LEHRSTUHL FÜR STEUERUNG INNOVATIVER UND KOMPLEXER TECHNISCHER SYSTEME
DR. MARTIN WIRTZ

Seminar: Why things are complex: an introduction to the complexity of governance

- Syllabus -

Room:	**F21/03.80**
Time:	**Tuesday, 10-12 h**
Start:	**17-10-2017**
Notes:	The seminar will be taught in English.
Registration:	Via FlexNow! From September 1st until November 5th, 2017 or during the first session.
Office hours:	Wednesday, 14-16 h and by arrangement; Room: F21/03.69
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Relevance and aims

Why should political scientists and other social scientists be interested in technology? As you will learn in this seminar, society and technology are not as separated as it may seem when you compare your own studies to those of an engineer. The fact that technologies are used by humans in social environments is one of the factors making technology complex. In turn, however, technological complexity affects society: Highly complex technological systems such as nuclear plants, for example, can pose risks that societies must try to control. Controlling technological risks is not always straightforward, which again is related to the fact that in order to control a technology, one also has to control its users. Those users, however, might not always agree on the level of risk involved or whether it is worth taking those risks. In this course, therefore, we will discuss how technological risks can be regulated.

Noteworthy, the governance of technological risks is just one example of trying to societally handle complex problems. It is often said nowadays that the world is becoming increasingly complex, and technology may just be one field where this holds: After all, very few students (or professors in the social sciences) would be able to explain how a microchip works, even though these things are in about every gadget you use. Luckily, in this course you will learn about one way of dealing with a complex world while appreciating this complexity: Thinking in systems. 'Systems thinking' allows drawing conclusions on how to organize our individual life as well as society at large. As we shall see, it is another question, however, in how far such thinking is possible within the confines of classic bureaucracy. We will therefore also talk about newer forms of governance that might be better suited to face complexity, as they constructively involve civil society. Involving private actors is, however, not a guarantee to success: although Private-Public Partnerships are often used to manage large infrastructure projects, for example, there are certain pitfalls that experience would teach us to avoid.

Equipped with the sum of these insights, you will be ready to raise and address your own research question in the final paper. Moreover, you will have gained a first impression of the general themes of the Chair and will thus be prepared for further courses in the field, maybe even deciding in favour of the *Schwerpunkt* "Governance of Complex Systems".

Learning goals:
- To obtain an overview of the persistent issues in governing complex technological systems
- To summarize the main factors that contribute to the complexity of governing complex technological systems
- To explain the operation of the main mechanisms of complexity
- To identify governance approaches with which such complexity can be handled
- To evaluate the various governance approaches
- To solve problems, rather than reproducing texts in their original form
- To improve your command of the English language by actively participating in classroom discussions and writing an (academic) paper.

Teaching method and test

The course is built on a teaching method known as 'Problem-Based Learning' (PBL). Most importantly, this includes active participation in classroom discussions of the assigned readings focused on so-called 'Learning Goals' centred on a broader problem or puzzle. Hence, in order to pass this course, students will be asked to regularly and actively participate in the classroom discussions, and to take over the 'chairing' of one of the sessions (25% of the overall grade) rather than individually presenting the readings assigned. Students further have to conduct a small research project of their own and write a respective paper (5,000 words; 75% of the overall grades) (see below for details). There will be ample room for individual feedback during the research process. Further details on PBL will be provided in the introductory session as well as in the Rules of the Game provided on the Virtual Campus.

Course programme

(1) October 17th 2017: Introduction and overview
In this session, you will be provided with an overview of the seminar and will learn that you do not have to be a tech nerd to like it. In addition, we will discuss some administrative details and the general 'rules of the game'.

Literature for this session:
Optional:
Sismondo, S. (2010). The Social Construction of Scientific and Technical Realities. In: S. Sismondo, *An Introduction to Science and Technology Studies* (pp. 57-71). Oxford: Blackwell Publishing.

(2) October 24th 2017: Why technology?
Why should political scientists and other social scientists be interested in technology? As you will learn in this session, society and technology are not as separated as it may seem when you compare your own studies to those of an engineer. Instead, they permanently influence each other.

Literature for this session:
Mandatory:
Bijker, W.E. (2010). How is technology made?-That is the question! *Cambridge Journal of Economics 34*, 63-76.
Optional/additional:
Bijker, W. E. (1997).Introduction. In: Bijker, H. *Of Bicycles, Bakelites, and Bulbs. Towards a theory of sociotechnical change*. Massachusetts: MIT Press.

