

Computer Science as a Discipline

And the 5 computing disciplines and majors

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BSCS-1

Computing as a Discipline

- The **computing profession** is the people and institutions that have been created to take care of other people's concerns in information processing and coordination through worldwide communication systems.¹
- The profession contains various specialties such as **computer science**, **computer engineering**, **software engineering**, **information systems**, and **information technology**.



Something to Note

Many activities in computing are not programming—for example, hardware design, system architecture, operating system structure, designing a database application, and validating models—therefore the notion that “**computer science equals programming**” is misleading.²

¹ (Denning, 1999)

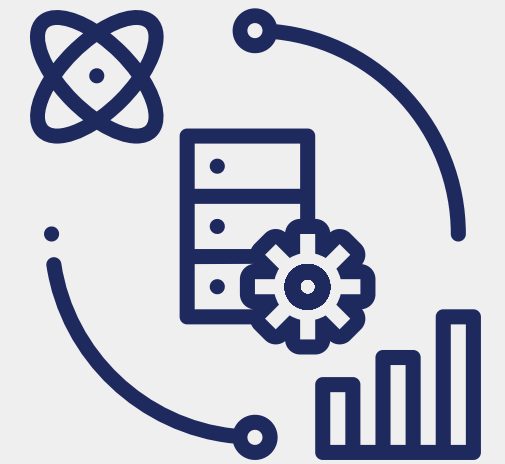
² (P. Denning et al., 1989)

Computer Science as a Discipline

- The discipline of computer science does not have a clear demarcation, and even its name is a source of debate. Computer science is sometimes called **informatics** or **information science** or **information and communication science**. A quote widely attributed to **Edsger Dijkstra** is Computer science is no more about computers than astronomy is about telescopes.³

Computer Science has three processes:

- Process of Theory
- Process of Abstraction
- Process of Design



Among the long-term standard topics in Computer Science are algorithms and complexity, characteristics of programming languages, intelligent systems (artificial intelligence), and human-computer interaction.⁴

³ (Baeten & Sangiorgi, 2014)

⁴ (Science, 2014b)

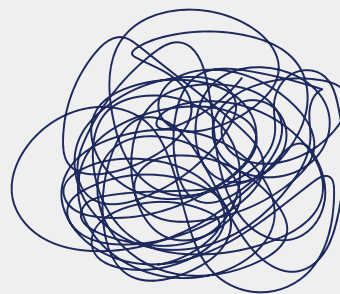
The Processes of Computer Science

From: <https://wp.stolaf.edu/cs/what-is-computer-science/>



Process of Theory

The approach of making formal definitions, conjecturing theorems, and creating proofs occurs at all levels in verifying correctness of hardware and software, analyzing performance of particular designs, and establishing the theoretical limitations of computation.



Process of Abstraction

Recognizing patterns in comparable situations and distilling models that express common characteristics, while discarding attributes that differ from case to case.



Process of Design

One designs to understand the principles and possibilities of computing; designs of systems and programs employ theoretical results and apply abstract notions, frameworks, and methods. In Computer Science, design aims more for better comprehension of the nature of computing than for production of a particular product.

The 5 Computing Disciplines and Majors

There are mainly 5 computing disciplines and majors, and they are listed as:

- **Computer Science**
- **Computer Engineering**
- **Software Engineering**
- **Information Systems**
- **Information Technology**

The body of knowledge of computing is frequently described as the systematic study of algorithmic processes that describe and transform information: their theory, analysis, design, efficiency, implementation, and application.⁵

⁵ (Denning, 1999)

Computer Engineering

Computer engineering is defined as the discipline that embodies the science and technology of design, construction, implementation, and maintenance of software and hardware components of modern computing systems and computer-controlled equipment.⁶

Software Engineering

Software Engineering is "a systematic approach to analysis, design, assessment, implementation, test, maintenance and reengineering of software, that is, the application of engineering to software. In the software engineering approach, several models for the software life cycle are defined, and many methodologies for the definition and assessment of the different phases of a life-cycle model."⁷

⁶ (ACM CCECC)

⁷ (Laplante, 2007)

