Contextual Usability

How to do research on real-world problems and how real world problems influence our research

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FDD3001/DA2205 Research: Theory, Method, Practice

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Where I come from...

Administrative work
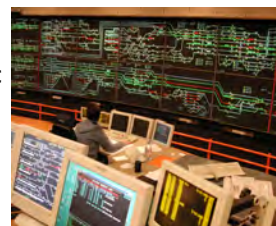
Health care work

Operating a ship or a vessel

Process and traffic control

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arkitekterna

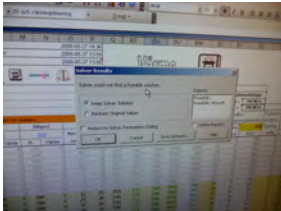*Management consultant at Frontwalker*

❖ Sustainable business development

❖ User-centred systems design

❖ User-driven innovation

❖ Usability coaching

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KTH
VETENSKAP
OCH KONST

ROYAL INSTITUTE
OF TECHNOLOGY

Human-Computer Interaction

- Research & education since 1985

- Involving the users in ICT design/development

- Collaboration in research with industry & organizations

- Interdisciplinary: Technology/computer science + human sciences + design

Contact

Human-Computer
Interaction Group
School of Computer Science and
Communication

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What is Human Computer Interaction (HCI)?

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– "Many would consider the field being about one person interacting with a computer with no connection to the outer world."

Human-computer interaction is a discipline concerned with the ***design***, ***evaluation*** and ***implementation*** of interactive computing systems for ***human use*** and with the study of ***major phenomena surrounding*** them.

(ACM SIGCHI curricula for Human-Computer Interaction by by Hewett, Baecker, Card, Carey, Gasen, Mantei, Perlman, Strong and Verplank, 1992)

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Human Computer Interaction is about understanding work…

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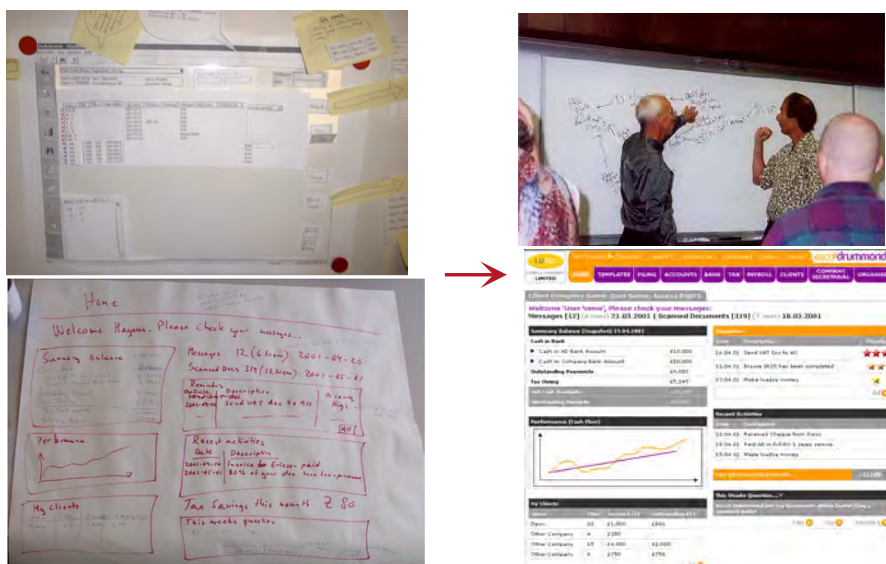
...and converting that knowledge into concrete ideas of change...

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...Simulating the future work through storyboards and scenarios...