Bijker, W.E. (1997). The fourth kingdom: the social construction of bakelite. In: Bijker, W. E. *Of Bicycles, Bakelites, and Bulbs. Towards a theory of sociotechnical change.* Massachusetts: MIT Press. [first part; second part]

October 31st 2017: Public holiday – No session!

(3) November 7th 2017: Why things sometimes go so incredibly wrong - or well: A complexity perspective
In our daily life, some things sometimes go incredibly wrong. Other things just seem to go better and better without having to do much. Shifting your mind towards a complex view of causality will help you to understand the often hidden dynamics behind bad days, vicious and virtuous cycles.

Literature for this session:
Mandatory:
Perrow, C. (1999). Introduction. In: *Normal Accidents. Living with high-risk technologies.* Princeton: Princeton University Press
Senge, P. (1990) A shift of mind. In: Senge, P. *The Fifth Discipline: the art and practice of the learning organization.* New York etc.: Double Day

(4) November 14th 2017: Why things go wrong / well – in technological systems
Unfortunately, it is not only in our personal lifes that things may go wrong to an extent that we did not expect. The same can happen in technological systems, sometimes with catastrophic consequences.

Literature for this session:
Mandatory:
Pidgeon, N. (2011). In Retrospect: Normal Accidents. *Nature* 477, 404–405.
http://www.nature.com/nature/journal/v477/n7365/pdf/477404a.pdf
Sagan, S.D. (2004). Learning from Normal Accidents. *Organization Environment* 17, 15-19.
Perrow, C. (2011). Fukushima and the inevitability of accidents. *Bulletin of the Atomic Scientists 67* (6), 44-52.
http://cisac.fsi.stanford.edu/sites/default/files/Fukushima_and_the_inevitability_of_accidents.pdf .
Sagan, S. D. (2004). The Problem of Redundancy Problem: Why More Nuclear Security Forces May Produce Less Nuclear Security. *Risk Analysis 24* (4), 935-946.
Additional/optional:
Perrow, C. (1999). Normal accident at Three Mile Island. In: *Normal Accidents. Living with high-risk technologies.* Princeton: Princeton University Press
Perrow, C. (1999). Nuclear power as a high-risk systems: why we have not had more TMI's but will soon. In: *Normal Accidents. Living with high-risk technologies.* Princeton: Princeton University Press
Perrow, C. (1999). Complexity, Coupling and Catastrophe. In: *Normal Accidents. Living with high-risk technologies.* Princeton: Princeton University Press

(5) November 21st 2017: Learning in technological systems
In the preceding session, we have learned how and why things go wrong in technological systems. Let's now see whether this knowledge is of any use.

Literature for this session:
Mandatory:
Roberts, K.H.; Bea, R.; Bartles, D.L. (2001). Must Accidents Happen? Lessons from High-Reliability Organizations. *The Academy of Management Executive* (1993-2005) 15 (3), 70-79.
Cooke, D.L. & Rohleder, T.R. (2006). Learning from incidents: from normal accidents to high reliability. System Dynamics Review Vol. 22, No. 3, (Fall 2006): 213–239.

(6) November 28th 2017: Failures of public risk management
Enforcing a duty to wear seat belts makes car driving safer, right? As you will learn in this session reducing technological risks by public regulation is not as straightforward.

Literature for this session:
Mandatory:
Adams, J. (2012). Management of the Risks of Transport. In S. Roeser, R. Hillerbrand, P. Sandin & M. Peterson (Eds.): *Handbook of Risk Theory. Epistemology, Decision Theory, Ethics, and Social Implications of Risk Vol. 1* (240-264). Dordrecht [et al.]: Springer.
Additional/optional:
Adams, J. (1995). Risk: an introduction. In: *Risk.* London: University College London Press
Adams, J. (1995). Risk and the Royal Society. In: *Risk.* London: University College London Press

(7) December 5th 2017: Risk governance and technology
Technology may entail risk, and is at times difficult if not impossible to control them. At the same time, we have seen how the perception of risk may differ culturally. That said, societies have to find systematic ways of dealing with innovative technologies and the risks they might entail.

