Developing An Argumentative Approach To Teaching Information Systems Development

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ABSTRACT

This paper examines some of the issues that are driving the development of a Masters course designated as Information Systems Development Methodologies. The aim of the course is to explore a variety of information systems development approaches and the philosophies that underpin them rather than to concentrate on one or more specific methods. The rationale for this approach is to provide students with a broad view of systems development that should enable them to consider systems in specific settings and to select methodologies, methods, techniques and tools that are appropriate to that specific setting. Two major problems were experienced with the course; firstly, students had difficulty with the notion of an underlying development 'philosophy' and secondly there was a lack of a clear framework to help them critically evaluate the wide range of methodologies that exist. A mechanism to alleviate the first problem was identified and is briefly outlined in the paper and a possible approach that will be adopted in the future to address the second problem is also discussed.

INTRODUCTION

Information systems development can be approached from a 'hard', or engineering, perspective or from a 'soft', position. The 'hard' approaches tend to assume a belief that real-world problems can be 'formulated as the making of a choice between alternative means of achieving a known end' (Checkland P B, 1981) and tend to lean towards project management based methods, techniques and tools that have been successfully used to create artifacts such as bridges, computer technology and spacecraft. However, despite the ample literature and detailed method of project management the successful application of 'hard' approaches to the development of management information systems has proved to be less effective, as evidenced by the typically reported levels of failure to deliver a viable object in line with time, cost, quality or usability requirements. The current high levels of interest in the development of knowledge management systems can also be viewed from a 'hard', knowledge repository, position through to a soft approach that is based upon a position where knowledge is viewed as 'dynamic human processing justifying personal belief toward the "truth"' (Takeuchi H and Nonaka I, in Morey D et al., 2000). The development of systems that recognise individual belief systems and multiple views of reality may require the accommodation of both soft views, to appreciate the broader systemic issues, and the hard approaches required to deliver a physical system that can support the development of practical knowledge management systems.

Many students appear to be comfortable with the 'hard' end of information systems, that is, with the traditional systems development life cycle (SDLC) or project management oriented approaches. In many ways in this is to be expected in educational programs that have a strong 'employable skills' approach and the engineering based approach of SDLC also lends itself well to presenting manageable, intuitive and comprehensible teaching approaches. SDLC can be used as a model to support the development of reasonably complex systems within the controlled and time-constrained environment of many educational settings. Removing the complexities of unexpected change, organisational politics, shifting priorities, multiple world views and so on leads to a simplified, although possibly stereotypical, view of the world within which can be engineered artifacts that meet a given, and unchanging, specification. This allows the basics of systems development to be experienced, but essentially from a 'hard' perspective and within a relatively closed environment.

The 'softer' approaches more strongly take account of the complex and dynamic relationships between the systems, the designers, the users and the organizational and broader environment. This view differentiates natural or designed systems from human activity systems, the latter being interpreted as the perceptions of human actors who are free to attribute meaning to their perceptions (Checkland P B,

1981). As the environment, availability of information, business paradigms and so on change, so may the interpretation of the system or system requirements by different actors. Not only do these actors need to be considered but there is also a need to take a holistic view of the organization under consideration, examining perceived relationships and networks of social interaction rather than relying upon formal functions and structures (Espejo R and Harnden R, 1989). One of the problems with the softer approaches is that even after reading extensive and well-written work describing, for example, Beer's Viable Systems Model, many people still find the ideas difficult to grasp when they attempt to turn them from theory to practice (Anderton, in Espejo R and Harnden R, 1989).

The course under discussion here therefore aims to help students to develop the ability to critically examine the available hard and soft development methodologies, methods, techniques and tools in the light of typical modern organizational settings characterized by change, political machinations, 'e' approaches and so on, and select appropriate approaches to suit the prevailing setting or to anticipate future changes

APPROACH

The direction of the course is to introduce students to a range of information systems development methodologies and to encourage them to consider how and under what circumstances the various approaches, or combinations of them, may be usefully applied. The approach adopted assumes a 'hard – soft' spectrum with the various methodologies, or their underlying philosophies, placed appropriately along that spectrum and sets out to explore the relative merits of the approaches for a variety of problem situations. Although the views presented in the lectures ranged broadly across the hard and soft areas the 'soft' were explored in more depth than 'hard' because this was a new perspective for most students. The ontological position of the course could be regarded as being at the nominalist end of the realism/nominalism spectrum and epistemologically as leaning towards the interpretive domain. (Hirschheim R and Klein H K, 1989)

Some time is spent exploring the meaning of the term 'methodology', working mainly around the views of (Avison D E and Fitzgerald G, 1995) who regard a methodology as more than simply a collection of 'procedures techniques, tools and documentation aids', in that it should have a 'philosophical' view that distinguishes it from being a method, or recipe.

