

Dr. Phil Hennel

# New Forms of Development

Syllabus



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# 1. Introduction

*Dear Students,*

Digital innovations are impacting everyone's everyday life. While technological advancements have become increasingly complex and intertwined, new methods of developing digital artifacts have emerged, lowering barriers to entry as well as the overall effort needed for their creation. As those barriers to entry become lower, innovative digital offerings are continuously disrupting long-established markets and driving traditional companies out of the market.

Many of the most successful digital businesses are (former) startups that have been founded by teams of young people, just like you. When collaborating with others, innovative ideas not only come to life, but can also be turned into reality. Bringing together a diverse group of engaged and motivated people offers unique possibilities to develop emergent ideas into great opportunities. In this seminar, we will take advantage of these. In small teams, you are going to experience first-hand what it means to develop a digital offering in an agile and innovation-driven manner; based on theories and literature, building upon no- and low-code development platforms.

After this seminar, you will have earned...

- The ability to differentiate terms such as Citizen Development, No-Code-Development, Low-Code-Development, Ecosystem, and Platform.
- Knowledge of different forms of development for digital artefacts.
- The ability to discuss and reason for or against specific forms of development considering all relevant influencing factors.
- The ability to analyze issues in teams and projects regarding their organization and management.
- An understanding and ability to reason for the importance of socio-technical aspects in (digital) project management.
- An understanding how Machine Learning or AI can impact digital artefact development now and in the future.

A small “*warning*” in advance, to manage expectations for this seminar: this is not a seminar to “sit back and listen.” Instead, it is a course that builds on interactive and cooperative learning and requires continuous work throughout the semester. Participation in this seminar involves teamwork, presentations, peer feedback, and intensive exchanges. The course is held in English. If you are not comfortable with this teaching format, I fully understand if you withdraw from the StudIP course. If you are motivated and excited to be actively involved in the course, I look forward to your participation! To facilitate this process, after the initial

kick-off, all students will be removed from the course and those still willing to participate need to re-join and organize (autonomously!) into teams.

This syllabus contains all important information about the course: a time schedule, the examination modalities, and much more. Please take the time to read the syllabus completely. If you have any further questions, please do not hesitate to contact me.

See you soon in class,  
*Phil Hennel*

## 2. General Information

### 1.1. Format

This is a hybrid course that contains different kinds of sessions and learning. “Hybrid” does not mean that sessions will be simultaneously available online *and* offline. Rather, some sessions will be online-only, some will be on-site-only.

#### Teamwork

Teamwork is a big part of this seminar. You are going to work together in teams of about 4 students. Together you will develop, refine, and finally pitch your own digital business model. As the lecturer, I will be available to the teams as a coach.

#### E-Learning and Milestone Assignments

Besides teamwork, the seminar also contains individual work. The basic knowledge about digital business is acquired independently by each student. E-learning videos are provided for self-study in the first weeks of the semester. Two (graded) milestone assignments will take place during the first weeks to check the knowledge learned during the self-study. During the e-learning phase, the StudIP forum serves as a place to exchange ideas and ask questions. The StudIP forum has the advantage (over other communication channels like Slack, Discord, or WhatsApp groups) that all students can benefit from the questions and that I can provide clarification if needed. Receiving and giving peer-feedback is important.

#### Reports

As this course is leaning heavily on teamwork which is not always visible to the outside and which can be skewed by outside intervention and observation, bi-weekly reports on the team’s process and progress are expected. These reports need to address general changes in the team’s structure and process, as well as what was achieved and what not, which problems have come up and which have been dealt with (and how). These reports are expected to draw a detailed picture of the team’s inner workings.

#### Presentation sessions

In the presentation sessions, the teams will finally present their projects to the course audience. During these presentations, the presenting team is tasked with making a clear-cut case for how their solution solves a *relevant* problem. This shall be done including, but not limited to, a demonstration of some sort of prototype which is to be developed. *All* students, those presenting *as well as* all other students, are *expected* to not only be present and sit in class, but also to actively engage during Q’n’A by asking questions and “interrogating” and (positively) challenging the presentations and solutions.

#### Additional Materials

In addition to the reports and the in-person assignments, teams are expected to hand in additional material for grading. This material entails a

video based on their presentation – not necessarily identical or “just” someone reading notes to moving slides, but similar in content. Further, a document outlining the motivating problem, its relevance, as well as the team’s structure, processes, and individual contributions needs to be handed in. All additional materials which might support or enrich and augment other submissions might be handed in as well.

## 1.2. Time and Place

The seminar is scheduled for **Wednesdays**, between **12:00** and **14:00**. For a detailed overview of which sessions take place on **campus** (room **WiWi1 A1070**) and which sessions will take place **virtually**, please refer to the time schedule below. The composition of the teams will be arranged at the kick-off session. The students are responsible to form teams themselves. After the kick-off-session, the course will be cleared, and students can re-join the course if they still intend to participate. If necessary, adjustments to the presentation schedule can be arranged.