Information Systems

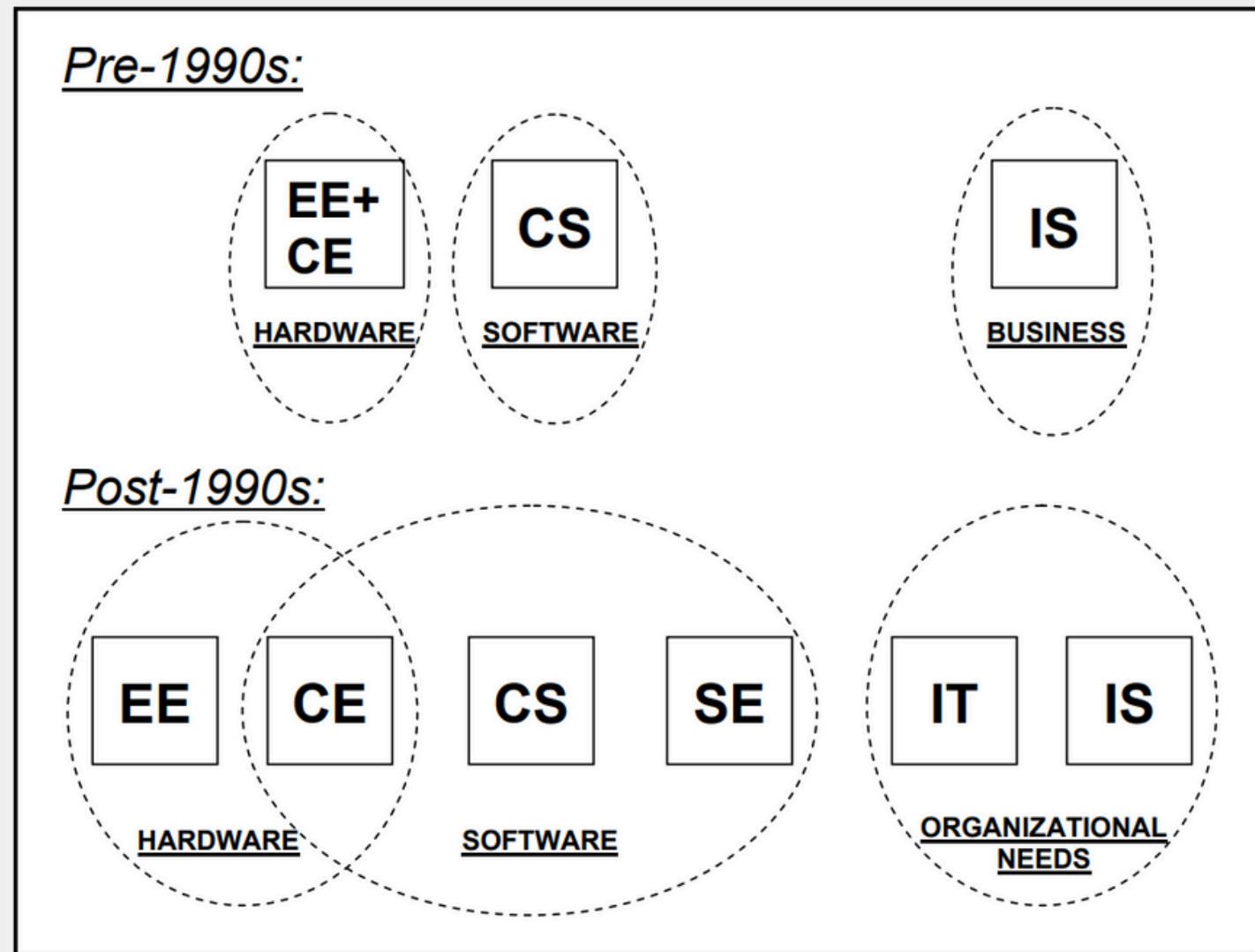
Information systems is an academic discipline of the complementary networks of hardware, software, users and business processes that organizations use to collect, filter, process, create and distribute data. Any specific information system aims to support planning, operations, management and decision making.⁸

Information Technology

Information Technology is the application of technology to solve business or organizational problems on a broad scale. In businesses, the IT department serves to ensure that the computer network, computer hardware, computing devices, and other physical devices all function properly.⁹

⁸ (Ak, 2015)

⁹ (Cosker, 2024)

