

Action Research Fundamentals

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RESEARCH CENTRE FOR

socio-interactive design

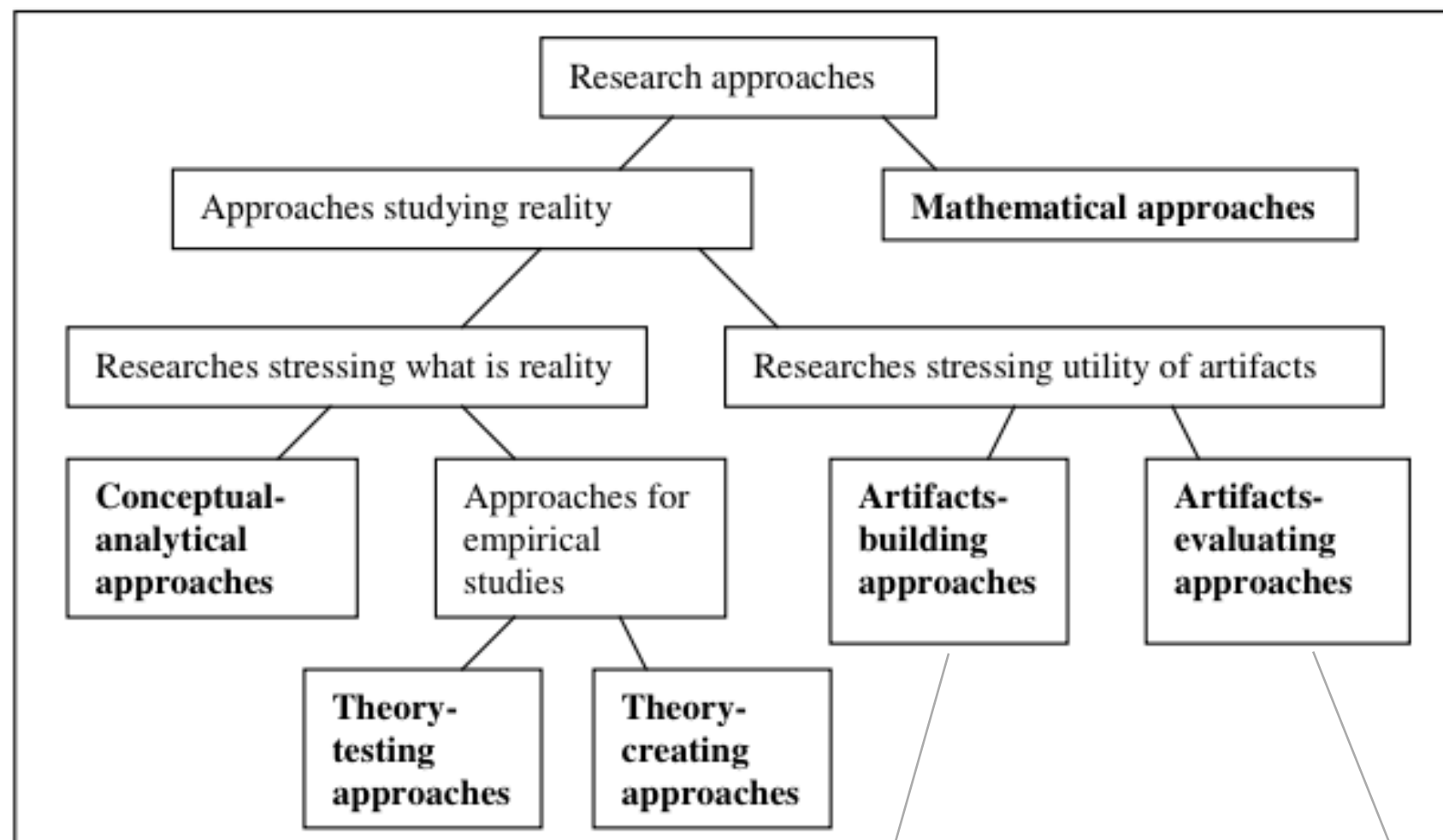


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Definition of action research

- "Action research simultaneously assists in practical problem-solving and expands scientific knowledge, as well as enhances the competencies of the respective actors, being performed collaboratively in an immediate situation using data feedback in a cyclical process aiming at an increased understanding of change processes in social systems and undertaken within a mutually acceptable ethical framework."

