Software Development – a collaborative work perspective

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Software Development

- Needs analysis – Requirements Engineering
- Design – Prototypes, Wireframes
- Software architecture
- Development
- Testing
- Implementation
- Project Management
Role of artefacts – Boundary Objects

- boundary objects (Star, 1989; Star and Griesemer, 1989),
- Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. They may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable means of translation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds.
Awareness

- used with reference to both humans and technologies
- awareness as an achieved outcome is a critical element of any cooperative work situation
  Awareness involves knowing who is “around”, what activities are occurring, who is talking with whom; it provides a view of one another in the daily work environments. Awareness may lead to informal interactions, spontaneous connections, and the development of shared cultures—all important aspects of maintaining working relationships which are denied to groups distributed across multiple sites. (Dourish 1992)
- peripheral awareness
Applications of the concept

- Distributed software development – IM - who else is online, what’s their status, can they be interrupted?!
- Social networking at work – getting to know your remote colleagues socially
"The need for some form of "organizational memory" (OM) has become increasingly recognized by many organizations in the current complex and turbulent business environment. This renewed interest in a topic that has had a chequered career is not due solely to the attentions of the CSCW community, but can be found throughout organisations and in the writings of those researchers studying them. Usually, the concept is described in terms of the "storage" metaphor borrowed from the cognitive science field, where human and computer memories are viewed as similar, thus leading to the view that "storing" and "recalling" are symmetrical operations which do not involve any situational complexities. (Bannon & Kuutti, 1996)

This is not an accurate picture of how people actually "remember" in organizations; the very nature of the memory and even the memory act itself are affected by the changing conditions existing both for the person and in the work environment over time.
Knowledge management in software engineering – creating “lessons learned” databases doesn’t work; knowledge repositories turn into knowledge cemeteries in the absence of people who can point useful resources
Common Information Spaces

- Common information spaces come in many forms; they can be constituted for:
  - people that are co-present in time and space
  - people distributed across time and space boundaries

- In the case of a physically shared workspace, due to the common work setting and exposure to the same work environment, actors are able to cooperate with each other, both in the production and reception of utterances and information, without having to resort to extended descriptions or elaborated codes, due to their understanding of the shared context within which they work.
  - little additional effort required to construct and use the CIS.

- In distributed work settings, there is a much greater need for refining and "packaging" information into a meaningful context, in order to maximise the likelihood that the intent of the message is received appropriately, and the recipient is also required to expend some effort in order to "unpack" this information, and hopefully be able to re-create the context of its transmission.

(Bannon and Bodker - Constructing Common Information Spaces)
Open Source

- Cave or Community?

Source code defines the functionality of a software application. It consists of a series of instructions, written by programmers in a programming language, that gets translated by a special program (called a "compiler") into a runnable software application. Source code is akin to the blueprint of a building or the recipe of a favorite dish, with one major difference: Converting source code to software is easy and automatic. In essence, source code is the software.

- Open source describes software whose source code may be freely modified and redistributed with few restrictions. Strictly speaking, the terms of the distribution license are the only factor that determines whether or not software is open source. (...) More importantly, open source software tends to be developed by loosely organized, ad-hoc communities consisting of contributors from all over the world who have never met face-to-face and yet who share a strong sense of commitment. Somehow, this mish-mash of people coheres to effectively accomplish an extremely complex task: building high quality software. The success of open source software has forced people to reconsider their traditional views on software development, individual psychology, and organizational dynamics.
How do OS developers find each other?

- There are a few major databases of open source software available on the Internet today:
  - Github - https://github.com/
  - Bitbucket – http://bitbucket.org
  - Sourceforge - http://sourceforge.net/
Who are the developers?

- overwhelmingly male, gen X, US&Europe, IT professionals, college graduates, part time (study from 2003)
What are their motivations?

- Learning
- Getting a software application they need
- Social interaction
- Gaining new competencies that could make them more employable
Topics for discussion

- Coordination
- Dependencies
- Articulation work
- Awareness
- Boundary objects
Infrastructuring

- In CSCW, infrastructuring is a school of thought which identifies the division of the domains of design and use as a critical factor in the development of technological systems.

- socio-technical systems - systems in which people, organisations and communities actively design, develop, engineer, use, apply, hack or are otherwise engage in "infrastructuring" activities without clear role boundaries.
Infrastructuring

- These activities take place in specific contexts which sometimes overlap.
  - formation of localized practices
  - comprise both digital and physical artefacts and places as important elements.

- At certain points the activities converge which makes the action, use development and other activities of the various actors, which were formerly not (consciously) perceived, visible.
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Infrastructuring - a methodological framework for development processes of socio-technical systems,

Key findings:

- criticism of heavyweight processes (steered from the top down) and development models;
- the importance of design and development as in-situ activities;
- the diversity of reciprocal references of socio-technical infrastructures to social practices, requirements and values
Citizen Science

- Citizen science - research collaborations between scientists and volunteers, particularly (but not exclusively) to expand opportunities for scientific data collection and to provide access to scientific information for community members.
- Democratisation of science
- Amateur astronomy, bird observation, citizen oceanography
- Mapping tribal land in Africa
Smart Communities

- A counterpart for Smart Cities
- Community Informatics and Urban Informatics
- The use of technology for social innovation – digital social innovation
  - New methods of civic engagement and citizen participation
  - Need for individuals to better self-manage their care, and for data and information to be better collected and used
  - Measuring, nudging and sharing: going green with new technologies
Location-based collaboration

Enabled my mobile technologies and the Internet

- Mapping
- Crowdsourcing place-based information
- Hyperlocal news
- Local initiatives – meet-ups
- Local events - Eventbrite