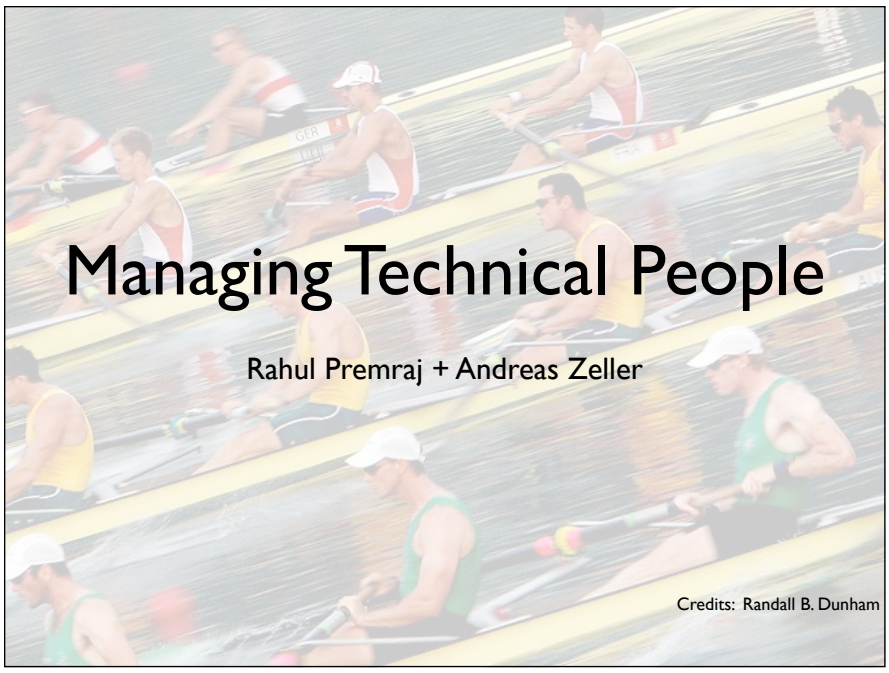


Managing Technical People

Rahul Premraj + Andreas Zeller

Credits: Randall B. Dunham

Bug of the Week

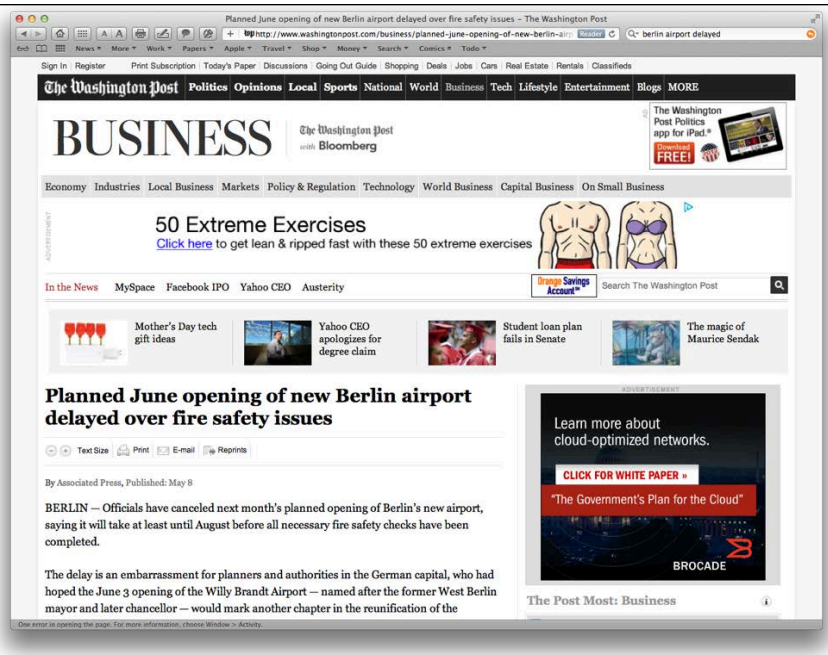
Eingereicht von Florian Gross

A Software Crisis

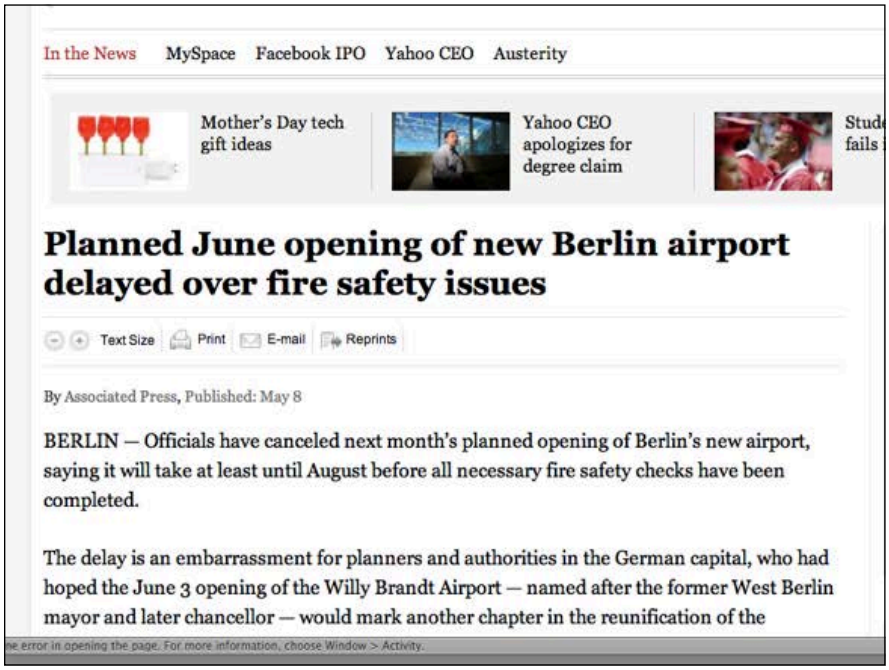
Denver International Airport (DIA)

Construction started in 1989 • 53 sq miles • Planned: 1.7 bio USD costs, opening 1993

Eingereicht von Florian Gross



Eingereicht von Florian Gross



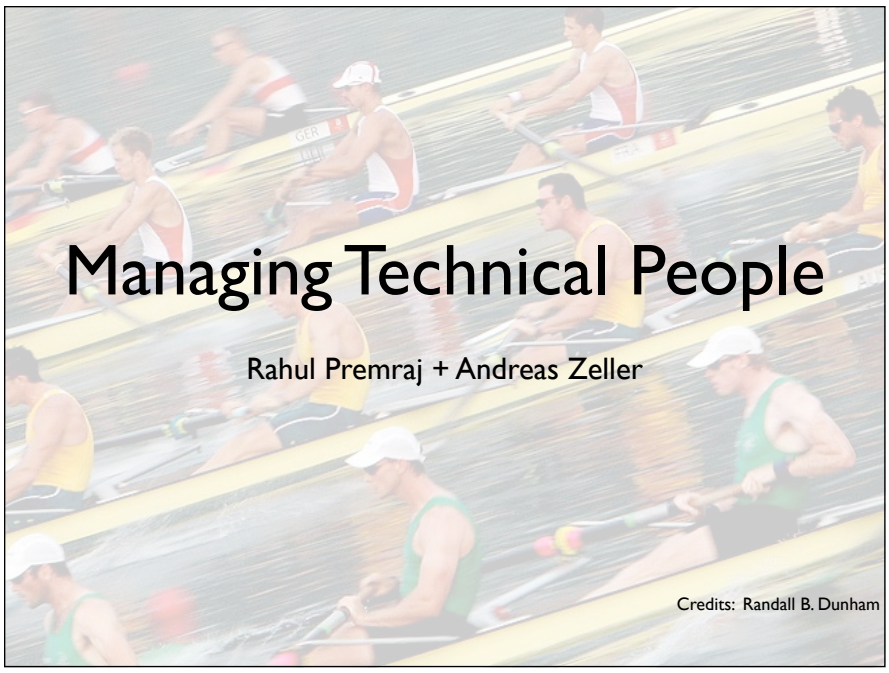
Register at HISPOS!

Dear lecturers of the summer term 2012,

all students are now asked to register in HISPOS for the exams for the summer term 2012.

Please inform the students about the obligatory examination registration.

In case of problems with the registration, the students can send an email to studium@cs.uni-saarland.de.



Managing Technical People

Rahul Premraj + Andreas Zeller

Credits: Randall B. Dunham

Four Ps of Project Management

People

Product

Process

Project

Project's Sociology

- Often, we see that projects that involve no technical innovation fail.
- Reason given – Politics!
- Politics or project's sociology includes aspects such as communication problems, staffing problems, rifts with the boss or client, lack of motivation or high turnover.

The major problems of our work are not so much technological as sociological in nature.

turnover - the ratio of the number of workers that had to be replaced in a given time period to the average number of workers

Technical People

- What are these computer scientists like?

short-sighted

grinning

talks through headset

lazy

addicted to soft drinks

fuzzy

What is a computer scientist? In the movie "Jurassic Park", Wayne Knight plays the hacker Dennis Nedry. He is fat. He is anti-social. He is the villain. In the end, he gets eaten by dinosaurs, and the audience applauds.

