INF5180: Software Product- and Process Improvement in Systems Development

Part 05:

Problem Solving and Improvement – in Groups

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Groups

”There is nothing more difficult to handle, more doubtful of success, and more dangerous to carry out than initiating changes…”

(Niccolò Machiavelli, Il Principe, ~1500)

Problem Solving and Improvement at Group Level

- Motivation
- The creation of the group
- The evolution of the group
- The achievements of the group
- The group as decision maker

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What is a Group?

- Definitions:
  - "two or more interdependent individuals who influence one another through social interaction" (Cartwright & Zander, 1968)
  - "a group exists when two or more people define themselves as members of it and when its existence is recognized by at least one other" (Brown, 1988)
- Group characteristics:
  - Interaction, structure, size, common objectives, cohesion (“proximity between group members"), dynamics/change.

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What is Group Dynamic?

Group dynamics is about:

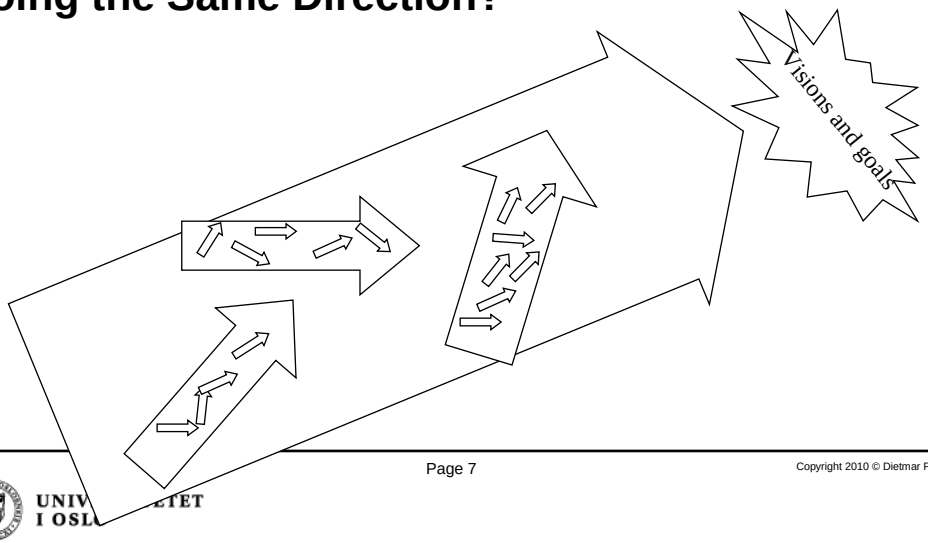
- social interaction within groups
- the effect of the group's structure and size on the actions (behavior) of group members
- (intended or unintended) changes in the group's behavior
- the use of groups to achieve goals/objectives

Why Group Dynamic in INF5180?

- Most of the work in sw & system development organizations happens in groups
- Although process improvement initiatives sometimes meet resistance when doing
  - process assessments,
  - planning and executing measurement programs,
  - documenting processes,
  - arranging training courses and so on,

  … the strongest resistance emerges (deliberately or not) when attempting to actually change the way individuals and groups work.
- Understanding the group dynamics in a development organization is probably the most important key to improve processes (why? → see next slide)

Going the Same Direction?



Why form a Group?

- Survival (originally, the most important cause)
- Some tasks simply require collaboration in groups (→ buffalo hunting, constructing (larger) buildings, streets, warfare (?), sw development)
- Psychological need
  - Affiliation/belonging
  - Power (”together we are stronger”)
  - FIRO (Fundamental Interpersonal Relations Orientation by **W.C. Schutz**)
    - Need for inclusion
    - Need for control
    - Need for affection

    See: http://en.wikipedia.org/wiki/Fundamental_Interpersonal_Relations_Orientation

Why form a Group? (cont'd)

- Social support
  - Emotional support
  - Avoiding loneliness
  - Reinforcing one's self-appreciation (positive feedback)
- Information need
  - Comparison of one's own judgments and attitudes with those of others ("social comparison")
  - **But**, we often seek information from persons/groups with very similar attitudes as ours (→ due to psychological needs)

Important: Be aware of cultural differences

- E.g., collectivism vs. western individualism, see next slide.

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Quality and Culture (differences) **["Strategic alliances" by P. Lorange]**

A story from Japan (from Fuji Xerox):

450 people with suits. The manager Tony Kobayashi arrives. In unisono: "good morning". TK explains with pictures "pyramids were built over long period of time by many people", "camels go slowly but surely", "the hare and the tortoise". Finally all stand up and sing "the quality circle song".