Hult & Lennung, 1980



In *building* a new artifact utility aspects are striven and a particular (IS) development model is applied. The research question could be: Is it possible to build a certain artifact? In *evaluation* of the artifact, e.g. an information system, some

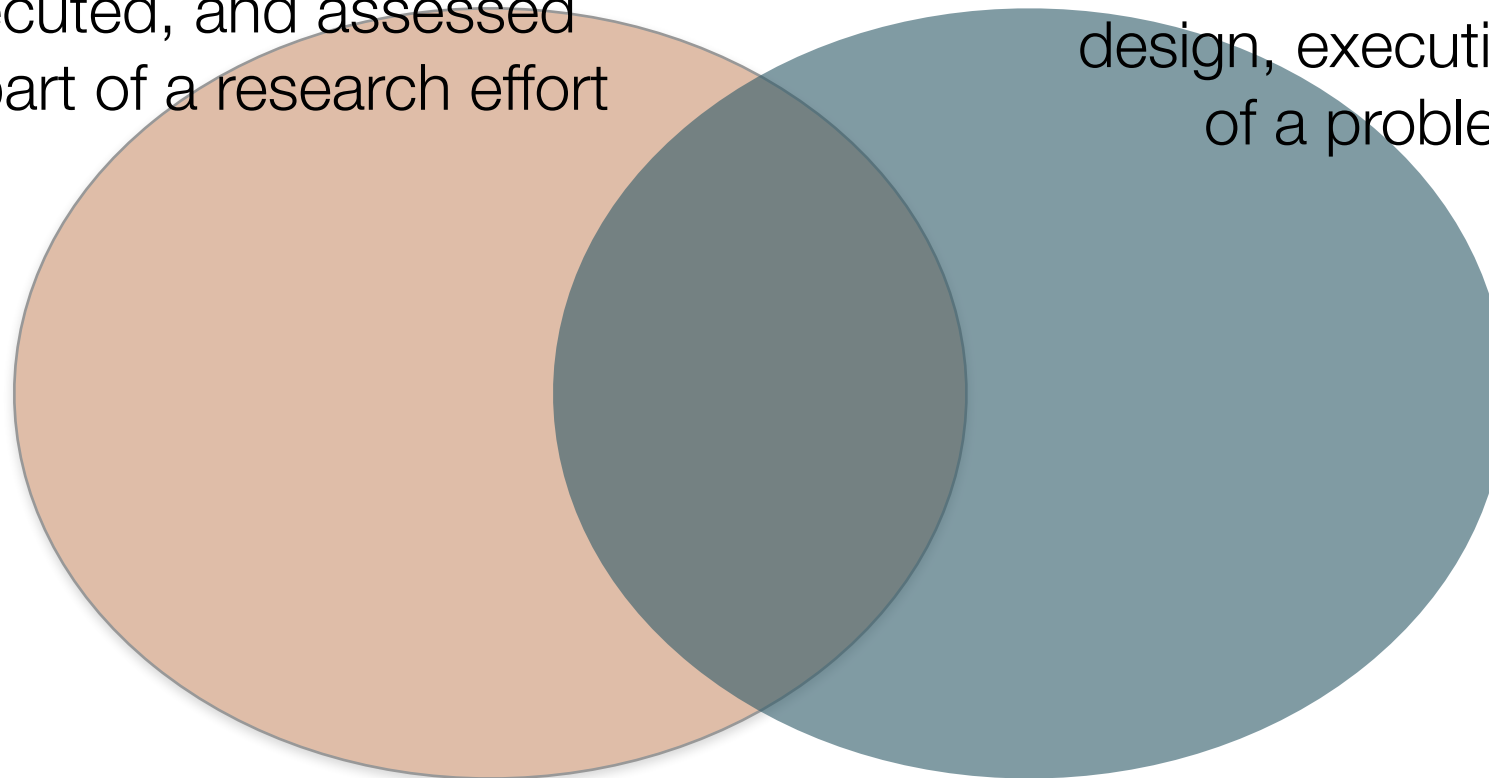
eria are used and some measurements performed. A researcher could ask: How effective is this artifact? A *research* contains the following phases: diagnosing, a

the cyclical process [20]. Hence, action research contains both building and evaluation in the same process. A researcher is then working with a client and the latter could ask: Could you help me and could we together solve this problematic situation?

