Chapter 6

Human Aspects of Software Engineering

Slide Set to accompany

Software Engineering: A Practitioner's Approach, 8/e

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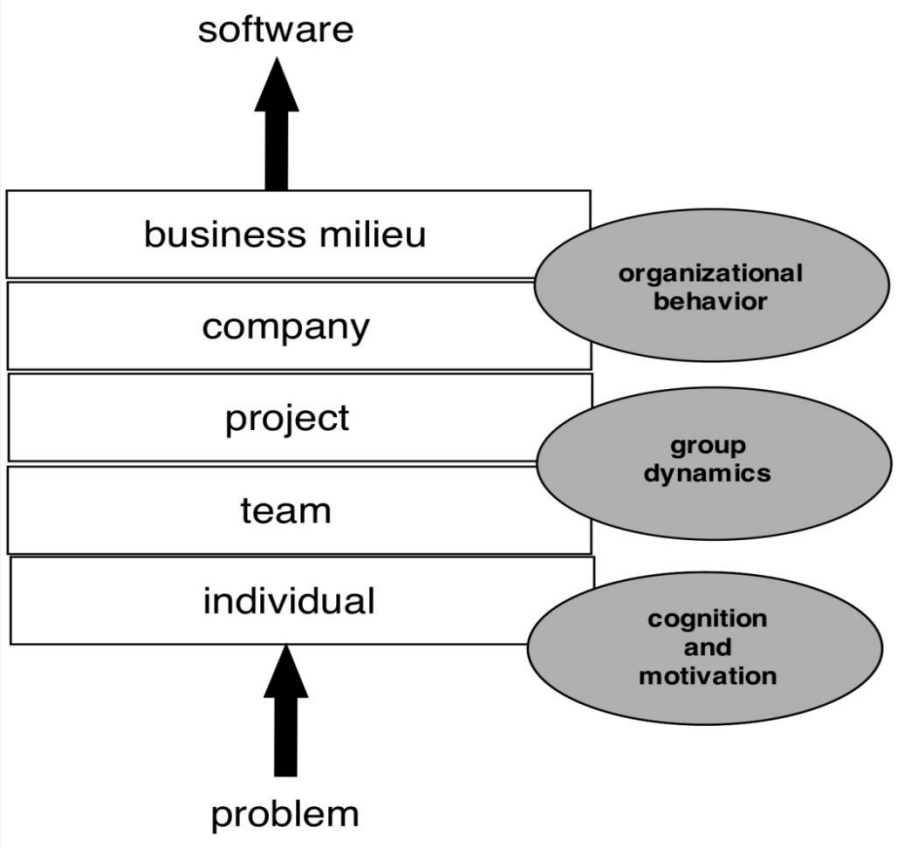
Traits of Successful Software Engineers

- Sense of individual responsibility
- Acutely aware of the needs of team members and stakeholders
- Brutally honest about design flaws and offers constructive criticism
- Resilient under pressure
- Heightened sense of fairness
- Attention to detail
- Pragmatic

Behavioral Model for Software Engineering



Boundary Spanning Team Roles

- Ambassador – represents team to outside constituencies
- Scout – crosses team boundaries to collect information
- Guard – protects access to team work products
- Sentry – controls information sent by stakeholders
- Coordinator – communicates across the team and organization

Effective Software Team Attributes

- Sense of purpose
- Sense of involvement
- Sense of trust
- Sense of improvement
- Diversity of team member skill sets

Avoid Team "Toxicity"

- A frenzied work atmosphere in which team members waste energy and lose focus on the objectives of the work to be performed.
- High frustration caused by personal, business, or technological factors that cause friction among team members.
- "Fragmented or poorly coordinated procedures" or a poorly defined or improperly chosen process model that becomes a roadblock to accomplishment.
- Unclear definition of roles resulting in a lack of accountability and resultant finger-pointing.
- "Continuous and repeated exposure to failure" that leads to a loss of confidence and a lowering of morale.

Factors Affecting Team Structure

The following factors must be considered when selecting a software project team structure ...

- the difficulty of the problem to be solved
- the size of the resultant program(s) in lines of code or function points
- the time that the team will stay together (team lifetime)
- the degree to which the problem can be modularized
- the required quality and reliability of the system to be built
- the rigidity of the delivery date
- the degree of sociability (communication) required for the project

Organizational Paradigms

- closed paradigm—structures a team along a traditional hierarchy of authority
- random paradigm—structures a team loosely and depends on individual initiative of the team members
- open paradigm—attempts to structure a team in a manner that achieves some of the controls associated with the closed paradigm but also much of the innovation that occurs when using the random paradigm
- synchronous paradigm—relies on the natural compartmentalization of a problem and organizes team members to work on pieces of the problem with little active communication among themselves

suggested by Constantine [Con93]

Generic Agile Teams

- Stress individual competency coupled with group collaboration as critical success factors
- People trump process and politics can trump people
- Agile teams as self-organizing and have many structures
  - An adaptive team structure
  - Uses elements of Constantine's random, open, and synchronous structures
  - Significant autonomy
- Planning is kept to a minimum and constrained only by business requirements and organizational standards

XP Team Values

- Communication – close informal verbal communication among team members and stakeholders and establishing meaning for metaphors as part of continuous feedback
- Simplicity – design for immediate needs nor future needs
- Feedback – derives from the implemented software, the customer, and other team members
- Courage – the discipline to resist pressure to design for unspecified future requirements
- Respect – among team members and stakeholders

Impact of Social Media

- Blogs – can be used share information with team members and customers
- Microblogs (e.g. Twitter) – allow posting of real-time messages to individuals following the poster
- Targeted on-line forums – allow participants to post questions or opinions and collect answers
- Social networking sites (e.g. Facebook, LinkedIn) – allows connections among software developers for the purpose of sharing information
- Social book marking (e.g. Delicious, Stumble, CiteULike) – allow developers to keep track of and share web-based resources

Software Engineering using the Cloud

- Benefits
  - Provides access to all software engineering work products
  - Removes device dependencies and available every where
  - Provides avenues for distributing and testing software
  - Allows software engineering information developed by one member to be available to all team members
- Concerns
  - Dispersing cloud services outside the control of the software team may present reliability and security risks
  - Potential for interoperability problems becomes high with large number of services distributed on the cloud
  - Cloud services stress usability and performance which often conflicts with security, privacy, and reliability

Collaboration Tools

- Namespace that allows secure, private storage or work products
- Calendar for coordinating project events
- Templates that allow team members to create artifacts that have common look and feel
- Metrics support to allow quantitative assessment of each team member's contributions
- Communication analysis to track messages and isolates patterns that may imply issues to resolve
- Artifact clustering showing work product dependencies

Team Decisions Making Complications

- Problem complexity
- Uncertainty and risk associated with the decision
- Work associated with decision has unintended effect on another project object (law of unintended consequences)
- Different views of the problem lead to different conclusions about the way forward
- Global software teams face additional challenges associated with collaboration, coordination, and coordination difficulties

Factors Affecting Global Software Development Team