Modelling Sustainable Systems and Semantic Web

Knowledge and Action

Lecture in the Module 10-202-2309
for Master Computer Science

Prof. Dr. Hans-Gert Gräbe
http://www.informatik.uni-leipzig.de/~graebe

July 2021

Storytelling and Digital Change. Summary

Starting point: RDF – what is happening there and in general in the internet?

- It is a digital form of storytelling.
- Storytelling accompanies our *cooperative actions*. Cooperative actions are possible only in such an interpersonal language based context.
- Question (1): *What* is here conveyed by language?
- But: Storytelling is not reduced to its *communicative* function. It has also a *reflective* component.
- Question (2): How does *theory building* work on such an empirical background?
- There is an arc of tension *Justified expectations* $\rightarrow$ *World changing actions* $\rightarrow$ *Experienced results*
  - Interpersonally this arc of tension is to be explored only in language form and *only in specific contexts*.

Storytelling and Digital Change. Summary

Why act cooperatively? "Change the world".

- But how change a world that is also constantly changing itself? How to deal with the diversity and contradictions of the requests for change?
- Approach "influence the changes of the world".
  - "Doing" is embedded here, prior to it is the reality of life. Justified expectations can only be derived from this reality of life.
  - Experience: *Practical* influence is (today) only possible through application of adequate processual knowledge and processual skills.
- But why cooperate?
  - Cooperative action is more powerful than individual action due to emergent synergistic effects.
  - The whole is more than the sum of its parts.

Storytelling and Digital Change. Summary

Cooperative action is only possible in a *common context of meaning*.

- Experience: *Understanding* language presupposes a common context of meaning on the one hand, and continues it on the other.
- This context of meaning expresses itself above all in the *social use of common terminology in common activities*.
- Question (3): How can that itself be expressed in language form?

Storytelling and Digital Change. Summary

Experience: Such contexts of meaning are stabilised through *institutionalisation*. Meanings are tied to social practices as a specific interaction between logos and telos.

- The *practically approved* is socially secured and institutionalised as *processual knowledge* (technology) and *approved practices*.
- Question (4): How to set up the notion of *knowledge* in this context?

Storytelling and Digital Change. Summary

Observation: Such institutionalised contexts of meaning are nested and interlaced in many ways.

- Experience: Cooperation between cooperative structures requires translation between contexts of meaning.
  This is yet hardly understood in the field of semantic technologies.
- People are involved in cooperative contexts with partial identities only $\rightarrow$ concept of roles.

The core of all four questions: How does such an institutionalisation of contexts of meaning work?

Storytelling and Digital Change. Summary

- We also identified this question as a core problem of semantic technologies.
- Historically in the last 150 years there have been various attempts to this problem.

Attempts to develop a general language theory as Universal Theory.

- Logical positivism of the Vienna Circle (1920s).
- Syntax, semantics, pragmatics (Charles W. Morris, 1940)
- Continuation as semiotics and linguistics in the 1970s.
- Noam Chomsky and his approach to a universal grammar.

Storytelling and Digital Change. Summary

At the same time, since 1920, the importance of evolutionary approaches increases: Institutionalisations of contexts of meaning are hierarchically complex and can be unterstood only in their historical-cultural development.

- Biosemantics: focus on coevolution of neural patterns and evolutionary patterns of contexts of meaning.

Pragmatics: Notions develop with their interactive use. (Jacob L. Mey: Pragmatics, 1993)

- The development of concepts cannot be detached from their practical use, in particular forms and practices of evaluation and judgment.

What is Knowledge?

Stabilisation of contexts of meaning through institutionalisation: what has been *practically approved* is transferred to *processual knowledge* (technology) and thus socially fixed in *approved practices*.

How is a notion of knowledge to be understood in this context?

What is knowledge?

- A cumulative notion as in a knowledge pyramid approach (Aamodt, Nygard 1995) was already criticised.
- The debate is heavily influenced by the accumulation theory of knowledge developed within linguistics in the 1970s.
- An understanding of knowledge as tangible resource was prominently present once more in the discussions about an approriate concept of information around 2000.

Storytelling, Conceptual Systems, Knowledge

Storytelling is tied to *interpersonal contexts of meaning*.

What is meaning?

- Meaning *is* the use of terms.
- Terms are a form of *cooperative human practices* and thus to be contextualised in a concrete-historical manner.
- Context of a civil society as legal system in which the actors are made individually responsible for the consequences of their actions.
- Action is thus embedded in the updating of interpersonal *relations of reasoning* (Begründungszusammenhänge) and *judgment practices* (Urteilspraxen).

Knowledge According to Berger/Luckmann

We have rejected a concept of knowledge, which considers knowledge as external epistemic entity which precedes human action (approach "knowledge pyramid", cumulative concept of knowledge of linguistics and semiotics).

Another approach is rooted in the sociology of knowledge. (Berger/Luckmann 1966) develop a concept of knowledge starting from its social use.

- Knowledge as socially objectified and therefore legitimate *interpretation of sense*.
- Also to be viewed critically. How far reaches a sociological approach of knowledge as objectification and institutionalisation if interpretations are subjectively pre-formed?
- How stabilisation and institutionalisation of contexts of meaning develop in such a concept?

