1 INFORMATION SYSTEMS RESEARCH METHODOLOGY: AN INTRODUCTION TO THE DEBATE

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Introduction

This book contains the papers presented, and some of the discussion generated, at an IFIP Working Group Colloquium entitled "Information Systems Research—A Doubtful Science?" The Colloquium was held in September, 1984, at the Manchester Business School, in England. It was organized to enable a concern about research methods in information systems to be aired. The concern was being voiced by some members of IFIP

Working Group 8.2 but the response to the Colloquium, in terms of interest, participants, speakers and publishers, indicated that the issues were relevant and keenly felt by many outside of WG 8.2 and warranted a larger audience than perhaps was originally conceived. Hence the publication of these proceedings.

The alert reader may have noticed that the title of the Colloquium is not the same as the title given to this book. The reason for this will have to remain a mystery, but we believe the papers should be read with the Colloquium title in mind. This title was chosen to be provocative and to call into question the notion of research in information systems being a science, in the same sense as research in the physical or natural sciences, and to ask whether the scientific research methodology is the only relevant methodology for information systems research or indeed whether it is an appropriate one at all.

Area of Concern

The particular area of interest and focus of IFIP Working Group 8.2 is the relationships and interactions between information systems, information technology, organizations and society. Given this area of interest it was perhaps inevitable that the subject of research methodology should enter the Working Group's discussions. The concern with information systems and the relationship to organizations and society is not the same as the study of information systems or computing as purely technical phenomena. The relationships of concern are closely related to human activities and involve the study of experiences, attitudes, values, effects and responses, as well as more traditionally technical aspects. This being the case it would seem to lead to the rejection of a purely scientific approach to the investigation of these relationships. Indeed subject disciplines that deal purely in the area of organizations and society without the same interest in information systems or information technology use a wide variety of methods in their analysis and research. These range from the survey, some of which might be regarded as relatively close to accepted scientific method, to methods which adopt subjective or political stances and use research to influence decisions and outcomes. The whole gamut of methods which might be said to reside somewhere on the continuum between these two also exists in profusion. A criticism of these approaches from the scientific viewpoint would be that they are not valid because they cannot be replicated. Whether this is true or not does not necessarily mean that they have not contributed to our understanding of the phenomena under consideration. They may not be scientific truths but perhaps such scientific truths do not exist in the same way in these areas. The history of the non-science disciplines shows that other methods are of value and can contribute to knowledge.

The interests of WG 8.2 lie somewhere in between the two extremes, some of its concerns are technical in nature and some are not; the fact that we have a foot in both camps means that we cannot simply apply methods which are applicable only to the technical end of the spectrum.

This might be thought to argue strongly for an acceptance of a pluralism of methods in this area of research and indeed a theme that emerged very strongly from the Colloquium was that we should let "many flowers bloom." However, some concerns have been expressed within WG 8.2 about the likelihood or ability of this to happen. Firstly, it is argued that the scientific viewpoint is endemic in the areas from which WG

8.2 has grown, particularly in computer science, and that the acceptance of a pluralism of methods is thus unlikely. Here scientific proof is regarded as the only valid method and anything else is, at best, humorously tolerated as a form of quackery and, at worst, rejected out of hand. This viewpoint rejects the possibility that the combination of two or more alternative research approaches might lead to progress.

A second area of concern relates to the fact that the universities and the research councils control the finance and thus the direction of research. The relevant research committees do not appear to support a pluralism of research methods, the research that receives the lion's share of resources is that which exhibits the traditional scientific values. Whilst much of this may make significant contributions in technical areas, it is not appropriate in many areas of endeavor regarding information systems. The fact that the majority of funded research is of this scientific nature means that the areas of information systems not applicable to the scientific method are being ignored as far as large scale funded research is concerned. The fact that the areas being ignored are those mainly concerning the relationships between organizations and technology only enhances the concern felt as these are regarded by WG 8.2 as some of the most fundamental.