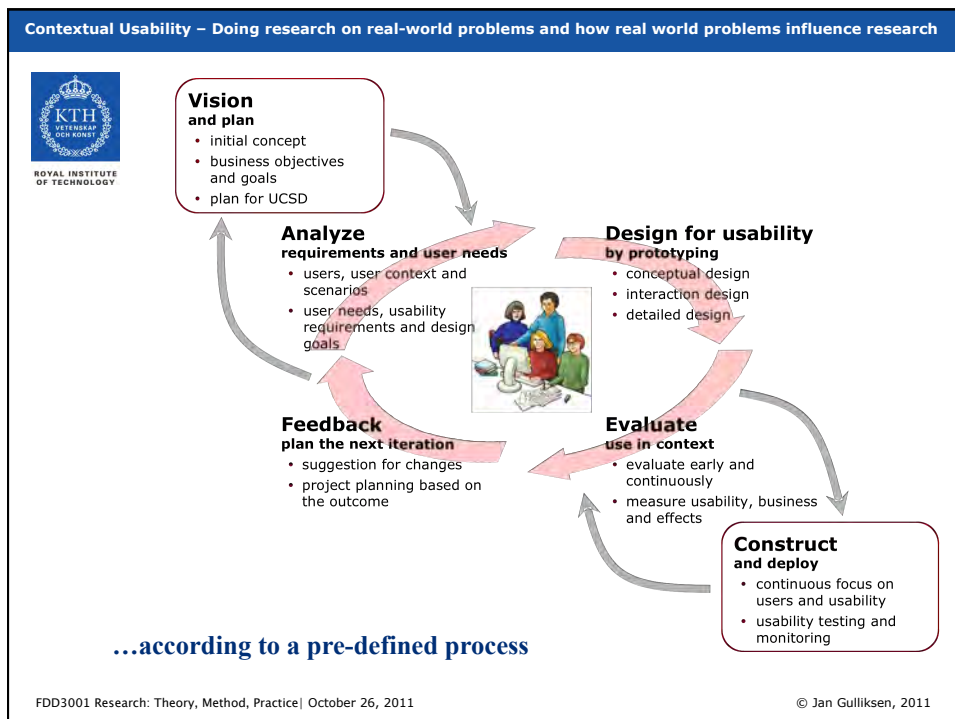FDD3001 Research: Theory, Method, Practice| October 26, 2011   © Jan Gulliksen, 2011

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…and to implement and evaluate the change together with the workers...

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Vision
and plan
• initial concept
• business objectives and goals
• plan for UCSD

Analyze
requirements and user needs
• users, user context and scenarios
• user needs, usability requirements and design goals

Design for usability
by prototyping
• conceptual design
• interaction design
• detailed design

Feedback
plan the next iteration
• suggestion for changes
• project planning based on the outcome

Evaluate
use in context
• evaluate early and continuously
• measure usability, business and effects

Construct
and deploy
• continuous focus on users and usability
• usability testing and monitoring

…according to a pre-defined process

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"Know thy user…"

❖ Background (computer science, engineering, psychology, design, etc.)?

❖ Previous work experience?

❖ Year 1, 2, 3, 4+, ready?

❖ Freedom to select research topic yourself?

❖ Extent of user involvement

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How would you want to be quoted in the future?

❖ Take a few minutes to specify how you would want your research to be quoted in the future.

❖ For example:

NN showed that the user experience for users with aphasia became 7 times higher when a brain computer interface was applied (NN, 2009)

The Incredible™ method was defined by NN to support eye movement input to maneuver a car (NN 2011)

❖ An example of warning:

"lots of research has been done in this field (Gulliksen, 1996)"

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What is your research question?

❖ Have you already arrived at a clear research question?

What is your research question?

❖ Have you already arrived at a clear research question?

❖ So, does your research question fit the way you want to be quoted in the future???

When did you last change your research question?

❖ "On average I would say three weeks before publication of the thesis"

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Motivation for doing research

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Why do you do research?