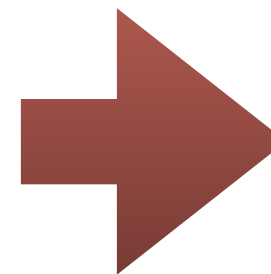
Järvinen's classification of IT/IS research approaches

problem-solving that is not
designed, executed, and assessed
as an integral part of a research effort

research that does not include
design, execution, and assessment
of a problem-solving effort



action research, i.e., research
that includes and is mainly
based on practical
problem-solving



generates action knowledge,
i.e., knowledge that actors
are ready to act on
or actually act on
(Baburoglu & Ravn, 1992)

Striking a balance

Action knowledge

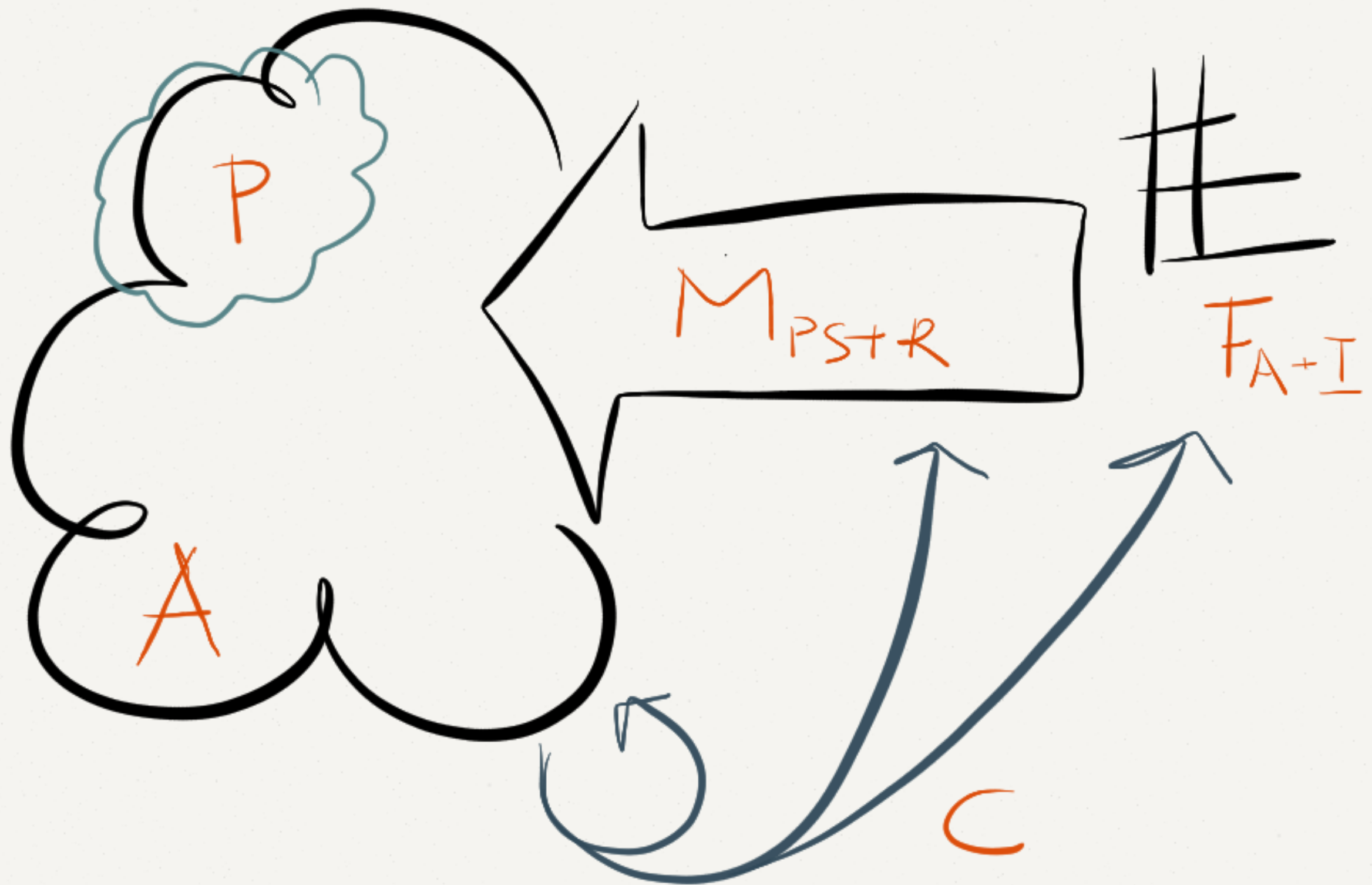
Why action research?