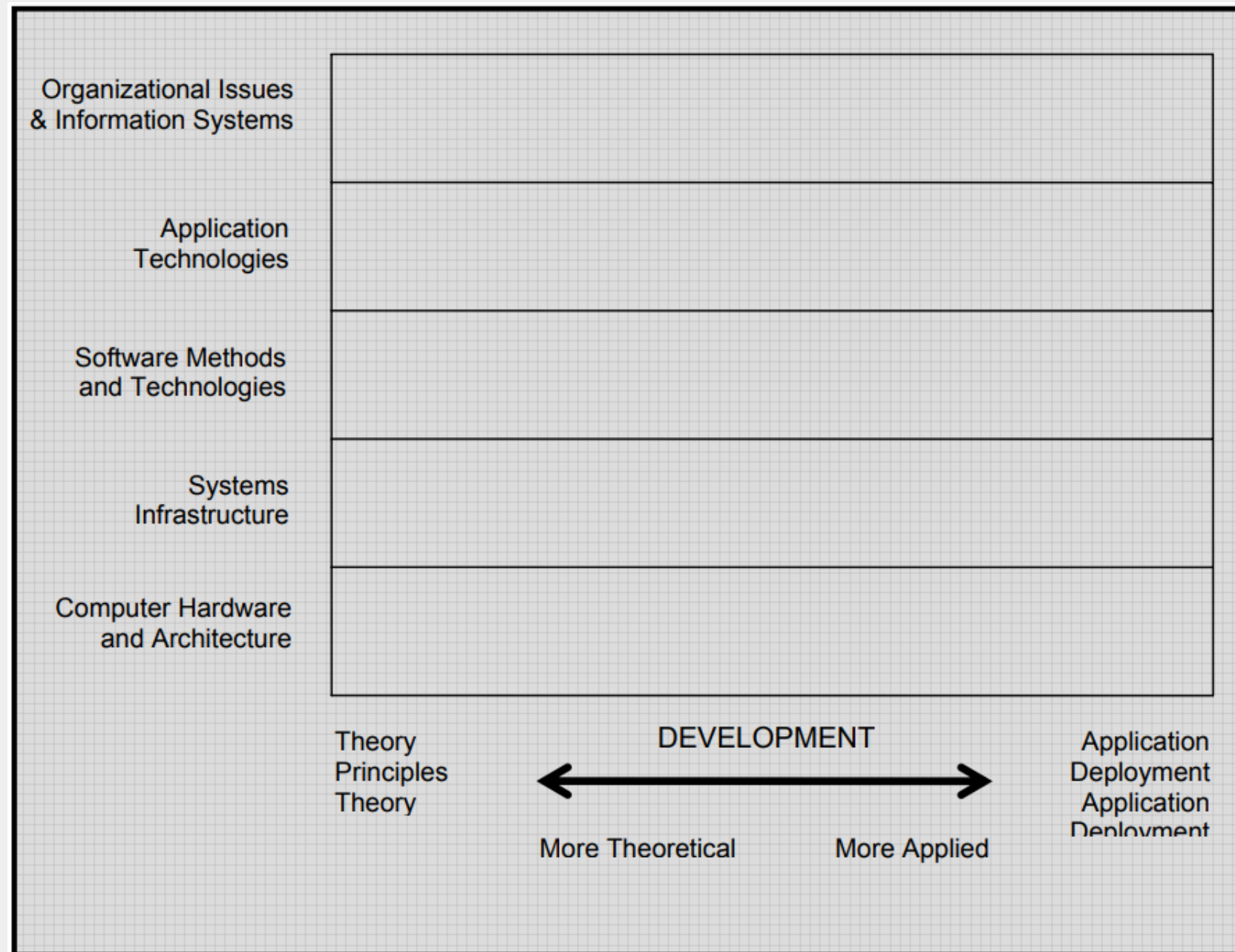


ACM Computing Curricula 2005

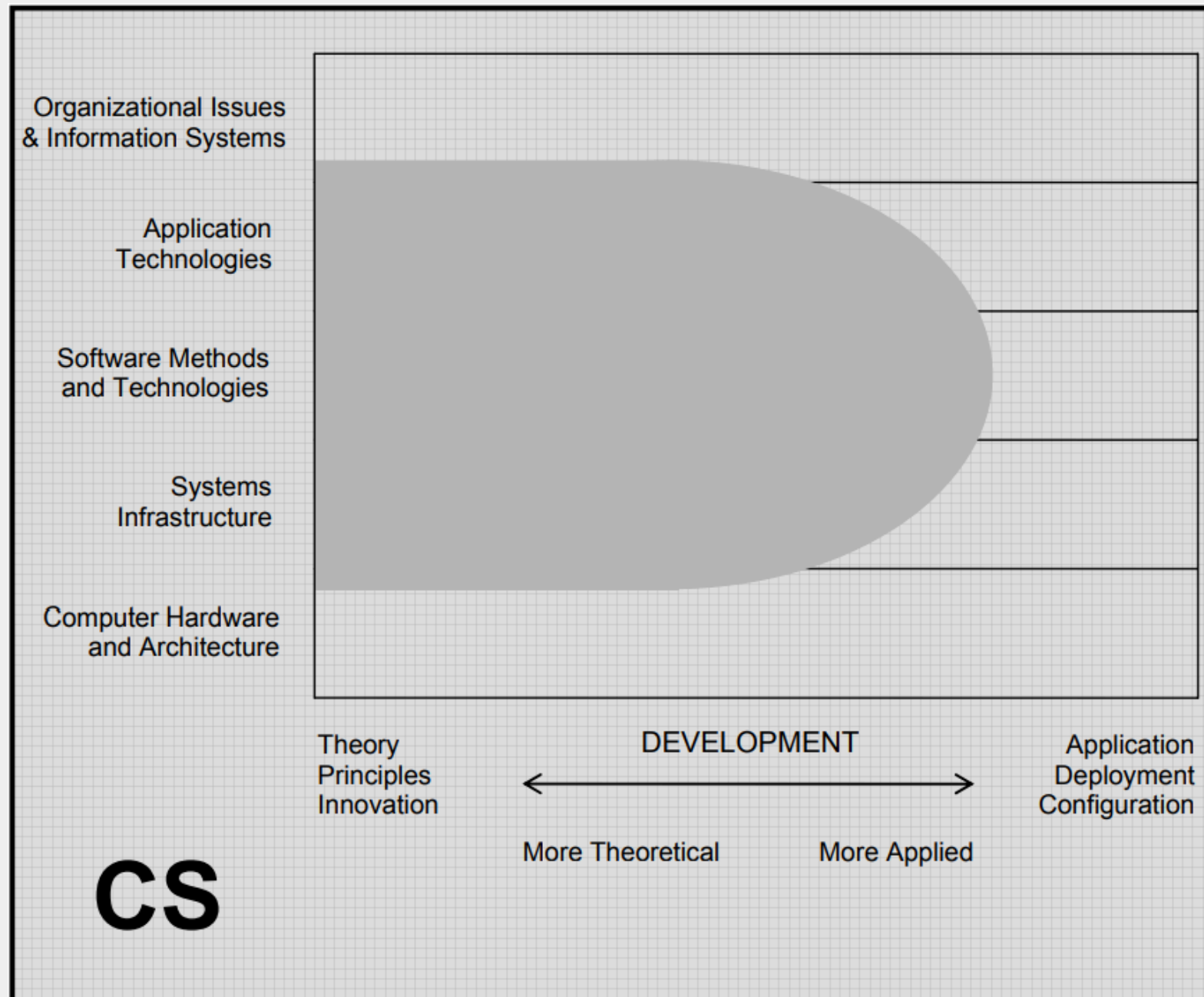
The **ACM Computing Curricula 2005 (CC2005)** is a set of guidelines developed by the Association for Computing Machinery (ACM) to provide a framework for undergraduate computing education. It outlines a comprehensive set of recommendations for what should be included in computing degree programs to ensure they are up-to-date and relevant to the field (Shackelford et al., 2006).

