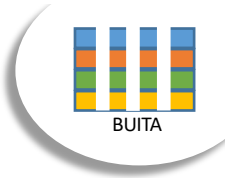

”CSCW and Knowledge management”

IT Architecture and User Driven Software Design (BUITA)

23. October 2018

Keld Bødker

Computer Supported Cooperative Work (CSCW)

Groupware and its challenges

Knowledge Management

Articles:

- Markus, M. L. (2001). Toward a theory of knowledge reuse: Types of knowledge reuse situations and factors in reuse success. Journal of Management Information Systems, 18(1), 57-94.
- Grudin, J. (1994). Groupware and social dynamics: Eight challenges for developers. Communications of the ACM 37, 92-105.
- Bjørn, P., Esbensen, M., Jensen, R. E., & Matthiesen, S. (2014). Does Distance Still Matter?; Revisiting the CSCW Fundamentals on Distributed Collaboration. ACM Transactions on Computer-Human Interaction (TOCHI), 21(5), 27.

Learning goals

- Know characteristics of Computer Supported Collaborative Work
- Know characteristics of Knowledge Management
- Know the methodical guidelines for typical challenges in CSCW and KM systems
- Be able to relate the two types of aforementioned systems to each other and their differences and apply this to a chosen/given case

Basic Concepts

- CSCW: Computer Supported Cooperative Work: a research field
- Groupware: the products that have come out

- KM: Knowledge Management
- Organizational Memory: ...the products

CSCW: Basic Concepts (2)

- CSCW: Computer Supported Cooperative Work

- cooperative/collaborative
  - "people engage in *cooperative work* when they are *mutually dependent* in their work and therefore are required to cooperate in order to get the work done" (Schmidt and Bannon, 1992, p. 13)

CSCW: Basic Concepts (3)

- Work and Articulation work
  "interdependent activities must be coordinated, scheduled, aligned, meshed, integrated, etc. – in short: articulated" (Schmidt and Simone p. 158)

- "Articulation work arises as an integral part of cooperative work as a set of activities required to manage the distributed nature of cooperative work [...] Articulation work amounts to the following: First, the meshing of the often numerous *tasks*, clusters of tasks. Second, the meshing of *efforts* of various unit-workers (individuals, departments, etc.). Third, the meshing of *actors* with their various types of work and implicated tasks." (Schmidt and Bannon, 1992, pp. 18f.)

Demonstration

- Example: move big table out of room
- Here we see work and articulation work
- Give examples of both
- Is this cooperative work after all?

CSCW (Olson & Olson,2000; 2008)

- common ground
  - the knowledge people share, and they know the other has
- collaboration readiness
  - ready to engage in collaboration activities together?
- collaboration technology readiness
  - difficulties in adapting, adopting, bringing collaboration technologies into use (Grudin's 8 challenges)
- coupling of work
  - notion of interdependence in work
  - tightly coupled or loosely coupled
- organizational management (2008 add on)
  - practices shaping the basic premises for collaboration

CSCW (Bjørn et al. 2014)

- common ground
  - still a fundamental challenge in distributed work
- collaboration readiness
  - still a fundamental challenge in distributed work
- collaboration technology readiness
  - no longer a fundamental challenge in distributed work
- coupling of work
  - loosely coupled work cannot be identified as a prerequisite for succesful collaboration
- organizational management an essential concern

(More details in Bjørn et al 2014, Table II)

Eight Challenges for developers (Grudin,1994)

1. Disparity in work and benefit
2. Critical mass problems
3. Disruption of social processes
4. Exception handling
   - Say-do problem
5. Unobtrusive accessibility
   - Designing for infrequently used features
6. Difficulty of evaluation
   - Lab problems, evaluation time, imprecise methods
7. Failure of intuition
   - US culture (development management), GDSS research programs
8. The adoption process

Eight Challenges for developers (Grudin,1994)

-we focus on those in italics and bold

1. ***Disparity in work and benefit***
2. ***Critical mass problems***
3. Disruption of social processes
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   - US culture (development management), GDSS research programs
8. ***The adoption process***

1. Disparity in work and benefit(Grudin,1994)

- Groupware applications often require additional work from individuals who do not perceive a direct benefit form the use of the application
  - Electronic calendar system
  - Knowledge Management systems in general

Adressing the problem

- Use authority!
- Demonstrate both collective and indirect benefits
- Reduce work required of nonbeneficiaries (difficult)
- Design – along with IT – processes for using IT that create benefits for all

2. Critical mass problems (Grudin,1994)

- Groupware may not enlist the ”critical mass” of users required to be useful
  - Electronic calendar system

Adressing the problem:

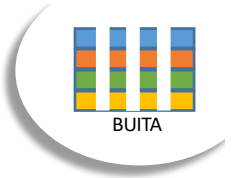
- Use authority!
- Design use processes that provide or emphasizes individual and collective incentives and benefits
- Invest in high level of support in start-up phase

