# Information Systems Development
## Syllabus

Last Update: 07.04.2020

# COVID-19 Update

- The course will run in a digital format while course attendance is discontinued by the University

- We provide updates when the situation changes

- We may switch back to an attendance-based model when this option becomes available again

- All further information will be communicated via ILIAS

# Introduction Session (Update)

**Introduction and Organization of Course**

- We will hold a webinar at the start of the semester to explain the organization of the course

- Webinar will be held via a videoconferencing solution (Zoom) on:
  **7 April 2020: 12.00 – 13.00, Zoom**

- Log-in details will be made available via ILIAS

# Unit Conduct (Update)

- Formats for online teaching may vary:
readings, ILIAS training modules (e.g. quizzes), live digital presentations, video lectures, video tutorials, or podcasts and interviews

- Because this part of the teaching is entirely online, it will be important for you to exercise discipline and study at your own leisure and pace.

# Unit Conduct (Update)

- We will not have regular, traditional lectures and tutorials where we can broadcast material to you, you will have to be proactive and explore the materials on your own.

- The learning volume is equivalent to regular teaching (e.g., traditional lecture, tutorials, reading). But because the content (in whatever format) will be available online, you are free to study each topic as you see fit.

- The course is awarded with six credits, equivalent to 180 hours

- As a rule of thumb, we expect you to invest around 12 semester working hours (= 12*45 minutes) on a weekly basis in total

# Assessment (Update)

- We currently assume that physical meetings will be possible again in the second half of the semester

- Thus, we do not intend to change the assessment forms for now

- However, if necessary, we have to adapt, and more information will follow

- We implemented a case study challenge as a new format to gain bonus points and to train working remotely in a distributed team

- Please see the corresponding slides for assessment and bonus points details

# Main Contents of the Unit

- Processes and important challenges in the development of IS
- Alternative forms of realization ("Make or Buy", Outsourcing, Software-as-a-Service, etc.)
- Process models for the development of IS (waterfall model, evolutionary development, agile software development)
- Concepts and forms of project management for IS development
- Project control and evaluation methods
- Time, team and project management

# Zoom Meetings / Webinars

- Zoom is a video conferencing tool (similar to Skype) that will be used by the WiSo Faculty for online teaching

- You can access Zoom meetings or webinars via your web browser

- There is also a free Zoom (desktop) client available, which we recommend for smoother handling:
  https://zoom.us/download

- Please be prepared to participate in Zoom Meetings with audio and video enabled and test this in advance!

- There is comprehensive support material online:
  https://support.zoom.us/hc/de

- Joining a meeting in Zoom:
  https://support.zoom.us/hc/en-us/articles/201362193-Joining-a-Meeting