THE QUALITY CIRCLE SONG

With radiant smile to one another, friends united with keen spirits.
Oh!, the friends speak about the new dreams, about quality control.
And struggle with the objectives clearly, quality circles filled with light.

With an all-time increasing morale, the days become full of systematic works
Oh!, this time is wonderful, promising businesses that flourish.
They struggle for tomorrow's ideas, quality circles filled with motivation.

By communicating with one another, this way will choose good means
Oh!, this way means luck, further growth of Japanese culture
Powerful and influential, quality circles filled with future.

BTW, IBM had a strong culture of song singing from the 1930s to the 1950s!

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Quality and Culture (differences)

- **Fujitsu company song:**

  Verse 1:
  Let's run out now, to greener fields, where shines a splendid Sun.
  We have a dream, a wondrous dream, that gets the best things done.
  A wide blue sky is in our heart now,
  Open-ness in our soul,
  We'll run together going onwards now,
  On towards our goal.

  Chorus:
  Ahhhh Fujitsuuuuu, oh tomorrow is our goal.
  .
  Verse 2:
  Lets join our hands, with everyone, and smile at each new hour.
  We have a dream, an endless dream, of youthful love and power.
  We want to use all our skill now,
  All the strengths unfurled,
  We plan uniting all our new techniques,
  Over all the world.

  Chorus:
  Ahhhhh Fujitsuuuuu, forges links all over the world.

  Verse 3:
  Let's make a bond, from heart to heart, throughout the human race.
  An unseen power, now in our grasp, can even conquer space.
  We want to find a new harmony,
  Both in work and play,
  We'll share the fresh things we discover now,
  Building a new day.

  Chorus:
  Ahhhhh Fujitsuuuuuu, GIVES A JOY WITH EVERY NEW DAY!

- "Ever Onward," written in 1931 by IBM'er Frederick Tappe:

  "There's a thrill in store for all
  For we're about to toast
  The corporation that we represent.
  We're here to cheer each pioneer
  And also proudly boast,
  Of that man of men
  Our friend and guiding hand
  The name of T.J. Watson means
  A courage none can stem
  And we feel honored to be
  Here to toast the IBM."

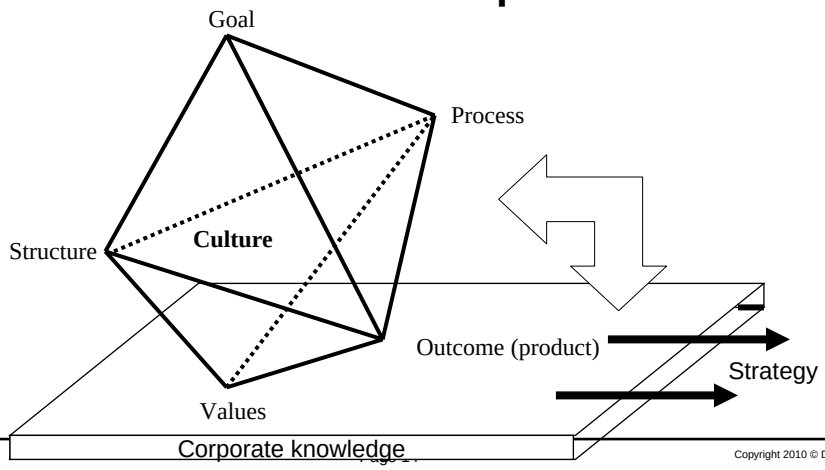
What triggers Group Forming?

- Physical closeness
  - people who by chance are located in the vicinity
  - people we often meet
- "like-minded children play well" - we like persons who resemble us (it's common that spouses are from the same social class/group)
  - Reinforcement of our own values and evaluations
  - Fewer conflicts
  - Affiliation/belonging
- Complementing qualities – we like persons in the group who correspond to the group's needs
- The minmax-principle [or maxmin-principle]
  - You join groups where you minimize the maximum loss (cost) [or maximize the minimum value]

What triggers Group Forming? (cont'd)

- We like to be in a group with those who like us (reciprocal feelings)
- We seek to be with the interesting/clever people (→ soccer team: "we won" but "they lost")
  - BIRGing (Basking In Reflected Glory): one's self esteem and evaluation can be enhanced by the identification with another person's success
- We like to be in the same group as "good-looking people"

The SPO-Framework for Groups



SPO-Framework for Groups vs. Individuals – Remarks

- Correspondence between the SPO-framework for individuals and for group means that
  - the group's structures, processes and outcomes correspond with the individuals' needs/preferences regarding structure, process, outcome,
  - the group's culture, values and objectives (goals) correspond with the individuals' personalities, values and objectives (goals).

