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Inquiring Systems in Approaches to Information Systems Development

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Abstract

The initial assertion of this paper is that information systems development (ISD) failures can best be addressed through a systems approach. Such an approach is characterised by Linstone's Multiple Viewpoints or Checkland's Soft System Methodology (SSM), both of which are supported by Singerian inquiring systems. The paper notes that these approaches are both forms of action research and therefore examines the support given to other forms of action research by Singerian inquiring systems. Organisations which recognise that they are not perfect when it comes to ISD and wish to do something about it can be considered as Learning Organisations. Senge's approach to Learning Organisations is seen as being generic. In the context of ISD, it is contrasted with SSM. In particular, the support required by these approaches from the classical inquiring systems is being considered. Further, the implications of what any resolution might mean for ISD is also considered. The final focus is to consider the framework of ISD as a social construct and examine the benefits of a non-classical inquiring system, based on the philosophy of Rorty.

Introduction

It is recognised that, historically, there have been problems creating software systems. Initially, this was identified as the Software Crisis - the inability of developers to produce systems to time, budget or expected functionality. The traditional response was a belief that systems development should be considered to be a form of applied science or engineering (Dijkstra, 1976; Floyd, 1992; Hoare, 1982). However, not all the issues which cause failure are technical. For example, Lyytinen (1988) identifies the skills and capabilities of the analysts and users as well as insufficient awareness of the relevant organisational politics as being among the reasons for failure. Issues such as these tend to be ignored by methodologies based on the rationalist paradigm but are explicitly addressed by approaches from within a systems paradigm (Checkland, 1981; Checkland and Scholes, 1990). While software engineering has certainly had a major impact on ISD, it still remains the case, unfortunately, that the majority of information systems developments end in "failure" (Standish Group, 1995). Systems approaches should be regarded as representing an extension of the rationalist paradigm as wider views are encouraged. Consequently, it is argued that fewer problems will be found if methodologies based on the systems paradigm are used. Further, it has been shown (Bennetts, Wood-Harper and Mills, 1999), that the Soft Systems Methodology (SSM), which is based on the systems paradigm, can be used as a metaphor or model of ISD.

This paper shows that Linstone's Multiple Viewpoint approach is a useful way of supporting information systems development (ISD), in conjunction with Checkland's Soft Systems Methodology (SSM). However, there is a problem with the way the Personal viewpoint is characterised in this context, as this viewpoint is usually seen to represent significant problems with a low probability of occurrence, while in ISD failures are shown to be common. Further, it is suggested that Singerian inquiring systems may be used as support for all forms of action research. The issues under current development are summarised in the final section.

Multiple Viewpoints and ISD

The work of Linstone and colleagues (Linstone, 1984, 1985, 1989; Mitroff and Linstone, 1993) relates to the image of ISD, developed above. The principal idea at issue is that any complex, unstructured business problem needs three generic viewpoints to be considered in order to arrive at a comprehensive, pertinent and acceptable solution. The viewpoints identified are the Technical (T), the Organisational (O) and the Personal (P). Given the scenario depicted in the Introduction, ISD is seen as an unstructured business problem. These three viewpoints are recognised as generating a framework which is equivalent to Churchman's (1971) Singerian inquiring system (Linstone, 1984) so both provide philosophical support for SSM (Checkland, 1981). These inquiring systems of Churchman (1971) are recognised by

Courtney, Croasdell and Paradice (1998) as providing philosophical support for learning organisations and by Checkland (1981) for SSM. This is useful as the same philosophical framework supports both the generic approach to successful ISD and the organisation's attempts to improve its processes. Mitroff and Linstone (1993) argue that the T perspective will cope with most events that are likely to happen. However, O and P perspectives are needed when considering low likelihood events with severe consequences.

This last comment needs further examination. Checkland (1981), in the context of SSM and therefore, in the context of ISD, would argue that all three viewpoints are required in order to adequately analyse any ill-structured problem situation, regardless of the risk. Thus, the Technical Viewpoint is covered by the Logic Stream, while the O and P perspectives are reflected in the Social Stream of Analysis. It is recognised that clearly defined goals can be addressed through the technical viewpoint alone. However, the O and P perspectives are always required if attitudes and assumptions need to be identified. This has been confirmed by pilot work reported by Bennetts and Wood-Harper (1996), which showed the implicit presence of these viewpoints in decision making about software quality by practitioners. The Introduction above argued that the probability that a large, complex information system will fail, in some sense, in its development or use, is high rather than low. However, the results of such a failure are often severe. The current analysis indicates that these viewpoints are necessary in high probability situations as well. It is, therefore suggested that, at least for ISD, that there is a problem with this element of the characterisation of multiple viewpoints.

