

# Ideologies of Technological Change — And How to Study Them (SOT86120)

Technical University of Munich

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<b>Term:</b> Winter 2025-26	<b>Instructor:</b> Timo Seidl
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<b>Time:</b> Monday, 13:15-14:45	<b>Website:</b> www.timoseidl.com
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## Course Description

'Data is the new oil.' 'AI democratizes wisdom.' 'The internet of the future will run on the blockchain.' 'Fusion can solve all our energy problems.' 'Luddism has never worked.' The history of technological change is rich with such metaphors, narratives, frames, and future imaginaries. These ideological elements are essential for understanding the course and character of technological change itself, as they shape how actors perceive and conceive its promises and pitfalls, its possibilities and problems. In this course, we examine both the theory of ideas in politics and society, and the qualitative and quantitative methods used to empirically study them. For different ideational concepts—such as narratives—we will read both theoretical and empirical studies, and practically explore methodological approaches to studying them. These approaches range from qualitative frameworks such as grounded theory, to mixed methods like discourse network analysis, to computational techniques such as transformer-based topic modeling and classification. While some of these approaches require some background in R or Python and this course cannot substitute for an introduction to either, knowledge of them is not strictly required to successfully participate in this course.

## Learning Outcomes

The seminar aims to familiarize with key theoretical and empirical approaches in the study of technological change, with a particular focus on ideational explanations. Upon successful completion of the seminar, students will be able to:

- Identify and explain key theoretical arguments and debates in ideational social science, and summarize empirical findings on the role of ideas in technological change.
- Interpret and critically assess major empirical approaches for studying ideas—including qualitative, mixed-method, and computational techniques—and demonstrate in principle how such methods can be applied to real-world cases

## Requirements

In line with the module, the examination consists of a research paper (wissenschaftliche Ausarbeitung) accompanied by a colloquium. The research paper itself will count for 65% of students' grade, the colloquium for 35%. The research paper takes the form of an exposé in which students are expected to develop a detailed proposal for an empirical research project that aligns with the course's overarching theme. This includes formulating a theoretically grounded research question, critically assessing one or more suitable empirical methods to address it, providing an in-depth elaboration of potential data sources, and discussing the relevance and implications of the expected findings. The research paper should be approximately 3,000 words in length and must be submitted during the semester. It is intended to assess students' ability to independently design an empirical research project and to apply the theoretical and methodological knowledge acquired in the module. The colloquium will take place during one or more of the final sessions. Students are expected to upload their research papers in advance and deliver a brief presentation (3–5 minutes) of their project. They should also be prepared to respond to questions from both their peers and the instructor. In addition, students are expected to read selected papers by their fellow students beforehand and prepare one or more questions for discussion. This is intended to ensure that students are able to discuss and defend their research in an academic setting.

## Prerequisites

Students need no prior knowledge to successfully complete the seminar, although basic knowledge of R and/or Python are useful.

## Course Policy

Basically, don't cheat and try to learn stuff. I'd also would—genuinely—appreciate if you regularly attend class in person, I promise I'll do my best to make it worth your while. For some more details, see below.

## Feedback Policy

I want to give you as much feedback as you want—but I also don't want to waste my time writing more detailed feedback if you don't even care. So while by default you will only receive your grade, you can easily request written feedback by simply writing on your assignment or telling me directly that you would like to received written feedback (e.g., 'I want to receive written feedback on this paper.').

## E-mail Policy

You can always email me if you have an idea for an assignment, if you want to learn more about a certain topic and don't know where to start, or if you have a question that you really don't want to ask in class. Please don't email me with questions that you could easily find the answer to in

the syllabus or in my previous emails. I might take it badly. Two more things that make my life easier: First, please make sure to mention the course title in the subject line of your email. Second, please reply to previous email conversations with me instead of starting a new email, especially if it's about the same topic.