Assessment is though several short (one page) papers critiquing selected book chapters or journal papers, a discussion/role play session and a 3000 word conference-style paper.

Although the major emphasis of this course is upon the higher level issues relating to development methodologies there is, in prac-

tice, a need to connect these issues with techniques and tools to permit implementation of real world systems. The final sessions of the course therefore introduce a variety of software tools that may be useful to support 'softer' approaches to systems development. The tools included cognitive mapping software, repertoire grids, mind maps and electronic meeting systems. These can be used to explore, elicit and share multiple world views and help move towards the development of meaningful system specifications that can be supported by more formal, 'harder' development approaches as appropriate. The overall aim is to produce a balanced, pluralist, or complementarist view rather than suggest that either 'hard' or 'soft' approaches are the 'right' way to develop systems.

PROBLEMS

Two major problems were experienced in the previous operation of this course. Firstly, difficulty in understanding the idea of a guiding 'philosophy' to underpin methodologies and, secondly, some difficulty in developing a critical or balanced view of the wide range of methodologies.

The symptom of the first problem was typically expressed as a feeling that 'philosophy' had little connection to the 'real world'. Those students involved in information systems projects in their working life were, initially, the most resistant to a theoretical or philosophical analysis of development methodologies. The most commonly used phrase was 'But surely that's just common sense?' Bringing them constantly back to literature describing failed systems kept their skepticism bounded by the unavoidable fact that development failures are commonplace and that we need to try to understand why this is the case and then consider a variety of possible approaches that may help us at least understand why this high level of failure prevails.

The learning strategy adopted to help students gain some understanding of how a particular 'philosophy' would influence a project was achieved through a 'role-play' session examining a single short case study from the viewpoint of a number of key figures. The objective of the exercise was for each student to attempt to express a view of a relatively simple case study through the worldviews of a specified individual drawn from an 'A to Z' (or, perhaps more practically, Ackoff to Zuboff) of significant individuals typically represented in the IS/IT/Quality literature. Each student was allocated a single name to research with the objective of producing a biography (an element of the marked assessment) of their allocated character to try to gain insight through the background, writings and significant achievements of that individual. In the actual role-play session each student suggested the views that they felt their individual would have been likely to adopt if confronted with the simple case study. As each student presented 'their' credentials and argued the case for their particular approach to be adopted for the common project it became apparent that they began to appreciate the notion of an underlying world-view. This technique will be used in future versions of the subject as it does appear to help with the problem of understanding 'philosophy' in the context of information systems development.
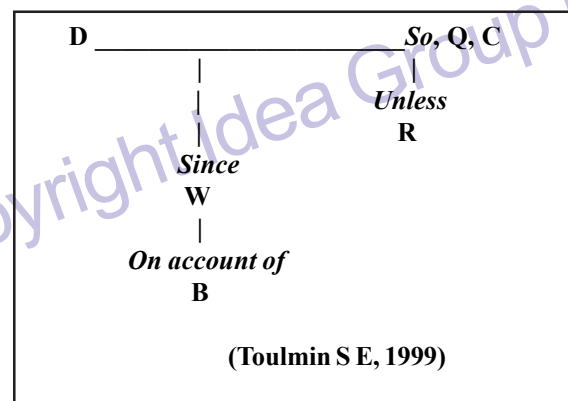
THE NEED FOR ARGUMENT

Although the role-play session revealed to the students how individual world-views would influence the way that a given scenario was approached, the impact upon selection of method and tools etc, it did not transfer to their written debate work. They still tended to adopt a single view of their chosen topic that was typically based upon their own experience, their previous studies or upon a limited range of literature. The selection of appropriate methodology, techniques and tools is complex and needs to be based on an approach that can be clearly articulated. There are two reasons for this need for clear articulation. Firstly, many students do have good ideas that they can express through relatively informal debate sessions, but find it difficult to express them in writing. They find it difficult to present a rigorous defence of their position and this can lead to the writing of a paper

that is not a true representation of the students' ability to think critically. The second reason is that those students in work may wish to present their new ideas back in the work place. This requires that they are able to present a cogent argument that recognizes and accommodates the possible rebuttals if they are to be able to introduce new thinking to their organisations.

Some mechanism is thus needed to help the students take a more rigorous approach to examining key issues even when evidence gathered during their research challenges their existing assumptions. The theme to be developed in future versions of the course will be based upon the argumentation approach of Stephen Toulmin (Toulmin S E, 1999) in which claims are made within a framework that brings in supporting evidence for the claim, repudiations, and qualifiers as to the level of certainty of the claim.