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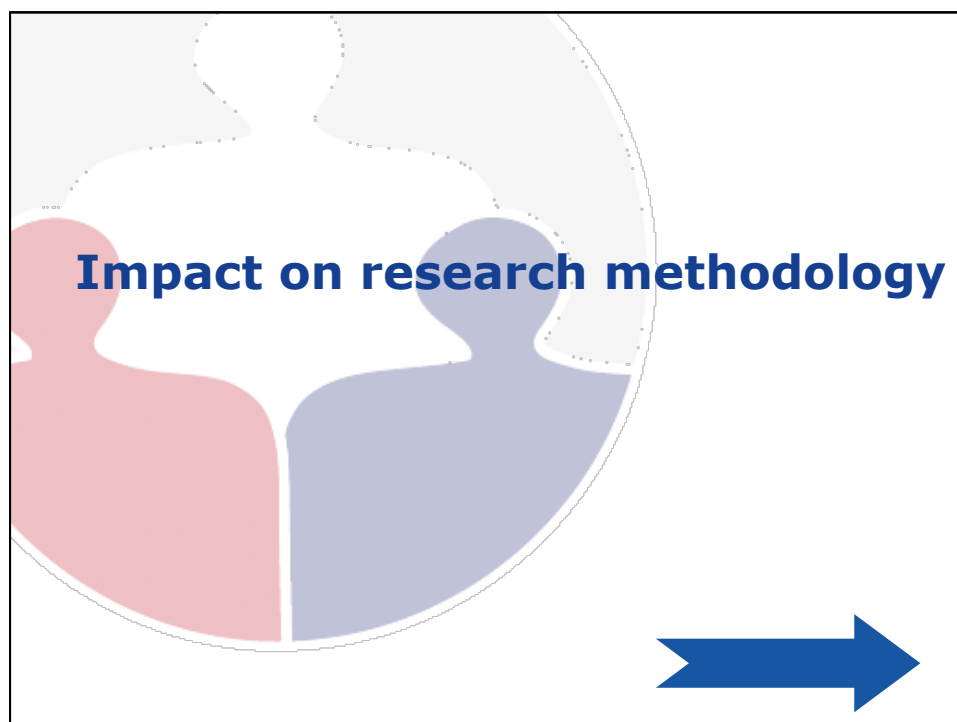**Contextual Usability – Doing research on real-world problems and how real world problems influence research**

What is the purpose of doing a PhD?

❖ Get enough knowledge to be able to trust your ways of achieving your results

❖ Learn to master a tool to help you to be able to tell what is the truth and what's not

❖ Are you doing the research that is the most easy one to do right and to get published?

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Are your motives reflected in your research question?

❖ Discuss with your neighbour for a few minutes…

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What motivates me?

❖ Doing something that will make a difference to people.

❖ Social responsibility and sustainability
❖ Accessibility and Design-for-all
❖ Work environment problems and how to avoid them

❖ I enjoy thinking about difficult problems

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What is your overall research objective?

I will give you three options…

1. You want to change the world?
2. You want to contribute new knowledge to the world?
3. You want a PhD?

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Impact on research methodology

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2011

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What makes HCI such a difficult research subject?

❖ Multidisciplinary – you are expected to have breadth and depth in all subjects.

❖ It is not getting answers that is the most problematic, it is asking the right questions?

❖ HCI often deals with wicked problems

❖ Don't be tempted to select an easy research problem – rather go for an interesting or relevant problem

❖ HCI is (or should be) based on a set of values that will help you ask the right research questions

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## Let's get some inspiration from Ben Shneiderman's keynote at INTERACT 2007
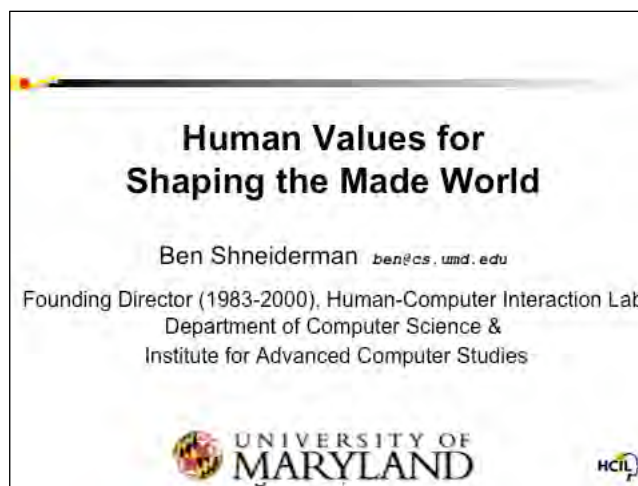
Human Values for Shaping the Made World

