

Exploratory Workshop — Center for Narrative Studies in Science
Weissbad, Switzerland, July 6-9, 2015

Workshop Program — a Short Description

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Participants will arrive some time during Monday afternoon, July 6, at Hotel Hof in Weissbad in Eastern Switzerland. The workshop ends on Thursday, July 9 at noon with a final lunch. This gives us time for five sessions during the five half days of the workshop.

We propose to have a brief introduction concerning the goals and structure of the workshop on Tuesday morning and devote most of the last session on Thursday morning to a summary discussion of a possible research agenda for the proposed Center for Narrative Studies in Science (CNSS; see the original description of Goals which is reprinted here in Appendix 2). The other sessions are each devoted to a particular subject.

Sessions

Session 0 (Tuesday morning): A brief introduction to the workshop and to participants.

Session 1 (Tuesday morning): *Narrative minds between oral mythic culture and literacy*

Session 2 (Tuesday afternoon): *Models, simulations, and narratives*

Session 3 (Wednesday morning): *(Cognitive) Development and language: mind, language, metaphor, and narrative*

Session 4 (Wednesday afternoon): *Science without laws: Biology (evolution, cosmology, earth science), medicine*

Session 5A (Thursday morning): *Narrative in science education*

Session 5B (Thursday morning): A research agenda for a Center of Narrative Studies in Science (CNSS)

A session might take the following form:

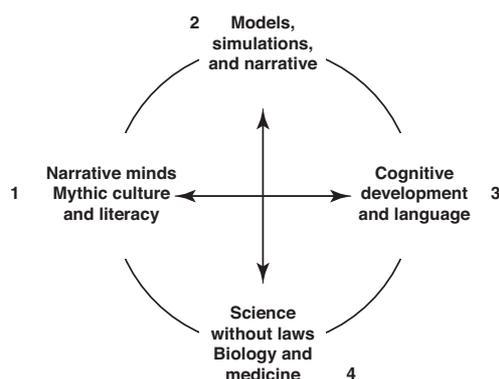
A Session chair introduces the theme of the session and might ask some *leading questions*. Two to three members of the international group of experts make *introductory contributions or statements*. Everybody joins in with *Questions and Discussions* (Q&D) lead by the chair. Local organizers will make sure that the main points of a session are (informally) recorded.

These themes reflect important ideas and issues that have come up in one way or another in research and development conducted by the three organizers during the last few years. It is important, however, that participants feel free to contribute what they feel is important to the overall theme of narrative in science. The program is intended to serve as a preliminary guide and we are open to changes as they might arise. Moreover, the format of a session we are describing here is not writ in stone. Themes and goals may lead us to be flexible about how we mix presentations, questions, and discussions.

A more detailed draft of the Program is added below (Appendix 1). We are asking the Swiss National Science Foundation invitees to make introductory contributions to one or more of the sessions whereupon the other participants—those of us who need to learn from the international group of experts—will engage in the themes with questions and discussions, on the other.

Ideas underlying the program

There are *themes* directly related to narrative and science, science and narrative, and there are those that represent fundamental background for the overall theme of narrative in science. The former, for which we reserve two sessions, are guided by work being done on the role of narrative in modeling and simulations in social and natural sciences, and on narrative in those sciences that appear to be less formally structured than fields such as physics (what has been termed science(s) without laws). The latter themes revolve around narrative and the human mind (in general, not necessarily related to narrative in science) on the one hand, and modern cognitive science (from developmental psychology to cognitive linguistics) as it might contribute to the role of narrative in understanding and learning.



Session 1. The relationship between narrative and science has many facets and can take many forms. We are interested in whether or not narrative (storytelling) can have an intrinsic role in the making of science. We believe that this could not be the case if it were not for the fundamental role narrative takes in human understanding. In this first session, we would like to explore what this fundamental role might be, how old it is (from the viewpoint of the history of human culture), and what forms of under-

standing it provides humans with. In particular, we are interested in questions regarding the roles of mythic (oral) and modern (literate) cultures and the question of the ubiquity of the sense of agency in human thought.

Session 2. Intrinsic forms of narrative in science have lately been explored—it is important to know if narrative is constitutive of science proper. We know from research in the history and philosophy of economics and from computational (natural) science that important elements of scientific work and method are closely related to narrative. We are particularly interested in the relationship between models, simulations, narratives and mental models (storyworlds). We ask if much of (classical, macroscopic) science—its concepts, models, and theories—has a narrative core.

Session 3. Cognitive science has made important progress in recent decades; we are interested in what we can learn from it. We are particularly interested in how all of this relates to learning. Here are some questions. How is human understanding shaped, how does it develop, and how can it be explored? What do the modern sciences of mind tell us about understanding of the world around us and inside us? How are emotion and reason related? Is it true that young children start life as abstract “thinkers” and if so, how do we learn formal science later in life? And again, what is the role of narrative—of a narrative mind—in all of this? Will the exploration of narrative in science help us understand the human mind better?

Session 4. Here is a dilemma: Can narrative contribute intrinsically only to sciences without laws (aspects of biology and medicine, psychology, anthropology, natural history such as cosmology and earth science, economics)? Extrinsic contributions—telling stories about science—are well known and accepted in science learning both for formal and less formal fields. Stories with which we can *do* science seem to be restricted to the less mathematically formalized fields. Interestingly, we believe that it has been shown that the conceptual structures of some of the very formal sciences (physical sciences) are fundamentally narrative. We are interested in learning how narrative contributes to the understanding of the sciences *without* laws and how this reflects back upon sciences *with* laws. In the end we would like to learn how narrative studies illuminate sciences in general.

