



Fakultät für  
**Mathematik und  
Informatik**

# Emergenz im digitalen Wandel der Hochschullehre

Niels Seidel

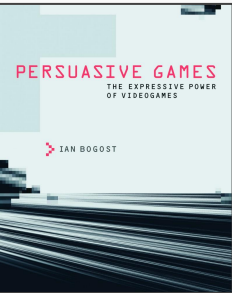
## Emergenz

Mehrere Entitäten verbinden sich auf der Basis ihrer Wechselwirkungen spontan zu Systemen mit neuen Strukturen, Eigenschaften und Fähigkeiten.

➔ irreduzibel, unvorhersagbar, kontextabhängig

## Procedural rhetoric

*“the art of persuasion through rule-based representations and interactions, rather than the spoken word, writing, images, or moving pictures”*  
Ian Bogost (2010)



## Online Learning Systems, LMS, etc.

- Starre technische Strukturen beeinträchtigen Lehr-Lern-Prozesse
- Starre reduziert Komplexität und schafft Vorhersagbarkeit und Stabilität
- Zusammenspiel der Akteure erfolgt in definierten Bahnen

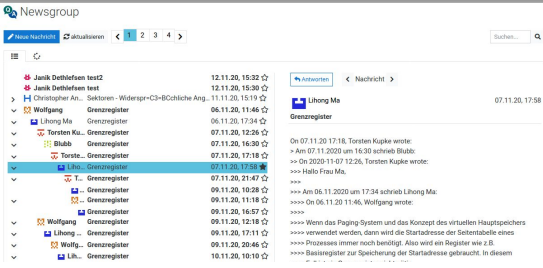
Mensch im  
geschlossenen  
System

Atomare  
Repräsentation

Geschlossener  
Informations-  
raum

Zeitliche  
Beschränktheit

# 1. Mensch im geschlossenen System



Wie können Menschen partizipieren, die außerhalb des LMS stehen?

Wie können sich spontane Begegnungen im digitalen Raum ereignen?

Wie kann sich eine kursübergreifende Community entwickeln?

# 2. Atomare Repräsentation

## Beispiele: PDFs, Video/Audio im Web

### Wie lassen sich atomare Repräsentation von Medien aufbrechen?

- Extraktion von Objekten
- Einbindung Echtzeitdaten
- Benutzereingaben, Annotationen und Bearbeitungen
- Deep Linking
- Suche nach Informationen
- Versionsmanagement

Figure 18.2 When Benjamin Franklin demonstrated that lightning was related to static electricity, he made a connection that is now part of the evidence that all directly experienced forces except the gravitational force are manifestations of the electromagnetic force.

Much has been written about Franklin. His experiments were only part of the life of a man who was a scientist, inventor, revolutionary, statesman, and writer. Franklin's experiments were not performed in isolation, nor were they the only ones to reveal connections.


For example, the Italian scientist Luigi Galvani (1737–1798) performed a series of experiments in which static electricity was used to stimulate contractions of leg muscles of dead frogs, an effect already known in humans subjected to static discharges. But Galvani also found that if he joined two metal wires (say copper and zinc) end to end and touched the other ends to muscles, he produced the same effect in frogs as static discharge. Alessandro Volta (1745–1827), partly inspired by Galvani's work, experimented with various combinations of metals and developed the battery.

During the same era, other scientists made progress in discovering fundamental connections. The periodic table was developed as the systematic properties of the elements were discovered. This influenced the development and refinement of the concept of atoms as the basis of matter. Such submicroscopic descriptions of matter also help explain a great deal more.

Atomic and molecular interactions, such as the forces of friction, cohesion, and adhesion, are now known to be manifestations of the **electromagnetic force**. Static electricity is just one aspect of the electromagnetic force, which also includes moving electricity and magnetism.

All the macroscopic forces that we experience directly, such as the sensations of touch and the tension in a rope, are due to the electromagnetic force, one of the four fundamental forces in nature. The gravitational force, another fundamental force, is actually sensed through the electromagnetic interaction of molecules, such as between those in our feet and those on the top of a bathroom scale. (The other two fundamental forces, the strong nuclear force and the weak nuclear force, cannot be sensed on the human scale.)