## **A.I. Policy**

I encourage you to use large language models like *ChatGPT* to improve, speed up, or challenge your writing (be that of text or code)—I regularly do so myself. However, not only do I expect you do make this use very (!) transparent.<sup>1</sup> I also want you to reflect on three things: First, current large language models are not very useful if it's really important to get things right. If you see yourself working in an area where this matters, you will have to learn how to get things right. Second, current large language models are much more useful if you actually know what you're doing—much like a cheat code in a video game is much more useful to someone who is actually good at the game. So if you want to be augmented instead of replaced by large language models, keep learning stuff. Lastly, by routinely relying on AI shortcuts you relinquish, as English professor Thomas Pfau puts it, 'the experience of intellectual achievement and growth, which can only ever be the fruit of *sustained* personal effort'. Your time at university will become 'a relentless series of logistical challenges', rather than 'a process of learning and intellectual and personal growth'. So think very clearly about what you are giving up—and risking—when trying to save some time.

## **Grading Policy**

In principle, all assigned tasks must receive a passing grade in order to pass the module. In exceptional cases, deviations from this rule may be considered, but any such decisions will be made on a case-by-case basis at the instructor's discretion. However, in exceptional circumstances, alternative assignments may be permitted as a substitute. Your final grade will be a weighted average of the above-described assignments.

In general terms, what is important to me when it comes to grading are two things. First, stick to the task at hand and look at the syllabus to see what is actually expected from you; and second, put a bit of effort into it. Try to write something that you yourself would like to read. Be concise and clear, or at least make it clear when you found something unclear. You don't need to understand everything, have read a ton of additional literature, or write in a fancy way to get a very good grade. Just stick to the task and try to make sense.

Below you can find more detailed grading criteria, which apply, with varying degrees of emphasis, to most types of assessments. These criteria comprise: Strength and Originality of Argument, Theoretical Framework and Literature Engagement, Methodology and Empirical Evidence, Topicality and Academic or Practical Relevance, Structure and Organization, Clarity and Quality

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<sup>1</sup>For example, you used an LLM to help you rephrase a certain paragraph, add a footnote saying something like 'I used GPT-4o to help me improve the phrasing of this paragraph.' If you use an LLM to brainstorm or come up with potential criticisms of your main argument, add a footnote at the start of the paper where you briefly explain how you used this criticism to improve your paper.

of Communication, Citation and Academic Integrity. In addition, I put some general advise on writing (a good term or response paper) on my website, which you can find here.

**Very Good (1,0—1,3):**

- *The argument is exceptionally clear, compelling, and thoroughly grounded in critical thinking, showcasing a high degree of originality. It demonstrates a sophisticated understanding of the topic, integrating novel insights or approaches with persuasive and well-substantiated reasoning.*
- *Demonstrates an exceptional understanding and engagement with the theoretical framework and relevant literature. The research is characterized by extensive depth and breadth, critically engaging with a wide range of sources to offer new insights or interpretations. It reflects a sophisticated integration of theory with the research topic.*
- *The methodology is excellently chosen, well-executed, and thoroughly justified, with empirical evidence used effectively to support the argument. Evidence is highly relevant, accurately interpreted, and integrated seamlessly into the research, enhancing the strength and credibility of the findings.*
- *The research is exceptionally topical, engaging deeply with current questions or themes within the field. It demonstrates a high degree of academic relevance, providing insightful analysis that could inform theoretical frameworks, discussions, or future research. The paper offers thoughtful reflections on potential practical insights or implications, highlighting its broader significance.*
- *Excellently structured. Outstanding organization and clarity.*
- *Exceptional communication. Written or oral expression is clear, fluent, elegant, and highly engaging. Ideas are articulated effectively and concisely, facilitating a deep understanding.*
- *Perfect or near-perfect adherence to citation guidelines and excellent, visually appealing formatting. High academic integrity.*

**Good (1,7—2,3):**

- *The argument is strong and well-founded, displaying a good level of original thinking and critical engagement with the subject matter. It presents a coherent and convincing case, supported by evidence, with some innovative perspectives or methods.*
- *Shows a thorough understanding of the theoretical framework with a good engagement with pertinent literature. The research covers a broad spectrum of sources, providing a solid grounding in the field and contributing to the topic with some new perspectives or critical reflections.*
- *The methodology is mostly appropriate and well-executed, with good use of empirical evidence that supports the main argument. While mostly relevant and well-integrated, there may be minor issues in execution or interpretation that do not significantly detract from the overall strength of the research.*
- *Shows strong topicality and relevance, connecting well with contemporary scholarly debates or issues. It makes a notable academic contribution, with implications that suggest possible avenues for further investigation, theoretical development, or practical considerations in a more general sense. Practical insights are offered in a way that enriches the academic discourse.*
- *Well-structured. Good organization that supports the content.*
- *Good communication. Mostly clear and engaging, with minimal errors or distractions. Ideas are effectively conveyed, and the overall expression supports comprehension.*
- *Only cosmetic mistakes in citation or formatting. Generally adheres to academic standards.*