Session 5A. Our own research has revolved largely around science learning and the training of teachers involved in primary education. We will briefly discuss the role we believe story construction and storytelling can have in this realm.

Session 5B. What questions will lead to a productive research agenda for a Center of Narrative Studies in Science?

Appendix 1

Detailed Program

Tuesday, July 7, 2015

Session 1 (9.00-12.30)

Introduction of participants (20')

Fuchs: Overview of goals (10')

Fuchs, Corni, Dumont: Origin of the workshop: Our work on narrative in science education (very short outline) (10')

Session chair (**Dumont**) introduces the theme of the session (might ask some leading questions...)

Theme: *Narrative minds between oral mythic culture and literacy* (10.15: 2h)

Contini (20'), Grimaud (20') make (introductory) contributions, statements

Session chair leads *Questions and Discussions (Q&D): Everybody*

Lunch (12.30)

Session 2 (14.30-17.30)

Session chair (**Fuchs**) introduces the theme of the session (might ask some leading questions...)

Theme: *Models, simulations, and narratives* (2.5h)

Morgan (20'), Wise (20') make (introductory) contributions, statements

Session chair leads Q&D: *Everybody*

Dinner (19.00)

Wednesday, July 8, 2015

Session 3 (9.00-12.30)

Session chair (**Corni**) introduces the theme of the session (might ask some leading questions...)

Theme: *(Cognitive) Development and language; mind, language, metaphor, and narrative* (3h)

Amin/Haglund (20'), Brendel (15') and Cervi (15') make (introductory) contributions, statements

Session chair leads Q&D: *Everybody*

Lunch (12.30)

Session 4 (14.30-17.30)

Session chair (**Dumont**) introduces the theme of the session (might ask some leading questions...)

Theme: ***Biology (evolution, cosmology, earth science), medicine: Science without laws*** (2.5h)

Morgan, Wise briefly refer back to Session 2 (5'+5'): Science without laws.

Examples: Zabel/Altiero (20'), Hurwitz (20') make (introductory) contributions, statements.

Counterpoint: Haglund/Fuchs (20'): Science with laws?

Session chair leads Q&D: *Everybody*

Dinner (19.00)

Thursday, July 9, 2015

Final Session (8.30-12.00)

Session chair (**Fuchs**) introduces the theme of the session (might ask some leading questions...)

Theme: ***Narrative in science education*** (1h)

Corni (15'), Niebert/Zabel (20')

Session chair leads questions and discussions (Q&D): *Everybody*

Fuchs, Dumont, Corni: A research agenda for a *Center for Narrative Studies in Science*

Everybody...

What questions or subjects would you personally have the CNSS investigate?

Are there fields of science that cannot be narrated?

Does investigating science from the viewpoint of narrative add to our understanding of the human mind?

And much more...

Exploratory Workshop on Narrative in Science

Dumont, Fuchs, Corni, September 2014

Background and Goals

We propose to hold an Exploratory Workshop in Switzerland for investigating and defining a research agenda of a *Center for Narrative Studies in Science*. This center is to be created as part of a proposed EU project (*Narrative in Science Communication and Technical Education*). It will be the research arm of an initiative directed at developing modern education and training of the coming generations in industrial and related settings. The workshop aims at bringing together leading experts from fields as diverse as cognitive science, anthropology, economics, developmental psychology, science and engineering education, history of science, and linguistics and narratology. We all accept that *stories engage us affectively*. However, recent developments in the study of narrative in science and engineering education—and in science itself—suggest that its role in these fields goes much deeper than is commonly assumed. Modern cognitive science tells us that there is a strong relation between *emotion* and *reason*—affect prepares us for the *messages* of a story that may well contain formally cognitive aspects in addition to the affective ones. Moreover, since the use of models is a narrative act, storytelling is an element of scientific method. Finally, it turns out that the *products of science* themselves—concepts, models, and theories—have narrative form; they are the products of a narrative mind.

The goal of the workshop will be to weigh the import of these different levels of narrative in science and to propose an *agenda for research* to be conducted at the *Center of Narrative Studies in Science* that leads to both fundamental understanding of the issue and applications for society. We want to research the relationship between mind, nature, and cultural products (science and engineering) and at the same time sketch a path toward application in science and engineering communication and education. The latter is assumed to be fundamentally important for sustaining technical culture in highly developed societies and to foster such culture in developing ones.

To date, members of the core team who are proposing the EU project have been performing research and development in the following areas: cognitive science (theories of the embodied mind relating to experience of natural and technical phenomena); cognitive linguistics, metaphor theory, and analogy (figures of mind in physics); the relation between science and a narrative mind; teacher education; modern continuum physics; energy engineering; studies of the conceptual structure of macroscopic physical science; education of engineering students in physical science and systems science; pedagogy of modeling and simulation; designing and building of Industrial Educational Labs (Ducati in Bologna and VW in Wolfsburg); science and art (visual

metaphors); didactics of engineering in Maker Spaces; and more. This enables us to draw upon a wide range of expertise and to propose research that brings together the important and necessary fields contributing to an understanding of the role of narrative in science and engineering.

Researchers to be invited to the Exploratory Workshop have done leading edge research in fields ranging from the narrativity of simulation in the sciences; to storytelling and modeling in economics; history of science; the role of abstraction in child development and in folk science; narratology and cognitive science; conceptual metaphor and embodied cognition in science; science education; to anthropology and the notion of agency in science. We are confident that a rigorous discussion with these experts will help us to establish fundamental and applied research in an area that still lacks solid models and theories of the relation between the human mind and understanding of nature and technical artifacts.