Discipline: Design Science (cross-domain)

1 Language

English

2 Title

Design Science

3 Lecturer

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4 Date and Location

June 5-8, 2017

University of St. Gallen, Institute of Information Management, Mueller-Friedberg-Str. 8, 9000 St. Gallen, Switzerland

The course will start at 10:00 on June 5. The course will be finished around 14:00 on June 8.

5 Course Description

5.1 Abstract and Learning Objectives

This class focuses on planning and conducting design science research on Ph.D. level. It is intended to provide state-of-the art methodological competences for all Ph.D. students in business whose research is not solely descriptive/explanatory, but also comprises components where artefacts are purposefully designed and evaluated.

While Design Science Research is very common in Information Systems research, purposeful artefact design and evaluation are found in many other business research fields like, e.g., General Management, Operations Management/Management Science, Accounting/Controlling, Business Education, or Marketing. Although Design Science is often conducted implicitly, the methodological discourse in the Information Systems has led to a high level of reflection and to the availability of a large number of reference publications and cases, so that examples and cases will often originate from this domain. It should however be noted that Design Science as a paradigm is applicable and is used in nearly all fields of business research. As a consequence, this class is not only part of the Information Systems ProDok curriculum, but intentionally being positioned as cross-domain class.

The goal of the course is to provide Ph.D. students with insights and capabilities that enable them to plan and conduct independent Design Science research. To achieve this goal, students will engage in a number of activities in preparation and during this four-day course, including preparatory readings, lectures, presentations, project work, and in-class discussions. The course format offers an interactive learning experience and the unique opportunity to obtain individualized feedback from leading IS researchers as well as develop preliminary research designs for their own Ph.D. projects.

5.2 Content

Pre-class:

Preparatory study of essential Design Science methodology papers by students. Core topics are Design Science as a paradigm (vs. other research paradigms), design process, design theory, problem analysis and requirements specification, artefact evaluation, and particularities of specific artefact types such as reference processes and methods.

On-site:

(1) Introduction by faculty

(2) Presentation of reading assignments by students, discussion of methodological insights and implications

(3) Faculty-coached definition of individual (or group) design projects, design of research plans, presentation and discussion of research plans. Depending on the maturity level of Ph.D. students dissertation projects, design projects could be the design component of their dissertation or a specific sub-project/paper of their dissertation.

5.3 Schedule / Course format

Mid May: Assignment of readings

June 5: Introduction, presentation of reading assignments

June 6: Definition of design projects, work on design projects, first walkthrough (all students/group present intermediate results)

June 7: Work on design projects, second walkthrough (all students/group present intermediate results)

June 8: Finalization of design projects, final presentation, feedback and discussion of follow-up activities (e.g. paper projects)

6 Preparation and Literature

6.1 Prerequisites

The course is intended for Ph.D. students in business whose dissertation project includes to purposefully design and evaluate an artefact – such as taxonomies/classifications, procedures/processes, metrics, information models, guidelines/principles, references architectures, etc.

Students should have a preliminary idea about their design research problem and research questions, about who the stakeholders of their artefact(s) are and what requirements they have, and about their sources of data.

6.2 Essential or Recommended Reading Material

From the following list of methodological papers, a subset of 2-5 papers (based on the number of participants) will be assigned to each Ph.D. student:

- Baskerville RL and Pries-Heje J (2010) Explanatory Design Theory. Business & Information Systems Engineering 2(5), 271-282.
- Braun C, Wortmann F, Hafner M and Winter R (2005) Method Construction – A Core Approach to Organizational Engineering. in Applied Computing - Proceedings of the 2005 ACM Symposium on Applied Computing, (New York, NY, USA, 2005), ACM Press, 1295-1299.
- Brinkkemper S (1996) Method engineering: engineering of information systems development methods and tools. Information and Software Technology 38, 275-280.
- Gregor S, Hevner AR (2013) Positioning and Presenting Design Science Research for Maximum Impact. MIS Quartely 37(2):337–55.
- Gregor S and Jones D (2007) The Anatomy of a Design Theory. Journal Of The Association For Information Systems 8(5), 312-335.
- Hevner AR, March ST, Park J, Ram S. (2004) Design Science in Information Systems Research. MIS Quarterly 28(1):75–105.
- Kuechler W, Vaishnavi V. (2008) The Emergence of Design Research in Information Systems in North America. Journal of Design Research 7(1):1–16.
- March ST, Smith GF (1995) Design and Natural Science Research on Information Technology. Decision Support Systems. 15(4):251–66.
- Nickerson R, Varshney U and Muntermann J (2013) A method for taxonomy development and its application in information systems, European Journal of Informatino Systems 22, 336.
- Niehaves B, Ortbach K (2016) The inner and the outer model in explanatory design theory: the case of designing electronic feedback systems, in: European Journal Of Information Systems 25, 303-316.
- Nunamaker JF, Chen M, Purdin TDM (1991) Systems Development in Information Systems Research. Journal of Management Information Systems 7(3):89–106.
- Peffers K, Tuunanen T, Rothenberger MA, Chatterjee S. (2007) A Design Science Research Methodology for Information Systems Research. Journal of Management Information Systems 24(3):45–77.
- Prat N, Comyn-Wattiau I, Akoka J (2015) Taxonomy of evaluation methods, Journal of Management Information Systems 32(3), 229-267.
- Recker J, Rosemann M, van der Aalst W, Jansen-Vullers M and Dreiling A (2007) Configurable Reference Modeling Languages. In: Reference Modeling for Business Systems Analysis. Editors: P. Fettke and P. Loos, Hershey PA: IDEA Group, 22-46.