# What is this unit about?

- Development … of…
  - the set of activities that results in products. Development may include research, purchase, design, new development, modification, reuse, (re-) engineering, maintenance, or any other activities that result in products.
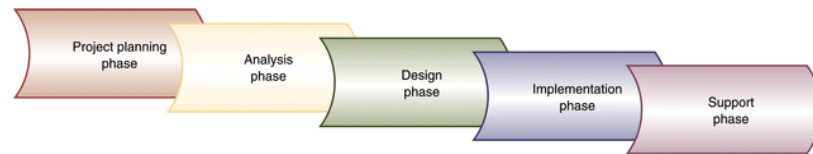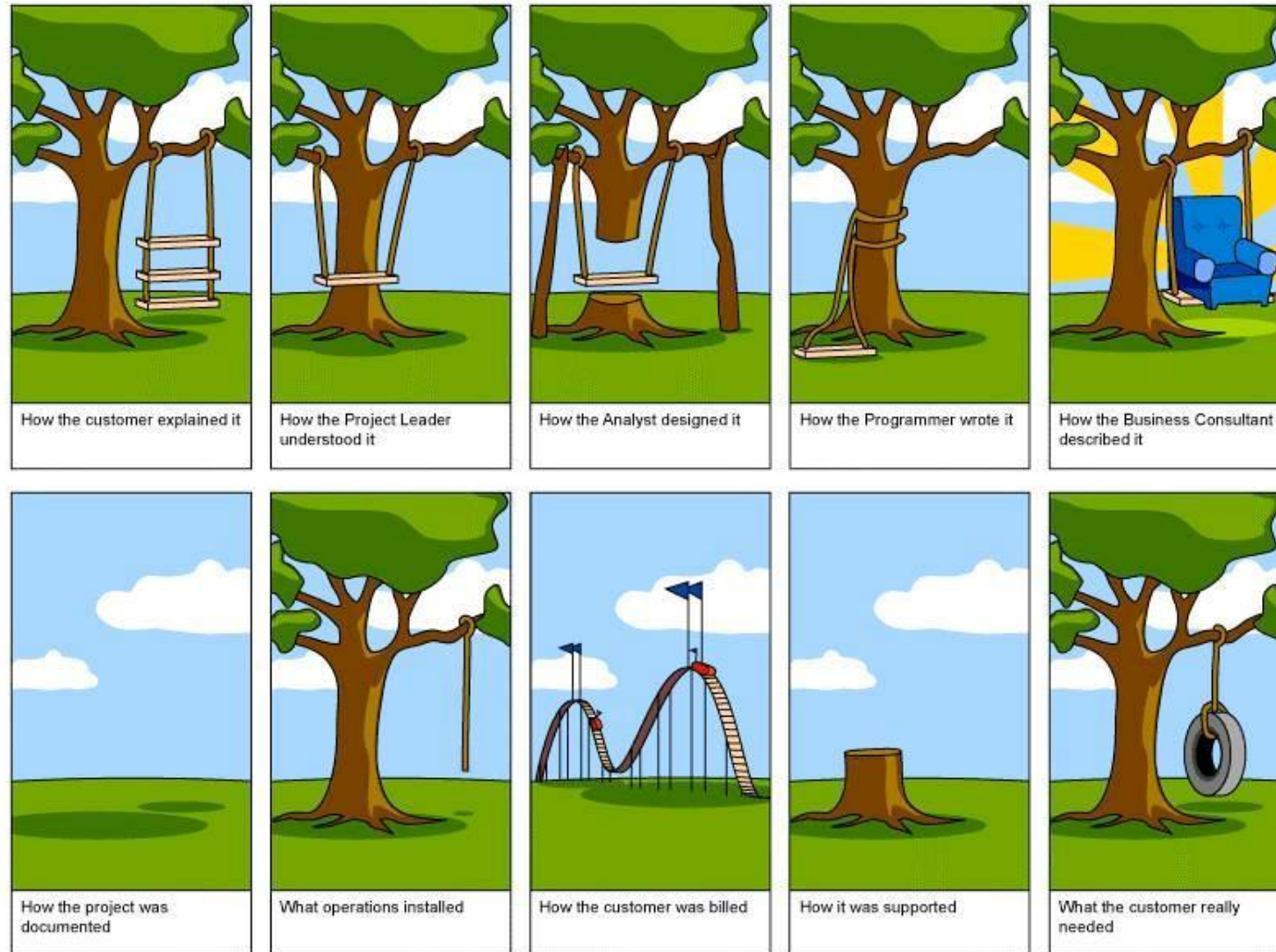


