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James F. Courtney

*Texas A&M University, j-courtney@tamu.edu*

Jaana Porra

*University of Houston, jaana@uh.edu*

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# Mini-track on the Philosophical Foundations of Information Systems

James F. Courtney, Texas A&M University, j-courtney@tamu.edu  
Jaana Porra, University of Houston, jaana@uh.edu

## Abstract

Keen (1980) and Churchman (1996), among others, have called for the use of philosophy as a reference discipline for information systems research, the objective being to produce more imaginative, reflective and diverse studies and hence a broader knowledge base for IS theory. This paper describes how Churchman's inquiring systems may be used as a basis for IS studies, and further describes five roles (as defined by Hodges 1995) that philosophy may play in informing IS research.

## Introduction

At the first meeting of the International Conference on Information Systems (ICIS) in 1980, Peter Keen gave a paper which, among other things, called for a clarification of the reference disciplines for information systems research and for the development of a cumulative research tradition. He concluded by saying:

There is a need too, for those whose reference discipline is philosophy. MIS is an immature field and while obviously its maturation depends on good research, it must not isolate itself from the work of ideas for ideas' sake. Too many researchers in MIS (and even more in management science and economics) lack curiosity. They rarely review their own axioms or actively search for new sources of concepts and methods... Every scientific field has a sense of history. It atrophies if it cuts itself off from curiosity, diversity and reflection.... Let us make sure we keep a few philosophers, historians, general systems theorists and social activists within our network... Research is the professional core of a discipline, but for it to also be the intellectual core, we need to think about research, not just do it. (Keen, 1980, p. 18).

The co-chairs of this mini-track concur with Keen's assessment. The objective of both the mini-track, and a related electronic journal, *Foundations of Information Systems: Towards a Philosophy of Information Technology*, is to provide a forum for those sympathetic to Keen's plea. The mini-track is actually the outgrowth of a conference session at the 1994 Decision Sciences Institute meeting and a panel discussion at the 1995 meeting of the Americas Conference on Information

Systems (AMCIS). The mini-track itself was started at the 1996 AMCIS meeting in Phoenix, Arizona.

We were most fortunate in 1996 to have C. West Churchman with us at the first mini-track and to present a heart-felt luncheon speech looking back on management of the planet during the past century. Churchman implored us to do better in the new century by becoming the "information imagination society," and to use information technology in creative ways so as to improve the human condition worldwide. Another goal of the mini-track and electronic journal is to foster diverse, imaginative views on information, information systems, and information technology by using philosophy as a reference discipline. Western philosophy has a history of some 2000 years, and Eastern philosophy goes back even further. We believe that philosophical thought can provide a basis for both continuity and creativity in information systems research that will lead to a diverse, but well-reasoned, cumulative tradition. In its broadest terms, this endeavor will hopefully lead to a "Philosophy of Information Technology." This means developing, exploring and debating fundamental beliefs about the ways in which information systems and technology may be best used by human kind.

Computers and global computer networks have the potential to change most all aspects of human life at the social, economic, organizational, group and personal levels. Information technology changes what, where, how, why, when, and with whom people share information. It may even change what human beings are. We suggest that to the greatest extent possible, we must understand the implications of information technology so that its affects can be managed in ethically responsible ways. Using philosophy as a reference discipline may enable us to do so.

## Philosophical Foundations of Information Systems

Philosophy is an established and vast field, as compared to our fledgling area of information systems. Yet the roots of IS literature extend to philosophy going back to Churchman's (1971) work on Inquiring Systems, and Mason and Mitroff's "MIS research program" article in 1973, which referenced and helped popularize Churchman's work. (Both Mason and Mitroff studied under Churchman.) Inquiring systems theory has served as the basis for a good deal of philosophically grounded

IS research. Inquiring systems are based on the philosophies of Leibniz, Locke, Kant, Hegel and Singer, these systems have also been proposed as the basis for learning organizations (Courtney, et al., 1998; Richardson, et al., forthcoming), and as a new way of looking at decision-making processes (Courtney, forthcoming). Each inquiring system is briefly described below.

### **Churchman's Inquiring Systems**

Churchman's Leibnizian inquiring system (IS) is a closed, deductive system with a set of built-in elementary axioms that are used along with formal logic and analysis to generate more general fact nets or tautologies. The system generates sentences representing hypotheses, each new hypothesis being tested to ensure that it could be derived from, and is consistent with, the basic axioms. Once so verified, the hypothesis becomes a new fact within the system. The guarantor of the system is the internal consistency of the process.

Mitroff and Linstone (1993) refer to the Lockean IS as being inductive and consensual. Empirical information, gathered from external observations, is used inductively to build a representation of the world. The givens of the Lockean inquirer include a set of labels (or properties) which it assigns to the observations that constitute its inputs. The Lockean system is also capable of observing its own process by means of "reflection" and backwards tracing of labels to the most elementary labels. Communication and consensus are hallmarks of this approach, and agreement by the Lockean community on the labels to be assigned to an observation is the guarantor of the system.

The Kantian approach recognizes that there may be many different perspectives on a problem, or at least many different ways of modeling it. Provided with observations about a decision situation, the Kantian inquirer is capable of constructing various models which attempt to interpret and explain those observations. Each model has some "goodness of fit" measure, such as a standard error or variance. An executive routine is capable of invoking a particular type of modeling process, and observing its behavior. It can turn off models, which are not performing well. It finally chooses the model which best explains the data.

