OPIM 651X: Problem Solving, Design, and System Improvement
Fall 2003 – Q2

Instructor:
Karl Ulrich
The Wharton School
Huntsman Hall – Room 547
3730 Walnut Street
Philadelphia, PA 19104-6340 USA
ulrich@wharton.upenn.edu
office hours: Tue. and Thur. after class

Assignments:
You must turn in six of the individual assignments for this class including the two-page “cheat sheet” due at the end of the class. They are each modest in scope and are distributed throughout the quarter. The assignments are due via webcafe by 3pm on the date indicated in the course outline. No late work is accepted. There are no exams in this course. You will also complete a project in teams of three. There are four project assignments.

Grading:
Your course grade is determined by the quality of your participation in class discussions (33%), the quality of your individual assignments (33%), and your final project grade (33%).

Course Materials:
Almost all of the readings for the course are available on WebCafe. You will see a charge on your bursar bill for additional readings distributed in class.

Class Logistics:
Tuesdays and Thursdays
3:00 – 4:20pm
Huntsman Hall F70

Teaching Assistant:
Jayanth Krishnan
jayanth@wharton.upenn.edu

WebCafe Site:
http://webcafe.wharton.upenn.edu/eRoom/opim/651-fa03-1

Workload:
This course is designed to require an average of seven hours of work outside of class each week although there is some variability week to week. Each dot (•) next to the readings and assignments for each session corresponds to roughly one hour of work content. (Of course, your own experience may vary due to differences in reading ability, Excel skills, etc.) Please let me know if you believe any of these estimates is substantially inaccurate.

Collaboration:
You may study together in preparation for any of the sessions in the course. You may discuss strategies and approaches to the assignments. The actual work product you hand in for individual assignments must be completed individually.
Learning Contract

I will:
- Apply care and effort in preparing and leading 13 sessions.
- Demonstrate flexibility and responsiveness to student concerns and suggestions.
- Provide next-session feedback on assignments.
- Respect the “andon card” for class participation.
- Provide good faith estimates of time/effort for preparation and assignments.
- Design the workload to average 6 hours per week outside of class.
- Respond to email within one work day.
- Start and end class on time.
- Learn student names.

You will:
- Prepare for each class session.
- Miss no more than one class session.
- Allocate an average of at least 6 hours per week outside of class for preparation and assignments.
- Arrive for class on time.
- Sit in your assigned seat.
- Use your name card.
- Demonstrate effort and care in your assignments.

Intended Benefits of Course

- Ability to categorize problems in order to know which tools are most likely to be useful.
  - Selection problems
  - Design problems
  - System improvement problems
    - Defect reduction
    - Tuning
  - Planning problems
- Working knowledge of problem solving tool kit.
  - Multi-attribute utility analysis/Selection charts
  - SPC/control charts
  - KJ diagrams
  - Design of experiments
  - Causal loop diagrams
  - Gantt/Pert charts
- Practice developing problem solving skills in a low-risk environment.
  - Weekly exercises solving problems
  - Project
- Proficiency in communicating problem solving activities and outcomes to others.
  - Information design
  - Analysis/presentation of data
Grading and Assignments

- Grading serves essentially only one pedagogical function: students are much more likely to complete the readings and preparation questions if this work is graded. Students who prepare better, learn better.
- Your final grade is based on class participation (33%), the quality of your individual assignments (33%), and the quality of your project (33%). I assign one grade per project team, but this may be adjusted for individuals if the contributions of individual team members, as estimated by their peers, are egregiously uneven.
- There are no exams in this class.

Class Participation

- I grade class participation each day after class based on the extent to which comments reflect preparation, analysis, and thoughtfulness. Although this process is subjective, it is highly reliable, as your grade is based on lots of data (13 observations).
- Class participation is your responsibility. Prepare for class. Sit in your assigned seat. Use your name card. Raise your hand.
- Students will be cold called in most class sessions. Cold calling is random and inconsistent. Do not rely on cold calling as your primary vehicle for class participation.