Ben Shneiderman ben@cs.umd.edu

Founding Director (1983-2000), Human-Computer Interaction Lab
Department of Computer Science &
Institute for Advanced Computer Studies

UNIVERSITY OF MARYLAND

HCIL

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Interdisciplinary Challenges

❖ Modern problems are complex

❖ Solutions require multiple disciplines

❖ Laboratory studies have limited relevance

❖ Natural sciences are not sufficient

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Science 1.0

Reductionist

Controlled Experiments

Replicability

Laboratory

Individual

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Science 1.0   +   Science 2.0

Reductionist → Integrated

Controlled Experiments → Case Studies

Replicability → Validity

Laboratory → Situated

Individual → Collaboration

Science 2.0 Emerges

Interdisciplinary study of the made world

❖ Socially embedded

❖ Bringing closer together
  ▪ theory & practice
  ▪ basic & applied research

❖ New research directions (Emerson, Dewey, James, Vygotsky, Simon, Suchman, Nardi, … and many of you!)

Science 2.0 Evaluation Methods

Ethnographic Observational Situated

- ❖ Multi-Dimensional
- ❖ In-depth
- ❖ Long-term
- ❖ Case studies

- ❖ Domain Experts & Communities Doing Their Own Work for Weeks & Months

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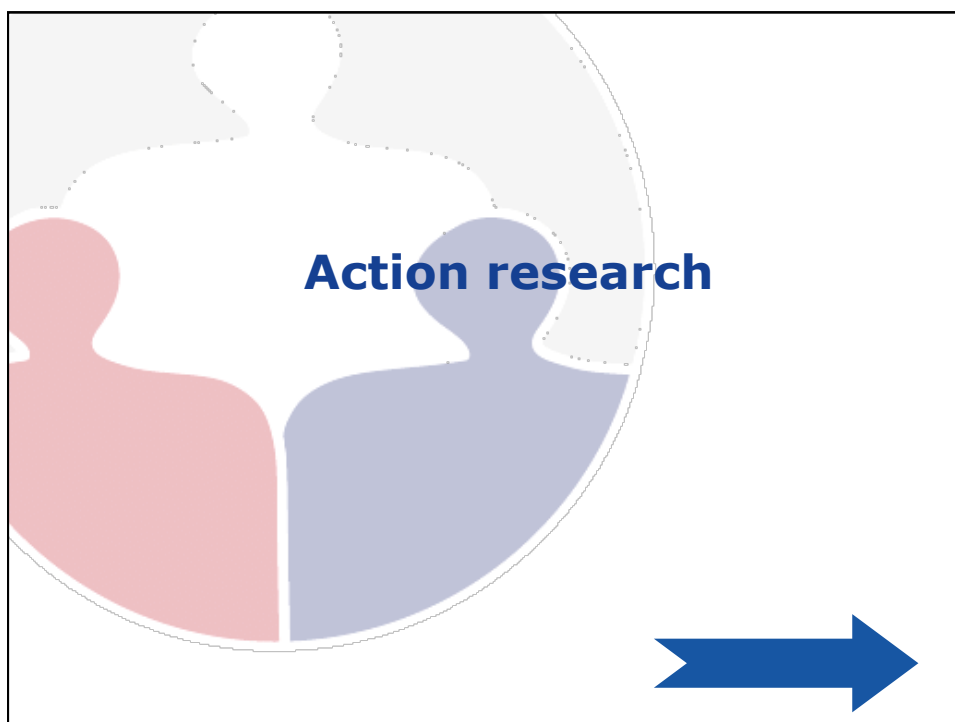
Action research

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❖ Is it possible to do research when you have a stake in the results?

❖ How do we deal with the fact that we might wish for a specific result to happen?