8. The adoption process (Grudin,1994)

- Groupware requires more careful implementation/introduction in the workplace: If sold ”of the shelf” in the usual fashion it can be doomed.
  - Organizational implementation (or adoption; dissemination; diffusion; assimilation; acceptance)

Adressing the problem:

- A research area of its own! (Gallivan, 2001; Lee, 2003; Rogers, 2003)
  - Design to meet the real need of group members
  - ”Nice to have” is not enough
  - Provide education that demonstrates a positive impact on the work day
  - Develop strategies for organizational implementation and treat this task as a project of its own



Exercise

- Go through your INF PP project
- Find examples of ”eight challenges”
- Select one for presentation in plenum

Knowledge Management (KM)
Basic concepts (1)

Data

Information

Knowledge

Knowledge Management (KM)
Basic concepts (2)

Data

- Bunch of characters
- structured records of transactions (Davenport and Prusak 1998, p. 2)
  - 192.168.73.200 RUCQuickPlaceServer CN=frank/OU= alpha-QP/OU=QP/O= bank [05/May/2001:14:58:42 -0100] "GET /QuickPlace/ alpha-QP/Main .nsf/$defaultview/505538f1eb2b9dbf0525670800167214?OpenDocument& Form=FolderInit&NoRedirect&CacheResults&TimeStamp=41256A00004DA4F3& LoginName=CN=frank%2FOU=alpha-QP%2FOU=QP%2FO=bank HTTP/1.1"200 4789

Information

- Meaningful data (assumes an “interpretation-system”)
- Ex: “... man er enige om betydning af begreber som f.eks. at medicinordination er en anvisning af, hvilket præparat og dosis der må gives til en patient og under hvilket ansvar der administreres.” (Barlach 2015, p. 3)

Knowledge Management (KM)
Basic concepts (3)

Knowledge

- Information that you learn something from
- "justified true belief" (Nonaka, 1994, p. 15)
- Knowledge is a multifaceted concept with multilayered meanings (p.15)

  Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, if often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms (Davenport and Prusak, 98, p. 5))
- Knowledge derives from information [by] transformations [...] as:
  - Comparison
  - Consequences
  - Connections
  - Conversation

Dimensions of Knowledge

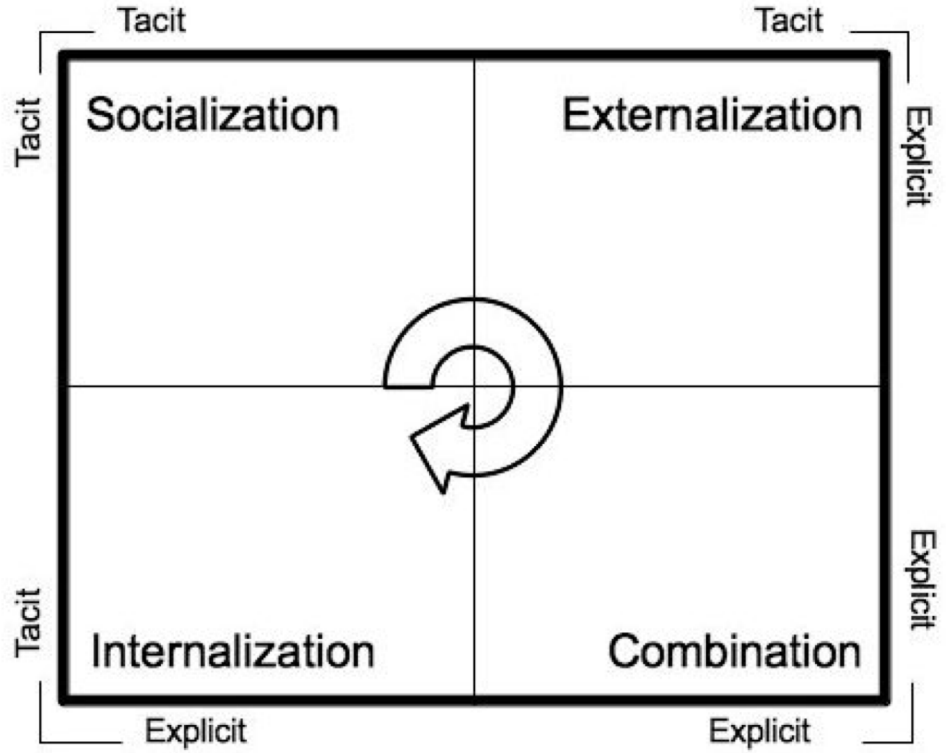
- Tacit vs. Explicit knowledge
- Know….
  - That
  - How
  - Who
  - Why

Knowledge re-use situations (Markus, 2001)