Individual Assignments

- You are to complete the preparation questions for every class session, otherwise you will not learn the material. However, to manage the amount of grading required, your grade will be based on only six of the “hand in” assignments. The assignment for the last session (the “cheat sheet”) must be completed by all students and counts as one of the six.
- All assignments are due via WebCafe by the start of class. Late work is not accepted.
- Please adopt the filename convention “lastname-sessionN” (e.g., ulrich-session2.xls, krishnan-session3.doc, zenios-session1.pdf, etc.). Incidentally, now would be a good time to learn to create PDF files if you don’t already know how to do this, as this file format is emerging as the most reliable way to deliver reports, documents, and other professional work products.
- There is no way to “catch up” if you miss the opportunity to complete six assignments.
- You may hand in more than six assignments, in which case your grade is based on the six best, however handing in more than six does not result in any kind of “extra credit” in this course.
- Individual assignments are given grades of one, two, or three stars. If you like, you may think of this scale as “good, better, best” or any other semantic scale you prefer (e.g., “super, extraordinary, beyond comparison”).
- Under no circumstances should you add cover sheets, binders, folders, or fancy jackets to your assignments. This practice is wasteful, cumbersome, and annoys rather than impresses.
- You will not receive detailed and specific feedback on these individual assignments (do the math on the grading time…). However, you will receive a general memo outlining common strengths and weaknesses along with examples of one or more exemplary pieces of work from your peers. If after reviewing the memo and the exemplar(s), you are perplexed by the causal relationship between your work and your grade, see me for feedback.
Projects

- The project in OPIM 651 is a problem that you will solve by Session 13. The project serves as the context for many of the assignments. Your first task, due by Session 4, is to select a project and form a project team.
- The details of each project assignment are provided in the description of the session in which the assignment is due.
- I will try to provide feedback on your intermediate assignments, however I will not grade them. In most cases, these intermediate assignments will be directly relevant to your final presentation. Your team’s overall project grade will be based on my evaluation of your work as a whole and on your peers’ evaluation of your final presentation.

Constraints

- Your project team must comprise **exactly three** people. (There are no exceptions unless the number of students in the class is not evenly divisible by three.)
- The problem must not be one you are addressing or have already addressed in another class.
- The problem must not be proprietary, as you will be giving a class presentation in Session 13.

Instructor Criteria for Projects

Your project need not address a “business” problem, per se. In my opinion, the best problems for OPIM 651 projects satisfy these criteria:

- The problem scope is such that you can substantially solve the problem by Session 13.
- You have access to data relevant to the problem and/or you can engage in experimentation (i.e., collect your own data).
- You care deeply about the problem.
- The problem is local enough that you can observe the problem environment yourself.
- The problem is rich enough that a solution is not trivial.
- You can implement a solution.

Examples (**random issues currently on the instructor’s mind...**)  
- Develop the best bike route for commuting from the western suburbs to/from Penn and stimulate its adoption within the Penn community.
- Devise an optimal advertising strategy on Overture and Google Adwords for direct selling of X.
- Create a for-profit service to efficiently deliver lunch to Wharton faculty. (I’m serious.)
1. Introduction

“OK, Houston, we have a problem.”
- Apollo 13 commander Jim Lovell

Tuesday, October 21

REQUIRED


MORE

1. Franklin, Benjamin, Autobiography of Benjamin Franklin, [This text is available widely in many different editions. It is also available on the internet.

PREPARATION QUESTIONS

1. Working alone, prepare a list of 20 problems that interest you deeply. Make sure at least some of them satisfy the course project criteria.
2. Find a way to record additional problems as they occur to you over the next few days. (Index card, spreadsheet, PDA…)

Problem solving gone bad

From “The Olive Garden® Targets Tap Water & WINS,” an article posted on Coca-Cola’s website until it was removed last year.

THE SITUATION

Water: It’s necessary to sustain life, but to many Casual Dining restaurant chains it contributes to a dull dining experience for the customer. Many customers choose tap water not because they enjoy it but because it is what they always have drunk in the past. In response, some restaurant chains are implementing programs to help train crews to sell alternative choices to tap water, like soft drinks and non-carbonated beverages, with the goal of increasing overall guest satisfaction. Because of its own successful campaign against water, The Olive Garden® has recently sent a powerful message to the entire restaurant industry—less water and more beverage choices mean happier customers.

THE PLAN

Olive Garden restaurants, like many other Casual Dining locations, were facing a high water-incidence rate. They wanted their restaurant crews to emphasize the broad array of alternative beverage selections available, with the hope of reducing tap-water incidence.

The Olive Garden asked Coca-Cola to help them create their beverage plan. We stepped up to the plate and suggested a tap-water reduction program named H₂NO.

