



UNIVERSITY
OF COLOGNE

Faculty of Management, Economics and Social Sciences
Cologne Institute for Information Systems (CIIS)

Bachelor Seminar on Information Systems and Digital Technology

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Professorship for Information Systems

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Creative and Innovative Knowledge Work in the Age of Artificial Intelligence

Artificial intelligence (AI) is typically defined as the ability of machines to perform cognitive tasks in a human-like manner (Russell & Norvig, 2010). Organizations initially focused on using artificial intelligence (AI) technologies to automate specific workflow processes and repetitive work. Such processes were linear, stepwise, sequential, and repeatable. But now, organizations are moving toward nonsystematic cognitive tasks that include creativity, idea generation, and problem-solving, which until recently have been within the bounds of human agency and seemed beyond the scope of automation. Generative AI tools (e.g., ChatGPT from OpenAI or LLaMA by Meta) have the potential to become essential during idea generation and design (Benbya, Strich, & Tamm, 2024).

However, there is contradictory evidence on the implications of human-AI collaboration in the context of creativity. On the one hand, AI may introduce less diverse patterns of creative activities (Balasubramanian, Ye, & Xu, 2022), which could lead to an increase in speed of ideation and the number of ideas but an atrophy in diversity. On the other hand, AI may present ways to augment human creativity in situations where humans still guide the process at critical junctions (Murray, Rhymer, & Sirmon, 2021). The contingencies of these implications are still largely unclear and need to be considered for different scenarios. For example, there is reason to believe that situations suitable to method-guided ideation such as systemic ideation (Recker

& Rosemann, 2015) and design thinking (Beckman & Barry, 2007) are affected in a different way in contrast to when radical new thinking is required.

We encourage students to study existing empirical and theoretical evidence in this domain to extend existing IS research. Students are open to investigate topics either from an organizational perspective (Benbya, Davenport, & Pachidi, 2020; Benbya, Pachidi, & Jarvenpaa, 2021; Berente, Gu, Recker, & Santhanam, 2021) or an individual perspective (Schechter et al., 2023; Seeber et al., 2020) on creativity and innovative knowledge work in the relationship between humans and AI. Topics can include different domains of creative knowledge work, such as art, design, journalism, (business) innovation, and software development (e.g., Petridis et al., 2023; Seidel, Berente, Lindberg, Lyytinen, & Nickerson, 2019).

Some potential research themes on AI and creativity and associated questions include:

- **Creativity:** How can AI be creative? How can humans and AI be co-creators? How does AI affect human creativity?
- **Idea generation:** How can AI be integrated into the idea generation process? How does and should attribution work when AI generates ideas based on human-created knowledge/ideas?
- **Innovation:** How does AI foster or corrupt innovation? How can AI enhance business process vs. product innovation? How does AI impact a firm's innovation process? What is the role of AI in explorative versus exploitative innovation? What is the role of AI in open innovation? How does AI affect knowledge management?
- **Managing creative knowledge work:** How does AI influence managers overseeing creative knowledge work? What managerial practices are necessary to ensure the effective implementation of AI for creative knowledge work?
- **Creative knowledge work:** How can AI foster or corrupt the work of artists/journalists/designers? What are drivers and barriers of AI implementation/adoption for creative knowledge work? How does the role of tacit knowledge change through the continuous interplay of AI-generated knowledge and human expertise (e.g., in the context of self-inferring feedback loops)?
- **Work processes and team dynamics:** In which creative tasks/processes does automation provide the best creative outcomes? In which augmentation? In which AI-free approach? Why? What are the different modes of human-machine interaction as part of the creative process? How should the best mode be chosen based on the nature of the creative task at hand?
- **Creative workforce:** How are workers affected when some of their tasks are automated while others are augmented? What happens when AI tools outperform human experts? What kind of skills become important when AI is used for creative knowledge tasks? How is the occupational identity of creative and knowledge workers transformed by AI?
- **Equity and ethics:** How can the use of creative automation and augmentation be balanced to ensure a net benefit to all key stakeholders (employees, organizations, and society)? How should the authorship, ownership, and accountability of GenAI outputs be determined?

See Benbya et al. (2024) for more research avenues for AI and creative work.

Fundamentals on Scientific Work

The students learn the fundamentals of scientific work via the Flipped Classroom on Scientific Work. A separate registration (and preparation) is necessary:

- https://www.ilias.uni-koeln.de/ilias/goto_uk_fold_2445676.html

For more information, please visit:

- <https://www.wirtschaftsinformatik.uni-koeln.de/de/studies/theses/scientific-work/>

Course Activities

The seminar work consists of five main phases:

1. The students acquire the basics of conducting scientific work via the Flipped Classroom.
2. The students learn the fundamentals concerning seminar's topic and literature reviews.
3. The students plan their seminar project by developing a research cycle and study protocol that is presented and discussed.
4. The improved study protocol guides the student to collect their data and assists them in their analysis. Hence, relevant data sources are identified, data is collected and processed in order to develop a key deliverable of the seminar project.
5. The seminar project is documented in a seminar paper. Before the final work is submitted, students give a presentation of their research project.

Course Grading

The course grading is threefold:

- Study Protocol (15%):
Written report including research problem and objective, outline of the paper, and plan of research method. Assessment in accordance with clarity, consistency, and comprehensiveness.
- Final Presentation (15%):
The 10-minute presentation should convey central parts of your research project such as research problem and question, method, results, and contribution to research and practice. Assessment in accordance with organization of content, oral, and overall presentation.
- Seminar paper (70%):
Written report about the research project. Assessment in accordance with evaluation scheme provided in ILIAS.

Timeline

Please kindly refer to the ILIAS course for detailed timeline and materials.

