Introduction to Information Systems

Compendium for IN5210 2025 (v.3)

University of Oslo, Department of Informatics

Åsmund Dæhlen, Ragnhild Bassøe Gundersen, Silvia Masiero, Petter Nielsen, Maja Lanestedt Thomassen and Vetle Utvik

This compendium offers a short introduction to Information Systems for students following the course IN5210 - Information Systems at Ifi, UiO. In this compendium, we:

- Introduce Information Systems and Information Systems research
- Introduce a sociotechnical perspective as the foundation of IN5210
- Introduce theories and concepts as we discuss them in IN5210
- Give recommendations on how you might want to approach learning in IN5210

Information Systems

Information systems are the tools we use to collect, organise, store, communicate and use data. Organisations use information systems for various purposes, such as pursuing efficiency and achieving business and social objectives. Individuals use information systems to achieve specific goals or for entertainment. Examples of information systems used at UiO:

- Inspera (digital examination)
- Studentweb (service for students to register for exam, get grades etc.)
- DFØ (self-service portal for registering time and absence for employees)
- TP (system for creating collision-free timetables for teaching and exams)
- FS (administrative student for Norwegian higher education)

Essential components of information systems are information technologies (IT). IT includes hardware (laptops, servers, keyboards, smartphones, etc.), software, networks and data. Another essential component of information systems is the people who design, implement and use them. Including people as equally important as technology distinguishes information systems from other disciplines such as data science, where the focus is on models and software. People are users, designers and implementers of IT.

Information Systems Research

Information Systems research emphasises the role of IT in social contexts. This research tradition works with IT, including computers, mobile phones, apps, social media, and digital platforms. And

the social contexts where IT is used and designed, include individuals, groups, organisations, institutions and societies at large. The focus is on where IT meets, or interacts, with the context - which is our sociotechnical perspective (more about that later).

Information systems research dates back to the 1970s. It was established as a response to computers being introduced in organisations and with the motivation to understand how computers could improve organisational efficiency. As a part of this, a distinct tradition of information systems research emerged in Scandinavia. The Scandinavian tradition of information systems research distinguished itself by incorporating workers' perspectives and the effects of computers on their work and life. This tradition advocates for and promotes the involvement of workers in the design of information systems.

Information systems research is based on both quantitative and qualitative research methods. The Scandinavian tradition of information systems research primarily uses qualitative research methods such as interviews, observations, and action-research. This approach differs from other approaches to information systems research, focusing on quantitative measures (for example surveys and statistics).

In IN5210, we focus on designers, implementers and users of IT and address the potential benefits of IT as well as the challenges and downsides of IT in different contexts. In line with the tradition of Information Systems research in Scandinavia and at Ifi, our focus is primarily on qualitative research.

A sociotechnical perspective

We adopt a sociotechnical perspective in IN5210. The core idea behind this perspective is that we can only understand design and use, and improve information systems if we address both social and technical components. There is always a connection and influence between technical and social components. Neither technology nor society determines the other. Thus, to understand how IT is used and designed, we view the social and technical as one entity - the sociotechnical. This perspective is fruitful for understanding IT in context. For example, how digital platforms like Amazon are thriving, the challenges of regional and national health platforms and the impact of the features of AI-based chatbots such as ChatGPT on higher education.

We can contrast the sociotechnical perspective with research that does not focus on technology in context. For example, the literature in prominent digital health journals tends to overlook features of IT (such as functionality, user interface, response times, integration, transparency) and the clinical setting in which IT is used (involving multiple technologies, established practices and professions with diverging needs). Instead, IT (as a generic entity without particular features, such as AI as a generic technology) are tested in a laboratory. We recommend you read the paper by Nielsen and Sahay (2022) to understand alternatives to a sociotechnical perspective.

We can also explain the sociotechnical approach in terms of *complexity* and *systems thinking*.

Information systems are complex because it is impossible to fully control the social, the technical, and the interaction of these components when designing and using IT. A typical challenge in today’s organisations is the increasing number of information systems. Different vendors provide

them, their functionality may overlap, systems are not or only partly integrated, some are old, some are new, some are internal to the organisation, and others are open for partners. Complexity is about dealing with multiple components, different components, and the lack of central control over them.

One way of making sense of complexity is systems thinking. Systems thinking can be described as different from the typical approach in natural science of splitting up systems into smaller components and focusing on these components. Instead, systems thinking focuses on interconnections between components from a holistic point of view. Another facet of systems thinking is a focus on the ever-changing nature of components and their relationships. Systems thinking also emphasises how systems work in practice, not only in theory.

With a sociotechnical perspective, information systems researchers are interested in topics including, for example:

- How medical doctors use digital tools and their particular features to interact with patients in a clinical setting
- The impact of introducing digital sensors on the work of engineers in a factory setting
- How we can integrate mobile payment apps with the broader banking system and align them with the users' payment practices

From a sociotechnical perspective, we argue that the design and use of IT can only be improved and understood by considering social and technical components and treating them as independent but interconnected parts of complex systems.

Theories and Concepts

Theories and concepts are important in IN5210. In research, we use concepts to make sense of, describe, and communicate what we are studying. Concepts are formalised abstractions of phenomena we observe and interpret. They are generalisations from observations and particular facts. They help us to organise our thoughts and ideas and establish a common language to share knowledge.

A theory is a collection of concepts in addition to principles, models, and relationships between different components. We make theories to explain something. We develop theories from particular cases and observations. While concepts are often relevant to a particular context, theories offer more general principles.

An example of a concept used in information systems research and IN5210 is the concept of a *platform*. A platform is a specific architectural configuration. The concept draws on a metaphor (borrowing meaning) of a platform as something you can step onto to do or achieve something. One example of a platform is Apple's Appstore, where you can add an application and instantly have a massive audience.

In the seminars and assignments in IN5210, key activities include identifying, understanding and using concepts and theories from the curriculum.

Learning in IN5210

IN5210 provides three main learning inputs for you: Lectures, seminars, and the curriculum.

The lectures introduce and give an overview of a specific theme within IS. A researcher gives each lecture and presents their research and the concepts and theories they are working on.

The lecturers handpick the curriculum related to the theme they present. Some readings are mandatory, while some are only suggestions for further exploration. Students must read the mandatory readings before the seminar to benefit from the discussions.

The seminars are essential for students to discuss what is presented in the lectures and the curriculum. The seminar teacher will introduce important themes and facilitate the discussions. The discussions will focus on concepts and theories.

In addition to the three learning inputs, you should also create your learning strategy. Based on experience from previous semesters, students who get the most out of IN5210 are those who actively engage with other students in their learning activities. Colloquial groups, papers discussions, reflections on the themes of the course, and in general, being present among other students and researchers will benefit your learning. What you learn will benefit you directly when you write your master's thesis.