Literature for this session:
Mandatory:
Hermans, M.A., Fox, T., Asselt, van M.B.A. (2012). Risk Governance. In S. Roeser, R. Hillerbrand, P. Sandin & M. Peterson (Eds.): *Handbook of Risk Theory. Epistemology, Decision Theory, Ethics, and Social Implications of Risk Vol. 1* (1093-1118). Dordrecht [et al.]: Springer.
Additional/optional:
Est, van R., Walhout, B. & Brom, F. (2012). Risk and Technology Assessment. In S. Roeser, R. Hillerbrand, P. Sandin & M. Peterson (Eds.): *Handbook of Risk Theory. Epistemology, Decision Theory, Ethics, and Social Implications of Risk Vol. 1* (1067-1092). Dordrecht [et al.]: Springer.

(8) December 12th 2017: The practice of risk governance in the EU
The preceding session has introduced a modern approach to the public management of risk. Let's see how and in how far it affects risk management as practiced by the European Union.

Literature for this session:
Mandatory:
van Asselt, M. B. A., & Vos, E. I. L. (2012). EU risk regulation and the uncertainty challenge. In R. Hillerbrand, P. Sandin, & M. Peterson (Eds.), *Handbook of risk theory epistemology, decision theory, ethics, and social implications of risk.* (pp. 1119-1136). Springer Verlag.
Additional/optional:
Tosun, J. (2013). *Risk Regulation in Europe. Assessing the Application of the Precautionary Principle.* SpringerBriefs in Political Science 3, New York: Springer.
→ Please read the introduction (pp. 1-7) and chapters 4-6 (pp. 39-82)

(9) December 19th 2017: Complexity of governance
Earlier we have seen, how public attempts at risk reduction can be countered by compensating behaviour at the individual level, a phenomenon that seems similar to the more general idea of a 'balancing feedback loop'. If public decision makers were more aware of such systems thinking, their regulation might become more effective. Thus, before we move from the governance of technological risks to broader questions of the governance of complex and innovative technological systems, let's dive a bit deeper into complexity thinking and its implications for organising as an activity.

Literature for this session:
Mandatory:
Senge, P. (1990) Nature's templates: identifying the patterns that control events. In: Senge, P. *The Fifth Discipline: the art and practice of the learning organization.* New York etc.: Double Day
Additional/optional:
Gerrits, L. (2012). *Punching Clouds. An Introduction to the Complexity of Public Decision-Making.* Litchfield Park: Emergent Publications.

December 23rd 2017 to January 7th 2018: Christmas break – No sessions!
Enjoy your holidays.

(10) January 9th 2018: The end of govern*ment*?
We all moan about 'bureaucracy' time and again. Often enough, it involves a lot of complicated – but usually not complex – paperwork and, even more annoyingly does not seem sufficiently flexible to reply to our very individual needs. In fact, at the time the 'Weberian' bureaucracy was installed in Western Europe, the lack of flexibility concerning individual cases was seen as one of its strengths. Yet, proponents of innovative forms of 'governance' claim that Weberian bureaucracy as a tool of government is not apt to today's complex challenges and must be replaced. In order to fully grasp the pros and cons of governance, let us first discuss – and maybe even learn to appreciate – bureaucracy and govern*ment,* and let's contrast it with possible alternatives.

Literature for this session:
Mandatory:
Peters, B. G. (2003). Dismantling and Rebuilding the Weberian State. In J. Hayward & A. Menon (Eds.): *Governing Europe* (113-127). Oxford: Oxford University Press.
Klijn, E.H. & Koppenjan, J. (2015). Governance networks in the public sector: an introduction. In: *Governance Networks in the Public Sector.* New York etc.: Routledge
Optional/additional:
Weber, M. (1946). 'Bureaucracy'. In H. H. Gerth & C. W. Mills (Eds.): *From Max Weber: Essays in Sociology.* Oxford: Oxford University Press.

(11) January 16th 2018: Addressing complexity by network governance
Earlier in the course, risk governance was introduced as a means to handle complex risks resulting from technology. Technology itself is, however, not the only source of complexity, and regulating technology is not always about regulation risks in the strict sense. Network governance was introduced last time as a more general alternative to bureaucratic forms of government and was claimed to be more apt to handle complexity. Let's have a closer look at this claim.