- Sein MK, Henfridsson O, Purao S, Rossi M, Lindgren R (2011) Action design research, MIS quarterly 35(1), 37-56.Venable J, Pries-Heje J, Baskerville R. FEDS: A Framework for Evaluation in Design Science Research. European Journal of Information Systems. 2016;25(1):77–89.
- Sonnenberg C and vom Brocke J (2012) Evaluations in the Science of the Artificial - Reconsidering the Build-Evaluate Pattern in Design Science Research. In Peffers K, Rothenberger M & Kuechler B (Eds.), Design Science Research in Information Systems. Advances in Theory and Practice. Proceedings of the 7th DESRIST Conference, Springer LNCS Vol. 7286, 381-397.
- van Aken JE (2004) Management Research Based on the Paradigm of the Design Sciences: The Quest for Field-Tested and Grounded Technological Rules. Journal of Management Studies 41(2):219–46.
- Venable JR (2006) The Role of Theory and Theorising in Design Science Research. Proceedings of the First International Conference on Design Science Research in Information Systems and Technologies (DESRIST), Claremont, CA.
- Venable JR, Pries-Heje J and Baskerville RL (2016) FEDS: a framework for evaluation in design science research. European Journal of Information Systems 25(1), 77-89.
- vom Brocke J (2007): Design Principles for Reference Models. Reusing Information Models by Aggregation, Specialisation, Instantiation, and Analogy. In: Reference Modeling for Business Systems Analysis, Editors: P. Fettke and P. Loos, Hershey PA: 47-75.
- vom Brocke J, Simons A, Niehaves B, Riemer K, Plattfaut R and Cleven A (2009). Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature Search Process. 17th European Conference on Information Systems (ECIS 2009), Verona, Italy. AIS electronic library.
- Webster J and Watson RT (2002) Analyzing the past to prepare for the future - Writing a literature review. Management Information Systems Quarterly 26(2), xiii–xxiii.
- Winter R (2008) Design science research in Europe. European Journal of Information Systems. 17:470–5.
- Winter R, Aier S (2016) Design Science Research in Business Innovation. In: Business Innovation: Das St. Galler Modell, Editors: Hoffmann C, Lennerts S, Schmitz C, Stölzle W, Uebernickel F, Wiesbaden: 475-498.

6.3 To prepare

Each student is expected to read assigned methodological papers and prepare a presentation of his/her reading assignment in class.

Each student is expected to, usually in a group, actively elaborate a design research mini-project according to certain presented criteria. For this design project, several walkthrough and a final presentation (max 20 minutes, focus on motivation and problem analysis, research design including evaluation, and expected contributions to the scientific knowledge base) need to be prepared in class.

All students need to participate in all classroom discussions. Good participation includes asking insightful questions, raising original ideas, and making constructive comments.

7 Administration

7.1 Max. number of participants

Due to the interactive character and Ph.D. project work, not more than twenty students should attend.

7.2 Assignments

See ‘pre-class’ part in section 4.2

7.3 Exam

Grading will be based on

- performance of reading assignment presentation (25%)
- performance of design project (75%)
- active participation in class

Upon successful participation, an individual certification with or without grades will be produced by VHB according to participant preferences.

7.4 Credits

The class will create an estimated overall workload of 150-180 hours, corresponding to 6 ECTS.