Forms of Knowledge Practices

What has been practically approved becomes processual knowledge and is institutionalised as approved practices.

Which types of practices are relevant at all?

- Wide range of forms: general knowledge – special knowledge – calculus – skills – technology.
  - Experience: Massive devaluation of knowledge (even of entire professions) during technological progress argues against a cumulative picture of knowledge.
- "Big data" and "digitization of the world" produces the opposite picture – quantity instead of quality is required?
  - But: Successful semantic projects work on a digital reconstruction of well established contexts of meaning in order to make them accessible for the use of digital tools.

Forms of Institutionalisation of Knowledge

Phenomenon of institutionalisation of approved structures through "pattern formation" (Musterbildung), "best practices", "meaning formation" (Bedeutungsbildung).

But that are only forms of complexity-reduction of descriptions (a *production of fiction*), because

- The investigation of the dynamics of the *relations* on the macro level assumes a relatively constant structure at the micro level.
  - This is valid at least in "normal times" (cf. T. Kuhn's notion of "normal science").
- "Enslavement effect": macro structures (as context) have a stabilizing impact on the dynamics and thus the stability of structures at the micro level. Throughput defines the inner structure of a system.
- Approach of a co-evolution model.

Knowledge and Cooperative Action

The considerations concentrate on a systemic model, i.e. the interweaving of the dynamics as well as structure and pattern formation processes on the micro and macro levels and thus on the dynamics of the *internal relations* of a cooperative context, which is separated from the *outside world* by a *system boundary*.

Such an approach is a *methodical approach to complexity reduction* by dividing all possible relationships into three groups,

- the relations within the system boundaries – internal relations,
- the cross-border relations and
- the relations outside the system – external relations.

The relations in the groups differ in the mode of shapeability related to a concrete cooperative action.

Focus of consideration: Contexts of meaning unfold in the field of tension between *justified expectations* and *experienced results within the cooperative context* which develops in time.

Yesterday – Today – Tomorrow

- The (processed) *experienced results* are anchored in the World View and thus are a conditionality of future action. They are a reflex of the Yesterday in the Today.
- The *justified expectations* are based in the World View as a reflex of the Tomorrow in the Today.
- Yesterday: justifications, action planning, development of *competence to act*.
- Today: execution of action
  - It is time critical! Acting under "incomplete information".
  - *Private* decision-making, action, responsibility.
  - To enable this condition of possibility are to be *socially* produced: Manageability, trust, reliability
- Tomorrow: The justified expectations are compared with the experienced results.

Yesterday – Today – Tomorrow

Reasonable expectations

- The diversity of private expectations appears socially as multi-optionality of expected future development.

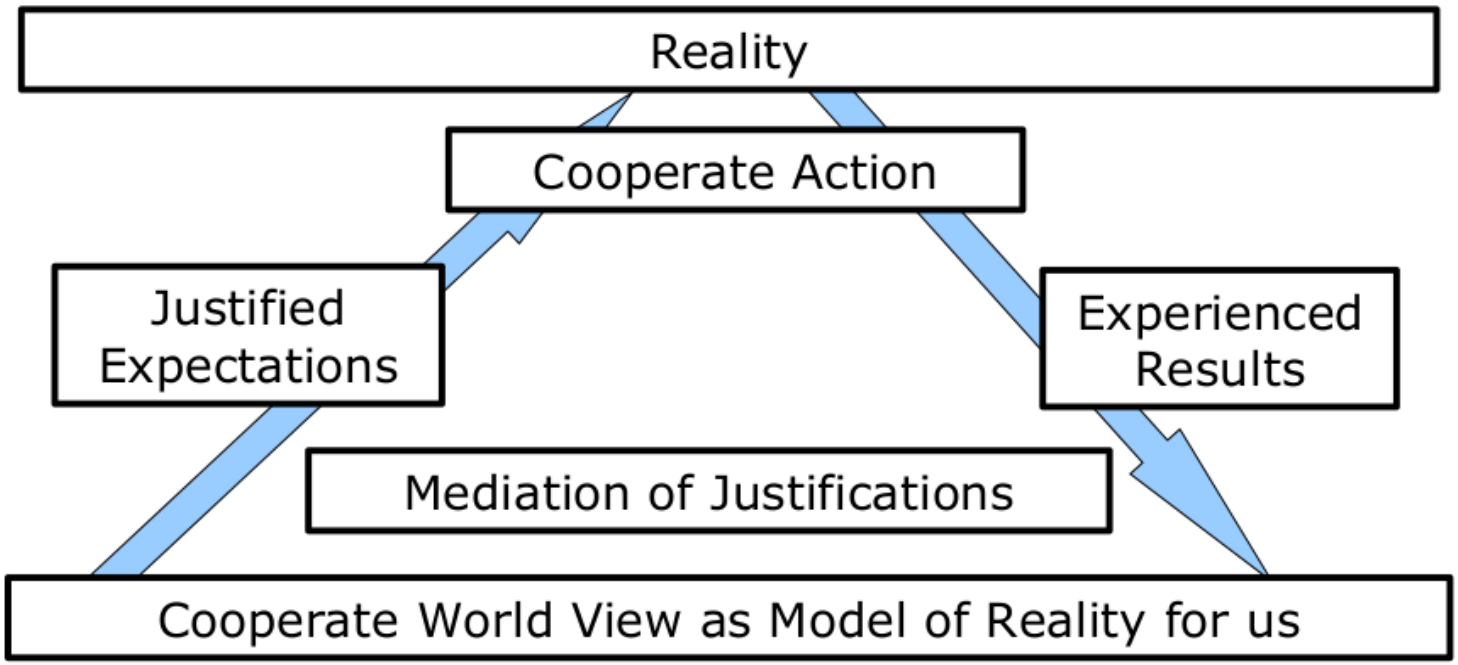
Lessons learned: comparison of the results of action with the expectations. Further development of *experienced results*.

