CS 307: Software Engineering

Lecture 12: Risk Management and Peopleware

Prof. Jeff Turkstra
Announcements

- Homework regrading in progress
Lecture 12

- Classic mistakes
- Lowering risk
- Human behavior
- Human interactions
- Human behavior – versatility
- Myers-Briggs type indicator
Precision vs Accuracy

- **Precision** deals with the exactness by which we describe a variable
- **Accuracy** deals with freedom from error

The temperature is precisely 74.456789 degrees with an accuracy of ±3°F. “... the last digit is correct about 10% of the time.”
Estimation biases

- People tend to believe their own estimates are more accurate than they really are.
  - Bias can be too high or too low
- Lack of understanding of probability and statistics can lead to really bad estimates
  - Picking wrong probability distribution
Some people have a tendency to not revise estimates. Watch out for the...

- “I’ve made up my mind, don’t confuse me with the facts” syndrome

Tend to be insensitive to sample sizes

- We have tested it successfully three times with three different users, must be ready to ship!
Bias of association: if risk is low then the damage must also be low!

- False coupling is an easy mistake to make
- Tend to make predictions based on our intuitive impression of the distribution
- Do you wear a seat belt when you drive?
Must not forget that even if the probability of component failures is small, the probability of system failure can be high given a large number of components.

\[ P(n, f) = 1 - (1 - f)^n \]
<table>
<thead>
<tr>
<th>Components</th>
<th>Probability of Failure</th>
<th>Probability of System Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>f</td>
<td>P(n, f)</td>
</tr>
<tr>
<td>10</td>
<td>0.100</td>
<td>0.65</td>
</tr>
<tr>
<td>100</td>
<td>0.010</td>
<td>0.63</td>
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<tr>
<td>1000</td>
<td>0.001</td>
<td>0.63</td>
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Classic mistakes

- Material from Chapter 3 of Rapid Development by Steve McConnell
  http://www.stevemcconnell.com/rdenum.htm

1. People-related
2. Process-related
3. Product-related
4. Technology-related
People-related

1. Undermined motivation
2. Weak personnel
3. Uncontrolled problem employees
4. Heroics
5. Adding people to a late project
   Brooks Law
6. Noisy, crowded offices
7. Friction between developers and customers
People-related

8. Unrealistic expectations
9. Lack of effective project sponsorship
10. Lack of stakeholder buy-in
11. Lack of user input
12. Politics placed over substance
13. Wishful thinking
Process-related

14. Overly optimistic schedules
15. Insufficient risk management
16. Contractor failure
17. Insufficient planning
18. Abandonment of planning under pressure
19. Wasted time during the fuzzy front end
20. Shortchanged upstream activities
Process-related

21. Inadequate design
22. Shortchanged quality assurance
23. Insufficient management controls
24. Premature or overly frequent convergence
25. Omitting necessary tasks from estimates
26. Planning to catch up later
27. Code-like-hell programming
Product-related

28. Requirements gold-plating
29. Feature creep
30. Developer gold-plating
31. Push-me, pull-me negotiation
32. Research-oriented development
Technology-related

33. Silver-bullet syndrome
34. Overestimated savings from new tools or methods
35. Switching tools in the middle of a project
36. Lack of automated source-code control
Lowering the risks

- Let us examine Barry Boehm’s list of top ten risks and some possible ways for reducing these risks
Risk 1: Personnel shortfalls

- Staff with the best people you can afford
- Provide training
- Improve your work environment
- Spend time developing teams
- Plan ahead
  - Pre-schedule key personnel
  - Anticipate job turnover
Risk 2: Unrealistic schedules and budgets

- Improve your current estimation process
  - Be sure you know and can estimate all of your costs
  - Be sure that the people who approve the schedule, budget, and resources are the same people that have to do the work
- Use an incremental development model (e.g., scrum), so that the needs of early and late users can be met
  - Allows schedule and budget to reflect current needs
- Buy components
  - Fight NIH (Not Invented Here) syndrome
- Develop a software reuse program
- Run a requirements scrubbing review with all pertinent parties in attendance
Risk 3: Developing the wrong software functions

- Reevaluate your market forecasting
- Utilize user surveys
- Build and evaluate prototypes
- Develop and circulate early versions of your user manuals
- Get your users involved in the testing and reviewing process
Risk 4: Developing the wrong user interface