"So what do you do?"
"Computer science."

This, as Herr Lehmann decided, must be true. He could not imagine anything more boring, weirder, dumber, or less glamourous than being a computer scientist.

A computer scientist is perceived as an autistic nerd who spends his time in a symbiotic relationship with his dream machine.

But how do these folks manage to build such systems?

Indeed, what computer scientists do most of the day is talking – and working in teams.

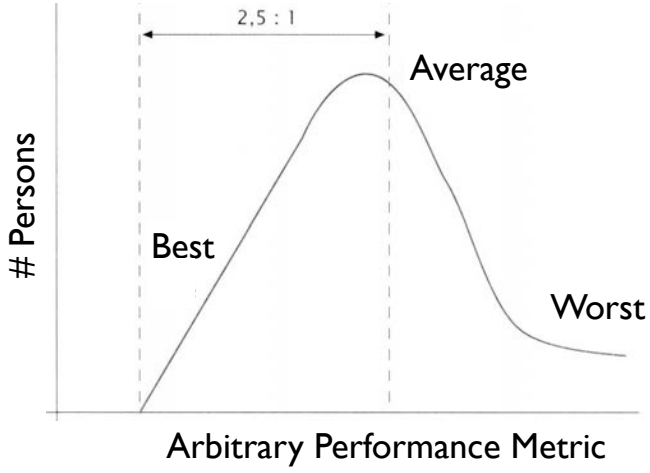
Here's a few real computer scientists.

Technical People

- Smart
- Seldom motivated by money or status
- Motivated by *unique achievements* – opportunity, responsibility, visibility
- Need appreciation + recognition

If technical people were motivated by money, we'd have to pay people who are ten times as productive ten times as much – but we don't. See the recipe?

Performance



Performance

The best workers

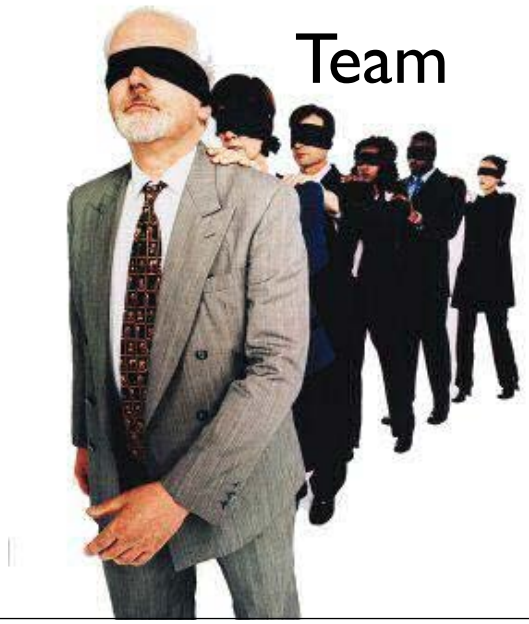
- are 10x better than the worst
- are 2.5x better than average

Holds for almost all performance metrics (time, errors…)

Not reflected in salary differences, though!

What is a computer scientist? In the movie “Jurassic Park”, Wayne Knight plays the hacker Dennis Nedry. He is fat. He is anti-social. He is the villain. In the end, he gets eaten by dinosaurs, and the audience applauds.

Team



Team

- A *team* consists of people of different roles, managers, testers, designers, programmers, etc.
- One person may carry out more than one role, depending on the size of the project
- Testing team is often independent of the development team
- Large teams are difficult to manage and often split up into smaller sub-teams. Each sub-team shall have clearly defined tasks and responsibilities.

Team

- How to group a number to engineers into teams?
- Team size should be chosen to minimize overhead and maximize productivity.
- Small, but not too small; and large, but not too large.
- Optimal size – 3 to 8 members per team.

Organizing Teams

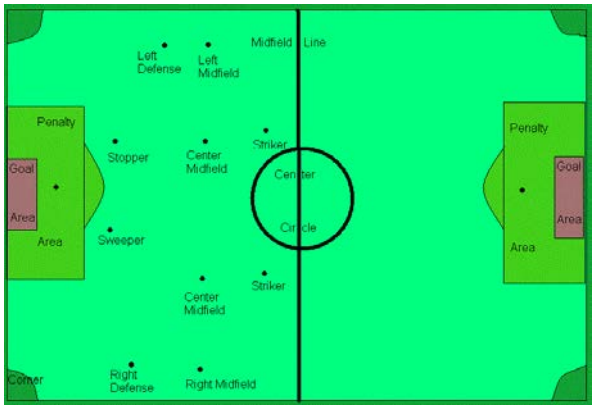
- Use fewer and better people.
  Large groups need more communication and reduce productivity
- Do not make people indispensable.
  Avoid a programmer becoming the only expert in a certain system
- Keep up the expertise.
  Avoid rising people in an organization to a level their expertise becomes obsolete within short time

Organizing Teams

- Keep up the balance.
  It is wise to select people such that a well-balanced and harmonious team results, i.e. not too many stars
- Remove outsiders.
  Someone who does not fit the team should be removed

Work Assignment

Carefully match people with their work assignment.