Thirdly, it is argued, the researchers we are training, the Ph.D. students, are not being adequately prepared to address the areas where the real problems exist. The data collection and analysis techniques of the scientific method are not adequate on their own in areas involving human activity. Karl Weick (1984) illustrates this very elegantly; he is amazed at the power of the measurable to dwarf the non-measurable. He quotes Vickers as saying,

> I recall times when I have criticized some forecast or estimate for omitting some variable which must obviously be relevant to the result and have been answered—"We couldn't include that; we couldn't put a value on it." And if I objected—"But by omitting it you have valued it at zero; and you know that is the only value it cannot have." The answer, given in the sad, patient voice which the professional keeps for the amateur, would be—"No, we haven't valued it; we have only omitted it." And then triumphantly—"Look, one of the footnotes says so."

The fourth argument states that information systems, and information technology are so new that it is positively dangerous to allow them to be researched using only one methodology, we stand to lose too much time and potential benefit by doing this. This begs the question of how do developments occur in new and youthful disciplines? It is difficult to know but certainly the testing of scientific hypothesis does not appear to be the activity of a discipline without well developed theories and hypotheses in existence. This kind of activity is more likely to be associated with disciplines of some maturity. It is argued that we should currently be generating ideas, theories and hypotheses, rather than simply testing them, and that anything which restricts or constrains this process is inappropriate.

It is often argued that the degree to which the problem exists differs from geographical area to area. A common expression of this states that in Europe and perhaps in Canada more freedom exists to choose something other than a purely natural science form

of inquiry, that alternatives are sometimes tolerated and live almost happily side by side. Whilst there are some notable examples of this, in the overall picture it appears to be on a relatively small scale. However, in the United States this appears to be even less common, and a study of doctoral programs confirms this. A worrying aspect of this being that the United States is, in quantitative terms, the most influential, and potentially the most successful, information systems society. The rest of the world needs the United States to widen its methods of inquiry in order for this success to be fully realized.

Although the above seems to indicate a slightly more pluralistic picture in Europe, the recent activities of the Alvey Committee in the UK shows that even in some areas of Europe the message has fallen on barren ground. The Alvey proposals are in the mainstream of the scientific viewpoint. They have thrown large sums of money for research into individual aspects of technology which may or may not be appropriate but have completely failed to recognize that other areas exist. The short history of computing shows that technological development does not lead inevitably to successful information systems in organizations and society. The problems of systems analysis, and information's systems development, do not exist as an enabling discipline according to Alvey, and yet surely exactly the same kinds of problems are inherent in the development and implementation of expert systems, especially in knowledge acquisition, and yet no research has been initiated by Alvey in these areas. Without this, the Alvey objective will not be achieved. They are not problems susceptible to the scientific method, and so they have been ignored. Not a major contribution to methodological pluralism! Even worse it begins to appear that the Alvey initiative is now regarded as defining the only acceptable research paths, anything outside being stifled or starved.

This hopefully illustrates some of the concerns and arguments being voiced by some members of the Working Group, and indicates the background of feeling which eventually led to the Manchester Colloquium. At a Working Group meeting held in the University of Minnesota in 1983, Professor Nissen raised a number of these issues in a paper that could not at the time be fully discussed and it was decided to devote the next meeting to a full discussion. Exactly how this evolved into a full blown conference remains obscure to many, but evolve it did.

Synopsis of the Papers

The papers, of course, speak for themselves but the following summaries (Mumford 1984) in the chronological order of the Colloquium might prove helpful to the reader.

> Hans-Erik Nissen got the debate off to a start by providing a critique of traditional "scientific" method. He described the complexity of real world information systems and stressed the fact that people are a major source of this complexity. New methods are therefore required.

> Andrew Pettigrew came next and stressed the importance of history in interpreting research. We need to note the different social influences affecting developments over time. He did not approve of "in and out" research. He believed that the researcher should spend time in the

research situation and really get to understand it. He also saw research as a craft, a point of view that caused some debate and disagreement.

Åke Sandberg, who spoke after Pettigrew, provided two extremely interesting points of view on research. He viewed it from a trade union perspective and criticized some of the design solutions provided by the social sciences, in particular socio-technical design.