## 1.3. Start

The kick-off session will take place on **October 18, 2023**. In order to participate in the course, you must be registered for the course via StudIP. Please use the time before the first session to read this syllabus carefully.

## 1.4. Literature

Luo, Y., Liang, P., Wang, C., Shahin, M., & Zhan, J. (2021, October). Characteristics and challenges of low-code development: the practitioners' perspective. In *Proceedings of the 15th ACM/IEEE international symposium on empirical software engineering and measurement (ESEM)* (pp. 1-11)

A. Sahay, A. Indamutsa, D. Di Ruscio and A. Pierantonio, "Supporting the understanding and comparison of low-code development platforms," *2020 46th Euromicro Conference on Software Engineering and Advanced Applications (SEAA)*, Portoroz, Slovenia, 2020, pp. 171-178, doi: 10.1109/SEAA51224.2020.00036.

Woo M. (2020). The Rise of No/Low Code Software Development-No Experience Needed?. *Engineering (Beijing, China)*, 6(9), 960-961. DOI: 10.1016/j.eng.2020.07.007

Di Ruscio, D., Kolovos, D., de Lara, J. *et al.* Low-code development and model-driven engineering: Two sides of the same coin?. *Softw Syst Model* **21**, 437-446 (2022). DOI: 10.1007/s10270-021-00970-2

Pekka Abrahamsson, Kieran Conboy & Xiaofeng Wang (2009) ‘Lots done, more to do’: the current state of agile systems development research, *European Journal of Information Systems*, 18:4, 281-284, DOI: 10.1057/ejis.2009.27

- Nunamaker, J. F., Chen, M., & Purdin, T. D. M. (1990). Systems Development in Information Systems Research. *Journal of Management Information Systems*, 7(3), 89-106.
- Naumann, J. D., & Jenkins, A. M. (1982). Prototyping: The New Paradigm for Systems Development. *MIS Quarterly*, 6(3), 29-44. DOI: 10.2307/248654
- Truex, D.P., Baskerville, R., & Travis, J. (2000). Amethodical systems development: the deferred meaning of systems development methods. *Accounting, Management and Information Technologies*, 10, 53-79.
- Brian Fitzgerald, Gerard Hartnett, and Kieran Conboy. 2006. Customising agile methods to software practices at Intel Shannon. *Eur. J. Inf. Syst.* 15, 2 (April 2006), 200-213. DOI: 10.1057/palgrave.ejis.3000605
- Iivari, J., & Huisman, M. (2007). The Relationship between Organizational Culture and the Deployment of Systems Development Methodologies. *MIS Quarterly*, 31(1), 35-58. DOI: 10.2307/25148780
- Hennel, P., & Rosenkranz, C. (2021). Investigating the “Socio” in Socio-Technical Development: The Case for Psychological Safety in Agile Information Systems Development. *Project Management Journal*, 52(1), 11-30. DOI: 10.1177/8756972820933057

### 3. Time Schedule

The table below shows the time schedule of this course, including the teaching format of each session and the deliverables with deadlines.

#	Day	Topic	Format	Deliverables
1	Oct 17	Kick-Off Session	On Campus	
2	Oct 24	Traditional Forms of Development	On Campus	
3	Oct 31	Agile Forms of Development	On Campus	
4	Nov 7	User-Generated Content and Citizen-Development	On Campus	
5	Nov 14	Deep-Dive into Low- and No-Code	Virtual	
6	Nov 21	Self-Learning	Your Choosing	
7	Nov 28	Self-Learning	Your Choosing	
8	Dec 5	Teamwork	Your Choosing	Milestone Questionnaire
9	Dec 12	Teamwork Coaching	Your Choosing Virtual*	
10	Dec 19	Teamwork	Your Choosing	
11	Jan 9	Teamwork	Your Choosing	
12	Jan 16	Presentation Session 1	Virtual*	
13	Jan 23	Presentation Session 2	Virtual*	
14	Jan 30	Wrap-Up Session	On Campus	Essay

*\*Subject to change*

As this course is based on interaction and active discussions, students are expected to not only be present during the sessions but to actively engage with the topic and take part in the discussion.



## 4. Examination

### 1.5. General information and form of examination

The course will be graded based on milestone questionnaire (40%) at the end of the course's first half and an essay (60%) that needs to be handed in at the end of the semester. This essay shall reflect the learnings made throughout the semester, both regarding the no- or low-code platform as well as regarding the literature review done as preparation.

Before heading into the teamwork phase in the second half of the course, students are expected to conduct a systematic literature review on the course's topics. The exact focus of this review can be chosen individually, however, it has to resemble the topics covered in the sessions before. The review does not need to cover the entirety of the selected sub-area, but rather shall give the student an opportunity to have an understanding of the current state of research regarding this specific area. This specialized knowledge shall then be outlined (together with a description of how the review was conducted) in the essay. More information can also be found in the Appendix.