- Information System
  - An arrangement of people, data, processes, information presentation and information technology to support and improve certain operations in a business.
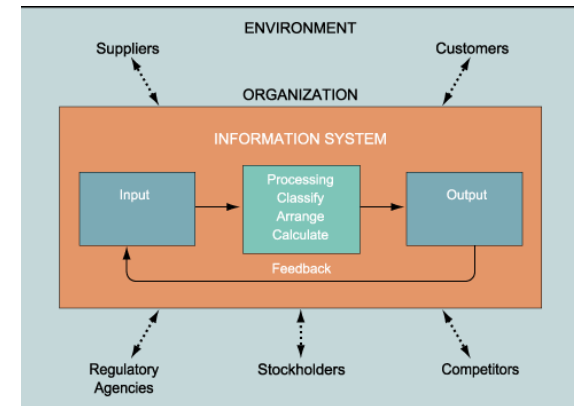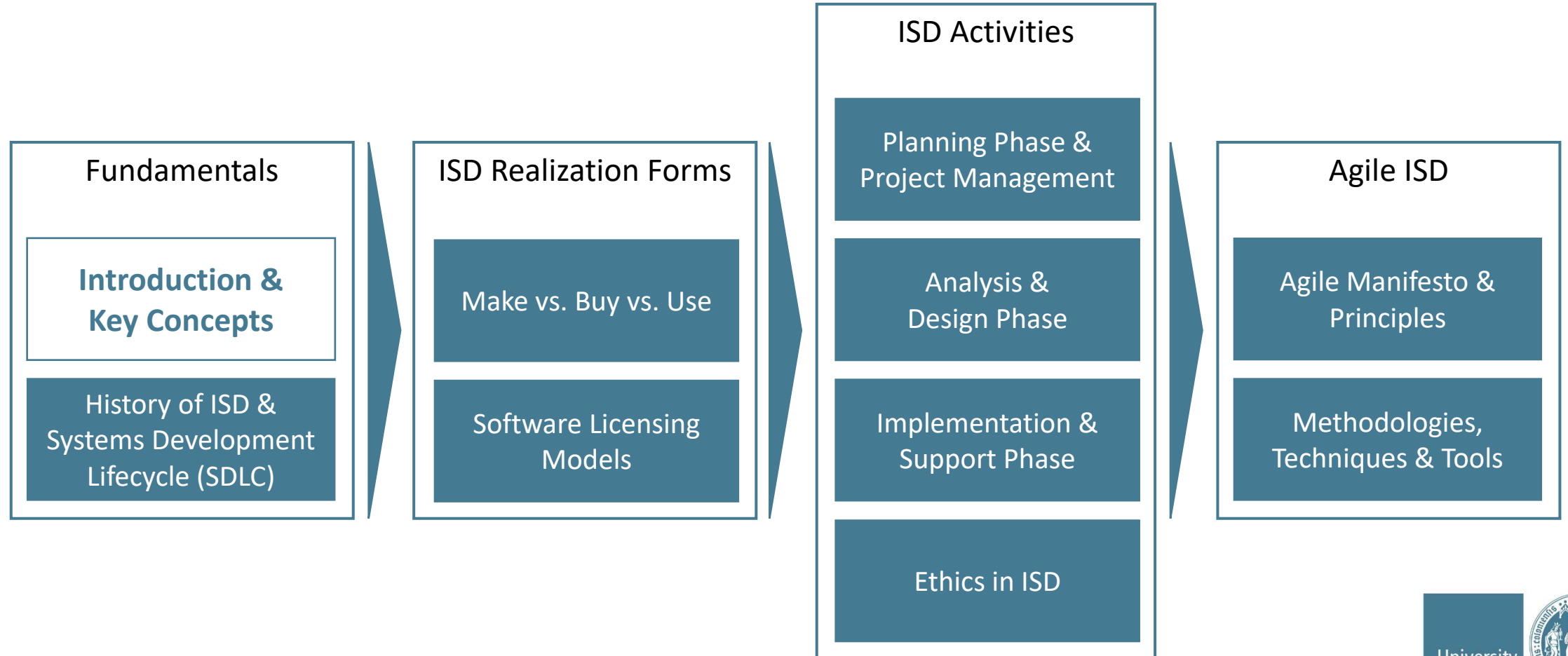
# What is Information Systems Development?

# Unit Administration

# Main Contents of the Unit

- Processes and important challenges in the development of IS

- Alternative forms of realization ("Make or Buy", Outsourcing, Software-as-a-Service, etc.)