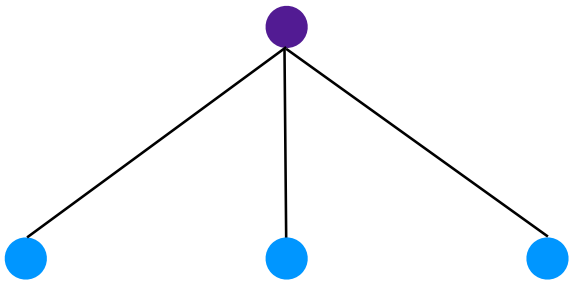


but you can also be an all-rounder :-)

Team Structures

There are several different ways
in which teams can be organized...

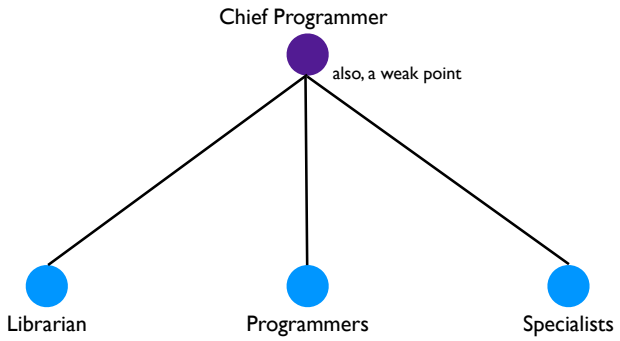
Centralized-Control Team Structure



Centralized-Control Team Structure

- Standard management technique.
- Several workers report to a supervisor.
- Supervisor directly controls their tasks and is responsible for their performance.
- Supervisors report to "second-level" managers and so up in the chain to the president of the enterprise.
- Works well for projects where one person can grasp the problem and solutions.

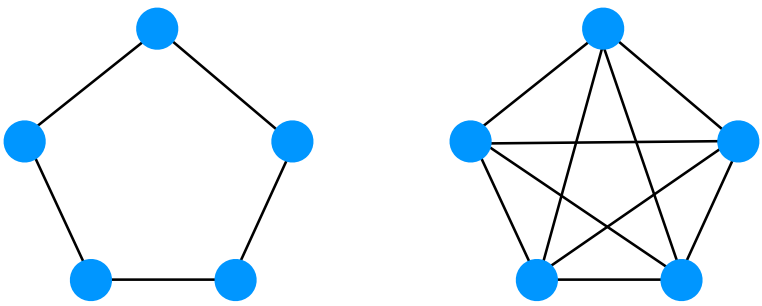
Centralized-Control Team Structure



Centralized-Control Team Structure

- Works well when the task is well understood.
- Is within the intellectual grasp of an individual (but this impairs creativity and group consensus).
- Finishing the project outweighs other factors.
- But, it is also the single point of failure.
- All communication needs to pass through one person.
- But, good way to exploit talent of rare highly proficient engineers.

Decentralized-Control Team Structure



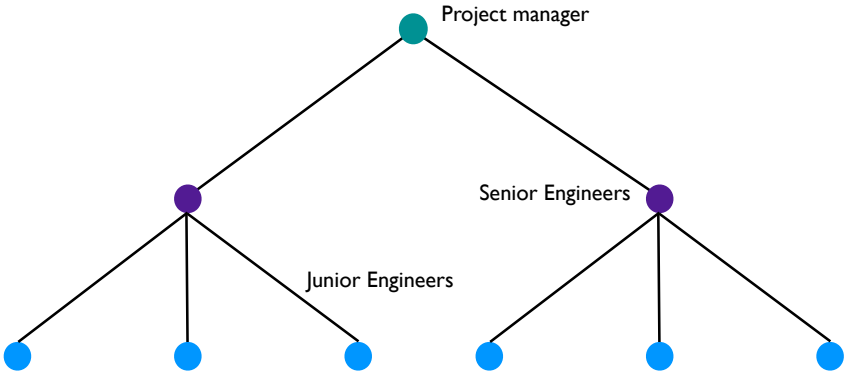
Decentralized-Control Team Structure

- Decisions are made by consensus, and all work is considered to be group work ("egoless programming").
- Members review each other's work.
- The "democratic process" leads to high morale, job satisfaction, ownership of the project and responsibility.
- Best for long-term projects that are not well understood and entail complex solutions.
- Good example: *Open-source software projects*.