- 🌀 provides first-hand and deep insight into IT practices
- 🌀 supports development of relevance criteria
- 🌀 includes complete learning cycles
- 🌀 provides good opportunities for industrial collaboration

- 🌀 highly dependent on problem-owners
- 🌀 highly dependent on action researchers' competence and credibility
- 🌀 research focus emerges - risky
- 🌀 it is always case-based
- 🌀 not a main stream approach to IT research

Exemplar: Checkland and SSM

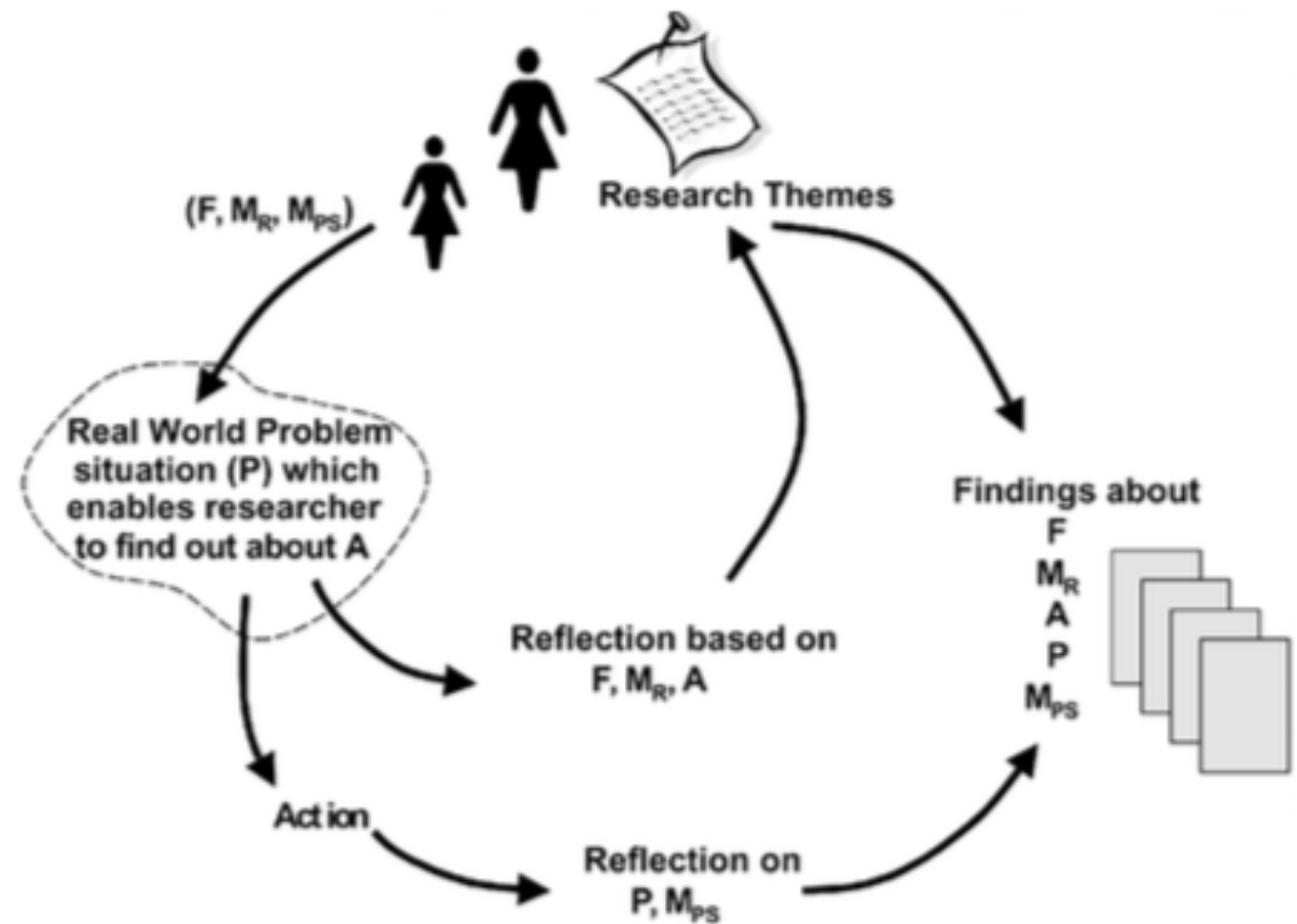
- Longitudinal development of an organizational problem-solving methodology
- "The criterion by which the research was judged internally was its practical success as measured by the readiness of actors to acknowledge that learning had occurred, either explicitly or through implementation of changes" (Checkland, 1981)
- "... it is the methodology that is generalised rather than the contents of models" (Checkland, 1981)
- Soft Systems Methodology is generalised from several hundred applications of the methodology where all models were taken to be unique