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Action Research Defined
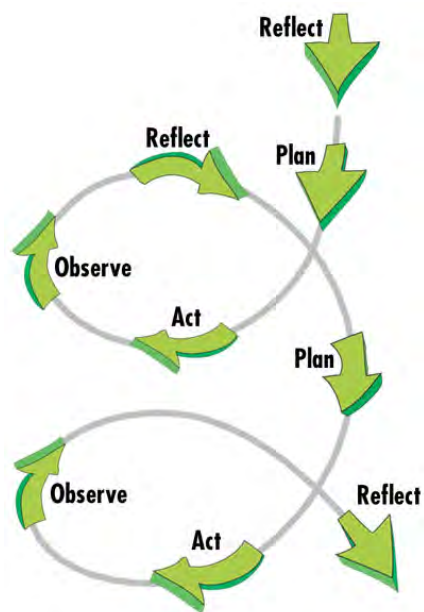
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What is Action research?

❖ A method?

❖ A framework?

❖ A theoretical foundation?

❖ A philosophy?

❖ *…or all of the above???*

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Situatedness

Lucy A. Suchman
PLANS AND SITUATED ACTIONS
The problem of human machine communication

❖ **Lucy Suchman**

❖ All activities are situated

❖ It is impossible to stick to a predefined plan

❖ This is true also for research

❖ *"But yet we keep disguising the fact that research questions evolve and that research is adapted to dynamically changing outer constraints and irrational events and last but not least to people!"*

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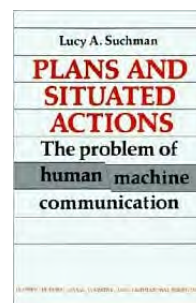
Coining the concept of *Action research*

"a comparative research on the conditions and effects of various forms of social action and research leading to social action"

that uses

"a spiral of steps, each of which is composed of a circle of planning, action, and fact-finding about the result of the action"

Kurt Lewin (1946) Action research and minority problems.
The Journal of social issues [0022-4537] Vol. 2, No. 4, p. 34

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The steps and processes involved in planned change through action research.

❖ Action research is depicted as a cyclical process of change.
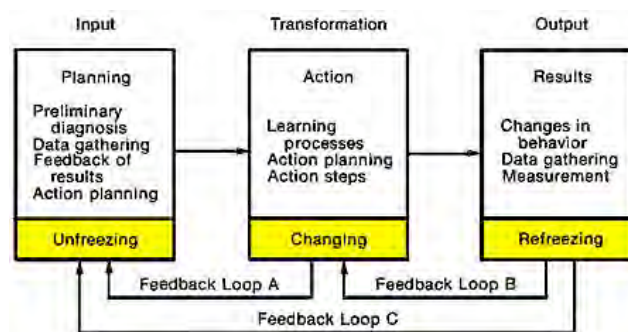
Kurt Lewin (1958). Group Decision and Social Change. New York: Holt, Rinehart and Winston. pp. 201.

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Definition of Action research

AR aims to contribute to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework.

Robert N. Rapoport (1970) **Three Dilemmas in Action Research: With Special Reference to the Tavistock Experience,** *Human Relations 1970; 23; 499*

The
**Tavistock Institute
Of Human Relations:**
Shaping the Moral, Spiritual, Cultural, Political, and Economic Decline of The United States of America.

John Coleman

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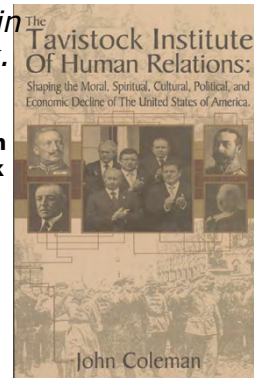
Definition of Action research

*"Action research is an **interactive inquiry process** that balances **problem solving** actions implemented in a **collaborative context** with data-driven collaborative analysis or research to understand **underlying causes** enabling future predictions about **personal and organizational change**"*

Handbook of
ACTION RESEARCH

Concise Paperback Edition

Peter Reason, Hilary Bradbury (2002) Handbook of Action Research: Participative Inquiry and Practice, 2nd Edition, SAGE

PETER REASON and HILARY BRADBURY

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Characteristics of Action research

Worthwhile purposes

Participation & Democracy

Emergent Developmental Form

Knowledge in Practice

Many ways of knowing

Peter Reason, Hilary Bradbury (2002) Handbook of Action Research: Participative Inquiry and Practice, 2nd Edition, SAGE