Inquiring System support for Action Research

It has been argued that if an ISD project should fail, it is usually through a failure to consider organisational and personal viewpoints sufficiently. However, this implies that the organisation is willing to change or learn. Further, it must be willing to move to an undefined (as yet) mode of operation. In order to gain insight into how this might be achieved requires the use of qualitative research methods. For example, Baskerville and Wood-Harper (1998) argue that "The discipline of IS seems to be a very appropriate field for the use of action research methods". Further (citing Van Eynde and Bledsoe, 1990), Baskerville and Wood-Harper comment that "It should not be surprising that action research is the touchstone of most good organizational practice ... [It] merges research and praxis thus producing exceedingly relevant research findings." It is, therefore, suggested that appropriate approaches may be determined through the use of action research.

It is noted that both Linstone (1984) and Checkland (1981) describe approaches to problems in organisations which are forms of action research. Further, both authors recognise the philosophical support they receive from Singerian inquiring systems. Checkland develops SSM through a merger of action research with systems science (Baskerville and Wood-Harper, 1998) and Linstone's approach can be characterised as "management consulting". Baskerville and Wood-Harper (1998) offer a genealogy of IS action research which divides the field into five streams - social and organisational science; organisational learning; process consultation; systems science and IS action research. Linstone's and Checkland's approaches come from different streams but both have the same philosophical framework as a basis. This paper therefore argues that Churchman's Singerian inquiring system can be used to support all forms of IS action research.

Future Work

The authors are currently exploring the support given to Senge's Learning Organisations by Churchman's Inquiring Systems. This is being addressed through a consideration of Linstone's Multiple Viewpoints. Earlier, it would have been recognised that Checkland's SSM is useful as a way of addressing any ill-conditioned business problem and is recognised as a learning methodology - a way of isolating a relatively unfocused "problem" from a problem situation. Similarly, Senge's approach is a learning methodology for a difficult business problem. Further, Senge makes use of the archetypes of system dynamics, and so, by implication, embraces its paradigm. The apparent similarities and differences between SSM and Learning Organisations will be examined.

Malhotra (1997) examines the significance of different inquiring system support for knowledge management. Malhotra (1997) considers well-structured problem situations which are stable, predictable and hence have strong consensus concerning their nature, to be supported by a Lockean inquiring system. Leibnizian inquiring systems are seen to support another class of well-structured problems. Similarly, Kantian and Hegelian inquiring systems are seen to support moderately ill-structured problems. The question arises as to the significance of acknowledging the support of a specific inquiring system in an organisation's decision making process. The response has to be that the identification of problems or problem situations as well-structured, moderately ill-structured or highly ill-structured will recognise techniques which are appropriate to address the problems. Consequently, approaches such as the Delphi

method would be associated with the support of Lockean inquiring system. Similarly, approaches can be identified for all the "classic" inquiring systems. Thus, if a problem situation arose which warranted the support of a Singerian inquiring system, an appropriate approach would need to be selected from SSM and the other methods of soft OR.

Churchman (1971) offers not only the "classic" inquiring systems but an approach which supports the use of any sufficiently coherent theory. It is recognised that data and the corresponding model are theory-laden, or as Wittgenstein put it, "the way we think about the world depends on the apparatus we use to describe it" (according to Lane, 1994). The approach to ISD that has been advocated above, is complemented by the approach taken by Crowe, Beeby and Gammack (1996), who view information systems as being socially constructed. It seems possible that the work of Rorty, for example will support this. If this is the case then, the possibility of characterising Rortian inquiring systems needs to be considered and the implications of their use examined. Clearly, such inquiring systems are subsumed by Singerian inquiring systems. However, the use of Rorty may give rise to more direct insights. Use of a Rortian inquiring system would suggest that strongly social relativistic approaches as characterised by Hirschheim, Klein and Lyytinen (1995) should be used.

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