Chapter 2
Informing Science:
The Ubiquitous Field of Knowledge and Action

ABSTRACT

This chapter defines the scope of informing science. The chapter begins by examining whether informing science is a discipline or field of knowledge. Next, the development of software engineering and informing science are discussed. The chapter then analyzes four key periods in the history of information processing models: (1) machine-centric computing, (2) application-oriented data processing, (3) service-oriented utility environments, and (4) interactive approaches. Next, the concept of informing science is analyzed, and a matrix model of informing science is presented. The chapter concludes by considering some of the contemporary issues with informing science, including (1) the relationship between ICT as it is applied in businesses and ICT as it is developed as a science in higher education (2) as well as the strategies used by universities for educating students in this field.

INTRODUCTION: IS INFORMING SCIENCE A DISCIPLINE OR A FIELD OF KNOWLEDGE AND ACTION?[1]

Informing science characterizes the progress of information technology (IT) in the 21st century as well as, by extension, information-communication technology (ICT), which makes IT more active and interactive among users and applications due to world-wide telecommunications networks. The term "informing science" was proposed for the first time by Eli Cohen (1999), who founded the Institute of Informing Science[2] and the Informing Science Press.[3] An important first question to ask in regard to informing science is whether it is best understood as a discipline or field of knowledge.

Research activities generally focus on selected areas of interest, where new knowledge and new ways of using IT are sought. If such areas of interest relate to a wide range of recurring research, they are then referred to as scientific fields. Fields of science include, for example, the social sciences, mathematical sciences, medical sciences, humanities, natural sciences, and technical sciences. Each field generally includes several disciplines. Technical or engineering sciences, for instance, include electronics, telecom-

DOI: 10.4018/978-1-7998-8036-3.ch002

munications, automation, and robotics. Disciplines are, therefore, distinguished by the subject matter and purpose of the research. They can also be divided into specializations, e.g., computer science, computer architecture, or software engineering. Specializations are introduced to focus attention on selected aspects of a broader research area and to mark specific methodologies. The classification of research into fields and disciplines makes it possible to manage science and assess researchers and research teams more efficiently. It also facilitates prioritizing funding amongst the disciplines and distinguishing between the scope of titles and degrees awarded by the relevant scientific committees.

The classification of fields, disciplines, and scientific specializations is the result of both tradition and the progress of research. According to the *panta rhei principle,* however, such classifications should only be viewed as indicative: It is essential to leave some flexibility of interpretation, especially in borderline cases. Therefore, interdisciplinary or even transdisciplinary research should be appreciated, that is, research at borders of related areas of inquiry or even more remote areas.

For our purposes, we will only deal with ICT, which generally concerns the processing of information from various sources. Such information may take numerous forms and have different meanings depending on the research perspective. So, should informing science be treated broadly as a field of knowledge or narrowly as just one of the disciplines? On the one hand, informing science methods are so versatile (e.g., algorithms or applications) that they are widely used in different fields and disciplines. On the other hand, attractive ICT solutions are born in specific fields and disciplines (e.g., in medicine, photo analysis contributes to the development of new algorithms for their recognition, and in robotics, autonomous systems are being built, which require a new perspective also in computer science). So, taking into account this specificity, should informing science be classified in a particular discipline or as an independent field?

We will assume that informing science is not a technical specialization, but something that encompasses the whole of society: health care, transportation, education, automotive technology, etc. ICT includes the design, construction, and operation of ICT products in both organizations and by individual users. Not only does ICT support human civilization, it also converts prior forms into global and virtual civilization, which is already happening before our eyes. An abbreviated historiosophy of the worldwide development of ICT will be presented from the beginning of ICT's inception to give a sense of its meanings and complexity (Targowski, 2014, 2015).

Informing science and machine processing of information dates back to the first census, recorded on analytical machines (on punch cards) in 1890 in the US. This means that ICT has been developing on substantial social grounds for almost 130 years. This is a brief period in which to define this pervasive and complex area of social life. For example, the field of construction has been developing for more than 6,000 years and is now well-formed. Therefore, our reflections on this subject are neither too late nor too early.

Informing science is associated with advanced professions (obtained via postsecondary education), skilled crafts (requiring excellent qualifications, although not necessarily supported by higher education), as well as various tools supporting activities and new knowledge for ordinary people. While such areas are supported by informing science, the field as a whole is not a science in the same way that health care is not a science *per se*, but is based on medical science.

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