- Process models for the development of IS (waterfall model, evolutionary development, agile software development)

- Concepts and forms of project management for IS development

- Project control and evaluation methods

- Time, team and project management

# Overview

| Fundamentals | ISD Realization Forms | ISD Activities | Agile ISD |
|---|---|---|---|
| **Introduction & Key Concepts** | Make vs. Buy vs. Use | Planning Phase & Project Management | Agile Manifesto & Principles |
| History of ISD & Systems Development Lifecycle (SDLC) | Software Licensing Models | Analysis & Design Phase | Methodologies, Techniques & Tools |
| | | Implementation & Support Phase | |
| | | Ethics in ISD | |

# Learning Goals

- **Students…**
    - … recognize the challenges of the development of information systems (IS).
    - ... evaluate, select and apply different process models for the development of IS according to their advantages and disadvantages.
    - … understand traditional and new, agile, information systems development (ISD) process models.
    - … assess, select and apply the different organizational forms of project management for the development of IS based on their respective strengths and weaknesses.
    - … are aware of the dangers of time pressure in IS development projects and are in a position to take appropriate countermeasures.
    - … develop solutions in small groups and present them in the plenum.
    - … develop a project solution to a specific ISD problem in small groups.

# Teaching Team

## Lecturer



- **Dr. Janek Richter**
- Email: janek.richter@wiso.uni-koeln.de
- Visiting hours: by appointment via email request

## Tutor / Main Unit Contact



- **M.Sc. Christian Hovestadt**
- Email: hovestadt@wiso.uni-koeln.de
- Visiting hours: by appointment via email request

# Dr. Janek Richter: Short Bio

- Studied and graduated at the University of Cologne
    - Studied abroad Indian Insitute of Management (IIM) Ahmedabad, India
    - „Diplom Wirtschaftsinformatik", University of Cologne
    - Research and Teaching Assistant at the Chair for IS and Systems Development (Prof. Recker) since April 2018 (previously at Prof. Mellis' Chair)
    - Researcher exchange at IIM Bangalore, India
    - Received Doctoral Degree December 2018
    - Post-doctoral Research Fellow („Akademischer Rat") since April 2019

- My expertise / research interests:
    - Organizational Agility – how can organizations cope with turbulent business environments?
    - Large-scale agile transformations – how can organizations manage and succeed with digital transformation?
    - Industries: Telecommunications, Insurance, Automotive
    - Qualitative research: case study research and interview-based research; quantitative: meta-analysis

- What I teach currently:
    - Information Systems Development (BSc, Summer Semester)
    - Systems Engineering for Digital Innovations (MSc, Winter Semester)
    - Seminars (BSc, Summer and Winter Semester)

# Christian Hovestadt: Short Bio

- Studied and graduated at the University of Cologne
    - M.Sc. Information Systems, University of Cologne (graduated in 2018)
    - Started my PhD studies in 2019 with Prof. Recker
    - Research and teaching assistant at Prof. Schoder's chair from 2014-2018
    - Internships in IT consulting (Accenture and Detecon) in 2015/2016

- My current research interests:
    - Artificial Intelligence in Business Processes (Main PhD topic)
        - What happens when autonomous AIs take over process tasks previously carried out by humans?
    - Sharing Economy
    - Future of Work

- Other areas of expertise:
    - Design Science Research
    - Strong background in systems modeling and development

- What I teach currently:
    - Information Systems Development (BSc, Summer Semester)
    - Systems Analysis and Design (MSc, Winter Semester)
    - Bachelor/Master Theses

# How this Unit Fits

- Bachelor Wirtschaftsinformatik (PO 2015)
  - Modul Name: *Ergänzungsmodul Wirtschaftsinformatik II* (1277EMWi02)
  - Unit Name: *Information Systems Development*
  - 6 ECTS Credit Points

# Recommended Sequence for the Information Systems Bachelor Courses

| | | | |
|---|---|---|---|
| **1st Semester (Winter)** | **Information Systems Management** [Basismodul Wirtschaftsinformatik I] | AND | **Database Systems** [Basismodul Wirtschaftsinformatik II] |
| **2nd Semester (Summer)** | **Integrated Information Systems** [Aufbaumodul Wirtschaftsinformatik] | | |
| **3rd Semester (Winter)** | **Systems Analysis & Design** [Ergänzungsmodul Wirtschaftsinformatik I] | OR | **Informationssicherheit & IT-Forensik** [Ergänzungsmodul Wirtschaftsinformatik I] |
| **4th Semester (Summer)** | **Information Systems Development** [Ergänzungsmodul Wirtschaftsinformatik II] | OR | **Introduction to Data Science and ML** [Ergänzungsmodul Wirtschaftsinformatik II] |
| **5th Semester (Winter)** | **Capstone Project Information Systems** [Schwerpunktmodul Wirtschaftsinformatik] | AND | **Bachelor Seminar** |
| **6th Semester (Summer)** | **Bachelor Thesis** | | |