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Exercise

- In the book «Il Principe» (which is a textbook for old days' "managers" = princes) Machiavelli offers the following recommendation:
  - *«And he who becomes master of a city accustomed to freedom* [e.g., "democratic" republics] *and does not destroy it, may expect to be destroyed by it, for in rebellion it has always the watch-word of liberty and its ancient privileges as a rallying point, which neither time nor benefits will ever cause it to forget.»*

    (The Prince, Chapter V) Source: http://www.constitution.org/mac/prince.txt
- **Question:** In what situations can similar drastic measures (i.e., split-up of groups, complete re-organisation) become necessary in software companies?

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The Evolution of a Group

TUCKMAN B (1965) "Developmental Sequence in Small Groups" *Psychological Bulletin* 63 pp. 384-399

- **An ideal group (a team) consists of "A small number of people with complementary skills who are committed to a common purpose, performance goals, and a common approach for which they hold themselves mutually accountable."**

  [Katzenbach, J.R., and Smith, D.K., The Wisdom of Teams: Creating the High-Performance Organization, Cambridge, Mass.: Harvard Business School Press, 1993.]

- **Five** typical stages (*the Tuckman sequence*):
  1. **Forming** – group members are introduced
  2. **Storming** – the group transitions from "as is" to "to be"
  3. **Norming** – the group reaches consensus on the "to be" process
  4. **Performing** – the group has settled its relationships and expectations and works efficiently and effectively
  5. **Adjourning** – the group dissolves and shares the improved processes with others

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Staged Development of Groups – Remarks

- The Forming, Storming, Norming, Performing stages might seem to be obvious but are in fact difficult.
  - The Forming stage is relatively easy.
  - Participants want to move to the Performing stage without passing through all of the first three stages.
  - The Storming stage is difficult and many times the cause of a group's failure to succeed.
  - The Norming stage is an important pre-requisite for the Performing stage.
  - Performing is (relatively) easy once the storming process is complete.

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Staged Development of Groups – Remarks

- All stages are necessary for group evolution but it is not always easy to tell when a stage is complete:
  - The group members agree that the stage is complete?
  - The group's supervisor agrees the stage is complete?
  - The group simply moves on to the next stage (without noticing)?
- The understanding of "exit criteria" of stages is essential to assess whether a group is evolving "properly". For some stages, the exit criteria can/should be defined by the group.

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The Evolution of a Group – Forming

- The "polite" stage in which the team starts to form.
- Everyone is trying to figure out what the group concept is (the group's informal structure).
- Initial "silent" leaders may take the rein.
- The team is usually positive – for the most part – during initial meetings.
- No one has offended anyone at this point yet!

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The Evolution of a Group – Forming (cont'd)

Forming includes feelings and behaviors of:

- Excitement, anticipation, and optimism.
- Pride in being chosen for the project (if it's a new project group).
- A tentative attachment to the team suspicion and anxiety about the job.
- Defining the tasks and how they will be accomplished.
- Determining acceptable group behavior.
- Deciding what information needs to be gathered.
- Abstract discussions of the concepts and issues, and for some members, impatience with these discussions. There will be difficulty in identifying some of the relevant problems.

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The Evolution of a Group – Forming (cont'd)

- Because there is so much going on to distract members' attention in the beginning, the group accomplishes little, if anything, that concerns it's project goals.
  - NB: This is perfectly normal.
- Success factor: Share knowledge during "forming".
  - Showing that you have confidence in others helps provide confidence (of others).
- Exit Criteria?

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The Evolution of a Group – Storming

- The honeymoon is over.
- The silent leaders may be clashing for control of the group.
- People disagree and may blame the group concept, saying it doesn't work.
- Management needs to do a lot of coaching to get people to work past their differences, may take separate 1–on–1's with people.


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The Evolution of a Group – Storming (cont'd)

Storming includes feelings and behaviors of:

- Resisting the tasks.
- Resisting quality improvement approaches suggested by other members.
- Sharp fluctuations in attitude about the group and the project's chance of success.
- Arguing among members even when they agree on the real issues.
- Defensiveness, competition, and choosing sides.
- Questioning the wisdom of those who selected this project and appointed the other members of the team.
- Establishing unrealistic goals. Disunity, increased tension, and jealousy.