The Problem Space of Computing

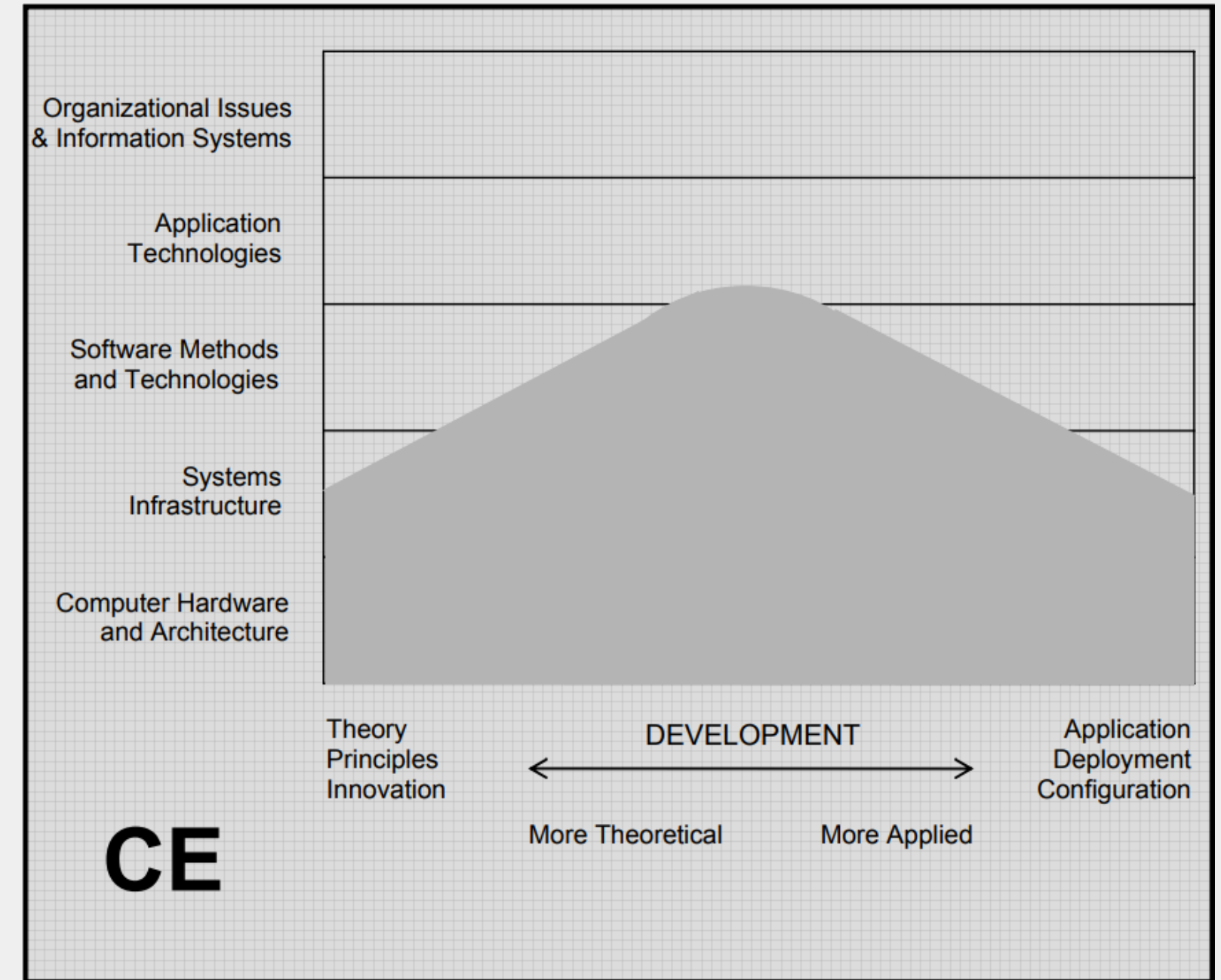
The **Problem Space of Computing** refers to the broad range of areas and issues that computing professionals address. It includes understanding and tackling various challenges and opportunities within the field of computing. This problem space is fundamental to defining the scope and content of computing curricula.