H₂NO is a crew education kit containing information about beverage suggestive selling techniques. Olive Garden restaurants embraced the program and even took it to a higher level, developing an employee-incentive content linked to H₂NO called “Just Say No to H₂O.” Olive Garden sales managers set beverage-sale goals and server goals in connection with the contest. All restaurants that reached the combined goal had a chance to win an all-expenses-paid trip for servers and the management team to Atlanta, Georgia.

THE WIN

Almost all participating restaurants realized significant increases in beverage sales and reduced tap-water incidence—a strong indication that Olive Garden succeeded in enhancing the customers’ dining experience.
Fall 2003

2. Problem Definition + Course Projects
Thursday, October 23

REQUIRED •
1. VanGundy, Arthur B., Jr., “Redefining and Analyzing Problems,” Chapter 3 in Techniques of Structured Problem Solving, Second Edition, Van Nostrand Reinhold, New York, 1988. [NOTE: this chapter is fairly dry, yet there are some nice ideas in it. Read it relatively quickly, and then go back to the sections that interest you most as you complete the preparation questions.]

MORE
1. Hackman, J. Richard, “Why Teams Don’t Work,” Theory and Research on Small Groups, R. Scott Tindale et al. (editors), Plenum Press, New York, p. 245-267, 1998. [This is a very interesting and useful article on pitfalls to avoid in setting up teams. Because team formation is often a critical component of problem solving and problem definition, I include the reading here.]

HAND IN
1. Your list of 20 problems.
2. The results of your problem definition effort for at least two of the problems. Please show some of the intermediate steps you used in creating your mission statements.
   (2 pages max)

“Problem well posed is a problem half solved.”
- paraphrasing of John Dewey

PREPARATION QUESTIONS •
1. Pick at least two of the “sensed gaps” associated with your “20 problems” from Session 1 and redefine these problems using the techniques in the VanGundy chapter. Try at least two different techniques.
2. Based on the results of this problem definition effort, craft a “mission statement” for the two (or more) problems. Your mission statement should include, at least, a statement of the problem, an identification of the stakeholders, and a timeline of critical events/due dates.

Benjamin Franklin – Founder of Penn and the “American Original” problem solver

Problem Solving, Design, and System Improvement
Fall 2003
TODAY I WILL FREEZE THE SEATING CHART FOR OPIM 651.
SIT IN THE SEAT YOU INTEND TO OCCUPY FOR THE REST OF THE SESSIONS.

REQUIRED

MORE
1. WIRED essays on Powerpoint by David Byrne and Edward Tufte.

PREPARATION QUESTIONS
1. A small manufacturer of electric-powered motoribikes would like to improve its sales and marketing efforts. Because of very limited capital, the company would like to focus its efforts geographically on just five cities. One idea is to use the registration data from the company’s website to determine where to focus, on the theory that there might be a strong correlation between interest expressed via the website and eventual purchase of the company’s products. You will find the raw registration data on webcafe as an MS-Excel file “registrations.xls.” Analyze this data and prepare one or more graphic presentations of your analysis in support of the decision of where to focus geographically. You may also find useful the data file on metropolitan area population.
2. Carefully critique your own graphic as if you were Tufte. Refine your graphic based on this critique. Is the refined version better?

HAND IN
1. Your graphic(s) (2 pages max).
4. Selection Problems & Multiattribute Utility Analysis
Thursday, October 30

REQUIRED

MORE

PREPARATION QUESTIONS
1. Prepare a Concept Selection matrix with your project team and select a project.
2. Perform a concept selection matrix for selecting among a set of alternatives in one of the following problems:
   - What vehicle to buy when you graduate from Wharton.
   - Which city to live in, if unconstrained by employment options.
   - Any other major problem of personal interest that can be thought of as a selection problem.

HAND IN
1. The analysis you did for Question 2 (1 page max). Please treat this assignment, along with all others, as at least partially a data graphics/communication problem.

Typical “selection matrix,” in this case applied to a product concept selection problem.