**Satisfactory (2.7—3.3):**

- *The work shows an adequate argument that is reasonably clear and supported, featuring some degree of originality. The argument has merit and is founded on appropriate reasoning, though it may occasionally lack depth or fail to fully persuade.*
- *Provides an adequate review of the theoretical framework and engages reasonably with relevant literature. The research demonstrates a sufficient depth and breadth, identifying key theories and sources, though it may lack in offering substantial new insights or critical analysis.*
- *The methodology is adequate, with some issues in choice or execution. Empirical evidence is used, with some relevance and support for the argument, but the integration and interpretation of data could be improved to strengthen the research outcomes.*
- *Adequately addresses current topics and demonstrates relevance to ongoing academic conversations. It offers some practical insights, presenting a grounded perspective on how the findings might be applied or considered in broader contexts. The paper contributes to academic understanding, albeit with more limited scope or depth.*
- *Adequately structured. Generally clear with some organizational issues.*
- *Adequate communication. Generally clear, though minor errors or awkwardness occasionally distract or impede immediate understanding. Ideas are communicated sufficiently but could benefit from improved presentation.*
- *Some smaller issues with citation or formatting, but generally correct.*

**Sufficient (3.7—4.0):**

- *There is an attempt at arguing a thesis, but the argument often lacks clarity, depth, and convincing evidence. Originality is limited, with the work showing minimal innovation in thought or approach. The argument is weak and not particularly persuasive.*
- *Exhibits a basic understanding of the theoretical framework with a limited engagement with relevant literature. The research scope is somewhat narrow, with gaps in the depth and breadth of literature reviewed, offering minimal new interpretations or critical engagement with existing theories.*
- *The methodology shows a basic level of appropriateness and execution, but lacks in thoroughness or precision. Empirical evidence is present but limited or flawed, with issues in relevance or integration that weaken the argument and research findings.*
- *Exhibits basic engagement with topical issues, with some relevance to the academic field. It hints at practical insights or implications, though these are not fully developed or are only tangentially addressed. The work provides a modest contribution, with potential areas for further exploration identified but not deeply explored.*
- *Acceptably structured. Some effort at organization but lacks clarity.*
- *Acceptable communication. Understandable overall, but frequently awkward, unclear, or disorganized. Errors or unclear expression frequently interrupt or complicate comprehension.*
- *Acceptable adherence but with some sloppiness or minor errors.*

**Insufficient/Fail (4,3—5,0):**

- *The argument is poorly structured, unclear, or largely absent, with no evidence of original thinking or critical engagement. It fails to make a convincing case, lacking both in strength and in the presentation of any novel insights or perspectives.*
- *Shows poor understanding and engagement with the theoretical framework and literature. The research is significantly lacking in depth and breadth, with little to no critical engagement with relevant sources or theories, failing to adequately support or contextualize the research topic.*
- *The methodology is poor or inappropriate, with significant flaws in execution. Empirical evidence is poorly used, irrelevant, or largely absent, offering little to no support for the argument or findings. This level reflects a fundamental misunderstanding or neglect of sound research practices.*
- *Lacks significant topicality or relevance, with minimal engagement with current academic or practical concerns. The paper offers little in the way of practical insights, failing to connect findings to broader discussions, potential applications, or theoretical implications.*
- *Poorly structured. Disorganized and difficult to follow.*
- *Poor communication. Frequent errors, unclear wording, disorganization, or a lack of coherence make understanding difficult.*
- *Poor adherence to citation and formatting. Major errors or ethical issues.*

# Course Outline

## Part I: General Introduction

### Week 1, Oct 13, 2025: Introduction

*no readings for this session*

### Week 2, Oct 20, 2025: A Primer on Ideational Social Science

#### Required Readings:

Mehta, J. (2011). The Varied Roles of Ideas in Politics: From “Whether” to “How,.” In D. Béland & R. H. Cox (Eds.), *Ideas and Politics in Social Science Research* (pp. 23–46). Oxford Univ. Press.