FMA

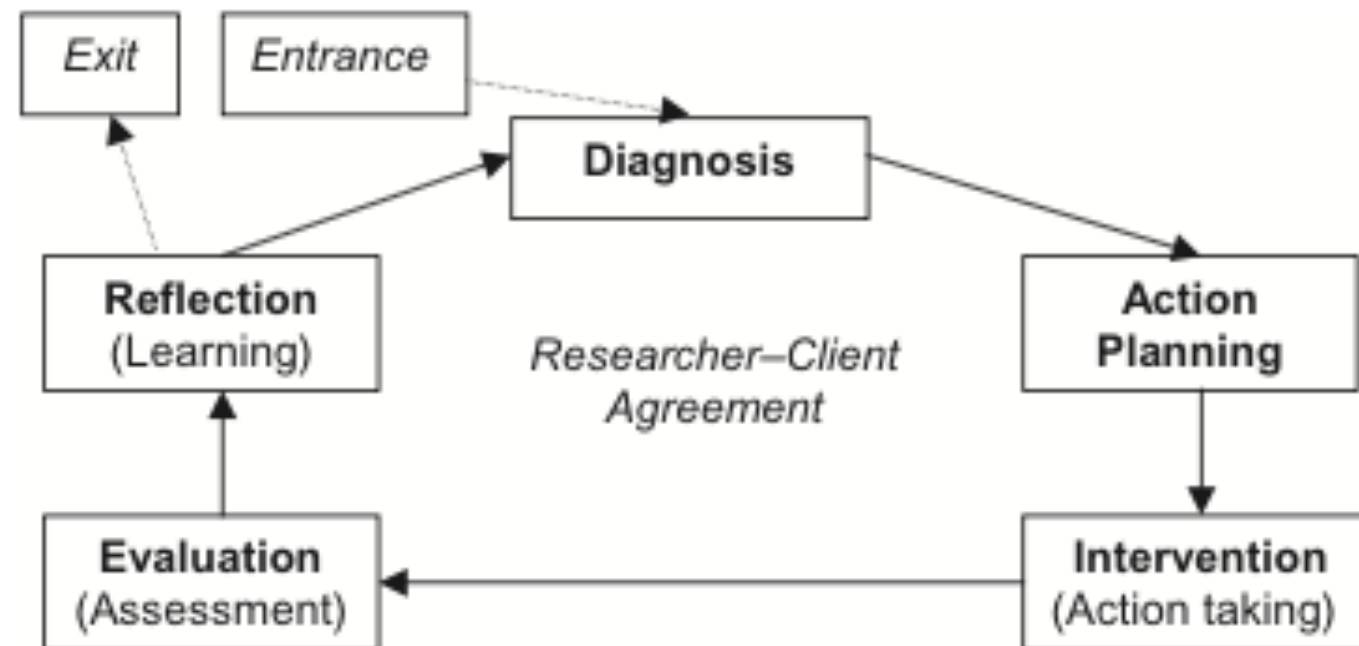
FMA expanded

- McKay & Marshall, 2001
- Mathiassen et al., 2012



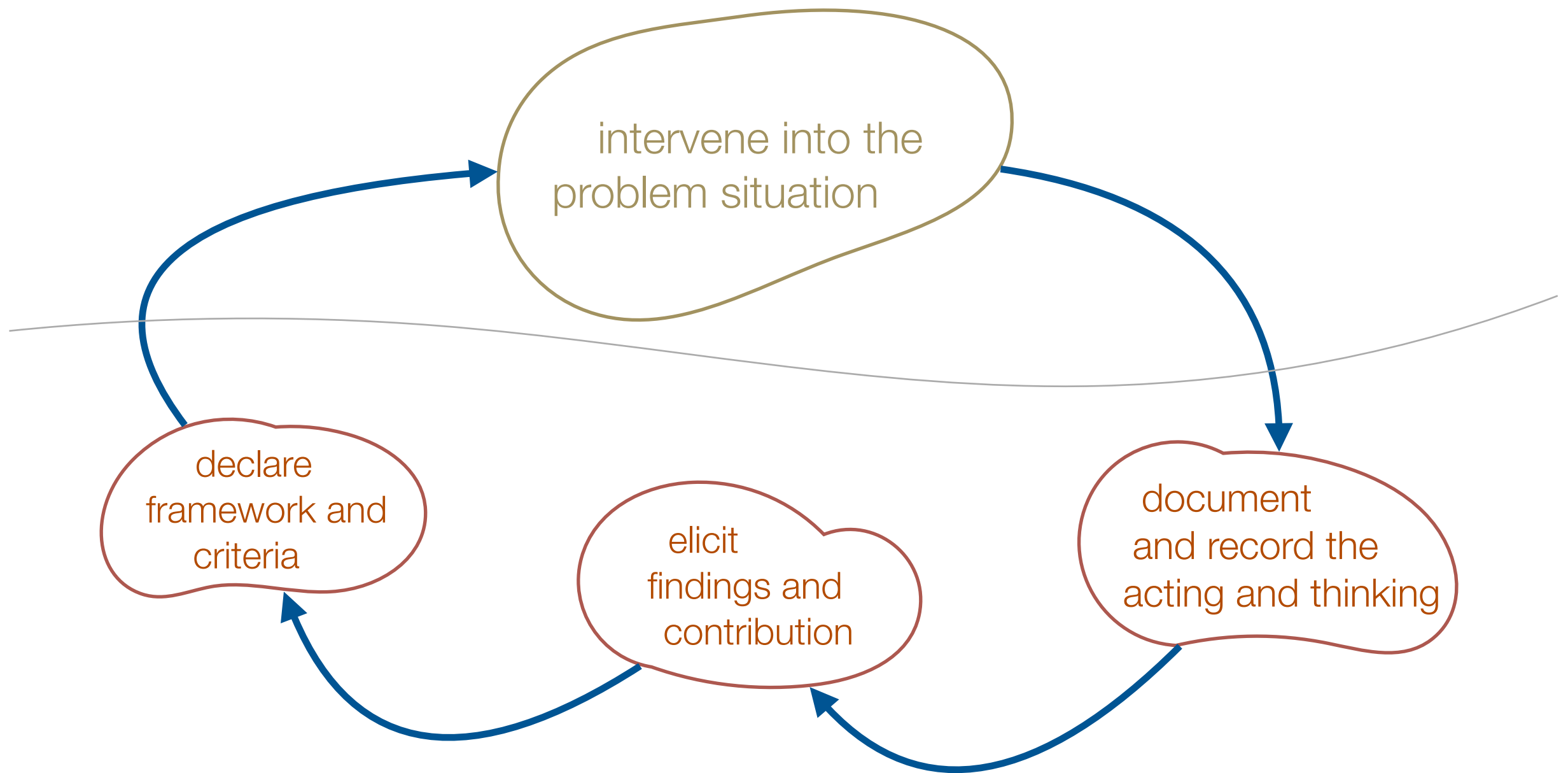
Element	Definition
PS	The problem-solving cycle focuses on producing practical outcomes
R	The research cycle focuses on producing research outcomes
A	The area of concern represents some body of knowledge within the literature
P	The problem setting represents people's concerns in a problematic situation
F	The conceptual framing helps structure actions and analyses
F _A	The specific concepts found in the literature about A
F _I	The general concepts used to inform studies independent of A
M	The adopted methods of investigation
M _{PS}	The methods guiding the problem-solving cycle
M _R	The methods guiding the research cycle
C	The contributions to P, A, F and M

Canonical action research



- 1 the Principle of the Researcher–Client Agreement (RCA);
- 2 the Principle of the Cyclical Process Model (CPM);
- 3 the Principle of Theory;
- 4 the Principle of Change through Action; and
- 5 the Principle of Learning through Reflection.

