"MAN IS A CREATURE MADE AT THE END OF THE WEEK...WHEN GOD WAS TIRED":  
SOME REFLECTIONS ON THE IMPACT OF HUMAN ERROR UPON INFORMATION SYSTEMS

George J. Bakehouse  
School of Information Systems  
The University of the West of England  
Coldharbour Lane, Frenchay  
Bristol BS16 1QY England

ABSTRACT

The notion of Human error has different meanings for many disciplines. Cognitive theorists see them as an important clues to the covert processes underlying routine human action. To applied practitioners they are the main threat to the safe operation of high risk systems. The theoreticians like to collect, cultivate and categorise errors, practitioners are more interested in their elimination and where total elimination is not possible in containing their adverse effects as much as possible. This paper will concentrate on the theoretical and applied practical approaches putting theory into practice. Identification and classification of Human error is essential in the design of information systems whether computer based or manual if the elimination of error is to be achieved. As Mach (1905) so aptly stated "Knowledge and error flow from the same mental sources, only success can tell the one from the other."

Keywords: Human error, action research, modelling, information mismanagement.

INTRODUCTION

This paper will begin with a discussion of the need for modelling techniques in order to give academic disciplines a method for describing the world in relationship to their own particular paradigm. Information systems is one such discipline, in its own brief history it has developed numerous models and techniques in a quest to understand and explain phenomena within its ever widening scope of activity. The second section of the paper will describe and discuss the underlying principles and theories which have assisted the author in developing a model centred upon the notion of human error in helping to explain the occurrence of information problems detected in field research. This model has been developed as a consequence of an ongoing action research program, which spans several sectors including: health, transport, manufacturing, construction and finance. The theories, tools, techniques and methods adopted for the research program were selected on the basis of their relevance to the solution of real problems discovered in everyday working environments.
THE NEED TO MODEL

In order to think about, understand and explain the world about us, it is necessary to develop models or abstractions of the world and ways of using them to think about it. These abstractions and approaches then become the epistemological constructs which form the basis of our reasoning, communication and discussion about the world. As new disciplines have emerged, each has developed its own ways of modelling and reasoning about the world. Many providing different descriptions of what is essentially the same set of phenomena. Religion and Philosophy, Politics and Economics, Sociology and Anthropology, all have their own brand of models and approaches, rules and evidence. The differences between them often lead us to the mistaken belief that the phenomena which they study are not the same.

The problem of fragmentation exists because of the differences in the epistemological constructs used to describe the world and its phenomena (observable or otherwise). It is true that to move from one paradigm to another constitutes a fundamental shift and that a lack of isomorphy means that the models of each may not be easily mapped or transformed into an equivalent form in the others. Through the medium of action research, different models may, be considered to be complementary because despite their differences in emphasis, focus and use, they have a common point of contact; the real world of social action. Action research also provides the means by which theory may be developed and tested in the real world.

The notion of improving theory through practice is anything but new. The action research approach, exemplified by Checkland's Soft Systems Methodology, is well established. (Checkland, 1981; Checkland and Scholes, 1990). Conventional research approaches following the paradigm of science (reductionism, experimentation, refutation and repeatability), seek to form and then verify theories. Action research promotes the emergence of theories through practice and the speculation over how such practice might be bettered in some way. In this respect action research is both descriptive/ interpretative and subjective / argumentative. (Galliers et al, 1987).

A clear point of contact for theory and practice and for their different tools and techniques, frameworks and approaches, is the world of information systems. Information systems, due to its inherent practical universal application, is an ideal area to consider this unification, as information system development and use is a natural point of contact for the 'natural' and the 'artificial', the 'hard' and the 'soft', the 'concrete' and the 'abstract' the 'physical' and the 'social'. This undertaking cannot come from abstract academic thought alone. Such a framework needs to be hammered out in the real world of human activity, through the medium of action research (Doyle, 1995).

"The modern specialist field-worker soon recognises that in order to see the facts of savage life, it is necessary to understand the nature of the cultural process. Description cannot be separated from explanation, since in the words of a great physicist, 'explanation is nothing but condensed description.' Every observer should ruthlessly banish from his work conjecture, preconceived assumptions and hypothetical schemes, but not theory". (Malinowski, 1936)

The ongoing action research project currently being undertaken by the author and a team of academics based at the University of the West of England (UWE, Bristol) spanning nearly a decade, has seen the emergence of an approach to embedding the tools and techniques of systems engineering in an action research framework (Bakehouse et al, 1995, 1997, Doyle, 1994, Waters et al, 1994). These projects have involved strategic, tactical and operational systems in transport (Lex Transflefl), health care (Frenchay Health Trust, Neurosciences) construction (Trafalgar House, WPE Homes), banking (Citibank), manufacturing (Rolls-Royce)and other areas of the private sector. The research team has worked with a wide range of organisations, at a number of different levels of involvement in an attempt to define a general purpose framework of open utility.

INFORMATION ITS DIMENSIONS AND QUALITY

The Industrial Revolution gave us the '4 M's' of men, money, machines and materials, the Green Revolution gave us the environment (the natural world that we have inherited,