*We strongly recommend to complete the courses from the 1st-4th semester* ***before*** *proceeding with the Capstone Project and the Bachelor Thesis.*

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# Our Chair's Teaching Offerings

| | Winter Term | Summer Term |
|---|---|---|
| **PhD** | | PhD Course <br> (not offered in every year) |
| **Master** | Master Thesis | |
| | Systems Engineering for Digital Innovations <br> [Schwerpunktmodul Information Systems IV] | Advanced Seminar IS & Digital Technology <br> [Schwerpunktmodul Seminar Information Systems I/II] |
| | IS and Environmental Sustainability <br> [Basismodul Information Systems I] | IT Entrepreneurship <br> [Schwerpunktmodul Information Systems II] |
| **Bachelor** | Bachelor Thesis | |
| | Bachelor Seminar Information Systems & Digital Technology | |
| | Systems Analysis and Design <br> [Ergänzungsmodul Wirtschaftsinformatik I] | Information Systems Development <br> [Ergänzungsmodul Wirtschaftsinformatik II] |

# Lecture Conduct (Update)

- The course flows along several content blocks for which we provide different online materials

- Will split up digital content for each week in several small and digestible portions (e.g., reading exercise + 2-3 videos)

- See ILIAS for updates on digital content

- Formats may vary including readings, live digital presentations, video lectures, or podcasts and interviews

- Materials will be made available at least one week in advance to the schedule (we are currently working on preparing all materials for you)

# Lecture Conduct (Update)

- In the beginning, we will have regular online webinars (Zoom) where we can discuss any questions and issues you might have.

- These webinars are not a replacement for traditional lectures!

- You will have to cover the main parts via self-study with the online materials provided in advance of each week

- Login details will be announced via ILIAS

- The weekly slot for online webinars is **Tuesdays, 12.00 pm noon** (no online sessions on Wednesday!)

# Q&A Online Webinars (*)

**Tuesdays**, 12.00pm (~ 45 min.), Zoom
(changed weekday!)

| Block | # | Date | Topic |
|---|---|---|---|
| Fundamentals | 1 | Apr 7, 2020 | Introduction & Key Concepts |
| | 2 | Apr 14, 2020 | History of ISD & Systems Development Lifecycle (SDLC) |
| ISD Realization Forms | 3 | Apr 21, 2020 | Make vs. Buy vs. Use |
| | 4 | Apr 28, 2020 | Software Licensing Models |
| ISD Activities | 5 | May 5, 2020 | Planning Phase & Project Management |
| | 6 | May 12, 2020 | Analysis & Design Phase |
| | 7 | May 26, 2020 | Guest Lecture 1 – TBA |
| | 8 | Jun 9, 2020 | Implementation & Support Phase |
| | 9 | Jun 16, 2020 | Ethics in ISD |
| Agile ISD | 10 | Jun 23, 2020 | Agile Manifesto & Principles |
| | 11 | Jun 30, 2020 | Agile Methodologies, Techniques & Tools |
| | 12 | Jul 7, 2020 | Guest Lecture 2 – TBA |
| Wrap-Up | 13 | Jul 14, 2020 | Wrap-Up, Exam Q&A |

* subject to change

# Tutorial Conduct

- We provide interactive **exercise modules in ILIAS** for each block

- Every Friday, there will be a ~45 min **tutorial webinar** where some of the exercises are discussed and you can ask questions
  - ➢ Taking place online in *Zoom*. Instructions how to connect will be provided in ILIAS.
  - ➢ We expect you to complete the exercises assigned to the tutorial before the webinar
  - ➢ There will be opportunities for you to present solutions for some exercises, which will be marked in ILIAS. If you want to present, write a short email to the tutor before the webinar.