Action research: a study of change



→ dependency

Example: improving development at Brüel & Kjær

- Old engineering company
- Right after severe down-sizing
- 60-70 SW developers
- All projects with both HW and SW development
- Own production
- Desire to improve SW development

Handheld noise profile measurement

Capability Maturity Model with 5 levels

1: Ad hoc

2: Repeatable

Project Planning

Requirements Management

Project Tracking and Oversight

Quality Management

Sub-Contractor Management

Configuration Management

3, 4, 5

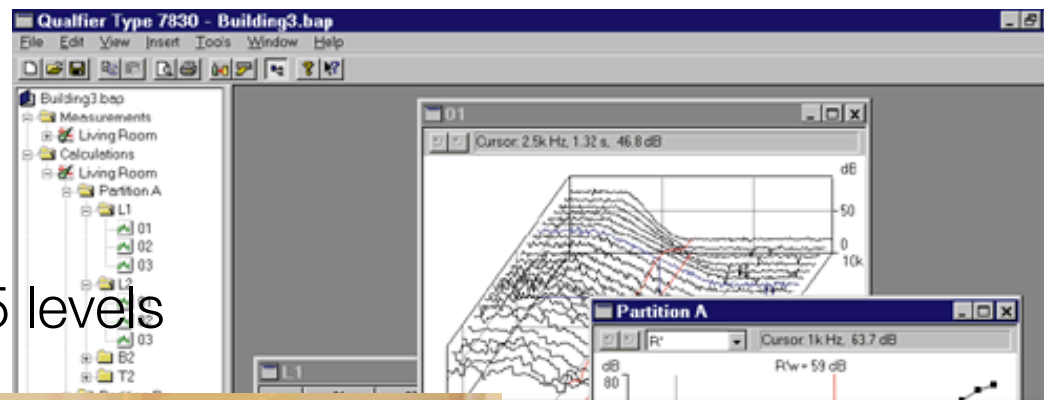
The models should be useful in the intervention

They should clearly point at significant problem

Suggestions should be operational

It might be necessary to adapt the model to Da

Maybe the models are increasing bureaucracy



Situated Assessment of Problems in Software Development

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Abstract

This paper reports on action research undertaken to understand and to improve the problems with software processes of a medium-sized Danish company. It is argued that, in order to understand what the specific problems are, we may, on the one hand, rely on normative process models like CMM or Bootstrap. On the other hand, we may also see the specific and unique features of software processes in a company through what we call "problem diagnosis." Problem diagnosis deals with eliciting problems perceived by software professionals and with forming commitment to enable software process improvement to effectively take place. A central purpose of problem diagnosis is to base the SPI project on the software process problems and suggestions for improvement rather than on the prescriptions and norms of a maturity model.

ACM Categories: D.2.9, K.6.3

Keywords: software process improvement, CMM, bootstrap, assessment, action research.

Introduction

Software process improvement (SPI) is an organizational change process, which introduces new and improved methods, techniques, and tools, as well as changes to work organization, attitudes, and work and management practices at all levels of a software producing organization (Grady, 1997; Humphrey, 1989; McFeeley, 1996; Zahran, 1997). To be successful, SPI requires deep insights and understanding of an organization's software processes in order to identify problems and to define and implement an improvement strategy. Studies of industrial SPI projects also highlight the importance of commitment between management and developers for successful SPI (Goldenson & Herbsleb, 1995).

SPI projects usually rely on well-known models of software process maturity such as the Software Engineering Institute's Capability Maturity Model (CMM) (Paulk et al., 1993) and Bootstrap (Kuraja et al., 1994). Such normative models help guide the assessment of current practices and the identification and prioritization of improvement initiatives. Critics, however, also claim that the models

