costume of the Flash, goes out for more coffee.

Instructor can raise the issue of profit sharing and discuss its pros and cons. The positive impact of profit sharing is that business owner (like Penny) can use the mechanism to encourage employees (Leonard, Raj, and Howard) work together on the same team. The employees have the same vision and goals and are rewarded equivalently. Employees knowing they will be rewarded financially if the business does well are more likely to contribute to the company success. Will the gang take the second order of 1000 Penny Blossoms if Penny offers to share profit with them?

After the play of video is over, we normally ask students to draw a picture of Penny Blossom's supply chain on a map. Figure 1 below is just one of the many excellent artworks students submitted.

Results

This video-based in-class exercise has been used successfully in our undergraduate core Operations Management courses for a couple of semesters. After each iteration of implementation, the instructor conducted a survey of students' opinion about this teaching approach. The survey asks a series of four questions, followed by an open-ended short answer section where students could suggest further improvements. The five questions are listed in table 1 shown below.

As you can see from table 2 presented below, the vast majority of students highly favored learning Operations Management basics from a sitcom and confirmed the positive experience gained from watching the episode. To mitigate against agreement bias, we reverse-worded question 4 statement to avoid respondents from careless answering. As expected, the domination switched to the negative side with 72% strongly disagree and 12% disagree. However, there was a noticeable uptick in the category of neither-agree-nor-disagree – 15%. Upon further investigation, we found that those

answered neither-agree-nor-disagree to this question provided some very insightful and constructive improvement ideas when they responded to the open-ended question 5. Some of the comments are listed in table 3. We are pleasantly surprised by the plethora of positive feedbacks. In the meantime, we are also encouraged by some fantastic constructive criticisms like response #4 in table 3. Actually, the current pause-discuss-go approach was inspired by similar suggestions of stopping the video periodically to discuss concepts to be taught from previous implementations.

Concluding Remarks

Research shows that students retain twice the information conveyed when using audio visuals versus reading, and they retain four times the amount they would from a lecture. In addition, humor helps relieve the tension that many students feel when entering a new class and it helps them realize that they truly can embrace learning about the subject matter. Drawing on existing works on video based teaching methods, we, as shown in this essay, endeavored to inject a sense of humor into classroom atmosphere while inspire learning. The advantage of our sitcom based OM introduction approach is best reflected in comments made by one student, "... It is the first week of school I dread having to sit through a boring fifty-minute presentation from a professor who is merely endeavoring collect a paycheck. I sit down preparing myself to sit through the grueling fifty-minutes. Then the professor come in and puts on my favorite show. I perk up and start paying attention. While laughing and enjoying myself I do not even realize that not only is the time going fast, I am truly enjoying learning about Operations Management. This changes my whole view on Operations Management. After the fifty-minute period ends, I am engaged and excited to come to the next class ...".

Finally, we encourage our colleagues worldwide to adopt, adapt our approach and make operations management interesting to our students. One uncharted territory would be the online delivery of the sitcom-based exercise, which clearly poses some serious legal

and technical challenges. We leave the challenges to our OM-teaching community and anticipate creative and innovative approaches in the near future.

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Table 1

Exercise Survey Questions

ID	Question	Type
1	The episode of The Work Song Nanocluster from Big Bang Theory contributed positively to my experiences of operation management	Likert scale
2	This episode helps me realize the the supply chain management issues related to E-Commerce	Likert scale
3	This episode helps me recognize the impact of work force morale on productivity	Likert scale
4	I would rather read the introduction chapter of the textbook than watch the sitcom to get a better picture of Operations Management	Likert scale
5	Please recommend further improvements that can make this video-based assignment suit students' learning needs better.	Open-ended

Table 2

Exercise Survey Results

Answer Choice	Question 1	Question 2	Question 3	Question 4
Strongly Agree	27.27%	27.27%	39.39%	0.00%
Agree	66.67%	63.64%	57.58%	0.00%
Neither Agree Nor Disagree	6.06%	9.09%	3.03%	15.15%
Disagree	0.00%	0.00%	0.00%	12.12%
Strongly Disagree	0.00%	0.00%	0.00%	72.73%

Table 3

Responses to Survey Question 5

ID	Response
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1	I think it is straight forward and helpful.
2	I enjoyed the video because it kept the attention of the class. I feel that is was a very productive exercise and helped show the importance of supply chain management
3	I have never had a learning practice like this done before. It was very different I enjoyed it.
4	My suggestion would be to introduce Henry Ford a little before watching the video.
5	I enjoyed this assignment. The show is one of my favorites, and I will definitely remember the episode.
6	Use these videos more often.
7	I think it is a great idea to start a class with a video that students can relate to and something they can enjoy, and that at the same time is instructive.
8	I think the assignment is set up well. It is nice to have out of the box learning exercises rather than the traditional exercises.
9	I think everything was fine with this assignment.
10	I think this assignment was much more effective than reading first chapter of book.



Figure 1. Supply Chain of Penny Blossom