Session Dates:

- 01– 07 April: Study from home preparation, Flipped Classroom ILIAS course on Scientific Work
- 09 April, 09:00 – 11:30: Seminar Kick-off & Q&A Scientific Work

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- 16 April, Study from home:
 - Online materials on literature reviews
 - Developing a draft study protocol
- 23 April, 09:00 – 12:00: Workshop on literature reviews and developing a study protocol
- 14 May, 09:00 – 16:00: Review and discussion of the study protocols
- 09 July, 09:00 – 16:00: Final presentations

Note: Our seminar takes place in room 6.207 in Bernhard-Feilchenfeld-Str. 9 (Building 414).

Important Submissions:

- 12 April: Submission of topic proposal in ILIAS
- 10 May: Submission of study protocol
- 08 July: Submission of presentation
- 16 July: Submission of seminar paper

Note: All submissions are due at 12:00 (noon) via ILIAS.

Participation Guidelines

Below is a list of mandatory and optional readings. It is imperative that all read all mandatory readings before our first online meeting. A more comprehensive list of readings is available online through the institute's website (https://www.wirtschaftsinformatik.uni-koeln.de/sites/wirtschaftsinformatik/pdfs/teaching/Reading_List-Research_in_IS.pdf).

In preparation for the “Review and discussion of the study protocols” session, you have to submit your own study protocol and review study protocols of your peers. Within this session, you will discuss your own study protocol and the study protocols of your peers that have been assigned to you.

Readings

Mandatory Readings on Literature Reviews:

Bandara, W., Furtmueller, E., Gorbacheva, E., Miskon, S., & Beekhuyzen, J. (2015). Achieving rigor in literature reviews: Insights from qualitative data analysis and tool-support. *Communications of the Association for Information Systems*, 37, 154-204.

Kitchenham, B. (2004). Procedures for performing systematic reviews. Keele, UK, Keele University, 33(2004), 1-26.

Paré, G., et al. (2016). "Contextualizing the twin concepts of systematicity and transparency in information systems literature reviews." *European Journal of Information Systems* 25(6): 493-508.

- Rowe, F. (2014). What literature review is not: diversity, boundaries and recommendations. *European Journal of Information Systems*, 23(3), 241-255.
- Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS quarterly*, xiii-xxiii.

Mandatory Readings on Seminar's Topic:

- Bahoo, Salman, Cucculelli, Marco and Qamar, Dawood, (2023), Artificial intelligence and corporate innovation: A review and research agenda, *Technological Forecasting and Social Change*, 188, issue C
- Benbya, H., Pachidi, S., & Jarvenpaa, S. (2021). Special Issue Editorial: Artificial Intelligence in Organizations: Implications for Information Systems Research. *Journal of the Association for Information Systems*, 22(2), 10.
- Benbya, H., Strich, F., & Tamm, T. (2024). Navigating Generative Artificial Intelligence Promises and Perils for Knowledge and Creative Work. *Journal of the Association for Information Systems*, 25(1), 23.

Further Readings on Research Methods:

- Recker, J. (2012): *Scientific Research in Information Systems: A Beginner's Guide*. Springer, Heidelberg, Germany.

References

- Balasubramanian, N., Ye, Y., & Xu, M. (2022). Substituting human decision-making with machine learning: Implications for organizational learning. *Academy of Management Review*, 47(3), 448-465.
- Beckman, S. L., & Barry, M. (2007). Innovation as a learning process: Embedding design thinking. *California management review*, 50(1), 25-56.
- Benbya, H., Davenport, T. H., & Pachidi, S. (2020). Artificial intelligence in organizations: Current state and future opportunities. *MIS Quarterly Executive*, 19(4).
- Benbya, H., Pachidi, S., & Jarvenpaa, S. (2021). Special issue editorial: Artificial intelligence in organizations: Implications for information systems research. *Journal of the Association for Information Systems*, 22(2), 10.
- Benbya, H., Strich, F., & Tamm, T. (2024). Navigating Generative Artificial Intelligence Promises and Perils for Knowledge and Creative Work. *Journal of the Association for Information Systems*, 25(1), 23.
- Berente, N., Gu, B., Recker, J., & Santhanam, R. (2021). Managing Artificial Intelligence. *MIS Quarterly*, 45(3), 1433-1450.
- Murray, A., Rhymer, J., & Sirmon, D. G. (2021). Humans and technology: Forms of conjoined agency in organizations. *Academy of Management Review*, 46(3), 552-571.
- Petridis, S., Diakopoulos, N., Crowston, K., Hansen, M., Henderson, K., Jastrzebski, S., . . . Chilton, L. B. (2023). *Anglekindling: Supporting journalistic angle ideation with large language models*. Paper presented at the Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems.

- Recker, J., & Rosemann, M. (2015). Systemic ideation: A playbook for creating innovative ideas more consciously.
- Russell, S. J., & Norvig, P. (2010). *Artificial intelligence a modern approach*: London.
- Schechter, A., Hohenstein, J., Larson, L., Harris, A., Hou, T.-Y., Lee, W.-Y., . . . Jung, M. (2023). Vero: An accessible method for studying human–AI teamwork. *Computers in Human Behavior*, *141*, 107606.
- Seeber, I., Bittner, E., Briggs, R. O., De Vreede, T., De Vreede, G.-J., Elkins, A., . . . Randrup, N. (2020). Machines as teammates: A research agenda on AI in team collaboration. *Information & Management*, *57*(2), 103174.
- Seidel, S., Berente, N., Lindberg, A., Lyytinen, K., & Nickerson, J. V. (2019). Autonomous tools and design: a triple-loop approach to human-machine learning. *Communications of the ACM*, *62*(1), 50-57.