Literature for this session:
Mandatory:
Klijn, E.H. & Koppenjan, J. (2015). Managing substantive complexities in governance networks. In: *Governance Networks in the Public Sector.* New York etc.: Routledge

Klijn, E.H. & Koppenjan, J. (2015). Managing strategic complexity in governance networks. In: *Governance Networks in the Public Sector*. New York etc.: Routledge
Addtional/optional:
Klijn, E.H. & Koppenjan, J. (2014). Complexity in Governance Network Theory. *Complexity, Governance & Networks 1* (1), 61-70.

(12) January 23rd 2018: The practice of governance networks
Now that we know the theoretical arguments in favour of network governance, which arguably make more or less sense on paper, let us take a look at the practice of network governance.

Literature for this session:
Mandatory:
Klijn, E.-H., Steijn, B. and Edelenbos, J. (2010), The impact of network management on outcomes in governance networks. Public Administration, 88: 1063–1082. doi: 10.1111/j.1467-9299.2010.01826.x
Borras, S. (2007). Governance Networks in the EU: The Case of GMO Policy. In M. Marcussen & J. Torfing (Eds.): *Democratic Network Governance in Europe* (232-251). Basingstoke: Palgrave Macmillan.
Additional/optional:
Torfing, J. (2007). Introduction: Democratic Network Governance. In M. Marcussen and J. Torfing (Eds.): *Democratic Network Governance in Europe* (1-22). Basingstoke: Palgrave Macmillan.
Weber, E. P. and Khademian, A. M. (2008), Wicked Problems, Knowledge Challenges, and Collaborative Capacity Builders in Network Settings. Public Administration Review, 68: 334–349. doi: 10.1111/j.1540-6210.2007.00866.x

(13) January 30th 2018: Public-Private Partnerships
In the discussion on network governance, we have already heard the argument that the state is sometimes not able to do it all alone. In this session, we will learn about yet another way of involving private actors in the practice of governing complex technological systems that has become rather prominent in the last decades: public-private partnerships (PPPs).

Literature for this session
Mandatory:
Flyvbjerg, B., Bruzelius, N., Rothengatter, W. (2003). Lessons of Privatisation. In: Flyvbjerg, Bruzelius, Rothengatter, *Megaprojects and Risk: an anatomy of ambition*. Cambridge: Cambridge University Press
Addtional/optional:
Wettenhall, R. (2010). Mixes and Partnerships through time. In: Hodge, G., Greve, C., Boardman, E. *International Handbook on Public-Private Partnerships*. London etc.: Edward Elgar
Hammersmith, G. and Ysa, T. (2010). Empirical PPP experiences in Europe: national variations of a global concept. In: Hodge, G., Greve, C., Boardman, E. I*nternational Handbook on Public-Private Partnerships*. London etc.: Edward Elgar

(14) February 6th 2018: Feedback session
In this session, you will be given the opportunity to present your research project (i.e. your seminar paper) and receive feedback.

March 31st 2018: Deadline for seminar papers
Please upload your seminar paper (pdf or Word doc) here.
Please additionally send it to me via e-mail OR hand in a hard copy at the Chair's secretariat.
In case of questions or problems, please contact me early enough.
Please follow the general instructions and feedback we have talked about.

Note: A deadline is a deadline is a deadline

Possible paper topics could be, amongst others:
driverless cars
facebook fact-checking efforts
management principles & complexity
google translate and machine learning / artificial intelligence
Pokémon GO!
decision by the Federal Constitutional Court (Bundesverfassungsgericht) on nuclear energy
(Atomausstieg)
electric vehicles (cars)
decision of the Court of Justice (EU) to increase transparency of risks of glyphosate
brittleness of steel in European nuclear plants
privatization plans regarding German motorways
risk regulation regarding "fracking"
Bad Aibling train accident
Privatisation plans regarding German motorways
plans on stricter punishment for illegal car racing

In the final paper, students should apply the concepts, theories and approaches learned during the
course to a real-life issue of public governance and explain what went wrong (or particularly well) in
this particular case, as well as what can generally be learned from this case. The insights gained in the
course should become tools, to be put to use in such a way that the issue in question is better
understood than by mere (e.g. journalistic) description.
For example, the way in which the World Health Organization (WHO) – presumably – overreacted to
the threat posed by H1N1 (a.k.a. the 'swine flu') in 2009 is often explained by some kind of conspiracy
theory involving the pharmaceutical industry, for instance. By using a concept studied in this course,
namely by perceiving of the WHO as an (international) *bureaucracy*, however, it can be explained in a
different manner, one that is arguably more accurate. [see example seminar paper in the VC]