

# Concept of the Lecture

## *Modelling Sustainable Systems and Semantic Web*

Winter Term 2021

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### General

The lecture will take place synchronously online (Thursdays 11-13 am.) and is based on the Flipped Classroom concept. The lecture consists of three parts.

In the first part we explore the concept of a *technical system* and introduce the main concepts of TRIZ as an important systematic innovation methodology. In contrast to other creativity and innovation methodologies, TRIZ focuses on the systematisation of engineering experiences.

In the second part, we study more closely aspects of the creation of conceptual networks for data models on the basis of the *Resource Description Frameworks* (RDF), the *Linked Open Data Cloud*, the emerging *Giant Global Graph* and the importance of these developments for the organisation of contexts of cooperative action and hence management of sustainable systems.

Finally, in the third part, we explore the role of data and information and the generation of new language tools for the development of technical systems in the context of a civil society and, in particular, the importance of concept formation processes in cooperative action.

In addition to the general bibliography, each lecture will be accompanied by literature for preparation which should be **studied before the lecture**, in order to be able to follow the explanations. In the lecture the topics are presented only cursorily, but there is room to ask questions about the literature and to discuss individual aspects.

Most of the material is easily found on the internet. Nevertheless we will not dispense on classical printed literature and your ability to access it.

To support our opening for an international audience, we switch step by step to English as operational language. The lecture will use a mixed form, with English slides and German presentation.

The progress of the lecture will be reported regularly in the github repository <https://github.com/wumm-project/Seminar-W21>. There you also find the schedule and the slides of the individual lectures.

## Digital Privacy

We follow not only a theoretical but also a practical Open Culture approach and make course materials publicly available. This also applies to the (annotated) chat recordings of the lecture, in which your names are mentioned. We assume your consent to this procedure, if you do not explicitly object. The discussions themselves will **not** be recorded.

## Literature

- Robert Adunka (2020). TRIZ Anwendungsbeispiele (in German)  
<https://www.triz-consulting.de/ueber-triz/triz-anwendungsbeispiele-2/>
- Iouri Belski (2020). Tools of TRIZ. A web repository of TRIZ materials on 12 simple TRIZ heuristics. <https://emedia.rmit.edu.au/triz/content/tools-triz>
- Peter L. Berger, Thomas Luckmann (1966). The Social Construction of Reality: A Treatise in the Sociology of Knowledge. Anchor Books. ISBN 978-0-385-05898-8. (In German: Die gesellschaftliche Konstruktion der Wirklichkeit: eine Theorie der Wissenssoziologie. Fischer Taschenbuch Verlag 1994. ISBN 978-3-596-26623-4).
- Raphael Capurro, Peter Fleissner, Wolfgang Hofkirchner (2000). Is a unified theory of information feasible? A Trialogue. <http://www.capurro.de/trialog.htm>
- Gaetano Cascini (2012). TRIZ-based Anticipatory Design of Future Products and Processes. Journal of Integrated Design and Process Science 16 (3), 29–63.  
<http://dx.doi.org/10.3233/jid-2012-0005>
- Frank W. Geels, Johan Schot (2007). Typology of Sociotechnical Transition Pathways. In: Research Policy 36 (2007), 399–417.  
<https://doi.org/10.1016/j.respol.2007.01.003>
- Hans-Gert Gräbe (2020). Man and its technical systems (in German). LIFIS Online.  
[http://dx.doi.org/10.14625/graebe\\_20200519](http://dx.doi.org/10.14625/graebe_20200519)
- Hans-Gert Gräbe (2020). TRIZ and transformations of socio-technical and socio-ecological systems (in German). LIFIS Online.  
[http://dx.doi.org/10.14625/graebe\\_20200627](http://dx.doi.org/10.14625/graebe_20200627)
- C.S. Holling (2000). Understanding the Complexity of Economic, Ecological, and Social Systems. In: Ecosystems (2001) 4, 390–405. [https://www.esf.edu/cue/documents/Holling\\_Complexity-EconEcol-SocialSys\\_2001.pdf](https://www.esf.edu/cue/documents/Holling_Complexity-EconEcol-SocialSys_2001.pdf)
- Helmut Klemm (2003). Ein großes Elend. Informatik-Spektrum 26, S. 267–273.  
<http://dx.doi.org/10.1007/s00287-003-0316-2>
- Karl Koltze, Valeri Souchkov (2017). Systematische Innovationsmethoden (in German). Hanser Verlag, München. ISBN 9783446451278
- Andrei Kuryan, Dmitri Kucharavy (2018). The OTSM-TRIZ Heritage of Nikolai N. Khomenko. A General Theory of Powerful Thinking. Slides of a talk given at TDS 2018 in St. Petersburg.  
<http://www.informatik.uni-leipzig.de/~graebe/Material/OTSM-Folien.pdf>

- Nikolai Khomenko, John Cooke (2007). Inventive problem solving using the OTSM-TRIZ “TONGS” model.  
<http://www.informatik.uni-leipzig.de/~graebe/Material/tongs-en.pdf>.
- Alex Lyubomirskiy, Simon Litvin, Sergei Ikoenko et al. (2018). Trends of Engineering System Evolution (TESE). TRIZ Consulting Group. ISBN 9783000598463.
- Michael Schetsche (2006). Die digitale Wissensrevolution – Netzwerkmedien, kultureller Wandel und die neue soziale Wirklichkeit (in German). In: zeitenblicke 5 (2006), Nr. 3.  
<http://www.zeitenblicke.de/2006/3/Schetsche>
- Ian Sommerville (2015). Software Engineering. 10th edition. (in German: Pearson Studium, 8. Auflage, 2007).  
<http://iansommerville.com/software-engineering-book/>
- Valeri Souchkov (2010). TRIZ and Systematic Business Model Innovation. In: Proceedings TRIZ Future Conference 2010, Bergamo, Italy. Available at ResearchGate.
- Valeri Souchkov (2014). Breakthrough Thinking with TRIZ for Business and Management: An Overview. <http://www.xtriz.com/TRIZforBusinessAndManagement.pdf>
- Felix Stalder (2016). Kultur der Digitalität (in German). Suhrkamp.
- Clemens Szyperski (2002). Component Software. Pearson Education. 2. Auflage. ISBN 0201745720.
- Rainer Thiel (2000). Die Allmählichkeit der Revolution. Blick in sieben Wissenschaften (in German). LIT-Verlag, Münster. ISBN 9783825849457.
- Dietmar Zobel (2007). Kreatives Arbeiten (in German). Expert Verlag, Renningen. ISBN 9783816927136.
- Dietmar Zobel (2020). TRIZ für alle (in German). Expert Verlag, Renningen. ISBN 9783816985105.