8-15-1997

The Informing Science Framework:Part I. The Similarity Among Various Disciplines

Eli Cohen
Baruch College, eli_cohen@acm.org

The Informing Science Framework:
Part I. The Similarity Among Various Disciplines

Eli Cohen
Baruch College
Eli_Cohen@acm.org

There is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the old system and merely lukewarm defenders in those who would gain by the new one.
Machiavelli, 1513

Abstract

Fields historically considered by universities as unrelated are shown in this paper to have a commonality in their purpose. Their commonality of "informing their clients" is placed in the context of the Informing Science framework, which is introduced here. This framework is developed as an extension of several other frameworks and models.

Introduction

Informing Discipline	Client to be Informed
Information Systems	Workers in a Firm, Managers
Information Science	Library patron
Journalism	Reader/Viewer/Listener
Education	Learner
Public Relations	Public
Secretarial/Office Systems	Office Workers

Table 1. Examples of Informing Science Disciplines and their Clients

Academia is as much a forum of politics as of knowledge creation and dissemination. Universities, built to house disciplines, discipline those who cross disciplinary boundaries. Even disciplines, such as Information Systems (IS), need to justify their existence, not to employers of their graduates, but to other disciplines (as seen in Davis 1992). A commonly asked question within academia is "What is IS?" The field of Information Systems is evolving and thus its history and ancestry filter and limit its self-perception. It draws upon findings first published in other areas of inquiry and so is considered by some to be applied computer science, applied accounting, applied psychology and so forth.

The philosophical basis for the field is tenuous. What area of inquiry can it call its own? Other fields define themselves through easy to understand statements: psychology defines itself as the study of behavior; mathematics as the study of numeric systems. Is there such a definition for Information Systems?

This paper does not and cannot propose a politically acceptable solution to the question of what is IS. Academic politics aside, the paper does offer a new perspective and framework for understanding information systems (or at least portions of it) as a member discipline of a field, called here Informing Science.

The term Informing Science applies to disparate fields that share the common goal of **providing** a **client** with **information** in a form, format, and schedule that maximizes its effectiveness. The definition points to three interrelated components: the client (who has a task to perform that requires information for its

completion), the delivery system (for providing information), and the informing environment that creates information to aid the clients complete their tasks. Table 1 lists some of the disciplines that comprise Informing Science.

The Informing Science Framework

Let us expand the word definition to form a framework, shown in Fig. 1. Readers will note that this framework contains elements derived from others' models. Combined, these elements form a powerful yet simple framework for the study of Information Systems and all of her sister disciplines; it provides a perspective on the field of IS.

The first of the works from which the Informing Science framework is derived is Shannon and Weaver's model of the communication process (1949). At its core, the model proposes understanding communications through its impact on five fundamental elements: the sender, the receiver, the medium, encoder, and decoder. Shannon and Weaver define information as a reduction in uncertainty. In this model, information can be said to be transmitted (and received) only if the receiver has reduced entropy. That is, information is defined in terms of the receiver's level of uncertainty. In the field of Information Systems, we would say information is defined as that which reduces risk for the decision-maker.

A second conceptual development from which the Informing Science framework is derived is that of the "meta-approach" to modeling. The meta-systems approach applies set-theory-like thinking to the analysis of systems. The obscurity of this useful approach has limited its use by researchers. To make the approach more accessible here, let us consider the simple example of applying meta-system analysis to building houses. At the most concrete level (no pun intended), we think about the individual house. The next higher level of abstraction considers all houses that follow one set of blue prints. A third, more abstract level considers the realm of the maker of blueprints, the architect. The architect creates plans, the builder constructs from architect-provided plans, and the house is an instance of the application of such plans. For Informing Science, we use three similar levels of abstraction: the implemented system, plans for implementation, and the creation of plans. (The "houses" we are building are systems to inform our clients. We are creating Environments that promote Learning.) Note that this is not the same as Churchman's (1971) purposive individuals. A third and final framework from which the Informing Science framework is derived is Leavitt's (1965) Change-Equilibrium Model. Leavitt writes that to understand organizational change, we must consider four distinct elements as inter-related: the task, technology, structure, and people. The key points here are that the components are interrelated, so a change in one affects all the others, and that the task, the technology, and other key components comprise the model.

Putting it together: The Informing Science Framework

The framework has three components: the informing environment, the delivery system, and the component needing the information, the one that completes the task at hand.

Informing Environment. The informing environment is analogous to the sender and encoder in the communication model. Unlike the communication model, the Informing Science Framework considers the informing environment at three levels of abstraction. These three levels are (1) the instance (using a system that is in place), (2) the creation of new instances of informing (to the organization or any of its components), and, at the highest level, (3) the creation of new designs for informing.

An academic example of these three levels is as follows: (1) teaching a course someone else has designed, (2) designing a course that will be taught by others, and (3) creating a new curriculum. A business example is (1) using an existing transaction processing system (TPS), (2) creating a TPS following general design rules, and (3) creating a new type of TPS.
The purpose of the informing environment is to provide information to the client in a form, level of detail, and sequence to optimize the client's ability to benefit from that information. This component draws heavily upon applied behavioral sciences.

Delivery System. The delivery system refers to the use of information technologies (computing, communications, and so on) that support the implementation of informing environments. This corresponds to the transmission or media component of the communications model. Information technologies are not limited to computing. Data communication includes video and voice, and even personal contact when it is augmented through planned communication.

The Task-Completion System. The driving force behind the creation of learning environments and delivery systems is that a task needs to be accomplished. The task defines what information is needed. This task completion component typically involves a person who has a job at hand. It corresponds to the decoder - receiver components in the communications model.

The task completion system is the sole component that defines the difference among various academic disciplines that comprise Informing Science. In business, the decision-maker commonly is a person (worker or manager) needing help completing a business process. In library science, the task commonly is helping a patron or creating a system to help future patrons. While the task may be different for students, readers or viewers of journalism, or business decision-makers, all share the need to be informed so as to be able to complete their task at hand.

Conclusion

This paper introduced a framework showing how fields historically considered separate are interconnected. Perhaps the university's structure of classification of disciplines into distinct Faculties or Colleges is outmoded, as knowledge derived on one end of campus impacts throughout.

Has IS evolved beyond its current limited conceptualization? Turchin's (1977) concept of Metasystem Transition (MST) may apply here. MST describes a process by which a new control level emerges which integrates a set of subsystems at the level below. This structure imparts "a discrete jump to a higher level of complexity". MST provides a general principle to explain evolutionary progress or development, and perhaps for understanding Informing Science. Readers are invited to visit the web site Global Informing Science Education at URL http://gise.org to see activities designed to promote such an evolution.

References

Churchman, C. W. *Design of Inquiring Systems*. New York: Basic Books, 1971.
Davis, G. "Information Systems As an Academic Discipline: Explaining The Future", *Journal of Information Systems Education*, Dec. 1992.
Leavitt, H. J. "Applying Organizational Change in Industry: Structural, Technological, and Humanistic Approaches." In *Handbook of Organizations.* Ed. James G. March. Chicago: Rand McNally, 1965.
Shannon, C. E. and W. Weaver. *The Mathematical Theory of Communications*. Urbana, IL: University of Illinois Press, 1949.
Turchin, V: *The Phenomenon of Science*, New York: Columbia University Press, 1977.
Turchin, V: *The Inertia of Fear and the Scientific Worldview*, New York: Columbia University Press, 1981.