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The Evolution of a Group – Storming (cont'd)

- The above pressures mean that team members have little energy to spend on progressing towards the team's goal.
- But they are beginning to understand one another. This phase sometimes takes 3 or 4 meetings before entering the Norming phase.
- Storming is very much about creating structure.
- Exit Criteria?

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The Evolution of a Group – Storming (cont'd)

Remarks on "Storming":

- Low conflict level in the group is often a signal for little involvement
- Conflicts are often useful to get solidarity (if conflicts are managed reasonably and not intensified)
  - "The threshold theory of conflict" (pp. 80-82 in Group Dynamic, Forsyth)
- **Question**: What do you think is an ideal conflict level in a group?

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The Evolution of a Group – Norming

- The group is starting to work well together, and is now focusing more on Process (and Outcome).
- Members may start to brag about the group concept to others who aren't in the group and will be very positive about their role in the group.
- Often, however, the team will bounce back and forth between Storming and Norming when issues crop up.
  - Regressions will become fewer and fewer and the team will bounce back to Norming in a quicker manner as the group matures.
- The natural leaders at this stage may not be the ones who were visible in stages 1 & 2 (those people may no longer have the "unofficial lead roles" within the group).
- The group still needs management direction, but not as much as during storming.

The Evolution of a Group – Norming (cont'd)

- Norming includes feelings and behaviors of:
  - Ability to express criticism constructively.
  - Accepting membership in the group.
  - An attempt to achieve harmony by avoiding conflict.
  - More friendliness, confiding in each other, and sharing of personal problems.
  - A sense of team cohesion, spirit, and goals.
  - Establishing and maintaining group ground rules (Group Culture).
- As team members begin to capitalize upon their differences, they now have more time and energy to spend on the project.
- Exit Criteria?

The Evolution of a Group – Performing

- Now the group is most productive.
- The group can be given new projects and tasks and accomplish them successfully, and less often falls back into Storming.
- The group is taking on new work on their own, and selling it to other groups.
- The group can usually take on a new member or two with little difficulty (with regards to Stroming and Norming).
- The group works self-directed and requires little, if any, management direction.
- In many organizations, it can take 6 months or longer to reach this stage!

The Evolution of a Group – Performing (cont'd)

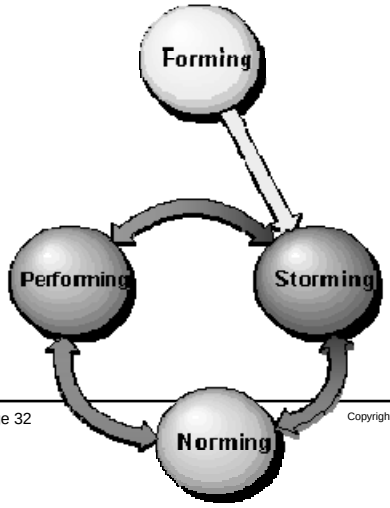
- Performing includes feelings and behaviors of:
  - Members have insights into personal and group processes, and better understanding of each other's strengths and weakness.
  - Constructive self–change.
  - Ability to prevent or work through group problems.
  - Close attachment to the team.
- The group is now an effective, cohesive unit. You can tell when a group has reached this stage because they get a lot of work done.
- Exit Criteria?

The Evolution of a Group – Adjourning

- The group briefs and shares the improved process during this phase.
- When the group finally completes that last briefing, there is always a bittersweet sense of accomplishment coupled with the reluctance to say good–bye.
- Many relationships formed within such a group may continue long after the group disbands.
- Exit Criteria?

The Evolution of a Group – Long-term View

Group development will continue when tasks change.



Group Evolution and Process Improvement

- Introduction or change of processes often follows the five stages of group evolution (forming, storming, norming, performing, adjourning).
- The conflict level (when introducing/changing processes) can be a good indicator for future success.
  - Experienced consultants in process improvement become suspicious when there is lack of conflict!
  - However: if the conflict level is too high, the group may never reach the Norming phase

Group Evolution and Process Improvement

- How important is it to go through all phases, i.e. Norming?
  - Studies show that
    - more homogenous productivity (but not necessarily higher) when more time is spent on Norming.
    - high/low productivity is related to the type of norms (→ structures, processes)
- Most SPI frameworks or development methods do not take into account which stage a group is in.
- A strong control-focused steering method can be proper for some groups, while a more confidence-based (self-)steering method can be proper in a well functioning team.
  - Question: What is the difference between ”control” and ”feedback”?