Decentralized-Control Team Structure

- Decentralized Control is not appropriate for very large teams.
- Communication overhead can retard individual productivity.
- Runs the risk of finding a futile search of a perfect solution for everyone.

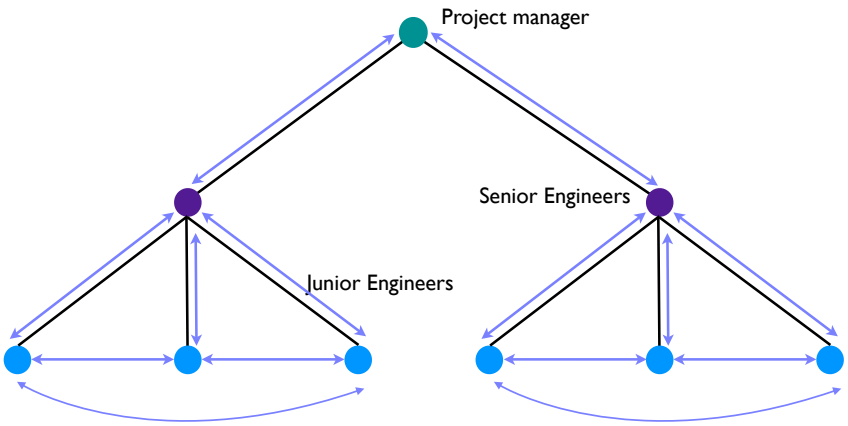
Mixed-Control Team Structure



Mixed-Control Team Structure

- Takes on the benefits of centralized-control structure and minimizes the disadvantages of decentralized-control structure.
- Differentiates engineers as *senior* and *junior*.
- Control is vested in the hands of senior engineers and project manager.
- Communication limited to small groups.

Mixed-Control Team Structure



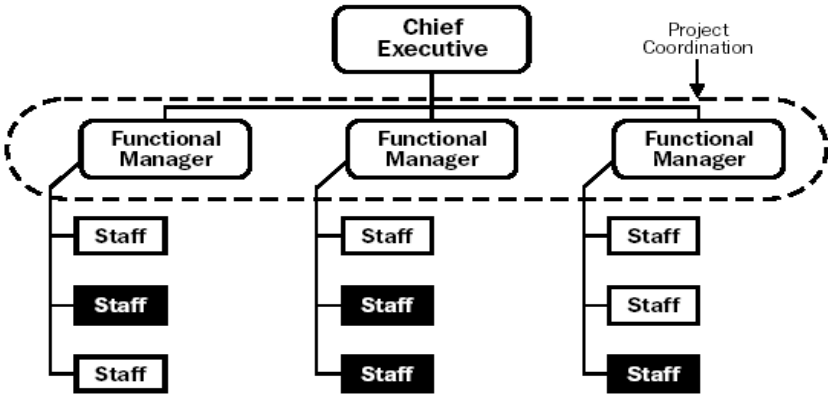
Which structure is better?

- Experimental assessment of different structures is difficult.
- Different cost models can be assessed on the same project - different org. structures cannot be assessed for the same project.

Which structure is better?

- No team organization appropriate for all tasks.
- Decentralized control is best when communication amongst engineers is important for achieving a good solution.
- Centralized control is best when speed of development is most important and the project is well-understood.
- Limit communication to appropriate levels – no more or no less.
- Many other goals such as development of junior engineers into senior engineers, lower life cycle costs, reduced personnel turnover and repeatability of goals.

Functional Organization



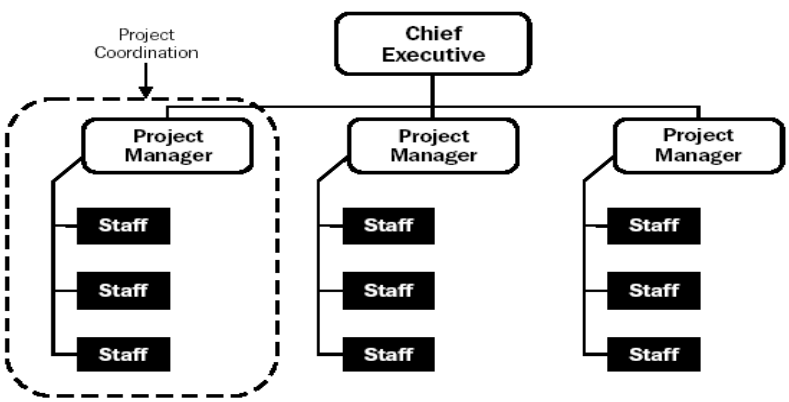
(Black boxes represent staff engaged in project activities.)