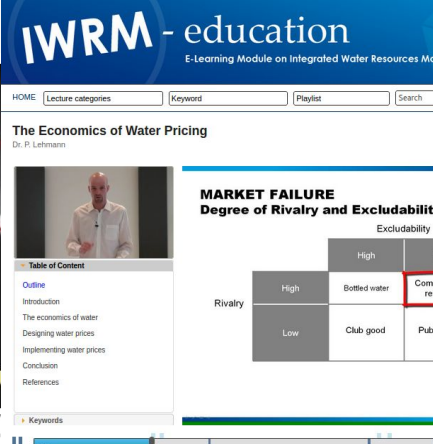
This chapter begins the study of electromagnetic phenomena at a fundamental level. The next several chapters will cover static electricity, moving electricity, and magnetism—collectively known as electromagnetism. In this chapter, we begin with the study of electric phenomena due to charges that are at least temporarily stationary, called electrostatics, or static electricity.



EMF is definitely a force. It is misleadingly mechanical force, push or a pull) but energy per unit of – or the ability to c force.

EMF is NOT the force – it is electric force – it is electric things are very different here IS magnitude of the force – the push or pull (electromotive force and is NOT a force

In den Augen des Kremls ist das U



**IWRM - education**  
E-Learning Module on Integrated Water Resources Management

HOME | Lecture categories | Keyword | Playlist | Search

### The Economics of Water Pricing

Dr. P. Lehmann

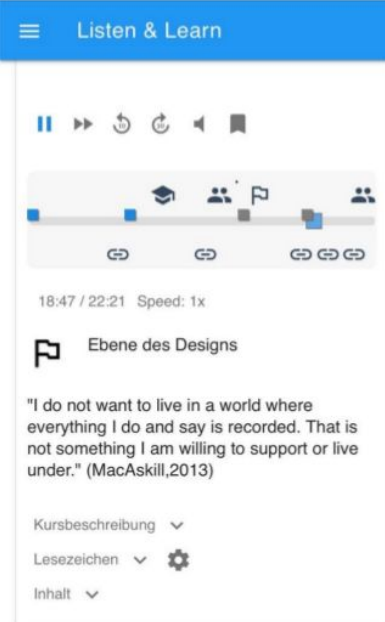
**MARKET FAILURE**  
Degree of Rivalry and Excludability

		Excludability	
		High	Low
Rivalry	High	Bottled water	Common resource
	Low	Club good	Public

Table of Contents

- Outline
- Introduction
- The economics of water
- Designing water prices
- Implementing water prices
- Conclusion
- References

Keywords



Listen & Learn

18:47 / 22:21 Speed: 1x

### Ebene des Designs

"I do not want to live in a world where everything I do and say is recorded. That is not something I am willing to support or live under." (MacAskill, 2013)