- About 40% of many current development efforts deal with the user interface
  - Build prototypes and actively involve real users in the evaluation process
  - Video tape and study how users really use your systems
  - Look for ways to reduce the user workload
Risk 5: Gold plating

- Design to cost. Customer pays with time and money
- Run a requirements scrubbing review with all pertinent parties in attendance
- Build and evaluate prototypes before adding unnecessary functionality
- Do cost-benefit analysis
- Prioritize the requirements and then follow an incremental development plan
- Set up a frequent build policy
- Inspect the product frequently
Risk 6: Continuing stream of requirements changes

- **Set a change threshold**
  - Set up a change control board to arbitrate requests
  - Make sure all needed changes can get through
  - Make it painful for the rest
    - Requester provides money, accepts schedule delays, or provides extra resources (people, equipment, etc)
Risk 7: Shortfalls in externally furnished components

- Benchmark components
- Do compatibility analysis
- Set up an inspection program
- Second source as much as possible
- Check the credentials of your suppliers
- Maintain a contingency plan
Risk 8: Shortfalls in externally performed tasks

- Check the credentials of your suppliers
- Fund competitive designs or prototypes
- Run pre-award audits
  - Are they at least at a process level equivalent to level 3 of the SEI software process model
- Develop a win-win strategy and relationship
Risk 9: Real time performance shortfalls

- Use simulators to check out the requirements and the design
- Develop system models
- Build and evaluate prototypes
- Extensively benchmark the system
- Instrument the system so that it can be tuned
Risk 10: Straining computer science capabilities

- Run technical analysis studies of the project and the project team
- Build prototypes to better understand the problems
- Check the credentials of your technical consultants
- Start and support a technical training program for your project personnel
- Support your technical supplier (Universities)
Maslow’s hierarchy of needs

1. Physiological
   - Food, shelter, clothing, etc

2. Safety and security
   - Protection from danger
   - Protection from loss of a job
   - Medical protection

3. Social
   - Being able to identify with individuals
   - Belonging to groups
4. Egotistical

- Desire for name and job recognition
- Desire for status and a sense of importance

5. Self-fulfillment

- Desire to reach one’s fullest potential in creativity and self development
Golden Rule

Do unto others as you would have them do unto you

Do not do to others what you would have them avoid doing to you

Are you sure people want to be treated that way?
Platinum Rule

Do unto others as they would have you do unto them

Treat people as they wish to be treated – within reason
Human behavior

1. People are not totally unpredictable

2. People act and react in observable ways which help to define their particular behavioral style

3. We are all creatures of habit

4. People behave and respond, in social situations, in ways that meet their needs
People are always behaving!
Social style

- How assertive are you?
- How responsive are you?
- How versatile are you?
Assertiveness

- The amount and type of control a person tries to exert over another person
- The amount and type of control a person tries to exert over a situation
Assertiveness

1. It is your active, direct, and honest behavior
2. It is the way you express yourself through words and actions
3. It conveys your own sense of self-respect and the respect you feel for others
Measurement of Assertiveness

Low

Ask

Tell

High
Responsiveness

- The manner with which a person expresses emotion
- The willingness with which a person develops relationships
Responsiveness

1. How one reacts to situations, appeals, pressures, and influences
2. It is a measure of how well one handles different situations
3. It is a measure of how well one controls their emotions and/or the impressions they make on others
Measurement of **Responsiveness**

Low Controls High Emotes
Behavior styles

High responsiveness - Emotes

Amiable
Low Assertiveness
- Asks

Expressive
High Assertiveness
- Tells

Analytic

Driver

Low responsiveness - Controls
Social styles

- **Analytic:** critical, industrious, indecisive, persistent, stuffy, serious, exacting, vigilant, righteous, systematic

- **Driver:** pushy, determined, firm, uncompromising, productive, harsh, efficient, decisive, thorough, requiring
- Amiable: complying, supportive, reliable, retiring, pleasant, softhearted, respectful, willing, dependent, dependable

- Expressive: manipulative, personable, excitable, dramatic, impatient, optimistic, undisciplined, promotional, stimulating, reacting
Behavior - analytics

