

Module 7: Introduction and Learning Objectives

Module 7: Information Technology and Informatics

Learning Objectives

1. Analyze how informatics integrates knowledge from natural and social sciences to address technological and societal challenges.
2. Identify and describe major domains of informatics, including health, bioinformatics, social informatics, educational informatics, and business informatics.
3. Assess how user-friendly and ethical design principles enhance the adoption and impact of informatics technologies.



To-Do List

1. Read the module overview below.
2. Watch the module lecture or review the transcript.
3. Complete the guided reading activity.
4. Complete the QQR activity.

Overview

This week, we explore **Informatics**, a vibrant interdisciplinary field dedicated to applying information and data technologies to solve real-world problems across various domains. Informatics combines

technical expertise with a deep understanding of human and societal contexts, making it a cornerstone of technological and societal innovation.

What is Informatics?

At its core, **Informatics** involves designing, implementing, and studying systems that use data and technology to address challenges. It integrates knowledge from:

- **Natural Sciences:** Understanding the mechanics of technology, including computing, artificial intelligence, and data processing.
- **Social Sciences:** Understanding how humans interact with technology and how societal trends shape technological adoption and impact.

This dual perspective enables informatics to answer pressing questions, such as:

- How do individuals and groups interact with emerging technologies?
- Will society accept and adapt to artificial intelligence, and under what conditions?
- How can health outcomes be improved using patient data?

Historical Development of Informatics

1950s–1960s: The Dawn of Computing Technologies

The emergence of modern computing technologies raised fundamental questions about their societal and ethical implications. As mainframes and early data systems began to take shape, researchers started considering:

- How data-driven systems could influence human decision-making.
- What societal changes might arise from automation and digital information.

1970s–1980s: Domain-Specific Systems

During this era, **context-specific information systems** began to mature, laying the foundation for specialized branches of informatics. The growth of these systems led to the emergence of fields like:

- **Health Informatics:** Applying data systems to healthcare practices.
- **Business Informatics:** Optimizing business operations through data technologies.

These systems demonstrated the potential of informatics to revolutionize industries, emphasizing the importance of adapting technologies to specific contexts.

1990s–Present: The Digital Transformation

The 1990s ushered in a wave of innovations in personal computing and the Internet, making information and data systems more accessible. This was followed by groundbreaking advancements in:

- **Mobile Technology:** Smartphones brought ubiquitous connectivity.
- **Augmented and Virtual Reality (AR/VR):** New ways to interact with digital environments.

- **Artificial Intelligence (AI):** Transformative tools for predictive analytics and decision-making.

These advancements expanded the scope of informatics, fostering the growth of subfields and enabling new applications in nearly every aspect of life.

Key Domains of Informatics

1. Health Informatics

- Focus: Improving healthcare delivery and patient outcomes through data-driven solutions.
- Applications: Electronic health records (EHRs), telemedicine, and predictive analytics for personalized treatment.

2. Bioinformatics

- Focus: Using computational methods to analyze biological data, especially in genomics and molecular biology.
- Applications: Genetic research, drug discovery, and understanding complex diseases like cancer.

3. Social Informatics

- Focus: Studying how society shapes and is shaped by information technologies.
- Applications: Examining the impact of social media, privacy concerns in digital spaces, and ethical AI deployment.

4. Educational Informatics (Learning Technology)

- Focus: Enhancing teaching, learning, and administrative processes using information technologies.
- Applications: Adaptive learning platforms, digital classrooms, and analytics for student performance tracking.

5. Business Informatics (Information Systems)

- Focus: Streamlining business operations and improving performance through data technologies.
- Applications: Enterprise resource planning (ERP), customer relationship management (CRM), and business intelligence tools.

The Interdisciplinary Nature of Informatics

Informatics thrives on collaboration, bringing together diverse fields such as computer science, sociology, psychology, and biology. This interdisciplinary approach is crucial for understanding how people use technology and for designing systems that are:

- **User-Friendly:** Ensuring that technologies align with user needs and capabilities.
- **Ethically Sound:** Addressing issues like data privacy, accessibility, and equity.

Designing for Adoption and Impact

A critical focus of informatics is creating technologies that are not only innovative but also practical and desirable. As the field emphasizes:

- **Technology's value lies in its usability.** No matter how advanced a system is, it only succeeds if users embrace it.
- Informatics research drives the design of systems that align with human behavior, ensuring higher adoption rates and more significant societal benefits.

This module provides a comprehensive understanding of informatics as an applied, interdisciplinary science. By examining its history, key domains, and guiding principles, you'll gain insights into how informatics shapes our world and addresses complex challenges. From improving healthcare systems to revolutionizing education and business, informatics is a driving force for innovation in the digital age.