A GUIDING FRAMEWORK FOR INQUIRY: TOULMIN

Toulmin suggests that our first intellectual obligation is to 'abandon the Myth of Stability that played so large a part in the Modern age' and to return to 'reasonableness' rather than rationality. He suggests that the future will not be served by the 'optimistic daydreams of simple-minded calculators, who ignore the complexities of life, or the pessimistic nightmares of the their critics, who find these complexities a source of despair'. (Toulmin S E, 1999). It is the reflective practitioners, in his opinion, steering a middle way between the extremes of abstract theory and personal impulse, who will be able to contribute most to the future. He describes a clear structure that helps frame an argument in such a way that a Claim, 'C', can be tested by detailing the foundation of the claim (the Data, 'D'), and the rules, principles and inferences that connect the Claim to the Data (the Warrant, 'W'). The items that give the Warrant legitimacy (assurances, currency, authority) provide the Backing, 'B', and Qualifiers, 'Q', are used to indicate the strength of the Warrant ('possibly', 'probably' for example) with Rebuttals, 'R', being used to indicate those conditions that might be capable of defeating the warranted conclusion. The basic 'T' shape of the argumentation structure is shown below:

```
D _____  So, Q, C
              |                          |
              |                        Unless
              |                          R
             Since
              W
              |
         On account of
              B


        (Toulmin S E, 1999)
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This structure provides a basic framework to guide the students' exploration of arguments relating to development methodologies in a critical and reflective way. The use of individual written argument based exploration of topics and group-based debate sessions should permit students to systematically test ideas expressed in the literature. The use of a qualifier allows students to express their level of confidence in the argument they are presenting and the need to consider warrants, backing and rebuttals should provide them with the required balance.

Before the students put the above structured argument approach into practice they will be exposed to the basic ideas through a lecture structure that is also built on the argument approach and is framed

within a broad interpretive ethos. The articulation and overt use of such a structure early in the course should avoid the danger of students confusing balance and qualification with equivocation, or even-handedness and exploration with a lack of the lecturer's ability to present the 'right' answer. It is also important that the 'argument' approach does not become mechanistic, as reflection is seen as an instrumental approach in helping students appreciate the many interpretations that prevail within the information systems field. For those students who are actively involved in the development of information systems in practice it is felt to be important that they are encouraged reflect on the nature, strengths and limitations of their currently favoured practice and to consider the merits or otherwise of alternative strategies or paradigms. For those students not yet in the workplace it is important that they have a framework that will help them critically evaluate oraganisational practices and thus be able to contribute to the strengthening or challenging of those practices as appropriate. Both groups of students will need to carry out this evaluation with a clear awareness of the social and political paradigms within their working environments.

The 'A to Z' multi-perspective debate will be retained and connected more strongly with a follow-up session based on the Toulmin argument structure to help them to test the ideas as a group before they use them in individual written work.

CONCLUSION

The exploration and comparison of methodologies is undertaken for both academic and practical reasons. Academic study of methodologies should inform future information systems development by providing frameworks that allow categorisation of the ever-growing number of methodologies and approaches in such a way that some understanding of their relationships can be obtained. (Avison D E and Fitzgerald G, 1995). In the 'real world' organisations are faced with changing environments and paradigms and by apparent failure in the delivery of systems that can support and adjust to these changes. An understanding of the reasons for the wide range of choices allied with informed selection of appropriate methodologies to meet specific circumstances may help to both explain some of the immediate failures and to reduce them in the future.

Helping students to move from a 'single right choice' view to multiple possibilities, or from the perception of a methodology as simply a recipe to seeing that the framing world view is important is a difficult process. It typically requires that the learner rigorously test previously existing views, acquired either through formal education or through work-place experience and this will clearly be challenging and will require some framework to support the 'safe' testing of new ideas. The course that forms the focus of this paper attempts to expose students to these challenges and previous experience has demonstrated that this is a difficult and potentially threatening task for both the learner and the learning facilitator. For the learner it requires exposure to a potentially confusing plethora of methodologies, and the adoption of critical and reflective thinking that may lead to the abandonment or adjustment of some existing and deeply embedded views. For the learning facilitator it means helping build a learning environment that is confrontational but supportive, broad in scope but clear in direction and offers the learner structure but also encourages diversity and risk taking in thinking. The promotion of critical and reflective thinking would appear to be one key element in attaining this goal and hopefully the argumentative approach outlines here will, with more development, act as an appropriate framework for this to be achieved.

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