<table>
<thead>
<tr>
<th>Selection Criteria</th>
<th>Weight</th>
<th>Rating</th>
<th>Weighted Score</th>
<th>Rating</th>
<th>Weighted Score</th>
<th>Rating</th>
<th>Weighted Score</th>
<th>Rating</th>
<th>Weighted Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of handling</td>
<td>5%</td>
<td>3</td>
<td>0.15</td>
<td>3</td>
<td>0.15</td>
<td>4</td>
<td>0.2</td>
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<td>0.2</td>
</tr>
<tr>
<td>Ease of use</td>
<td>15%</td>
<td>3</td>
<td>0.45</td>
<td>4</td>
<td>0.6</td>
<td>3</td>
<td>0.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readability of settings</td>
<td>10%</td>
<td>2</td>
<td>0.2</td>
<td>3</td>
<td>0.3</td>
<td>5</td>
<td>0.5</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>Dosage metering accuracy</td>
<td>25%</td>
<td>3</td>
<td>0.75</td>
<td>3</td>
<td>0.75</td>
<td>2</td>
<td>0.5</td>
<td>3</td>
<td>0.75</td>
</tr>
<tr>
<td>Durability</td>
<td>15%</td>
<td>2</td>
<td>0.3</td>
<td>5</td>
<td>0.75</td>
<td>4</td>
<td>0.6</td>
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<tr>
<td>Ease of manufacture</td>
<td>20%</td>
<td>3</td>
<td>0.6</td>
<td>3</td>
<td>0.6</td>
<td>2</td>
<td>0.4</td>
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</tr>
<tr>
<td>Portability</td>
<td>10%</td>
<td>3</td>
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<td>0.3</td>
<td>3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Total Score
- Rank: 2.75
- DF: 3.45
- E: 3.10
- G+: 3.05

Continue? No
Develop No
No

Project Assignment 1
- Give your project a name. (Incidentally, what type of problem is naming?)
- Create a project folder on webcafe whose name is your project name and with your team members as its owners.
- Post the list of projects you considered.
- Post the concept selection matrix you used to guide your project selection.
- Post a “mission statement”-- the results of a problem definition effort.
5. Systems Thinking
Tuesday, November 4

REQUIRED

PREPARATION QUESTIONS
1. Draw a causal loop diagram capturing the top-level variables that govern performance for McKinsey & Company. What are the goals of the organization (the dependent variables)? What are the managerial decision variables? What are some intermediate factors? How are these variables related to each other?
2. What are the key trade-offs that McKinsey must balance to make this system work well?
3. What do you think of Gupta’s initial plans for McKinsey in the area of knowledge development and cross-unit learning? As a senior partner, what specific advice would you give him?

HAND IN
1. Your diagram for preparation Question 1. (1 page max.)
6. Systems Improvement – Six Sigma and Statistical Process Control
Thursday, November 6

REQUIRED


2. “Statistical Process Control,” part of Chapter 6 from James R. Evans and William M. Lindsay, The Management and Control of Quality, South-Western, 2000. [NOTE: I am working with my colleague Christian Terwiesch to create an SPC note. In the event we finish it by the end of October, I will substitute it for this reading.]

PREPARATION QUESTIONS

1. Analyze the data in the file spc-data.xls on webcafe. Prepare an X-bar chart with control limits estimated from the first 100 or so samples.

2. Design a nice one-page graphic illustrating what you learn. This graphic could incorporate a control chart or use any other device that illustrates your findings. Consider the Tufte guidelines from the session on Data Visualization and Communication in your work.

HAND IN

1. Your graphic (and your X-bar chart if your graphic does not include it) (2 pages max).

Project Assignment 2

- Apply data analysis and/or experimentation to your problem.
- This might involve primary data collection, a survey, data analysis, etc.
- Hand in a nicely prepared data graphic illustrating your findings. (2 pages max)
7. Systems Improvement – Parametric Tuning
Tuesday, November 11

PLEASE REMEMBER TO RETURN YOUR CATAPULT KIT TODAY.

REQUIRED
1. Terwiesch, Christian and Karl Ulrich, Xpult Instructions, University of Pennsylvania, Department of Operations and Information Management, October 2002. (you probably saw a version of this document in OPIM 631. This is just to refresh your memory about how to set up the catapult.
2. “What is Six Sigma?,” Motorola, Inc., 1987. [This document explains the idea of “six sigma.” It is also a historical document that reflects Motorola’s initiative. To my knowledge, Motorola was the originator of this concept in the mid 1980s.]

MORE

PREPARATION QUESTIONS
1. Using the catapult kit handed out in class, explore the effects of the catapult parameters on firing characteristics.
2. Develop a qualitative causal model of how the parameters influence firing distance (e.g., a causal loop diagram, except it may not have any loops…).
4. Find a way to reliably fire the ball 96 inches, using robust design methods, or any other methods you might devise. You may modify the catapult set up, as long as you don’t permanently modify the catapult itself (i.e., don’t cut parts, drill holes, etc.)