- Common experiences are the basis of the further development of the *cooperative world view*.

Two central mediation contexts for *synchronicity* of cooperative action:

- Mediation on the level of description forms as further social development of a common World View (and thus of *competence* to act).
- Mediation on the level of action forms as socially based further development of *shaping reality*.

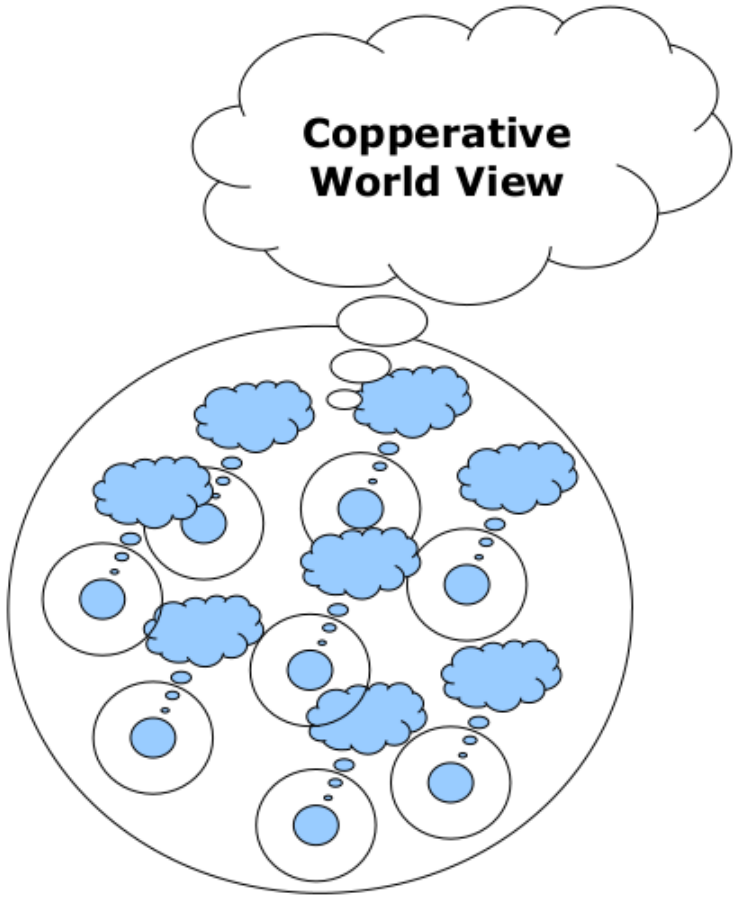
Yesterday – Today – Tomorrow



This picture describes the position of the two mediation contexts of the dynamics of cooperative action both at the micro level and the macro level.

Cooperative Action

How do justified expectations develop in the context of cooperative action?
Forms? Common interests, predefined norms.
Dynamic moments? Generalise and spread the approved as commonly accepted processual knowledge, marginalize or criticize the non approved.
Structural Moments? *Operationalisation* of processural knowledge in institutions, tools or technology. Corporate identity.



Cooperative Action. Observations

Relational moments as relationships between actors shape the cooperative context more than individual moments of individual actors.

- This requires to postulate also *specific, cooperative processual knowledge* that cannot be assigned to individual actors. Such phenomena cannot be described within an accumulative concept of knowledge.

Actors are involved in cooperative contexts only with partial identities. Or, interpreted submersively: only in a reduced form of their overall personality.

- Such a *reductionistic approach* to the individual personality hides intercooperative phenomena of the intentionality of personalities and leads to the assumption of a *relational intentionality*.

Micro Level: Private Actions of the Actors

The great importance of private action results from the legal basic constellation and various institutionalisations of the civil society in which the consequences of actions can be attributed.

In the field of tension of private action between expectations and results evolve

- The private *capability* to act (Handlungsfähigkeit) as socio-technical *capacity* to act (Handlungsvermögen) in a socially determined *field of action* (Handlungsfeld).
- The *private World View* (as "Unity of Consciousness") as a reflex on the *conditionalities* of this capability to act.

In a theory of the *inner perspective of cooperative action* (within the systemic limit) these processes are visible only so far as they *relate to the cooperative context* (reductionistic assumption of relational intentionality).