Group Evolution and Process Improvement

Group building aspects relevant for improvement work:

- Group can have sub-groups in different development activities
- Group formation is a cyclical process
- Group formation is dialectic → balance between efficiency/effectiveness and "social" aspects
- How/by whom are the norms determined that determine the productivity? Is it strong personalities (perhaps without formal power) which should be won?
- Integrating new group members? (→ group socialization)

Role Evolution (the individual's view) – Steps

- Registration
  - Arrival of non-member
- Evaluation
  - Group evaluates new member / new member evaluates group → quasi-member
- Socialization
  - Assimilation, the group and the new member get acquainted with each other
  - Acceptance and full integration of new member → full member
- Maintenance
  - Role re-evaluation (repeatedly)
  - If role no longer suitable/needed → marginal member
- "Re-socialization" or exclusion of marginal member

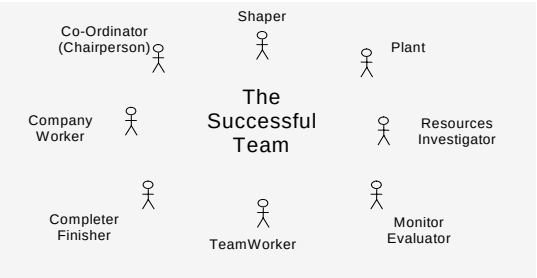
Constructing Groups

Possibly the most popular model for "team-building" is Belbin's role model.
(See www.belbin.com). Is based on profile thinking similar to MBTI.

The idea is that an effective team shall have all these different qualities represented.

Individuals can often play several roles.

Nobody can be good at everything, which also means that all roles have (well defined) weaknesses.



Exercise:
Discuss the consequence of a lacking Chairperson
Discuss the consequence of a lacking Completer/Finisher

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Myers-Briggs Type Indicator (MBTI)

- **Attitudes:** **Extraversion vs. Introversion (E – I)**
  - Extraversion relates to the external world of behavior, action, people and things
  - Introversion relates to the internal world of ideas and reflection
- **Information-gathering function:** **Sensation vs. Intuition (S – N)**
  - These functions describe how new information is understood and interpreted.
- **Decision-making function:** **Thinking vs. Feeling (T – F)**
  - Both Thinking and Feeling types strive to make rational choices, based on the data received from their information-gathering functions
- **Lifestyle:** **Judging vs. Perceiving (J – P)**
  - individuals seem to have a preference to show either their Judging function (T or F) or their Perceiving function (S or N) when relating to the outside world. Myers and Briggs called this a person's "ambassador," that is, the one sent forth to deal with the world.
- Personality type tests use these dimensions to uncover "personality profiles", e.g., ISTJ (see, e.g., http://www.humanmetrics.com/)

  See also: http://en.wikipedia.org/wiki/Myers-Briggs_Type_Indicator

Originally introduced by Carl Gustav Jung (1875 – 1961)

… addition made by Catherine Cook Briggs (her daughter, Isabel Briggs Myers, continued this work)

The 16 Types

ISTJ	ISFJ	INFJ	INTJ
ISTP	ISFP	INFP	INTP
ESTP	ESFP	ENFP	ENTP
ESTJ	ESFJ	ENFJ	ENTJ

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Myers-Briggs Type Indicator (MBTI)

- **Attitudes:** **Extraversion vs. Introversion (E – I)**
  - E-types draw energy from action: they tend to act, then reflect, then act further. If they are inactive, their level of energy and motivation tends to decline
  - I-types become less energized as they act: they prefer to reflect, then act, then reflect again
- **Information-gathering function:** **Sensation vs. Intuition (S – N)**
  - S-types prefer to trust information that is in the present, tangible and concrete
  - N-types tend to trust information that is more abstract or theoretical, that can be associated with other information (→ holistic)
- **Decision-making function:** **Thinking vs. Feeling (T – F)**
  - T-types prefer to decide things from a more detached standpoint, measuring the decision by what seems reasonable, logical, causal, consistent and matching a given set of rules
  - F-types prefer to come to decisions by associating or empathizing with the situation, looking at it 'from the inside' and weighing the situation to achieve, on balance, the greatest harmony, consensus and fit, considering the needs of the people involved
- **Lifestyle:** **Judging vs. Perceiving (J – P)**
  - Types ending in J show the world their Judging function - either T or F. So TJ types tend to appear to the world as logical, and FJ types as empathetic. J-types types prefer to have matters settled (→ results-oriented)
  - Types ending in P show the world their Perceiving function - either S or N. So SP types tend to appear to the world as concrete, and NP types as abstract. P-types prefer to keep matters open (→ process-oriented)
- **Important: Test results indicate PREFERENCE not APTITUDE!**