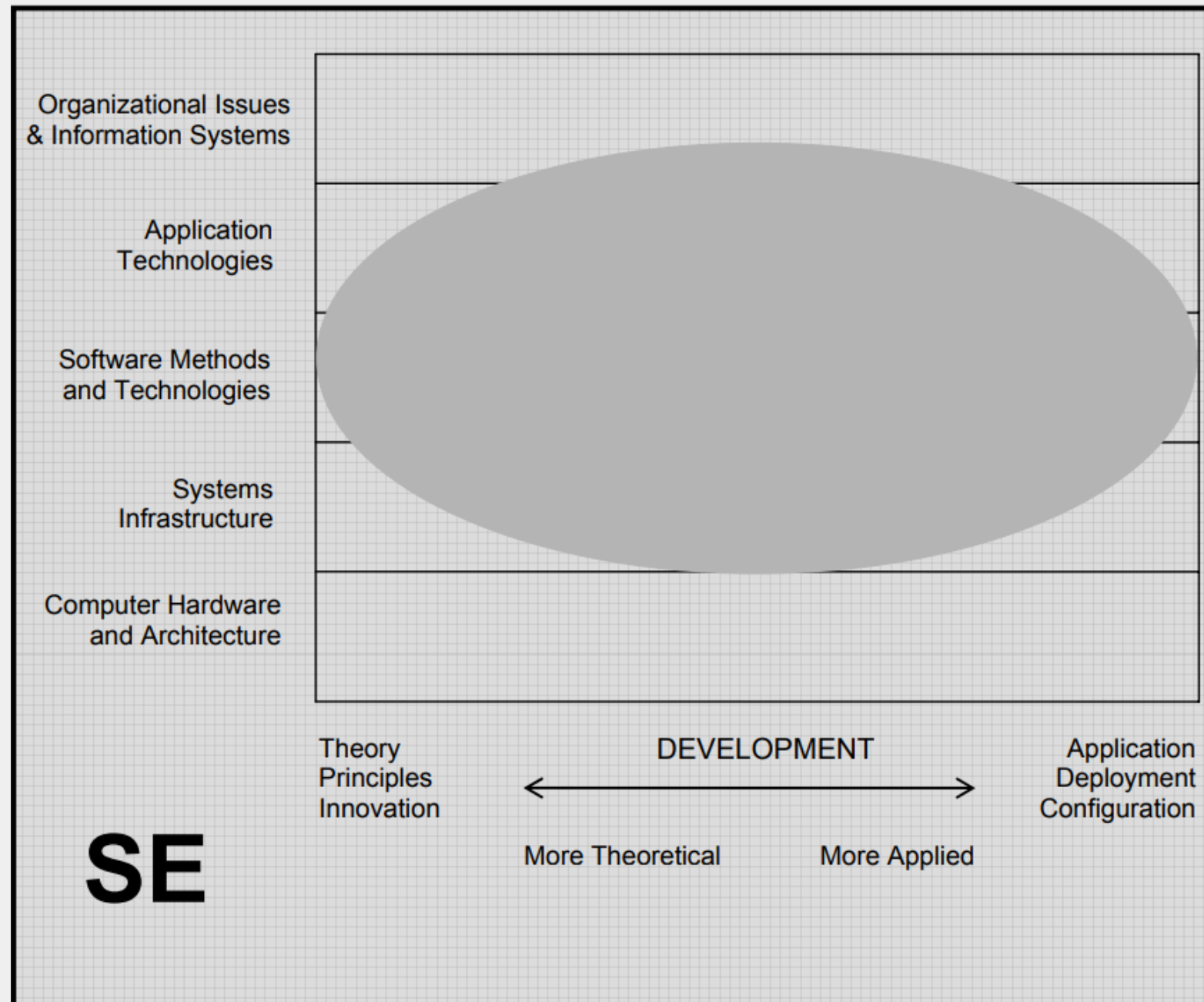
Computer Science



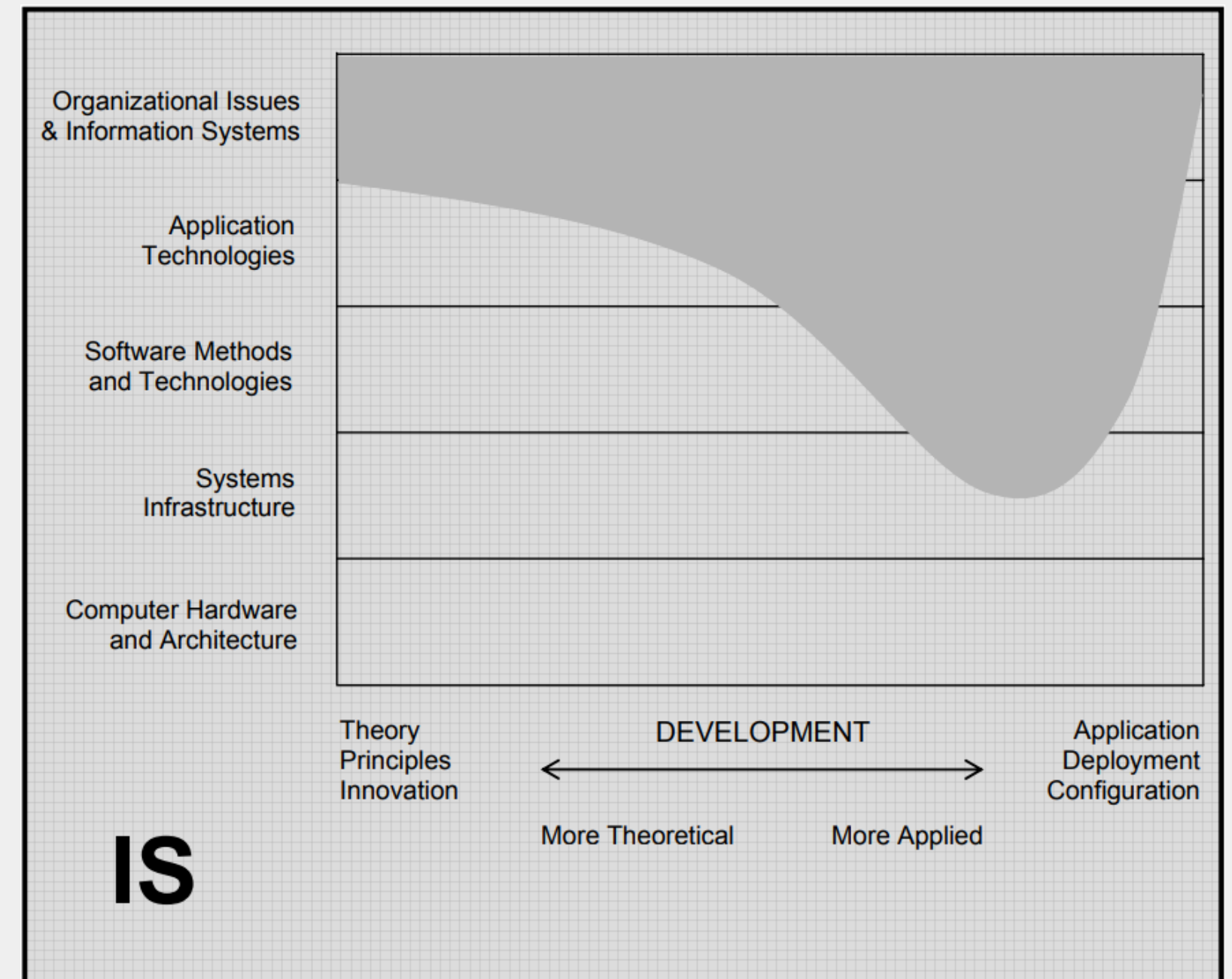
Computer Engineering



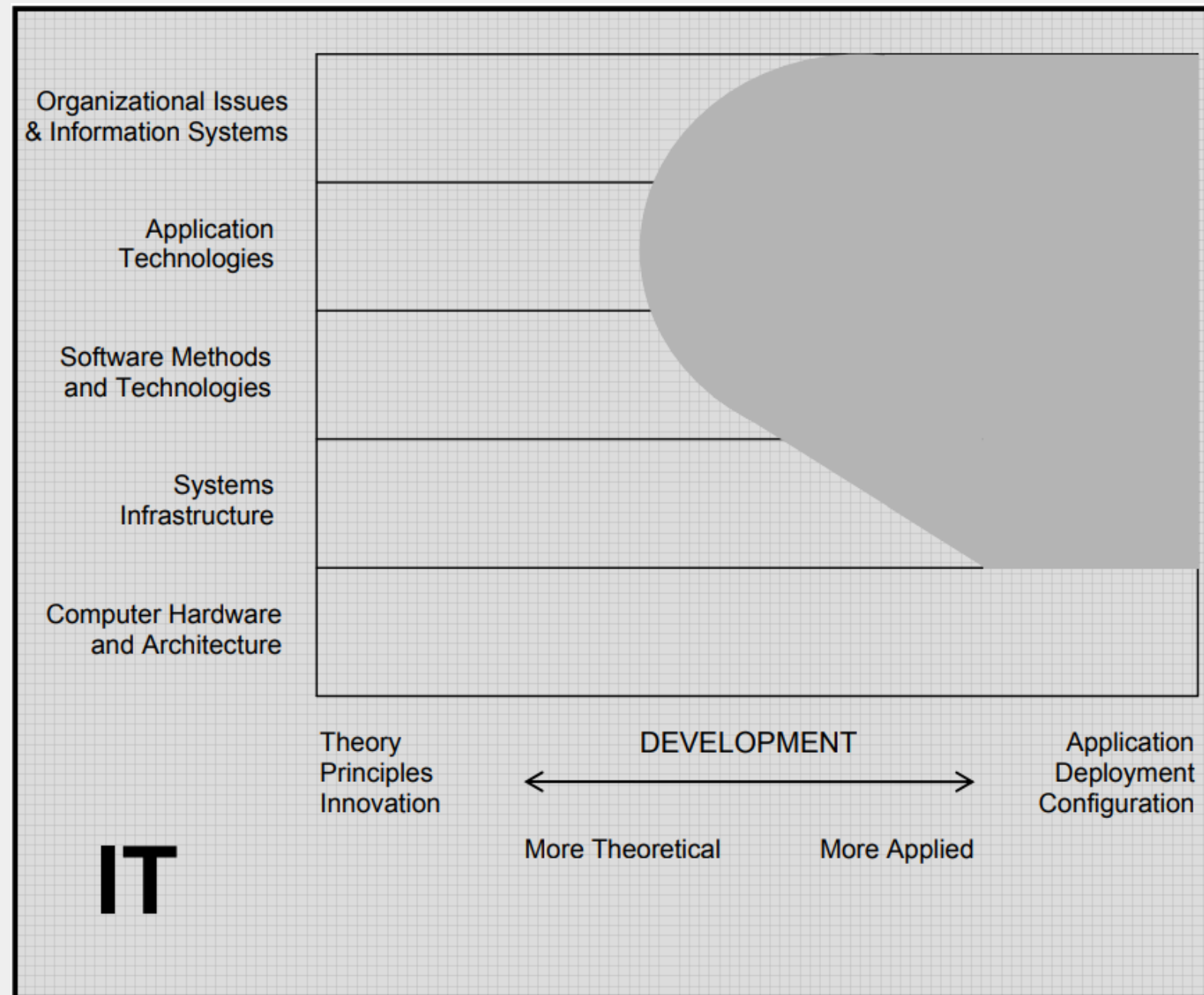
Software Engineering



Information Systems



Information Technology



Source:

Shackelford, R., McGettrick, A., Sloan, R., Topi, H., Davies, G., Kamali, R., Cross, J., Impagliazzo, J., LeBlanc, R., & Lunt, B. (2006). Computing Curricula 2005: The Overview Report.

The Association for Computing Machinery.

<https://doi.org/10.1145/1121341.1121482>

Analysis

Computing as a discipline is broad, and it encompasses of smaller disciplines such as Computer Science, Information Technology, Computer Engineering, Software Engineering and Information Systems. There are distinct differences between these disciplines, but as a computer science student, we are more interested on Computer Science as a computing discipline. Computer Science comprises of three processes: The process of theory, abstraction and design. Each process deals with a certain fundamental aspect of computer science as a discipline. We also understand that activities in computing does not only rely on programming; there are also other jobs and activities that computing disciplines do. Thus, we learn that the notion of “computer science = programming” is a misleading truth. Edsger