Hegelian inquirers rely upon the dialectic to resolve differences a thesis and its antithesis, two diametrically opposed positions on an issue. The thesis and antithesis are used to interpret the same data set. An "objective observer" views a debate between proponents of the thesis and antithesis, and forms a synthesis of the two views, which ideally dissolves the problem. In Hegelian inquiring organizations, arbitration is used to evaluate and

synthesize contributions from opposing viewpoints resulting in a larger mind which absorbs the thesis/antithesis conflict. Knowledge gained through Hegelian inquiry may result in entirely new strategic direction for a given organization, as Mason and Mitroff (1981) have shown in their work on dialectical planning systems.

Singerian inquirers are based on the pragmatic school of philosophy, which, in addition to Singer and Churchman, includes William James, John Dewey, and Clarence Ayres, among its proponents. Singerian systems are above all teleological, but with an ethical base. Unlike the other systems, they are designed to generate "exoteric" knowledge or knowledge for every man, as opposed to the scientific, esoteric knowledge generated by the other inquirers. However, Singerian systems are holistic in nature and "sweep in" theories, variables, concepts and tools from any or all disciplines in order to deal with a problem. They may incorporate aspects of any of the other inquirers, but concentrate on social problems in the large. Mitroff and Linstone (1993) argue that Singerian inquiry should form the basis for modern business organizations, which face very complex environments consisting of a confluence of economic, social, governmental and environmental factors.

While Churchman's inquiring systems have provided the philosophical basis for a good deal of IS research, there is a large body of philosophically grounded IS scholarship that does not follow this vein. Hodges (1995) has proposed five ways in which philosophy may contribute to IS research. These five roles provide a convenient framework for describing philosophically based IS research of other types.

### **Hodge's Five Roles Philosophy in IS Research**

Hodges (1995) has proposed five ways in which philosophy can inform information systems research. First, as a reference discipline *per se* in the sense that it would contribute a subject and a methodology. According to at least some schools of thought the dialectic method, meaning a dialogue which critically analyzes all the implicit assumptions of a theory, (Mueller, 1965) is the most prevalent philosophical methodology. In the present case, this approach would consist of applying the dialectic method, as opposed to the scientific method, to theories concerning information systems. Mason and Mitroff's (1981) work on use of the dialectic in strategic planning illustrates this role. Ethics is another area which has served widely as a reference discipline for IS, and general systems theory is a third (see Earl McKinney's paper in this volume for a recent review).

The second way in which philosophy can contribute to IS research is by helping to lay conceptual foundations on which to build MIS theory. This is different from the first role in that philosophy may be but one of several contributing reference disciplines. Thus, for example, a philosophical perspective might be combined with a scientific methodology to experimentally analyze conceptual problems. The empirically based work of Paradice (1990) and his colleagues (Paradice and DeJoie, 1991; Udas, et al., 1996) in IS-oriented ethical attitudes and dilemmas exemplify this role.

The third type of research that Hodges describes consists of epistemologically informed studies such as those described above using Churchman's inquiring systems. Epistemology is one of the major branches of philosophy and the cultural tradition established by the Greek philosophers views knowledge accumulation as an end in itself. A good deal of the current work in knowledge management and organizational learning can be viewed as a sort of pragmatic epistemology. Argyris and Schon's *Organizational Learning II* (1996) is a case in point.

The first three roles described above reflect a somewhat conventional, cognitive processing view of IS research. The fourth and fifth roles that Hodges describes might be expected to yield the more unconventional, imaginative ideas called for by Keen and Churchman. MIS tends to view information technology simply as tools in the hands of their owners, serving their owner's purposes. Scholars in the philosophy of technology tend to view man's relationship to technology in a much broader and deeper way, however, through offering such propositions as: "The nature of technology can be understood only by understanding the being of man." (Hood, 1972/1983, p. 347), and "A tool, like an utterance, only reveals its meaning to those who can infer it by reconstructing it in their own context." (Oakley, 1957 as per Bronkowski 1977) One might ask how many users of information systems can reconstruct an IS in their own context!

Hermeneutics and phenomenology may serve to inform IS research to help develop a better understanding of information technology in a broader context. Work by Bunker (1998; forthcoming) and Haynes (1997) is representative of this role for philosophy in IS research.

The final role described by Hodges is based on existentialism as associated with such well-known authors as Marx, Sartre and Heidegger. This philosophy rejects the notion that intelligence and reasoning are human kind's most telling attribute, and instead is based on the belief that "being" is the most fundamental principle of knowledge. This brings a vastly different view of human beings to the IS research table. Existentialism suggests that some phenomena may be understood intellectually, but others can be understood only by experiencing them.

Cognition takes a back seat to being and experience, and the problem of human existence becomes the center of scholarly debate. This approach has been embraced by Porra (1996) in her work on colonial systems and by Hirschheim and his colleagues (1994) in their work on IS development approaches.

## Summary

This brief introduction has barely scratched the surface in discussing the potential of philosophy to inform IS work, especially in developing a more robust and lasting foundation for what IS researchers do. The objective of this mini-track is to explore how philosophy has been used as a reference discipline in the past, and to foster the development of a "philosophy of information technology." The continuing explosion of information technology in forms such as the World Wide Web and commercial information services is leading to an intrusion of information technology into our personal and business lives at a scope only imagined just a few years ago. Understanding and managing the implications of this technology is a vital issue, not only for scholars of IS, but for humankind as a whole. It seems appropriate that we turn to philosophy as a way of understanding these issues. Our hope is that this mini-track will contribute to an understanding of these issues in imaginative, reflective and logical ways, as Keen and Churchman have implored.

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