- Cautious actions and decisions
- Like organization and structure
- Dislike involvement with others
- Interested in facts and details
- Has good problem solving skills
- Historical time frame
Behavior - drivers

- Swift/firm actions and decisions
- Like control, dislike inaction
- Independent, competitive
- Low tolerance for feeling, attitudes, and advice of others
- Good administrative skills
- Immediate time frame
Behavior - amiables

- Unhurried actions and decisions
- Like to relate, dislike conflict
- Work slowly and cohesively with others
- Good listener and support gatherer
- Good counseling skills
- Current time frame
Behavior - expressives

- Spontaneous actions and decisions
- Like involvement, dislike being alone
- Dreamer and seller of ideas
- Dislike routine
- Good persuasive skills
- Future time frame
Mild conflict

<table>
<thead>
<tr>
<th>Analytics</th>
<th>Drivers</th>
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<tr>
<td>Slow Task</td>
<td>Fast Task</td>
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<th>Amiables</th>
<th>Expressives</th>
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<td>Slow People</td>
<td>Fast People</td>
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</table>
Serious conflict

Analytics
Slow Task

Drivers
Fast Task

Amiables
Slow People

Expressives
Fast People
Versatility

- Your ability to adapt or modify your own social style or behavior patterns when interacting with other people.
Stress

- The analytic withdraws
- The driver dictates
- The amiable submits
- The expressive attacks
Working with analytics

- Try to support their organized and thoughtful approaches to solutions. Support them with actions rather than with words or personal opinions.

- Be organized and well prepared when working with them. Be prepared to discuss the advantages, and the disadvantages of any alternate problem resolutions.
Analytics like things in writing
Analytics like guarantees that their actions will not fail
Give them time to verify your ideas and suggestions. Don’t rush or force the decision making process
Working with drivers

- Try to support their goals and objectives. Give them recognition for their ideas.
- Avoid establishing personal relationships with them.
- Avoid telling them what to do. Ask questions which will help them make their decisions.
When you have a disagreement, argue with the facts and not your personal feelings

When trying to influence decisions, use risk analysis and facts to support alternative solutions

Be well organized, efficient, and precise when working with a driver
Working with amiables

- Try to support their feelings and dreams
- Make them feel that you are interested in them as a person
  - Be an active listener
  - Take time to listen to their stories
- Try and get them to express their true feelings, needs, and ideas rather than what they think you want to hear
Do not debate them with facts and/or logic. Discuss instead personal opinions and feelings.

Be informal and don’t rush the decision making process.

Try and provide them guarantees that their actions will not place them at risk.
Working with expressives

- Get them to talk about opinions, ideas, and dreams. Try to support them
- Don’t hurry any discussion
- Try not to argue with them
- Put all agreements in writing
- Get the details on who, what, when, where, and how on all agreements
Use testimonials from people important to them in order to help obtain favorable decisions
Dealing with People You Can’t Stand – Brinkman and Kirschner
Brinkman and Kirschner Intent

Task Focus

Get it Right
Get It Done

Get Along
Get Appreciated

Analytic
Perfectionist
Passive
Approval Seeking
Amiable

People Focus

Expressive
Attention Getting

Driver
Controlling

Normal
Not Met
Driver – Intent

“Get it done” not met

- **Tank** – rips people apart, runs over people
- **Sniper** – uses embarrassment and humiliation
- **Know it All** – uses domination, finding faults, disallows opposing views
Analytics - Intent

“Get it right” not met

- **Whiner** – constant complaints, sense of helplessness, nothing is going right
- **No person** – it won’t work, sense of hopelessness
- **Nothing person** – fine! Do it your way. I have nothing to say on the matter
Amiables – Intent

“Get along” not met

- **Yes person** – whatever you say is fine with me
- **Maybe person** – afraid to make a wrong decision. Therefore puts off making any decisions
- **Nothing person** – shy, timid, uncomfortable, and uncertain. Best to say nothing at all
Expressives - Intent

“Get appreciated” not met

- Grenade – the adult temper tantrum
- Friendly sniper – sniping is a fun way to gain attention
- Think they know it all – use exaggeration, half truths, useless advice to help again attention
Tips

- Some helpful suggestions from DeMarco and Lister’s book Peopleware: Productive Projects and Teams
There are a million ways to lose a work day, but not even a single way to get one back.
Team formation environment