Example personality type test result:

ISTJ
- **distinctively expressed introvert (67%)**
- **slightly expressed sensing personality (1%)**
- **slightly expressed thinking personality (12%)**
- **slightly expressed judging personality (11%)**

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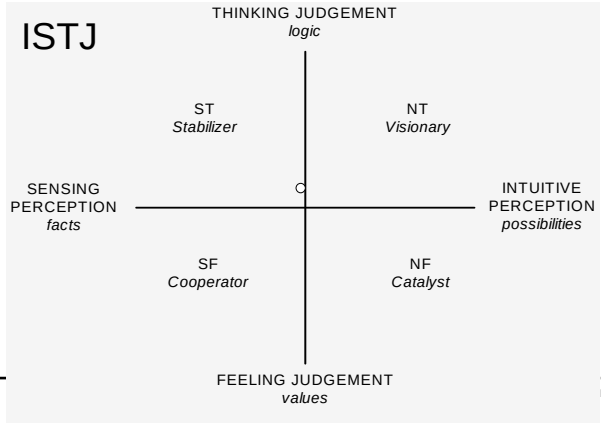
Personality Types based on MBTI – Example

According to Myers-Briggs, ISTJs thrive on organization. They keep their lives and environments well-regulated. They bring painstaking attention to detail in their work and will not rest until satisfied with a job well done. They are faithful, logical, organized, sensible and earnest traditionalists. They earn success by thoroughness and dependability. Practical, matter-of-fact, realistic, and responsible. Decide logically what should be done and work toward it steadily, regardless of distractions. Take pleasure in making everything orderly and organized – their work, their home, their life.

ISTJs are centered on the inside world, persons of thoughts and (sometimes) emotions. They prefer dealing with the present and factual, using various options to make decisions. They are also keen observers of life, well prepared for most eventualities, and have a good understanding of most situations. They believe in practical objectives and value traditions and loyalty.

Information-gathering (S-N) combined with Decision-making (T-F)



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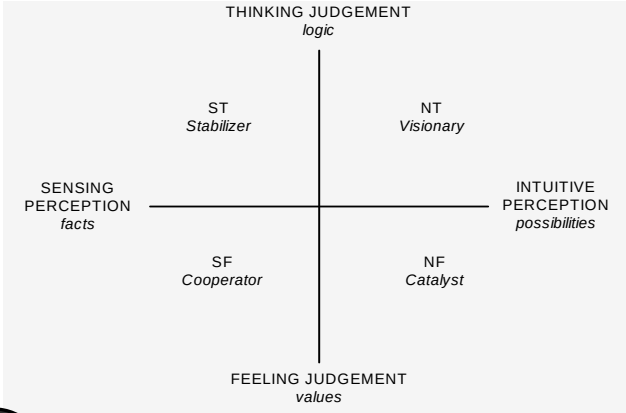
Personality Types based on MBTI

Exercise (play with stereotypes)
"Persons of culture" in Norway often associate with the concept "engineer" a boring, predictable person.

• Where in the graph would these persons place "the engineer"?

• Where would you place the engineer?

• Where will "the social worker" be placed?



Organization Development

- Important learning from (Coch & French, 1948) experiment:
  - Increased degree of participation in change program reduces degree of resistance and stimulates increased output. (Perhaps trivial, but extremely important!)
  - **Question**: Not everyone can always actively participate in a change program. How to still avoid high degree of opposition?
- Important means in organization development
  - Organization analysis (survey-based or in-depth assessment)
  - Process information/consultation
  - Team building
  - Conflict diagnosis
  - Training in communication ("interpersonal skill")

Trust

- Confidence in colleagues and managers appeared to be most important factor in support of job satisfaction (Driscoll, 1973).
- Groups with high degree of trust are more effective than those with less confidence.
  - E.g., the reaction to well-justified criticism will usually be different in trustful relations than where you suspect someone could have used or plans to use the criticism against you.
  - It is difficult to imagine successful improvement work in total absence of criticism.

