



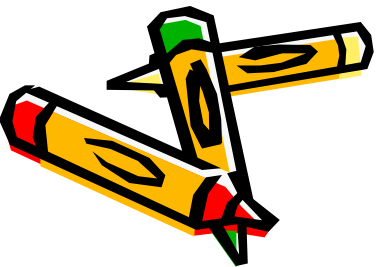
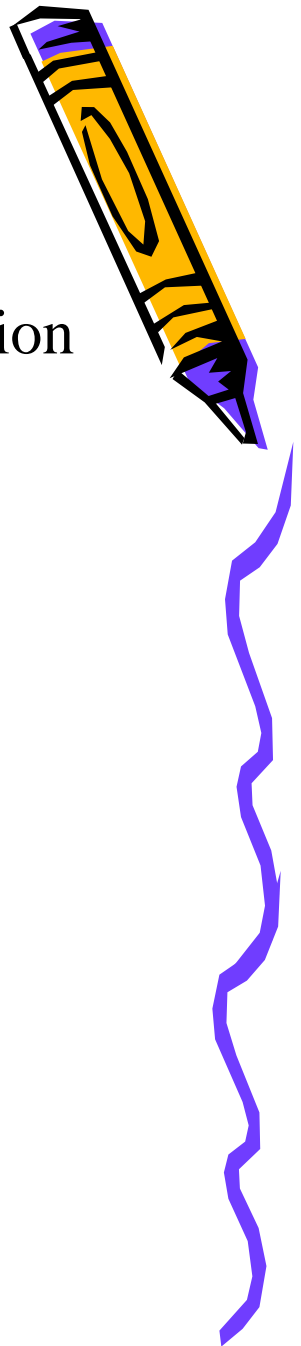
Measurement of team  
knowledge:  
transactive memory system and  
team mental models

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# Team Knowledge (1 of 5)

- Belongs to a broader research stream on group cognition
- Group knowledge is more than the sum of group members' knowledge
- Multifaceted nature
- Different explanations, e.g.:
  - transactive memory system
  - team mental models



# Team Knowledge (2 of 5)

## Transactive memory system

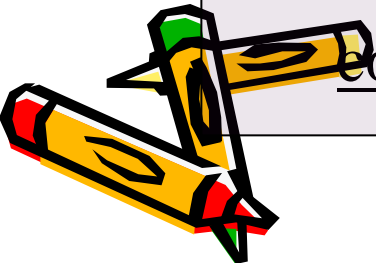
- Fulk et al., 2005:
  - transactive memory system
- Transactive memory system (Wegner)
  - “a set of individual memory systems in combination with the communication that takes place between individuals” (Wegner, 1986)

### Transactive memory system

individual expertise

knowledge of “who knows what”

communication processes between individuals



# Team Knowledge (3 of 5)

## Team mental models

- Cooke et al., 2005:  
“collection of task- and team-related knowledge held by teammates and their collective understanding of current situation”

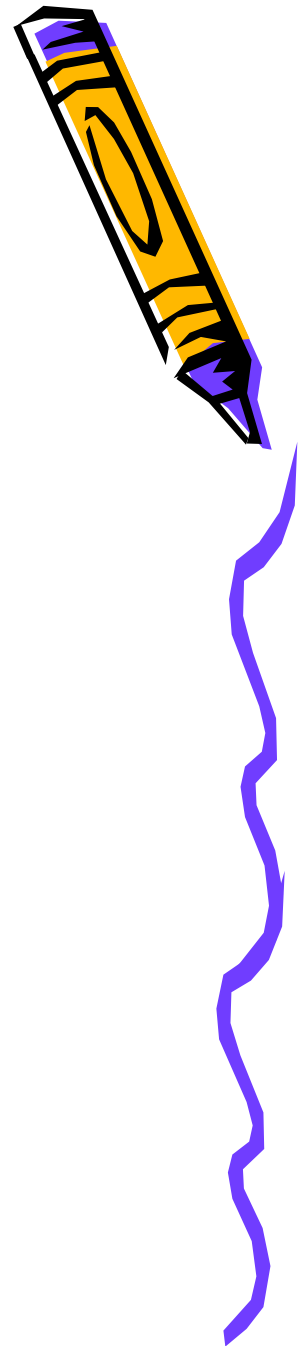
### Team knowledge

- team mental model
  - task-related knowledge
    - » individual expertise
    - » equipment-related knowledge
  - team-related knowledge
    - » “who knows what” in a team

situation model



# Team Knowledge (4 of 5)



What does “shared” mean?:

- 1) identical (held in common) knowledge;
- 2) “divided” or “distributed among team members” (no overlap);
- 3) overlapping knowledge (some of the knowledge is different, some is held in common)



# Team Knowledge (5 of 5)

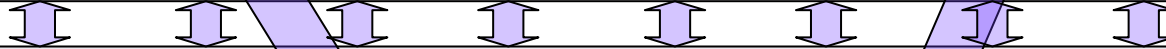
## Transactive memory system and Team mental models

### Transactive memory system

individual expertise (heterogeneity)

knowledge of “who knows what” (homogeneity)

communication processes between individuals



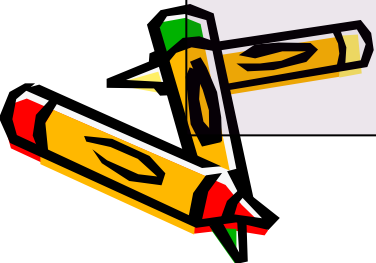
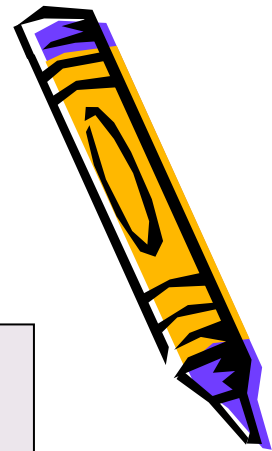
### Team mental model

task-related knowledge

- individual expertise (homogeneity)
- equipment-related knowledge
- ...

team-related knowledge

- “who knows what” in a team (homogeneity)
- ...



# Measurement of Team Knowledge (1 of 4). General considerations

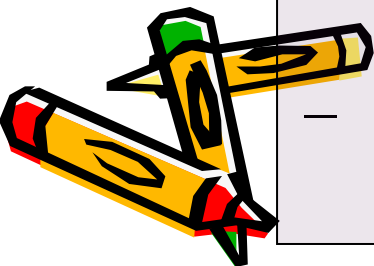
1. No uniform measure
2. Different measurement targets (e.g. heterogeneity vs. homogeneity) - different measures

## 3. Grouping according to data-collection methods:

- collective
  - aggregation of individual measures
- holistic

## 4. Grouping according to provided cognitive content:

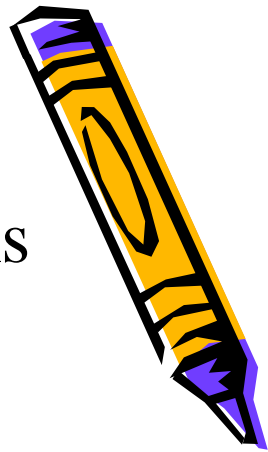
- direct
  - cognitive content is provided by researchers
- indirect
  - manifestations: indirect behavioural measures