Kursbeschreibung

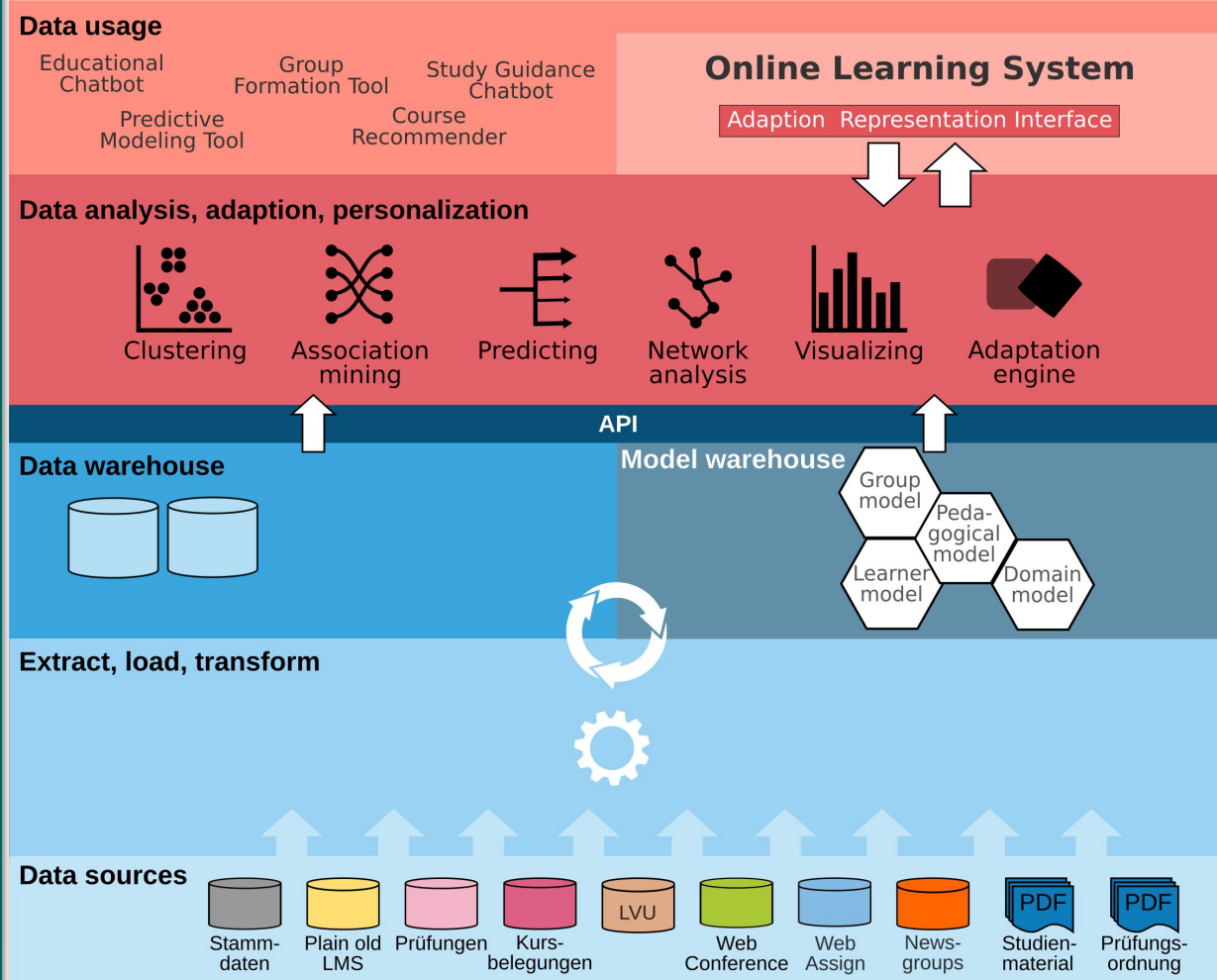
Lesezeichen

Inhalt

### 3. Geschlossene Informationsräume

#### Wie lassen sich Informationen aus externen Quellen integrieren?

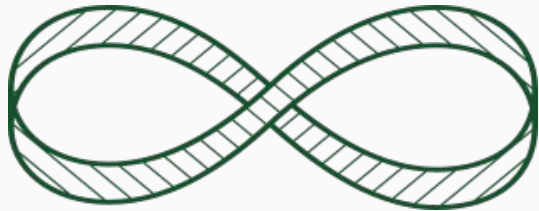
- Hochschul-IT
- Lernmaterialien (OER, MOOCs)



## 4. Zeitliche Beschränktheit

### Wie lässt sich die individuelle Bildungshistorie berücksichtigen?

- Verknüpfung mit zurückliegenden Kursen an anderen Einrichtungen
- Anerkennung von Leistungen
- Sichtbarmachung von Kompetenzen (Open Badges)



### Kontinuierliches Lernen, statt zeitlich begrenzte Kurse

- Kontinuierliche Kursräume über Sommer- und Wintersemester hinweg
- Dauerhafter Zugang zu ein mal besuchten Kursen (bspw. [Udemy](#))
- feste Course Object IDENTIFIER (COI)