Throughout the team work sessions, the students are expected to develop a prototypical application using a no- or low-code platform, specifically Mendix. The content, vision, etc. are up to the teams to decide. The essay should therefore entail a write-up how the platform was used, how the development process was like, what challenges were necessary to overcome, and how these experiences reflect learnings from the course's first half or the current state of research as identified in the literature review. More information can also be found in the Appendix.

### 1.6. Grading scheme

A maximum of 100 points can be achieved, 40 points from the milestone questionnaire and 60 points from the essay. The detailed evaluation criteria for the examination components can be found in the appendix of this document. The points achieved for each examination component are added up and evaluated according to the following grading key:

Points	Grade
00.0	5,0
50.0	4,0
54.5	3,7
59.0	3,3
64.5	3,0
69.0	2,7
74.5	2,3
79.0	2,0
84.5	1,7
89.0	1,3
94.5	1,0

## 5. Contact and Communication



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## Appendix A: Assessment of the Essay

	Insufficient	Below average	Average	Above average	Exemplary
<b>Structure and writing</b> <ul style="list-style-type: none"> <li>▪ Is the essay well-structured and well-written?</li> <li>▪ Does the essay contain all needed aspects?                             <ul style="list-style-type: none"> <li>○ Literature review and insights generated</li> <li>○ Experiences made during development</li> <li>○ ...</li> </ul> </li> </ul>	0pts	5pts	10pts	15pts	20pts
<b>Analysis and Integration</b> <ul style="list-style-type: none"> <li>▪ Is the essay well justified with arguments and explained in a comprehensible way?</li> <li>▪ Is the essay well-grounded in the theories and models learned?</li> <li>▪ Does the essay come to meaningful/insightful conclusions (“connects the dots”)?</li> <li>▪ Is the development process described in a clear and concrete manner?</li> <li>▪ Is the development result presented well?</li> </ul>	0pts	5pts	10pts	15pts	20pts
<b>Critical Look at the Literature and Own Experience</b> <ul style="list-style-type: none"> <li>▪ Does the essay put reviewed literature in clear and concrete context?</li> <li>▪ Is the literature looked at critically and cross-linked to the own experiences well-justified and explained in a comprehensible way?</li> </ul>	0pts	5pts	10pts	15pts	20pts

Maximum 60pts.

## Appendix B: Essay: Structure & Form

### (Rough) Essay Structure

The essay should (roughly) follow the following structure:

1. Introduction
  - a. Introduce the chosen focus of the literature review.
  - b. Provide a brief overview of the prototypical application developed using Mendix.
2. Literature Review
  - a. Objective and Scope
    - i. State the purpose of the literature review.
    - ii. Define the boundaries or specific focus area of the review related to the course topics
  - b. Methodology
    - i. Describe how the review was conducted. This can include search engines, databases used, key search terms, selection criteria, and the number of sources reviewed.
  - c. Main Findings
    - i. Summarize the current state of research in the chosen area
    - ii. Highlight significant discoveries, themes, or patterns.
  - d. Relation to Course
    - i. Explain how the topics reviewed relate to the course's initial sessions.
3. Prototypical Application Development
  - a. Platform Introduction
    - i. Describe the no- or low-code platform used (i.e., Mendix)
    - ii. Describe the envisioned artifact that is being developed and why it is suited for a no- or low-code platform
  - b. Development Process
    - i. Narrate the journey of creating the application, from idea conception to execution.
    - ii. Discuss the specific tools or features of Mendix used during the process.
  - c. Challenges and Solutions
    - i. Enumerate challenges faced during the development.

- ii. Describe the solutions or strategies used to overcome these challenges.
4. Reflection and Integration
  - a. Reflect on how the development experience tied into the learnings from the course's first half.
  - b. Integrate insights from the literature review to elucidate how the prototypical application mirrors or diverges from the current state of research.
5. Conclusion
  - a. Recap the significance of the literature review and its implications for the Mendix application project.
  - b. Sum up the main learnings derived from both the review and the development process.
  - c. Offer a perspective on the possible future advancements or research directions based on the findings and experiences.
6. References
  - a. List all sources and references used for the literature review and any other information sourced from external materials. Ensure a consistent citation style throughout the essay.
7. Appendices (if necessary)
  - a. Provide any supplementary information, data, or insights that couldn't be incorporated into the main body.
  - b. Ensure to reference where it's mentioned in the text as "(See Appendix A)" or similar.

### **General Formatting Tips:**

- Use clear headings and subheadings to demarcate different sections.
- Ensure consistency in font style, size, and spacing.
- Cite sources properly throughout the essay.
- Keep an eye on the word limit (5 pages or 1,250 words)

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