Handbook of ACTION RESEARCH

Concise Paperback Edition

Edited by PETER REASON and HILARY BRADBURY

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Criticism to Action Research

*"While supporters try to create a balanced picture of implications from the various research methodologies within AR, dissidents aim only at the fundamental difference from traditional methods, namely the intention to accomplish change through getting involved and the application of uncontrolled, unconstrained iterative processes where the **actual change is the only valuable research finding**" (Hodgkinson, 1957).*

Hodgkinson, H L. (1957). Action Research – A Critique. In Journal of Educational Sociology, Vol. 31, No. 4, pp. 137-153

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Elaboration on Action Research

An umbrella term for several different strategies that involve *"activities intended to **foster change on the group, organizational, and even societal levels**" (Dickens & Watkins 1999, p. 127).*

Dickens, L. and Watkins, K. (1999). Action Research: Rethinking Lewin. In Management Learning Vol. 30(2): 127–140. Sage Publications: London, Thousand Oaks, CA and New Delhi

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THE ACTION TURN
Toward a Transformational Social science

Action research challenges traditional social science, by moving beyond reflective knowledge created by outside experts sampling variables to an active moment-to-moment theorizing, data collecting, and inquiring occurring in the midst of emergent structure.

"Knowledge is always gained through action and for action. From this starting point, to question the validity of social knowledge is to question, not how to develop a reflective science about action, but how to develop genuinely well-informed action—how to conduct an action science".

Reason, P., & Torbert, W. R. (2001). Toward a Transformational Science: a further look at the scientific merits of action research. Concepts and Transformations, 6(1), 1-37.

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What is knowledge?

❖ What kind of knowledge do you gain from AR projects?

❖ What is science?

❖ Reflective practitioner

❖ Donald A. Schön
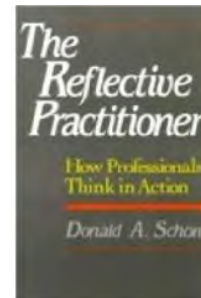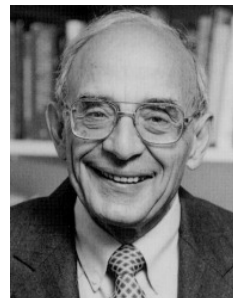
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Klein & Myers

7 Principles of interactive research

1. The Fundamental Principle of the Hermeneutic Circle

2. The Principle of Contextualization

3. The Principle of Interaction Between Researchers and the Subjects

4. The Principle of Abstraction and Generalization

5. The Principle of Dialogical Reasoning

6. The Principle of Multiple Interpretations

7. The Principle of Suspicion

Figure 7:1   The seven principles of interpretive research as suggested by Klein and Myers (1999)

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Theory versus Practice

Much of the literature on AR seems to be concerned with the chasm in social science between theory and practice; between researcher and subject (Dickens & Watkins 1999, Rasmussen, 2004).

Dickens, L. and Watkins, K. (1999). Action Research: Rethinking Lewin. In Management Learning Vol. 30(2): 127–140. Sage Publications: London, Thousand Oaks, CA & New Delhi
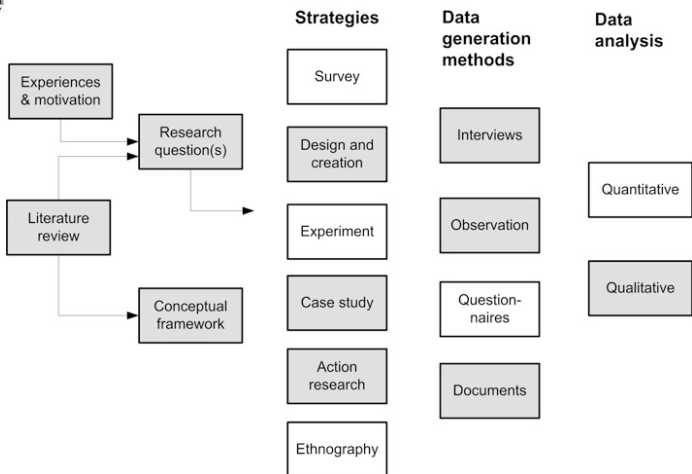
Lauge Baungaard Rasmussen (2004) Action research— Scandinavian experiences. In AI & Soc 18: 21-43

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The process of research

Oates, B. J. (2006). *Researching Information Systems and Computing. Oxford,* SAGE Publications.