A Guide to the Project Management Body of Knowledge (PMBOK®), 2004, pp. 28--32

Functional Manager: A manager responsible for activities in a specific function (engineering, manufacturing, marketing)

Project Manager: A manager responsible for a specific project (product or service)

Projectized Organization



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Functional Manager: A manager responsible for activities in a specific function (engineering, manufacturing, marketing)

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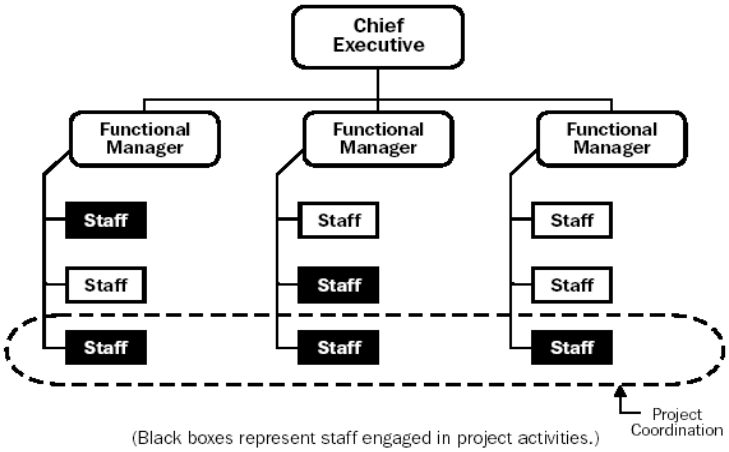
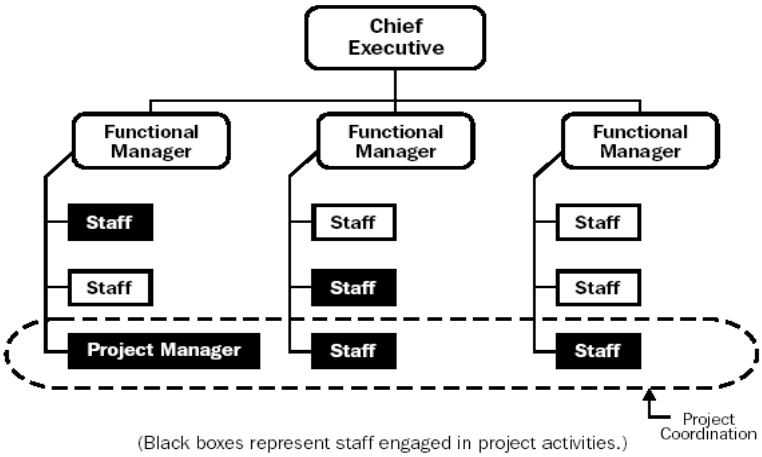
Weak Matrix Organization



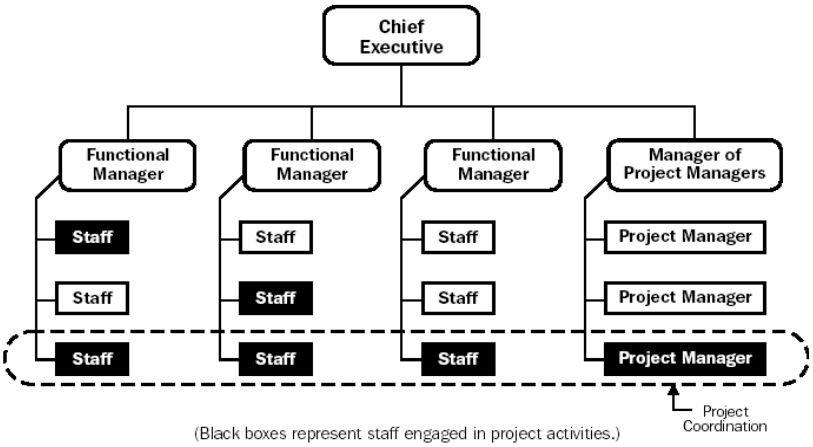
(Black boxes represent staff engaged in project activities.)

Balanced Matrix Organization



(Black boxes represent staff engaged in project activities.)

Strong Matrix Organization



(Black boxes represent staff engaged in project activities.)

Motivating Teams

If technical people were motivated by money, we'd have to pay people who are ten times as productive ten times as much – but we don't. See the recipe?