- After each Webinar, a **Kahoot Challenge** will be published for you to recap the topic. You can complete those at any time.

- We may switch to attendance-based tutorials at some point in the semester if the Corona situation allows for that.

# Tutorial Webinars (*)

Fridays, 10.00am (~ 45 min.), Zoom

| Block | # | Date | Tutorial Topic |
|---|---|---|---|
| Fundamentals | 1 | Apr 17, 2020 | Key Concepts & SDLC |
| ISD Realization Forms | 2 | Apr 24, 2020 | Make vs. Buy vs. Use |
|  | 3 | May 8, 2020 | Software Licensing Models |
| ISD Activities | 4 | May 15, 2020 | Planning Phase & Project Management |
|  | 5 | **May 19**, 2020 (Tuesday, 12:00am) | Case Study Results |
|  | 6 | May 22, 2020 | Analysis & Design Phase |
|  | 7 | May 29, 2020 | Analysis & Design Modeling |
|  | 8 | Jun 12, 2020 | Implementation & Support Phase |
|  | 9 | Jun 19, 2020 | Ethics in ISD |
| Agile ISD | 10 | Jun 26, 2020 | Agile Simulation & Scrum |
|  | 11 | Jul 3, 2020 | Methodologies, Techniques & Tools |
|  | 12 | Jul 10, 2020 | Agile ISD: Case Study |
| Wrap-Up | 13 | Jul 17, 2020 | Poster Slam |

subject to change

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# KLIPS and ILIAS

- All relevant course material is shared through ILIAS

- ILIAS is used for important course announcements
  → activate message forwarding to your email inbox

- In ILIAS, there is a single course only (no separate courses for the lecture and exercise)

- If you are not yet a member of the ILIAS course, …
  - You have to enroll yourself to the course via KLIPS2 (you will be automatically added to the ILIAS course on the next day)
  - If you encounter problems, contact hovestadt@wiso.uni-koeln.de

# Course Reading

- **Information Systems Development**
  - 4th edition
  - by David Avison and Guy Fitzgerald
  - Published: 2006, McGraw-Hill
  - ISBN: 9780077114176

  - **UPDATE: Relevant reading parts available in ILIAS**

  - 15 copies available for rental at the Main University Library & reference copy at "Winfo Bib"
    https://www.ub.uni-koeln.de/usbportal?query=inst001:7844519
    http://informatikbibliothek.uni-koeln.de/
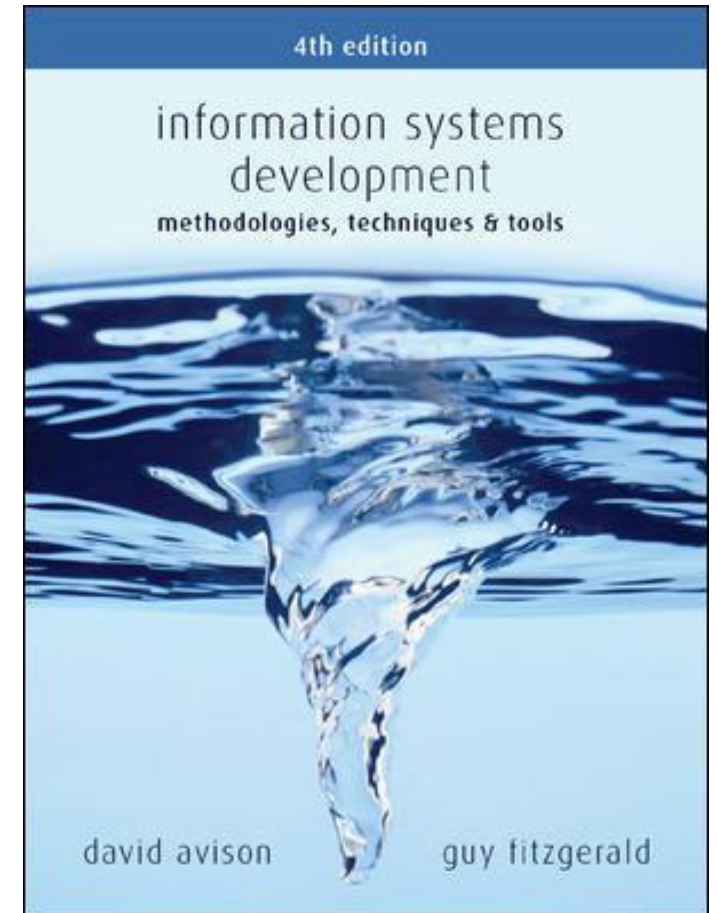
# Assessment