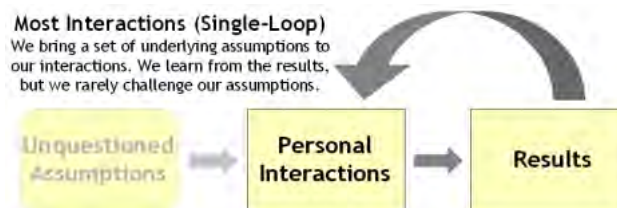FDD3001 Research: Theory, Method, Practice| October 26, 2011   © Jan Gulliksen, 2011

Action science

Human actions are designed to achieve intended consequences and governed by a set of environment variables. How those governing variables are treated in designing actions are the key differences between **single loop learning** and **double loop learning**. When actions are designed to achieve the intended consequences and to suppress conflict about the governing variables, a single loop learning cycle usually ensues. On the other hand, when actions are taken, not only to achieve the intended consequences, but also to openly inquire about conflict and to possibly transform the governing variables, both single loop and double loop learning cycles usually ensue. (Argyris applies single loop and double loop learning concepts not only to personal behaviors but also to organizational behaviors in his models.)

Argyris, C. Putnam, R. & Smith, D. 1985. Action Science: Concepts, methods and skills for research and intervention. San Francisco: Jossey-Bass.

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Action science – single loop

Argyris, C. Putnam, R. & Smith, D. 1985. Action Science: Concepts, methods and skills for research and intervention. San Francisco: Jossey-Bass.
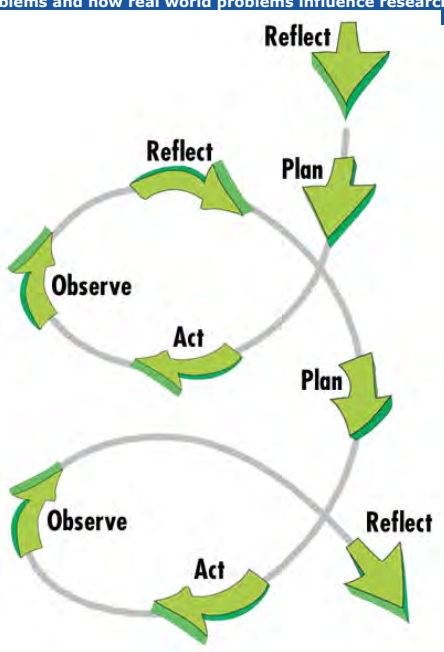
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What aspects of the cases are important?

❖ Researcher-practice cooperation (contract, power, funding, initiative)

❖ Conflicts in research agenda and the goal of the practice

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Case: Swedish National Tax Board (RSV)

❖ 10 year longitudinal action research projects (1994-2004)

❖ Funding from different places

    Arbetslivsfonden, Arbetsmiljöfonden, Nutek, Vinnova and RSV

❖ Continuous progression

    Evaluation – Design – Methods – Processes – Attitudes

❖ Cooperation with both business side and IT side

❖ Extensive union cooperation

❖ Many success cases but also some gigantic failures

❖ Positive attitude towards research and researchers, at least on the middle management and user level

❖ In the end the most innovative public authority in Sweden

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Case: CSN

- ❖ 4 year longitudinal Action research project (2004-2009)
- ❖ Funded by Utvecklingsrådet/Satsa Friskt
- ❖ Business development, Usability Index, Software development processes, Competence development
- ❖ Up to 8 researchers involved
- ❖ High ambitions with involvement all the way from GD to users

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Case: CSN (Hello World)

- ❖ Background: Teaching HCI methods to software developers.
- ❖ Practical exercises in field studies, (design and evaluation)