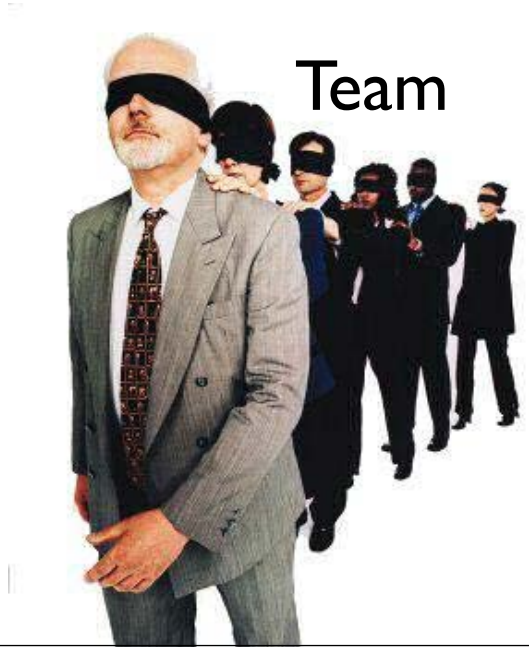
Motivating Teams

- Set up clear *success criteria*
  rather than vague mission statements
- Every team is an *elite team*
  and has something unique to that team
- Only the *best* is good enough
  Give the team *challenges* – but avoid *overengineering*
- Foster *diversity*
  Men and women; clients, programmers, and artists…
- Never change a winning team

Motivating Teams

- Rely on *trust* rather than *control*
  Produce strategies, but do not involve into tactics
- Avoid red tape (bureaucracy)
  Do what you believe in, avoid the rest
- Stick together
  Try to be co-located in one place (or meet at least once)
- One team per member
- Real deadlines
  rather than psychological tricks

Team



Meetings

Efficient Meetings

- Meet only when there's *no alternative*
  such as sending around e-mail, or doing things offline
- Have a *moderator*
  who cares for the room, invitations, agenda
- Start *on time*
  "So Amanda is not there yet? Let me search her…"
- Avoid *interruptions*
  such as being late or having your cell phone ring

Agendas

- Have an *agenda*
  such as sending around e-mail, or doing things offline
- Typical template:
  1. Last minutes
  2. State of things
  3. Goals
  4. How to reach that goal
  5. Next steps
  6. Miscellaneous

Goals

- Meetings should revolve around *goals*
  - You don't need meetings for passing information around
  - You cannot change the past.
- After discussing the current state, you should set up *goals* – specific, measurable, and set up for a specific date

"Our client expects a prototype by Jan 15"

Solving Problems

- Every problem (= every goal) can be resolved (= met) in four steps:
  1. What *is* the problem?
  2. What are the *causes* for the problem?
  3. What are the *possible solutions?*
  4. What is the *best* solution?
- Discussing these needs *discipline*
  stay with the goals • stay with the agenda

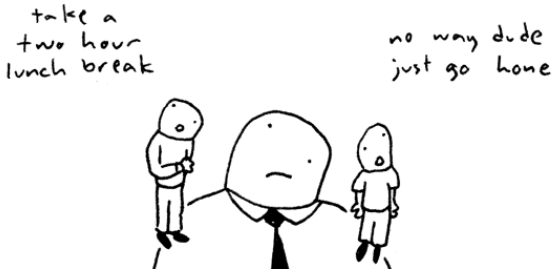
Discussion Rules

- Only one can speak at a time
  possibly enforced by moderator and/or "speaker's token"
- Stay with the agenda
  including pauses
- Note down new ideas and thoughts
  to be discussed on-topic later
- Questions can be asked any time
- Keep it short

Wrapping it Up

- Next steps
  concrete, measurable activities to be assessed next time
- Send around meeting minutes
  such that you can check the planned state against the actual state

Decision Making



The process of specifying a problem/opportunity, identifying alternatives, evaluating them, and selecting from among the alternatives.

Group Decision Making

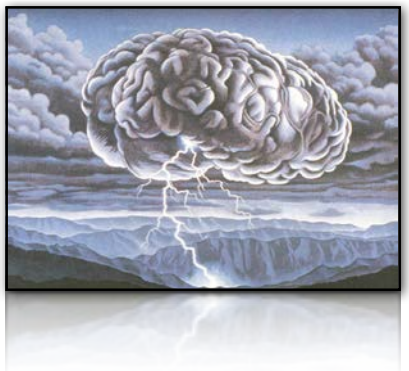
Assets

- Greater knowledge & facts
- Broader perspective on issues
- More alternatives considered
- Greater satisfaction with & support of decisions
- Better problem comprehension
- Serves communication & political functions

Liabilities

- Less speed
- Compromise may damage decision quality
- Negative social pressure
- Premature decisions
- Individual domination
- Interference of personal goals

Brainstorming



Stimulate people to develop alternatives during the planning and decision-making process.