Portfolio exam consisting of…

1) **Electronic Exam (60 min.)**
   - Worth 50 points
   - Individual
   - On one date of your choice:
     - 1st option: **24 July 2020**
     - 2nd option: **07 August 2020**
     - Time and location TBA
   - Focused on the theoretical knowledge covered in the lecture and the tutorial
   - Trial exam will be uploaded in advance

2) **IS Development Solution**
   - Worth 50 points
   - Team Project (4-5 members)
   - Due date **17 July 2020**, 11:55pm, via ILIAS.
   - Focused on application of knowledge to an actual ISD problem

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# Assessment

We currently assume that physical meetings will be possible again in July/August (when the presentations and exams are scheduled). If not, we will inform you about the changes.

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# IS Development Solution

In a group of 4-5 students, you have to develop a small-scale information system solution for a selected purpose or business problem. You will need to identify a business problem or opportunity, decide on key questions regarding the development of an IS-enabled solution to the problem or opportunity, and specify the development process in sufficient details. Finally, you will need to develop and present a poster on the solution in class.

*Assignment Details are available in ILIAS!*

# Case Study Challenge (Bonus Points)

After the second block (ISD Realization Forms), we ask you to investigate a case study to apply your knowledge.

➢ **Same groups** as for the IS Development Solution

➢ Work out how to organize your group work **without physical meetings**

➢ Voluntary, but opportunity to earn **up to 5 bonus points**

➢ Due date: **15th May 2020**, 11:55pm, via ILIAS

➢ Solutions will be discussed in the Tutorial Webinar on **20th May** (Wednesday!)

*Assignment Details are available in ILIAS!*

# Final Grade

- You will be assessed against your total achieved score:
  - Max. 50 points for the exam
  - Max. 50 points for the team project
  - Max. 5 points for the Case Study Challenge
    (in theory up to 105 points in total)

- You pass the module when achieving at least 50 points

# Exam Registration

- Regardless of the day you want to write the exam, you must register for the **same portfolio exam in KLIPS.** Registration in KLIPS is mandatory to complete the module.

- Additionally you need to fill out a **survey in ILIAS:**
  - Specify the day you want to write the exam
    - Switching the exam date after the survey deadline is not possible
    - If you register for the first date and get sick on the day of the exam, you may still write the exam on the second date if you submit an attest from a doctor to us
  - Specify your team name for the team project (optional)
    - Try to find a team of motivated students you want to work with
    - Pick a <u>unique</u> team name that you all specify in your individual surveys
    - It is not an issue if you are less than 5 students, we will merge smaller teams after the survey deadline
    - If you do not specify a team name, we assign you to a random team
  - If you don't submit the survey (but register in KLIPS), we will assign you to the first exam date and a random team

- Deadline for both the registration in KLIPS and the survey in ILIAS is **29th April 2020** (11:59pm)!