Dijkstra also quoted that Computer science is no more about computers than astronomy is about telescopes. As mentioned earlier, there encompasses smaller disciplines (although not necessarily “small”) below Computing as a whole. These include (abbreviated) CS, IT, CpE, SE and IS disciplines. IT, or also known as Information Technology, is the application of technology in order to offer business solutions. People in the IT discipline often work at businesses and often manage the business’ data, applications and handle technical inquiries by the business. Computer Engineering on the other hand deal with both the hardware and software and works at mostly embedded systems. They build, design and implement computer architecture and software altogether. Software Engineering is focused on the development, design and maintenance of software programs. Software Engineers often test and apply engineering principles in creating software in order to create solutions and automate tasks. Lastly, the discipline of Information Systems concerns more with the handling and processing of different types of information and data, and they create systems to handle such information. They are often of value to businesses to generate reports, help in decision making and support planning and operations. All together, they make up as the 5 computing disciplines and majors that is integral to our technological world and advancement.

GTKY



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BSCS-1 Block C

Age 18

Birthday 09/05/2005

High School Education

2018-2022 **Don Bosco Technical College - Cebu**

Notable Achievements:

- Consistently With Honors (Grade 7 - Grade 10)
- Computer Technology Awardee
- Technical Excellence with High Honors

Senior High School Education

2022-2024 **University of San Carlos**

Notable Achievements:

- With Honors Second Semester (Grade 11 & 12)

Programming Experience

- **Web Dev** - HTML/CSS/JS + ReactJS + other frameworks
- **Game Hacking** - C / C# / C++, Python

P.S I'm not that good

If I were to describe my personality,

- An introvert to people I'm not close with enough, but an extrovert to my close friends. Caring, gentle, sometimes with a weird humor, and I like to treat my friends.

Why BS in Computer Science?

- I decided a long time ago that I would always pursue BSCS as a college degree. With an interest in computers, technology, and a fascination with the world of coding and programming, I've already discovered my passion for this discipline. Although it may be hard, “**Anything is possible if a person believes.**” (Mark 9:23)

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