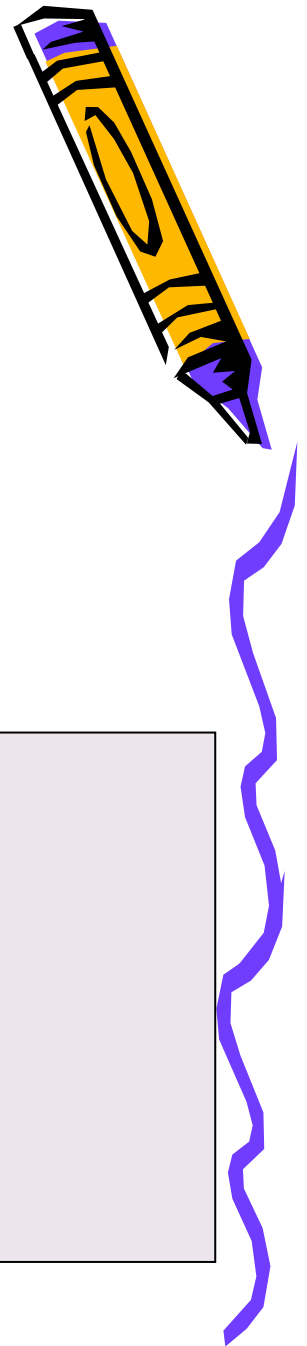
# Measurement of Team Knowledge

(2 of 4). Measurement of TMS in work teams

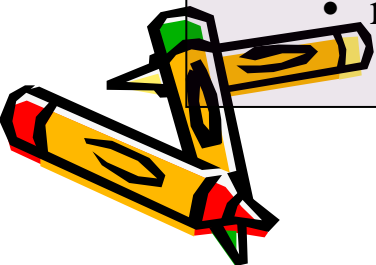
- 7 studies
- Different definitions of transactive memory system
  - (sometimes only awareness of “who knows what” without knowledge possessed by team members)
- Measurement of awareness:
  - only agreement (while accuracy and complexity are also important)
- Aggregation
- Indirect measures or combination of direct and indirect methods



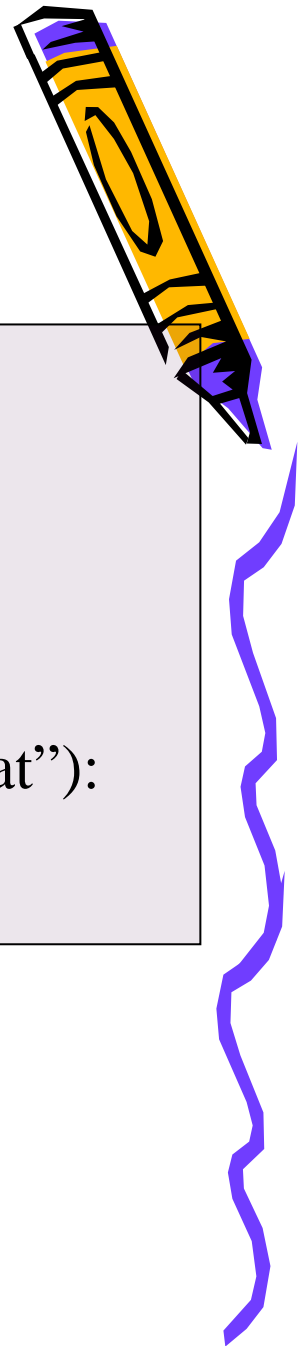
# Measurement of Team Knowledge (3 of 4). Example (description)



- Distributed R&D team:
  - 8 people (University of Vaasa and Finnish company)
  - development of supply chain management software
  - final stage of the project
  - tenure differences are negligible
- Measurement:
  - Transactive memory system:
    - indirect aggregated measure: “specialization, credibility, coordination” scale (Lewis, 2003)
  - Team mental model:
    - reports on expertise of the others (Rau, 2005, Lewis, 2003)



# Measurement of Team Knowledge (4 of 4). Example (results)



- Transactive memory system (Lewis's scale):
    - developed more than average
      - specialization: 3,9
      - credibility: 3,5
      - coordination 3,4
  - Team mental model (awareness of “who knows what”):
    - 5 people out of 8 were unable to say “who knows what”
      - “I don't know them at all”
- ↑↓
- Possible explanations:
    - influence of centralized communication
    - lack of face-to-face communication due to physical distance



# Conclusions and Directions for Future Research

- Lack of parsimony in definitions and measurement approaches precludes empirical research on measurement of team knowledge
- Agreement is needed on how to conceptualize TMS for measurement purposes
- A need of holistic measures
- “Who knows what”: measure accuracy and complexity as well
- Application of existing measures to diverse organisational settings requires caution

More research on the topic is needed





**Thank you**

Questions?