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Case: CSN (Hello World)

❖ Data gathering:

- Research diary
- Participatory observation
- Survey after field studies
- Group feedback of field study survey
- Field study documentation
- Course evaluation
- Interviews
- Participation in project where field studies were used

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Case: CSN (Hello World)

❖ Data analysis

- Immediate reflection and group discussion
- Oral presentation considering the feedback
- Transcribing interviews, finding themes, tagging, cutting up and resorting interview material

- …but above all, the writing process is a very important process, rarely discussed in HCI, and never acknowledged as an important research tool.
- …additionally making research a group process improves the quality tremendously

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Case: CSN (Hello World)

❖ Problems:
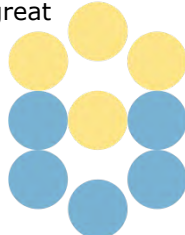 ▪ How can any generalizable knowledge be extracted from the cases?

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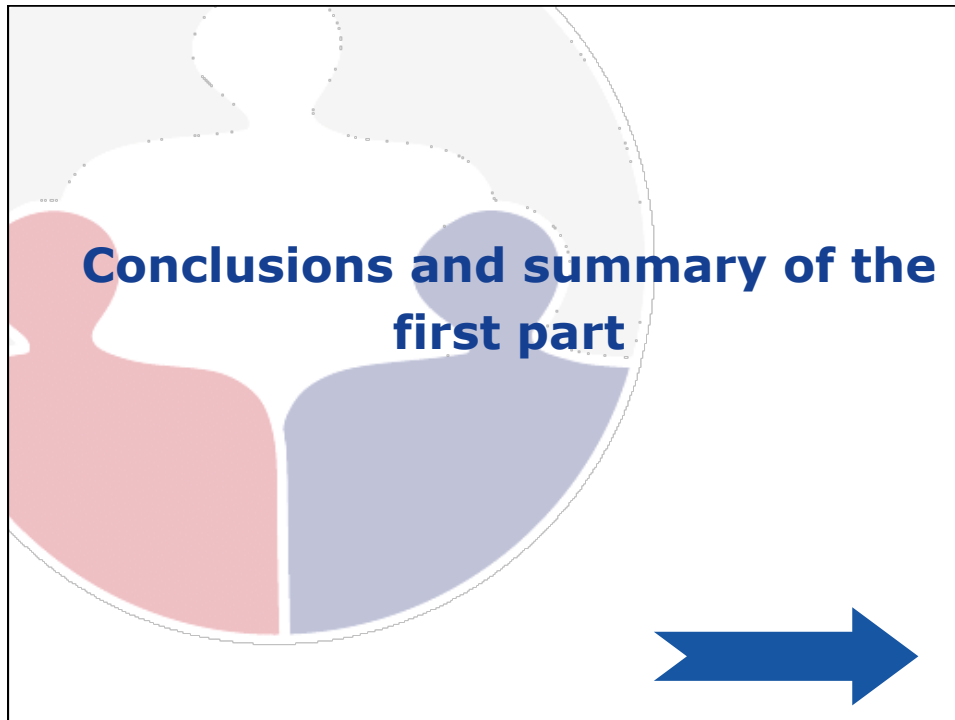**Contextual Usability – Doing research on real-world problems and how real world problems influence research**

Case: BV (Swedish companies registration office)

❖ Project purpose to increase health and improve the work environment

❖ Local project leader got burned out

❖ They demanded that we took over her role

❖ Disaster and project aborted – many people were really upset

❖ Today they mention the aborted project as a great success

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Conclusions and summary of the first part

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Thoughts I hope I have managed to raise?

- ❖ Doing a PhD should not be a lifetime achievement, it is the end of a research education – it is better to practice all sorts of research methodologies than making a lifetime achievement.

- ❖ Don't go for the easy problems, go for the problems that you burn for and that may make a difference to a third party.

- ❖ Theories are not something you pick for the day, they are the lenses through which you see the world, so pick those theories that fit your basic values and prepare to argue why you have not selected the others.

- ❖ Don't forget the analysis work – a lot of it happens during the writing process.

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