Brainstorming

- No one may evaluate or criticize the ideas of others
- Be free-wheeling in creating ideas
- Produce as many ideas as possible
- "Hitchhike" (take another person's idea and expand on it)

Brainstorming

Advantages

- Reduces dependence on a single authority figure
- Encourages the open sharing of ideas
- Stimulates participation among group members
- Provides individual safety in a competitive group
- Maximizes output for a short period of time
- Ensures a non-evaluative climate
- Tends to be enjoyable and stimulating

Brainstorming

Disadvantages

- Lack of closure (only generates a list of unevaluated ideas, not a plan or a solution)
- May cause dissatisfaction among participants
- Even in a relaxed atmosphere, presence of group members may inhibit creativity among some participants

Nominal Group Technique (NGT)

Generate a large number of creative potential solutions to a problem, evaluate these solutions, and rank them from most to least promising.

http://en.wikipedia.org/wiki/Round-robin

Nominal Group Technique (NGT)

advantages

- Generation of ideas in writing
- Round-robin recording of ideas
- Serial discussion of ideas
- Ranking of ideas

Nominal Group Technique (NGT)

advantages

- Generates many high quality ideas
- Low quality ideas eliminated during vote
- Feelings of accomplishment and commitment to both the process and the solution
- Participation is balanced across members.

Nominal Group Technique (NGT)

advantages

- Influence of individuals is balanced
- Produces more creative ideas than do traditional interacting groups

Nominal Group Technique (NGT)

disadvantages

- Requires advanced planning
- Takes a couple of hours to implement
- High level of structure can reduce feelings of involvement and direct interaction
- Opinions may not converge in the voting process

Conflict Management

Exists when two or more people have incompatible goals and one or both believe that the behavior of the other prevents their own goal attainment.

Potential Negative Effects

- Decreased performance
- Dissatisfaction
- Aggression
- Anxiety
- Wasted time
- Wasted energy
- Reduced efficiency

Potential Positive Effects

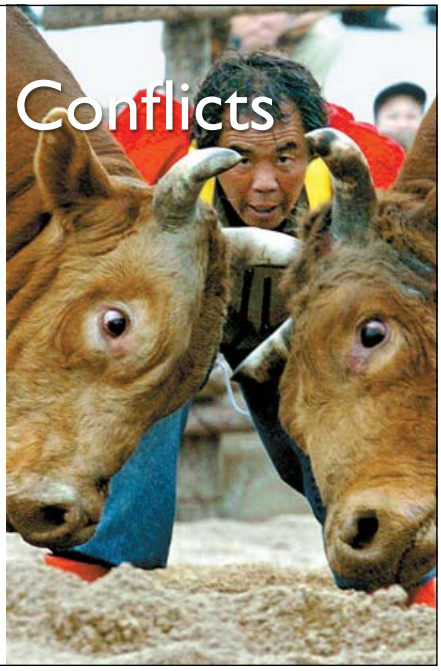
- Identifies issues of import to others
- Resolution of underlying problems
- Enhancement of group development
- Inter group conflict can increase within-group cohesion
- Facilitation of needed organizational change

Why do Conflicts Occur?

- Worker needs/values
- Personality
- Job assignments
- Scarce resources
- Job design
- Organizational structure
- Culture differences

Resolving Conflicts

- Compromising
- Accommodating
- Collaborating
- Avoiding



Compromising

Conflict Resolution

- Point out to the other person that if you both will make a few concessions, the conflict can be resolved quickly.
- Point out that if the disagreement is to be resolved, some sacrifices must be made by both of you.

Accommodating

Conflict Resolution

- Offer to handle the problem any way the other person wants.
- Go along with whatever the other person requests, rather than get into the difficulties of direct confrontation.

Collaborating

Conflict Resolution

- Try to sort out where each of you stands and identify options available to meet both parties' needs.
- Suggest that you take your ideas and the other person's ideas and put them together to make an even more workable idea.
- Express your concern for the differences between you and let the other person know you want a resolution that satisfies both of you.

Avoiding

Conflict Resolution

- Downplay the seriousness of the problem and suggest the two of you not waste time with the matter.
- Tell the other person that the problem does not concern you.
- Explain that there is no point in trying to resolve a conflict between two people with such basically different personalities.

Meetings

Four Ps of Project Management

People

Product

Process

Project

Team

Meetings

Summary

Decision Making

The process of specifying a problem/opportunity, identifying alternatives, evaluating them, and selecting from among the alternatives.

Conflict Management

Exists when two or more people have incompatible goals and one or both believe that the behavior of the other prevents their own goal attainment.