1. Shared work producers
   - Working together in a team on a shared product
   - Homogenous group or cross-functional team
   - Relatively few problems with knowlege re-use
2. Shared work practitioners
   - Community of practice (”people who do the same kind of jobs”)
   - Produce for each other to use
   - Few problems applying knowledge, but location and selection might be problematic
3. Expertise seeking novices
   - Knowledge transfer
   - Great difficulties at all stages
4. Secondary knowledge miners
   - Data mining

Knowledge Creation (Nonaka, 1994)

In organizations, knowledge is created by conversions between explicit and tacit knowledge



Nonaka's SECI model of knowledge dimensions

Four modes of knowledge conversion were identified (Figure 1):

Tacit to Tacit (Socialization) - Sharing tacit knowledge through face-to-face or share knowledge through experiences. Socialization typically occurs in a traditional apprenticeship, where apprentices learn the tacit knowledge needed in their craft through hands-on experience, rather than from written manuals or textbooks

Tacit to Explicit (Externalization) - Between tacit and explicit knowledge by Externalization (publishing, articulating knowledge). When tacit knowledge is made explicit, knowledge is crystallized, thus allowing it to be shared by others, and it becomes the basis of new knowledge.

Explicit to Explicit (Combination) - Explicit to explicit by combining different types of explicit knowledge, for example building prototypes. Explicit knowledge is collected from inside or outside the organisation and then combined, edited or processed to form new knowledge. The new explicit knowledge is then disseminated among the members of the organization

Explicit to Tacit (Internalization) - Explicit to tacit by Internalization (knowledge receiving and application by an individual), enclosed by learning by doing; on the other hand, explicit knowledge becomes part of an individual's knowledge and will be assets for an organization.

(Wikipedia: http://en.wikipedia.org/wiki/SECI_model_of_knowledge_dimensions)

Knowledge re-use concepts (Markus, 2001)

Roles: Producer ⇒ intermediary ⇒ consumer

- Knowledge producer
  ⇒ originator: records explicit knowledge or makes tacit knowledge explicit
- Knowledge intermediary
  ⇒ prepares for reuse: eliciting, sanitizing, structuring, summarizing, indexing, disseminating, facilitating, etc.
- Knowledge consumer
  ⇒ retrieves and applies
- Roles might be conducted by same or different actors or groups of actors
- Role of ICT: Typical as intermediary.
  (Overlap with producer and consumer role in AI, e.g. rule based systems)
- Relation between producer and consumer is decisive in characterizing 'reuse' situation and understanding context

Knowledge re-use concepts 2 (Markus, 2001)

Knowledge reuse process (4 parts)

1. Capturing and documenting knowledge
   - Passive/active, before/after the fact strategy
2. Packaging knowledge
   - Add/remove context, indexing using classification scheme
3. Distributing/disseminating knowledge
   - Passive/active (facilitation)
4. Reusing knowledge
   1. Defining the search question
   2. The search for, and location of expertise (or expert)
   3. Selection of appropriate expert advice (or expert)
   4. Applying the knowledge (”re-contextualization”)

Knowledge re-use

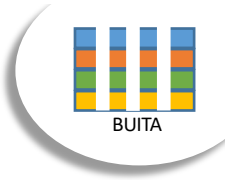
Central concern: who authors entries and for whom?

1. Content varies whether you are documenting for
   - Ourselves (me, my project team)
   - Similar others (eg. my supervisor)
2. Challenges

   "First, the records knowledge producers make purposely for their own use are not likely to meet the needs of others. Second, the records knowledge producers make for others may not meet their own needs, and therefore, they may not have adequate incentives to produce quality documents that meet the needs of others"

3. Focus needed on
   - Costs or work (Grudin's first challenge)
   - Incentives for knowledge producer
   - Human or technical intermediaries

Case story: Danske Bank ODC in Bangalore, India



- In 2006 Danske Bank established an ODC (off shore development center) in Bangalore, India
- The ODC quickly grew to 4-500 staff members. The idea was to have the ODC staff members participate in DB's development projects alongside DB staff members in CPH.
- However, that turned out not to be easy
- Knowledge asymmetries, cultural challenges, timezone challenges, collaboration challenges
- Exercise: discuss with you neighbour how to make sense of this using concepts from the lecture

Knowledge Management (KM)
Basic literature

Argyris and Schön, 1978: Learning organization

Nonaka: A Dynamic Theory of Organizational Knowledge Creation

Davenport & Prusak: Working Knowledge. How Organizations Manage What They Know

Dixon: Common Knowledge. How Companies Thrive by Sharing What They Know ()

Markus : Toward a Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success.

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Success/failures-cases

- Bobrow & Whalen: Community Knowledge Sharing in Practice: The Eureka Story
- Bansler & Havn: Knowledge Sharing in Heterogeneous Groups: An Empirical Study of IT-Support for Sharing Better Practices

Computer Supported Cooperative Work (CSCW)

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Knowledge Management