Kamkhaji, J. C., & Radaelli, C. M. (2022). Don't think it's a good idea! Four building sites of the 'ideas school.' *West European Politics*, 45(4), 841–862. <https://doi.org/10.1080/01402382.2021.1959751>

#### Optional Readings:

Parsons, C. (2007). *How to Map Arguments in Political Science*. Oxford University Press, Chapter 4.

Schmidt, V. A. (2008). Discursive Institutionalism: The Explanatory Power of Ideas and Discourse. *Annual Review of Political Science*, 11(1), 303–326. <https://doi.org/10.1146/annurev.polisci.11.060606.135342>

### Week 3, Oct 27, 2025: Ideas, Ideologies & Technological Change

#### Required Readings:

Sturken, M., & Thomas, D. (Eds.). (2004). *Technological visions: The hopes and fears that shape new technologies*. Temple University Press, Introduction.

Jasanoff, S., & Kim, S.-H. (2009). Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea. *Minerva*, 47(2), 119–146. <https://doi.org/10.1007/s11024-009-9124-4>

#### Optional Readings:

Nachtwey, O., & Seidl, T. (2024). The Solutionist Ethic and the Spirit of Digital Capitalism. *Theory, Culture & Society*, 41(2), 91–112. <https://doi.org/10.1177/02632764231196829>

Ornston, D. (2021). How Stories Shape Regional Development: Collective Narratives and High-Technology Entrepreneurship in Waterloo, Canada. *Economic Geography*, 97(4), 390–410. <https://doi.org/10.1080/00130095.2021.1945435>

## Part II: Topic Modeling

### Week 4, Nov 3, 2025: What Can We (Not) Do with Topic Modeling?

#### Required Readings:

Chen, Y., Peng, Z., Kim, S.-H., & Choi, C. W. (2023). What We Can Do and Cannot Do with Topic Modeling: A Systematic Review. *Communication Methods and Measures*, 17(2), 111–130. <https://doi.org/10.1080/19312458.2023.2167965>

#### Optional Readings:

Eshima, S., Imai, K., & Sasaki, T. (2024). Keyword-Assisted Topic Models. *American Journal of Political Science*, 68(2), 730–750. <https://doi.org/10.1111/ajps.12779>

Gessler, T. (2022). Topic models. In A. Ceron (Ed.), *Elgar Encyclopedia of Technology and Politics* (pp. 108–111). Edward Elgar Publishing. <https://doi.org/10.4337/9781800374263.topic.models>

### Week 5, Nov 11, 2025: Topic Modeling with BERTopic

#### Required Readings:

*none*

#### Optional Readings:

Grootendorst, M. (2022). BERTopic: Neural topic modeling with a class-based TF-IDF procedure (No. arXiv:2203.05794). arXiv. <http://arxiv.org/abs/2203.05794>

## Part III: Classification

### Week 6, Nov 17, 2025: Stance Detection

#### Required Readings:

Burnham, M. (2025). Stance detection: A practical guide to classifying political beliefs in text. *Political Science Research and Methods*, 13(3), 611–628. <https://doi.org/10.1017/psrm.2024.35>

#### Optional Readings:

Laurer, M., Van Attevelde, W., Casas, A., & Welbers, K. (2024). Less Annotating, More Classifying: Addressing the Data Scarcity Issue of Supervised Machine Learning with Deep Transfer Learning and BERT-NLI. *Political Analysis*, 32(1), 84–100. <https://doi.org/10.1017/pan.2023.20>

Müller, S., & Proksch, S.-O. (2024). Nostalgia in European Party Politics: A Text-Based Measurement Approach. *British Journal of Political Science*, 54(3), 993–1005. <https://doi.org/10.1017/S0007123423000571>

Törnberg, P. (2024). Best Practices for Text Annotation with Large Language Models (No. arXiv:2402.05129). arXiv. <http://arxiv.org/abs/2402.05129>

## **Week 7, Nov 24, 2025: Stance Detection with Transformers**

### **Required Readings:**

*none*

### **Optional Readings:**

*none*

## **Part IV: Discourse Network Analysis**

## **Week 8, Dec 1, 2025: What is Discourse Network Analysis?**

### **Required Readings:**

Leifeld, P. (2018). Discourse Network Analysis: Policy Debates as Dynamic Networks. In J. N. Victor, A. H. Montgomery, & M. Lubell (Eds.), *The Oxford handbook of political networks* (pp. 301–326). Oxford University Press.