Communication Elements

- Meaningful communication demands
  - Shared code (lexicon, syntax, and semantics)
  - Proper usage of the code (→ pragmatics)
- Meta communication and non-verbal communication
- Communication structure
  - Organizational structure (line, matrix, project, ...) is about structuring communication
  - "Linking individuals"
  - Informal structures
- Communication process requires feedback:

Good Communication

- Good communication is a two-way process that involves getting your message across and understanding what others have to say.
- Good communication involves active listening, speaking and observing.
- Once you know the essentials of a working communication process, you can begin to evaluate your communication skills.
  - Begin to watch yourself in action.
  - Each time you communicate observe what you do, how it went, what went well, and what could have been better.

Communication Structure

- Number of communication channels (dialog) in a group is n(n-1)/2
- Number of possible communication situations is $n(2^{n-1}-1)$

Team size =	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Comm. channels		1	3	6	10	15	21	28	36	45	55
Comm. sit.		2	9	28	75	186	441	1016	2295	5110	11253

- **Fred Brooks** showed in the book *The mythical man-month* that taking on **new developers late in a project** creates additional delay. One of the main reasons for this effect is the non-linear relationship between group size and communication channels.

Communication Structures

- **Exercise**: What are possible ways to reduce the negative effects of “exploding” communication structure?
- **Exercise**: What other factors can influence productivity in a negative way?

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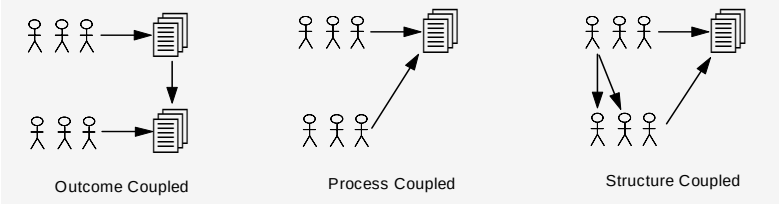
Coupling (and Cohesion)

Hohman uses the SPO-framework to discuss organizational coupling



Exercise:
- Discuss advantages and disadvantages of the different couplings for groups working towards the same end product.

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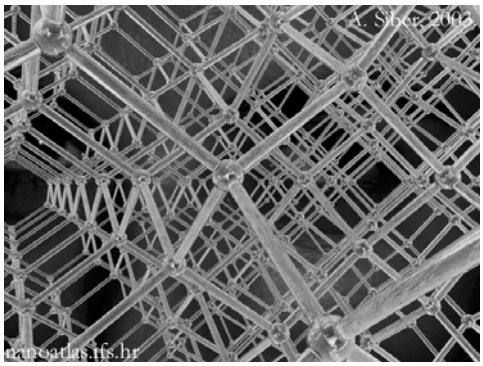
How Much Structure?

Factors that determine how much structure is appropriate:

- Experience
- Group size
- Age
- Culture/personality
- Problem complexity
- Product requirements
- Project duration



Exercise

- Hohmann proposes a structure for status reports from project members to project managers. The structure looks like this:
  - Name of developer + date
  - Completed work.
  - Ongoing work.
  - Future work.
  - Comments/risk points/problems
  - Status related to plan (plan vs. actual)
- What are the advantages and disadvantages of having such formal communication?
- Hohmann points out the importance of the status report not being longer than one page. Which effect has this on communication?
- Should the project manager also make such status report for project members?

Working in Groups

«Twelve men's strength, but how many men's wit?»

- System development is largely communication, work in groups and meetings (> 50%)
- Team building/work/composition is difficult, and usually constrained by scarce resources (in particular with regard to the optimal mix of skills and experience).
- To improve the group output it is useful to know what type of tasks are best solved jointly and which are best solved individually (before presenting them to the group).
- Productivity = Potential productivity
  - loss due to bad work process
  + premium due to positive group dynamics (→ synergies)

Exercise

- We have earlier described factors that were important for group forming.

Factors:
-- psychological needs
-- task complexity
-- information need
-- social support
-- survival
-- sympathy ...

- Analyze how these factors can promote/inhibit the productivity in sw/system development.

How to avoid low performance in groups?

- Means to avoid performance reductions in groups are (among other things):
  - Give the individuals interesting, engaging and challenging tasks
  - Create confidence so that others try to give their best performance
  - Clarify personal responsibility (and authority) – ideally related to the impact on the end product
  - Evaluate individuals based on their (identifiable) contribution

Group Work

- Some results from studies (→ survey of 241 studies including 24 000 persons by [Bond & Titus, 1983]):
  - Solving simple tasks in groups (even with passive listeners) increases performance (efficiency). This is called “social facilitation”. However, groups do not increase quality (effectiveness).
  - Solving complex tasks in groups decreases performance (and quality). This is due to the fact that groups “bind cognitive resources”, thus impairing the primary task.
- What distinguishes “simple” from “complex” tasks?
  - (Zajonc 1965); simple = “dominant responses” (simple, well-learned/instinctive responses), complex = “non-dominant responses” (new, not yet “learned” responses”)

Why does the presence of others affect us?