HAND IN
1. Diagram/graphic of your causal model.
2. Your proposed catapult settings for a firing distance of 96 inches.
3. Hypothesized sources of variability.
4. Your system/process for firing exactly 96 inches.
(total of one page for all four)

“To the optimist, the glass is half full. To the pessimist, the glass is half empty. To the system designer, the glass is twice as big as it needs to be.”

-unknown
8. Design Problems – Generating Alternatives  
Thursday, November 13

REQUIRED  
1. “A Critical Review of Popular Creativity-enhancement Methods,” Chapter 3 in Creativity in Product Innovation, by Jacob Goldenberg and David Mazursky, Cambridge University Press, Cambridge, 2002. [This chapter is very short and essentially critiques the most popular techniques for creative thinking. The reading refers to “templates” – a concept we will discuss in class.]

MORE (not on webcafe)  
1. Hanks, Kurt and Larry Belliston, Rapid Viz, Crisp Publications, Menlo Park, CA, 1992. [This book is an excellent guide to basic sketching and drawing, as is most commonly used in design problem solving. A motivated student can learn to draw very well by applying the methods in Rapid Viz.]
4. Diane Ritter and Michael Brassard, The Creativity Tools Memory Jogger, Goal/QPC Publishing, Salem, NH 1998. [This is a nice little booklet presenting the basics of the most common techniques with very little dogma or hoopla.]

PREPARATION QUESTIONS  
1. A possible solution to the “spam” problem is to charge “postage” to senders of email. One concept is that an intermediary could forward all email after collecting “postage.” A name is needed for this service. The name will serve as the email address for subscribers, e.g. ulrich@service-name.com would be my email address. Design a name for this service. It must be fully dot-com available. (That is, a name “foo” must be available as “foo.com”... “foo.net” would also be nice to have). As a practical matter, the name must be less than 12 letters, and probably less than 8.
2. In solving this problem, please generate at least 100 alternatives. As you work, introspect on what cognitive techniques you are using to generate these alternatives.
3. (optional) Generate some other concepts for eliminating spam.

HAND IN  
1. 100 names with the top 20 and top 3 identified.
2. A succinct description of the cognitive techniques you believe you used to generate the names. (These need not correspond to any formal methods you know about or have read about...just describe what techniques you find yourself using.)
3. (optional) Your concepts for eliminating spam.

Project Assignment 3  
• Generate a dozen or more solution concepts.
• Refine and articulate at least five of the solution concepts.
• Prepare a description of each concept on a separate powerpoint slide.
• Hand in the five slides to WebCafe.
9. Planning Problems – Low Uncertainty
Tuesday, November 18

REQUIRED
1. DRAGONFLY: Developing a proposal for an Uninhabited Aerial Vehicle (UAV), INSEAD Case.
2. “Activity Network Diagram,” Chapter 7 from The Memory Jogger Plus+ by Michael Brassard, Goal/QPC Press, Methuen, MA 1989. [This is a straightforward tutorial on PERT/CPM. If you already know this technique, you only need to skim this.]

MORE

PREPARATION QUESTIONS
1. Represent the DRAGONFLY project using a PERT chart. If you would like, you may use MS-Project for this task. If you do not already have the software, you may use it in the Wharton computer lab. (Warning: if you don’t know MS-Project, learning the software will take some time. You are not required to do this.)
2. Assuming that the interdependence between tasks A4 and A9 does not exist, what is the expected completion time of the project?
3. How might you estimate the effect of the interdependence between A4 and A9 on the completion time?
4. Should any activities be shortened to ensure timely completion? Which ones?
5. How does uncertainty in the task completion times affect your responses to (2) and (4)?
6. What types of projects are best suited for a PERT analysis?
7. For what types of projects is PERT less well suited?
8. (Optional) Can you figure out how to use simulation to generate a distribution of completion times for Question 2? How about if you include the dependency between A4 and A9?

“Adding manpower to a late software project makes it later.”
- Brooks’s Law

HAND IN
1. Responses to the preparation questions (2 pages max).

“The bearing of a child takes nine months, no matter how many women are assigned.”
- Frederick Brooks
10. Planning Problems – High Uncertainty  
Thursday, November 20

REQUIRED • •

MORE

PREPARATION QUESTIONS • •
1. Critique Space Data’s progress in developing its venture.
2. Evaluate Space Data’s flight testing program (e.g., Exhibit 13). In your analysis, consider:
   - What is the overall logic of the approach they are taking?
   - How have they responded to the information generated in each test?
   - Are they ready to fly now? If not, what tests should be run next?
3. What scenarios can you envision for the future world in which Space Data must compete?
4. Which application (paging, voice, or telemetry) should Space Data focus on? Why?