1. Make a cult of quality
2. Provide lots of satisfying closure
3. Build a sense of eliteness
4. Allow and encourage heterogeneity
5. Preserve and protect successful teams
6. Provide strategic but not tactical direction
Teamicide environment

1. Defensive management
2. Bureaucracy
3. Physical separation
4. Fragmentation of people’s time
5. Quality reduction of the product
6. Phony deadlines
7. Clique control
8. Those damn posters and plaques
9. Overtime
Dinosaur Brains

“The Dinosaur Brain is our source of instructions for handling instincts and emotions as old as the dinosaurs: aggression and anger, mating and sexual attraction, territoriality and fear, social hierarchy and loyalty.”

– Bernstein and Rozen
When the Dinosaur Brain gets in the way of rational, organized, businesslike thinking, the result can be trying to reason with a lizard.

– Bernstein and Rozen
Lizard Logic Rules

1. Get It Now! Impulsiveness
   - Reptiles can’t wait
   - Immediate time frame
   - Short term thinking
   - Highly emotional
2. Fight, Run, or Freeze
They respond to threats or aggression by
- Fighting back
- Running away
- Becoming unable to think or function
3. Be Dominant! Hierarchies, Dominance, and Power Struggles

- They love social hierarchies
- They want to be top dinosaur
- They tend to be aggressive with unbridled competitiveness
4. Defend the Territory! Power and Empire-building

- Dinosaurs seek, acquire, guard, and defend their turf
- It can be a cultural issue
5. Get the Mate! Office Romances

- When lizards see an attractive member of the opposite sex, they immediately behave in courtship patterns instead of paying attention to business.
6. If It Hurts, Hiss! Complaining and Placing Blame

- Dinosaurs believe that they are never the source of their troubles. Therefore, when something goes wrong they:
  - Complain
  - Blame
7. Like me Good; Not Like Me, Bad

- Dinosaurs always divide the world into good and evil
Management ideas from the book

The Art of Managing People
Hunsaker and Alessandra
1. Learn the art of questioning
2. Learn how to become an active listener
3. Learn how to project the appropriate image
4. Learn how to communicate effectively through voice tones
5. Learn how to read and use body language effectively
6. Be aware that spatial arrangements are important
7. Learn how to use your time effectively
8. Learn how to use feedback effectively
Out at Five

“The average person is only mentally productive a few hours a day no matter how many hours are worked. To get the best work out of your employees, make sure they leave work by five o’clock”

– Scott Adams
Some wisdom from Tom DeMarco’s *The Deadline*

- **Four essentials of good management**
  1. Get the right people
  2. Match them to the right jobs
  3. Keep them motivated
  4. Help their teams to jell and stay jelled

*(the rest is administrivia)*
Safety and change

- People can’t embrace change unless they feel safe
- Change is essential to all success in project work
- A lack of safety makes people risk averse
- Avoiding risk is fatal, since it causes you to miss out on the associated benefit as well
Manager’s essential body parts

- Management involves heart, gut, soul, and nose
  - Lead with the heart
  - Trust your gut (trust your hunches)
  - Build soul into the organization
  - Develop a nose for bullshit
Playing defense

1. Cut your losses
2. You can improve overall performance more by containing your failures than by optimizing your successes
3. Be aggressive about canceling failed efforts early
   - Sunk cost fallacy
4. Think of a jelled team – ready and willing to take on a new effort – as one of the project deliverables.

5. A day lost at the beginning of a project hurts just as much as a day lost at the end.
Process and process improvement

1. Good process and continually improving process are admirable goals

2. They are also very natural goals: good technical workers will focus on them whether you tell them to or not

3. A project can hope to gain enough from a single well-chosen method improvement to repay the time and money invested in the change
Effects of pressure

1. People under pressure don’t think any faster
2. Extended overtime is a productivity reduction tactic
3. Short bursts of pressure and even overtime may be a useful tactic as they focus people and increase the sense that the work is important
   - Extended pressure is always a mistake
Conflict

- Building and installing systems is particularly conflict prone
- Conflict deserves respect. Conflict is not a sign of unprofessional behavior
- Remember: everyone is on the same side; the problem is on the other side
Questions?