- "Arousal": Audience is stimulating/activating and triggers dominant responses at the expense of the non-dominant responses.
  - This result also applies to animals (cockroach -study (Zajonc, Heingartner & Herman, 1969))
  - Perhaps it is that why highly trained athletes with well-studied movements (e.g., high jumpers) stimulate the spectators to intensify clapping and cheering when the do their next attempt.
- "Distraction": Facing an audience we become more "self-aware" (focused on how we perform etc) and focus on how the audience reacts.
  - For complex tasks the positive effect of arousal will be overruled by distraction (Baron 1986).

Why does the presence of others affect us?

- "Evaluation apprehension": When others are present we automatically feel (and possibly are) evaluated – i.e., we expect "reward" or "punishment" (lose face) depending on how we perform.
  - E.g., committing a mistake is a source for losing face. For complex tasks it's easier to make mistakes and thus we will work slower in a group exposure as compared to an individual work setting (Sanders, 1984)
  - This is one reason why evaluation is not always positive for performance!

Decisions Made by Groups

- Polarization of opinions often happens in groups. (Myers & Lamm 1976)
  - Group polarization means that the initial position of the majority of the group is strengthened following group discussion.
    - Members may move toward the dominant position in the group for various reasons.
    - Ideally, this would only happen when the substance of the majority's position is sound, and this often happens.
    - Unfortunately, less desirable processes occur also. For example, group members may adopt the majority position because of some artificial rule (such as "the majority rules") or because members want to be seen as agreeable to other group members.
  - One form of group polarization is the "risky shift" phenomenon, in which the final group position is more risky than the initial position of some individual members.
    - E.g., it has been found that under certain conditions, the group will endorse a stronger statement of opinion on an issue after the discussion process.
    - One interpretation of this dynamic is that there has been a diffusion of responsibility that otherwise may fall on one individual

Decisions Made by Groups

- Groups using some of their time on defining (and agreeing on) the decision-making process come up with better decisions. (Hirokawa 1980)
  - Often, however, groups use very little or no time for clarifying/discussing the decision-making process.
- Sometimes groups develop "group thinking", i.e., lack of real discussion of alternatives and a strong motivation with regard to agreeing and being loyal (esprit de corps).
  - Perhaps an explanation why the Singapore-broker Leeson succeeded to splash all of the Baring bank's capital? / see also recent financial crisis (→ lack of control)

Conclusions

- Tasks to be solved in groups, and related argumentation and information given during meetings should not be too complex.
  - If it is, good preparation is needed.
  - This is due to the fact that the ability to solve complex problems, comprehend complex arguments, and process complex information decreases in groups!
- Creative work should be prepared “offline” (i.e., it is not optimal to have brainstorming in bigger groups), and then discussed jointly.
  - Sometimes, however, brainstorming can actually generate the best idea(s) for solving a problem.

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Conclusions (cont’d)

- One should be aware of the effects that meetings can have on our behavior (due to the fact that there is an ”audience” that is evaluating what we do and say).

  For example, there exist indications that meetings increase:

  a) The number of “dominant responses”, i.e. the instinctive, good learned behavior, at the expense of the more reflective “non-dominant responses” and
  b) The probability of taking high risk decisions

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Conclusions (cont'd)

- For many types of tasks the composition of the meeting is very critical.
  - A wrongly composed group can generate lower performance than the average performance the individuals would show.
- Groups that host hostile fractions do not get rid of their prejudices against each other by simply "sitting together".
  - Only by close (and successful!) cooperation towards joint objectives, joint work experience, etc., the understanding of each other will increase and eventually overcome the hostilities.

Exercise

- Web-development projects are often cross-disciplinary, e.g., a project may be composed of pedagogues, graphical designers and programmers. Thus, the project will be done by persons with very different preferences regarding work, collaboration and communication styles. Assume that project members of different professions don't know each other. If you make additional assumptions, make them explicit.
- Compared to a project with a homogeneous team, how will the diversity in the group influence/change the project structures with regards to:
  - process
  - product specification
  - communication
  - status reporting within the project