“What a puny plan.”
- The Humungus in *The Road Warrior*

Dawn at 100,000 feet.  
Photo taken from balloon in Space Data Corporation SkySite™ Network.

HAND IN
1. Responses to preparation questions 3 and 4 (2 pages max).

Project Assignment 4
- Prepare an implementation plan for your project.
- Identify the implementation steps you will complete before Session 13.
- Hand in one or more graphics depicting your plan.
(2 pages max)
11. Wicked Problems  
Tuesday, November 25

REQUIRED 
2. Executive Summary of “Once and For All” a report by a Philadelphia organization Research For Action. The full report is available at http://www.researchforaction.org/
3. Weick, Karl E., “Small Wins: Redefining the Scale of Social Problems,” American Psychologist, Vol. 39, p. 40 - 49, January 1984. [NOTE: the first page of this article is full of jargon...you can figure out most of the meaning from context, but the article does become much more readable once Weick starts writing about specific examples.]

PREPARATION QUESTIONS
1. Why is system improvement hard in public schools?
2. What are the key elements of the theory that underlies Olchefske’s approach?
3. How would you assess Olchefske’s performance?
4. What factors have contributed to the improvements Olchefske has been able to achieve?
5. What lessons can you extract from the Seattle case for addressing wicked problems more generally?
6. Consider a social problem that interests you and that seems large and intractable (e.g., public school reform, global warming, middle-east peace). Generate a set of 10 possible initiatives that a small group could undertake in the spirit of “small wins.”
7. Give some more thought to the initiative you think is most promising and outline a handful of tasks that outline a project plan for this initiative.
8. (Extra credit.) Implement your plan.

“And another reason that I’m happy to live in this period is that we have been forced to a point where we are going to have to grapple with the problems that men have been trying to grapple with through history. Survival demands that we grapple with them. Men for years now have been talking about war and peace. But now, no longer can they just talk about it. It is no longer a choice between violence and nonviolence in this world; it’s nonviolence or nonexistence. That is where we are today.”

- Martin Luther King

("I've been to the mountain top")

HAND IN
1. Your problem, your 10 possible initiatives, and your action plan for 1 initiative (1 page max).

We will have a guest visiting class today with expertise in improving educational systems.

Dr. Nancy Streim, Associate Dean for Graduate and Professional Education  
Penn Graduate School of Education

Dr. Streim’s research interests focus on the reform of public education, especially urban schools, and on the role of professional development in improving teaching and learning. Current projects include management of Penn’s role in planning, opening, and operating the Penn-assisted PreK–8 demonstration public school, and development of the new Penn Center for Education Leadership. She also directs a GSE/school district partnership to revitalize a local elementary school.
12. Academic Theory Meets Industrial Practice:
   Dr. Beetzwaken’s Adventures in Business
   Tuesday, December 2

   This session describes Ulrich’s experience in founding and running Nova Cruz Products, with particular emphasis on problem solving at critical junctures for the company.

REQUIRED
(no readings for this session.)

PREPARATION QUESTIONS
:none

HAND IN
(nothing due today)
13. Project Presentations
Thursday, December 4

Hand in your presentation graphics (5 pages max) in Powerpoint format via WebCafe by NOON TODAY. Otherwise they will not be included in the “deck” to be handed out to your peers in class.

HAND IN
1. A two-page “cheat sheet” summarizing your own personal problem solving methodology. This is intended to be a document you can refer to in the future or share with others. Hopefully it reflects, at least in part, some of the ideas you have taken away from this course. (This assignment may be turned in by midnight Monday.)

Project Assignment 5
• Prepare a presentation communicating the results of your project.
• Your presentation must be less than 300 seconds long.
• This means that you probably want to use only a single presenter.
• (The nice thing about a 300 second presentation is that you can practice it 12 times in an hour. Please do.)
• Hand in your presentation graphics (5 pages max) in Powerpoint format via WebCafe by NOON TODAY. Otherwise they will not be included in the “deck” to be handed out to your peers in class.
• The TA will have your presentation ready to go in the classroom, so please make sure that the powerpoint file is exactly as you want it for your presentation.

Edward Tufte, The Cognitive Style of PowerPoint