Acknowledgement

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and effectiveness

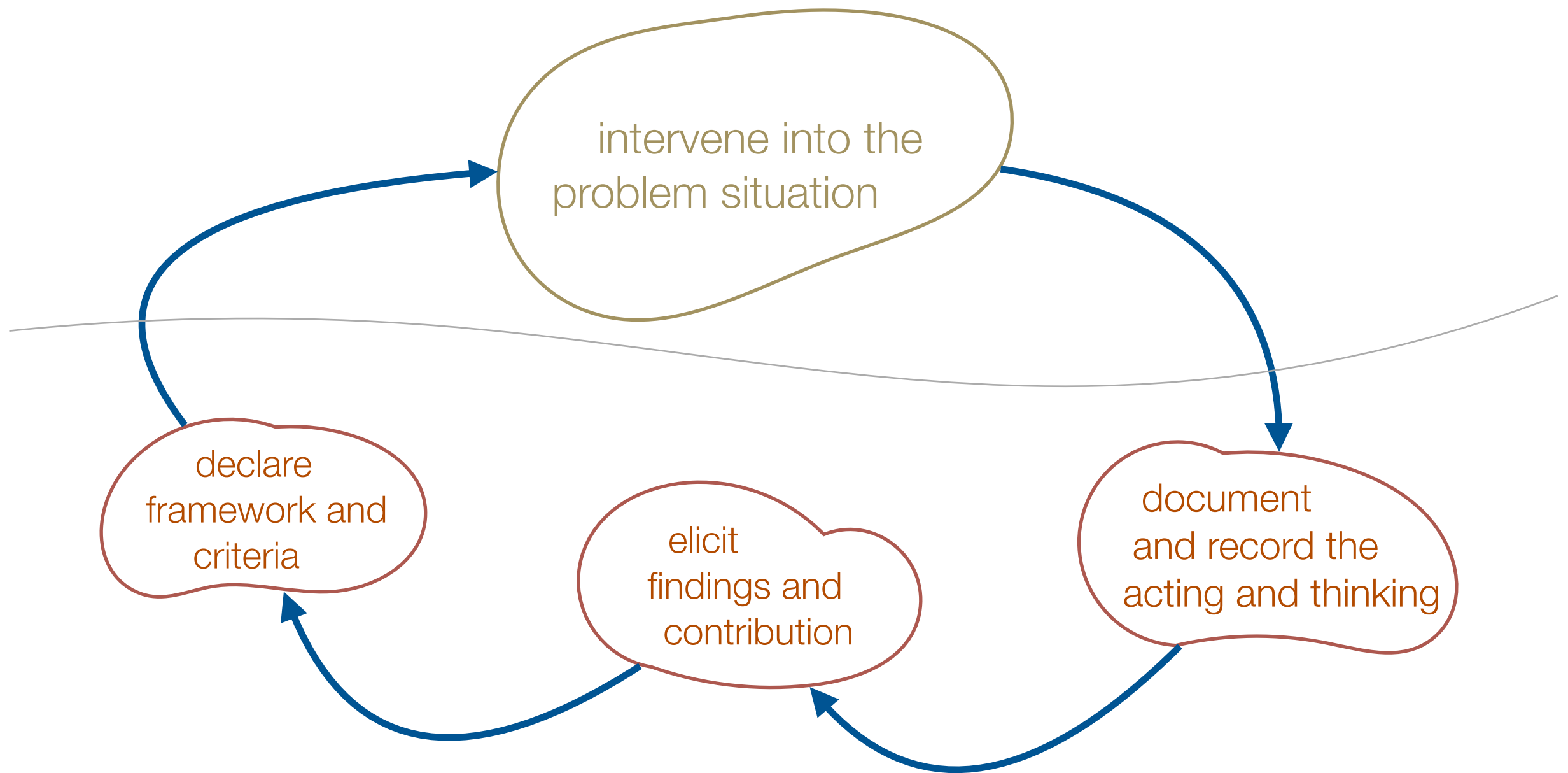
Kinds of contributions

- Iversen et al.
- A method for risk assessment of software process improvement

Strategy	Actions	Impr. Area	Impr. Ideas	Impr. Proc.	Impr. Actors	Ind. Weight	Grp. Sum	Grp. Weight	Grp. Prio.
Adjust Mission (1)	Focus the initiative	X							
	Specify the objective	X							
	Create results that are conceived to be usable	X							
	Focus on business results	X							
	Use culturally acceptable solutions	X							
	Consider identified needs for improvement		X						
	Adjust the level of ambition				X				
Modify Strategy (2)	Document and emphasize best practice in the improvement area	X							
	Affect the expectations towards the initiative.	X							
	Base the initiative on facts and experiences	X							
	Create clear and shared visions		X						
Number of chosen actions:									

- Lindgren et al.
- A set of design principles for a next generation competence systems
- The principle of balanced competence descriptions
- The principle of user control
- Revised principle of transparency
- Revised principle of real-time capture
- Revised principle of interest integration
- The principle of flexible reporting

Action research: a study of change



→ dependency

Reflection

- Write a note to yourself on
 - *How is this relevant for my study? (5 minutes)*
- Discuss 2-and-2
 - *Mention 1-2 things that you now need to reflect on and perhaps re-frame in your own PhD study?*