### **Optional Readings:**

Leifeld, P. (2020). Policy Debates and Discourse Network Analysis: A Research Agenda. *Politics and Governance*, 8(2), 180–183. <https://doi.org/10.17645/pag.v8i2.3249>

## **Week 9, Dec 8, 2025: Doing Discourse Network Analysis**

### **Required Readings:**

*none*

### **Optional Readings:**

Carstensen, M. B., Emmenegger, P., & Ivardi, C. (2025). Problems and Solutions in the Knowledge Economy: Ideational Power in Slow-Burning Crises. *Regulation & Governance*, <https://doi.org/10.1111/regg.70060>

Schmitz, L., & Seidl, T. (2023). As Open as Possible, as Autonomous as Necessary: Understanding the Rise of Open Strategic Autonomy in EU Trade Policy. *JCMS: Journal of Common Market Studies*, 61(3), 834–852. <https://doi.org/10.1111/jcms.13428>

## **Week 10, Dec 15, 2025: Automating Discourse Network Analysis**

### **Required Readings:**

*none*

### **Optional Readings:**

Angst, M., Müller, N. N., & Walker, V. (2025). Automated extraction of discourse networks from large volumes of media data. *Network Science*, 13, e4. <https://doi.org/10.1017/nws.2025.4>

Haunss, S., Kuhn, J., Padó, S., Blessing, A., Blokker, N., Dayanik, E., & Lapesa, G. (2020). Integrating Manual and Automatic Annotation for the Creation of Discourse Network Data Sets. *Politics and Governance*, 8(2), 326–339. <https://doi.org/10.17645/pag.v8i2.2591>

### **Week 11, Dec 22, 2025: Open Session**

We decide in class what we want to do in this session. Can involve anything from recaps, to an AMA, to feedback on specific ideas or projects.

## **Part V: Computational Grounded Theory**

### **Week 12, Jan 12, 2025: What is Computational Grounded Theory?**

#### **Required Readings:**

Nelson, L. K. (2020). Computational Grounded Theory: A Methodological Framework. *Sociological Methods & Research*, 49(1), 3–42. <https://doi.org/10.1177/0049124117729703>

Carlsen, H. B., & Ralund, S. (2022). Computational grounded theory revisited: From computer-led to computer-assisted text analysis. *Big Data & Society*, 9(1), 205395172210801. <https://doi.org/10.1177/20539517221080146>

#### **Optional Readings:**

Charmaz, K. (2014). *Constructing grounded theory* (2. ed). SAGE, chapter 1.

Abramson, C. M., Joslyn, J., Rendle, K. A., Garrett, S. B., & Dohan, D. (2018). The promises of computational ethnography: Improving transparency, replicability, and validity for realist approaches to ethnographic analysis. *Ethnography*, 19(2), 254–284. <https://doi.org/10.1177/1466138117725340>

Bonikowski, B., & Nelson, L. K. (2022). From Ends to Means: The Promise of Computational Text Analysis for Theoretically Driven Sociological Research. *Sociological Methods & Research*, 51(4), 1469–1483. <https://doi.org/10.1177/00491241221123088>

Pardo-Guerra, J. P., & Pahwa, P. (2022). The Extended Computational Case Method: A Framework for Research Design. *Sociological Methods & Research*, 004912412211226. <https://doi.org/10.1177/00491241221122616>

### **Week 13, Jan 19, 2025: Doing Computational Grounded Theory**

#### **Required Readings:**

*none*

#### **Optional Readings:**

Than, N., Fan, L., Law, T., Nelson, L. K., & McCall, L. (2025). Updating “The Future of Coding”: Qualitative Coding with Generative Large Language Models. *Sociological Methods & Research*, 54(3), 849–888. <https://doi.org/10.1177/00491241251339188>

### **Week 14, Jan 26, 2025: Colloquium I**

*No Readings*

### **Week 15, Feb 2, 2025: Colloquium II & Open Session**

*No Readings*