# Group Formation: FAQ
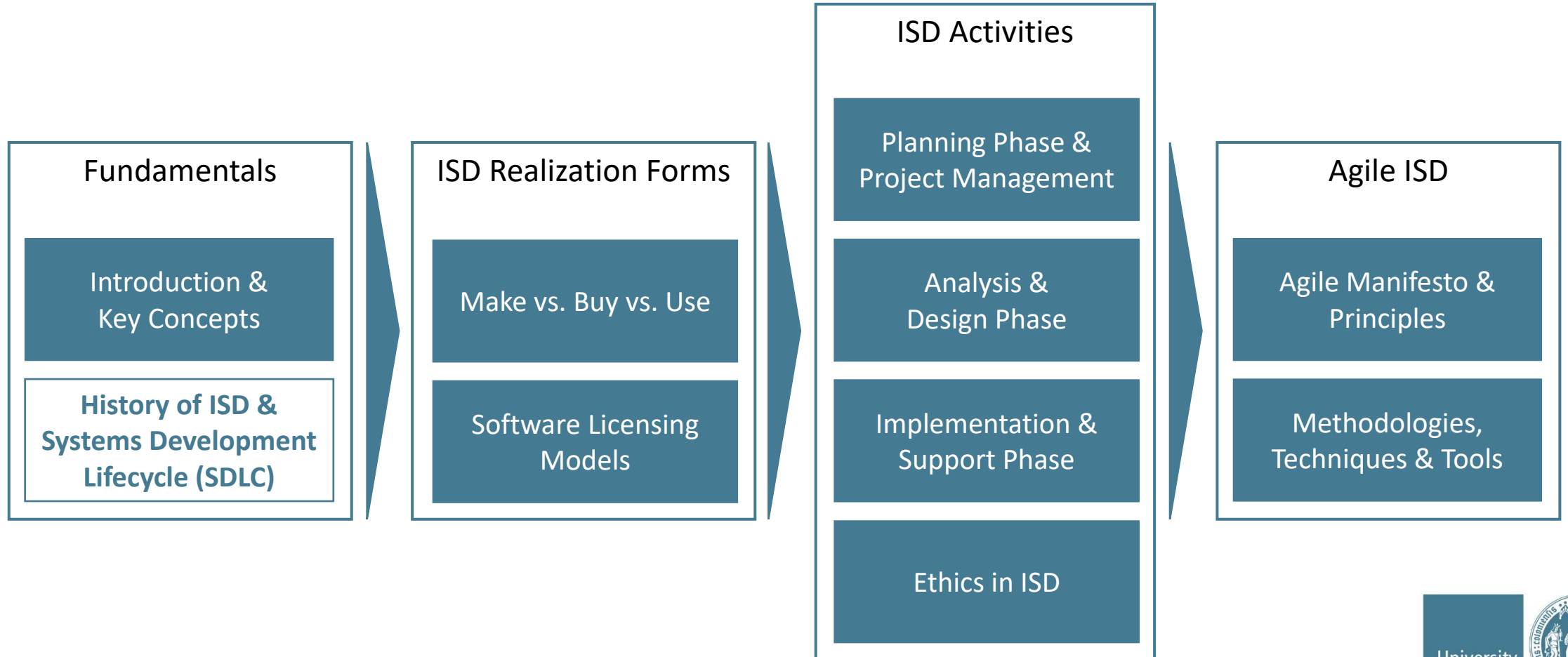
- *"Can we form a group of more than five people?"*
  - ➢ Groups are limited to five students, no exceptions.

- *"We are less than five people in our group. What can we do?"*
  - ➢ Simply register your group in the survey, we will merge smaller groups after the survey deadline. We will make sure that there are no less than four people in any of the final groups.

- *"I cannot find a group."*
  - ➢ Simply fill out the survey without specifying a team name. We will assign you to a random group after the survey deadline.

# How to Succeed

Please familiarize yourself with, and monitor...

- The Unit
  - Unit synopsis
  - Learning goals

- The Resources
  - ILIAS
  - Readings
  - Other references
    - The library
    - The Internet

- The Involved People
  - Yourself
  - Your Learning Team
  - Your Lecturing/Tutoring Staff

- The Assessments
  - Requirements/specification
  - Due dates
  - Marking scheme
  - Tips in lecture or tutorials

# Next Week

| Fundamentals | ISD Realization Forms | ISD Activities | Agile ISD |
|---|---|---|---|
| Introduction & Key Concepts | Make vs. Buy vs. Use | Planning Phase & Project Management | Agile Manifesto & Principles |
| **History of ISD & Systems Development Lifecycle (SDLC)** | Software Licensing Models | Analysis & Design Phase | Methodologies, Techniques & Tools |
| | | Implementation & Support Phase | |
| | | Ethics in ISD | |

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