On the morning of the second day of the Colloquium, Milt Jenkins provided a concise breakdown of the research methodologies that are presently used in information science and discussed how the student could choose between these.

Jenkins was followed by Julie and Kenneth Kendall who, like Pettigrew, stressed the importance of context. They, however, were particularly concerned with the physical context in which behavior took place. They collected their research data with the help of a camera, photographing the environment and using the photographs as an aid to explaining attitudes and behavior.

Heinz Klein took up the thread started by Hans-Erik Nissen and gave a powerful and dramatic presentation of the problems and limitations of using scientific method. He argued that because this was based on an engineering view of the world, it was bound to fail. It could not tackle crucial research issues. New paradigms were urgently required if research was to make progress.

Trevor Wood-Harper discussed both old and new approaches to research in information systems and described and classified these within a social science framework. He also described action research used by his own research group and discussed how this had developed and the rationale behind its use.

Dick Boland provided us with another example of a new approach in his description of what he called "phenomenology." Phenomenology digs deep and seeks to uncover the meaning of our experience. It is concerned with interpretation and finding out what things are. This is in contrast to traditional science, which views the world as a set of objects to be manipulated. Boland suggested that phenomenology was particularly appropriate for research in information science because organizations are essentially systems of communication.

Lynn Antill was the last speaker of the day and she provided an overview of research methods for information processing. IS research cannot easily be fitted into the traditional scientific method paradigm because repeatable experiments are not possible in real world

situations. Antill pointed out that there are a large number of different research methods that can be used in different circumstances. The researcher must choose the one that best fits the problem that is being studied and the circumstances of the researcher.

The final morning of the Colloquium began with a paper by Kalle Lyytinen, which suggested that another useful paradigm for IS research could be derived from the work of Habermas. Habermas has developed what he calls "critical social theory." He suggests that people's behavior is influenced by their view of the world. This view is derived from their "knowledge interests." These knowledge interests can be classified into three categories: technical knowledge interest, which is concerned with explanation, prediction and control; practical knowledge interest, which is concerned with communication and relationships; and emancipatory knowledge interest, which is concerned with emancipation, freedom and consensus. Lyytinen believes that IS development should be directed at assisting the last of these.

Kathy Brittain White spoke about research "perceptions and deceptions." Researchers are not usually rational intellectuals but very subjective human beings who interpret what they see in terms of their own values and interests. Therefore it is essential for the researcher to understand herself or himself and to have a clear picture of personal biases, interests and prejudices. We need to understand our own "inner worlds" before we can interpret those of the groups we study.

Our final speaker was Nicholas Vitalari, who added to the range of new research approaches by describing longitudinal research. He argued that social change could not be understood by examining at a single moment in time. Instead a longer term approach was required with the researcher returning to the research situation at regular intervals in order to see how the situation has altered. Vitalari has been applying this approach to the use of computers in the home.

In addition to our distinguished speakers, we also had three excellent discussants. David Cooper analyzed and criticized the papers of Hans-Erik Nissen, Andrew Pettigrew and Åke Sandberg; Tony Lowe did the same for Milt Jenkins, Kenneth and Julie Kendall and Heinz Klein; Rudi Hirscheim discussed the papers of Trevor Wood-Harper, Dick Boland and Lyn Antill; and Raul Espejo discussed those of Kalle Lyytinen, Kathy Brittain White and Nicholas Vitalari.

At the end of the Colloquium, Gordon Davis and Niels Bjørn-Andersen summarized the discussion.

To complement the above papers at the Colloquium, this book includes reflections before, at, and after our meeting.

> Per Flensburg presents two research methods for studying end-user development of Information Systems.

> Rudi Hirschheim traces the historical perspective of the methods to acquire knowledge in Information Systems.

References

Mumford, E. "Discussion on the IS Research Colloquium," *OASIS, WG 8.2 Newsletter* (5), September 1984.

Weick, K. "Theoretical Assumptions and Research Methodology Selection," in *Information Systems Research Challenge*, Cambridge, MA: Harvard Business School Press, 1984.