How effective is Soft Systems Methodology as an alternative to the dominant and so-called ‘hard’ approaches to Information Systems design and development? When is this approach most useful? Discuss with examples.

Introduction

Despite the myriad of information systems development methods that have surfaced over recent years, and the growing interest in the use of soft systems methodology (SSM), the realisation of computer-based information systems in real-world situations continues to be somewhat challenging. Against this background, this paper will aim to delve into such a methodology known as SSM, establish an understanding of what it is and its effectiveness compared to the alternative ‘hard’ approaches. In doing so, the advantages of the methodology and its problems will also be presented.

Systems Thinking

When the concept of systems thinking was beginning to be applied to real-world problem situations in the 1970s and ‘80s, it was identified that the root of the problem situation was the analyst’s inability to accurately identify and describe objectives amongst the other, numerous ambiguous and conflicting alternatives. (Checkland, cited in Checkland 1999, p. 52) In addressing this dilemma, Checkland (Cited in Avison & Fitzgerald 1995, p.365) made an attempt at incorporating systems theory into a practical methodology. In doing so, models were constructed and used by analysts as a device to assist them in structuring questioning procedures to specifically address the problem situation. This process became later known as the ‘Soft Systems Methodology’ (SSM), a system of learning and enquiring.

Comparing Hard and Soft Approaches and When to Apply Them

The fundamental difference between the soft systems thinking of the 1970s and 80s to its counterpart, that is, the hard systems thinking of earlier approaches to real-world problem situations, is soft systems aims to promote an open and unconstrained attitude towards change so that everyone’s contribution is encouraged. Soft systems also have the ability to conceptualise the social processes of a particular organisation in context allowing for a specific group of individuals to conceptualise their own world and choose the relevant, purposeful actions they wish to undertake. (Checkland 1999, p. 54)

According to Avison and Fitzgerald (1995, p. 355), an information systems development methodology is defined as ‘a system of procedures, techniques, tools and documentation aids… which help system developers… to implement a new information system’. Despite there being numerous information systems development methodologies around, no one standard methodology is used or can be applied to every problem situation. Even in one organisation, a standard methodology cannot be
applied to everything. It is the real-world constraints evident in real-world problem situations that reflect which methodology is to be used. (Checkland 1999, p. 52) The main problem for most analysts is which methodology or which combination of methodologies to adopt and apply to a particular problem situation. This next section of the paper will address these problems, and make suggestions as to when such methodologies would be more appropriate to apply.

Information systems problem situations have been classified into five types of classes depending on their level and structure of requirements and problem definition. These classes are as follows:

<table>
<thead>
<tr>
<th>Class One:</th>
<th>Well-structured problem situations with a well-defined problem and clear requirements.</th>
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<tr>
<td>Class Two:</td>
<td>Well-structured problem situation with clear objectives but uncertain user requirements.</td>
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<tr>
<td>Class Three:</td>
<td>Unstructured problem situation with unclear objectives.</td>
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<tr>
<td>Class Four:</td>
<td>Situations where there is a high user interaction with the system.</td>
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<tr>
<td>Class Five:</td>
<td>Complex problem situations, combing two or more of classes 1-4, requiring a contingency approach to information systems development.</td>
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(Avison & Taylor 1997, p. 74)

‘Hard’ approaches to information systems design and development involving methodologies based on traditional systems development life cycle (SDLC) are most suitable towards Class One type problem situations. (Avison & Taylor 1997, p. 74) The central focus of this methodology is to identify the ‘best’ solution for the problem at hand. Such an approach has proven to be successful, but only so when the description of this class matches that of the problem situation. Requirements need to be clearly stated from the beginning, and be easily understood and communicated. Users of the new system would usually have a limited contribution towards the development of the system, and even the analysts themself are to follow orders and not question the objectives of the system. Examples of such ‘hard’ solutions include the design and construction of a computer system, or a reduction in the time spent towards completing a task, etc. (Patching 1990, p. 29)

At the opposing end of the spectrum, soft systems approaches are more of a match for Class Three type problem situations where situations are regarded as unstructured or soft, inevitably involving people, either as individuals or groups, working together towards a common goal. (Patching 1990, p. 26) Hence, an emphasis is placed on getting participation from those involved. (Avison & Taylor 1997, p. 76) In this situation, the objectives of the information system are to be clearly communicated to all parties; it also does not make the assumption of an agreed
objective or that a ‘best’ or ideal solution may be found. A ‘soft’ approach would involve clarifying what the problems are in the given situation, in the hope of making some kind of improvement. The most well known of the soft approaches is Checklands’ Soft Systems Methodology (SSM), which recognises that the perspective (Weltanschauung) of a particular individual will influence their view of the problem situation and the objectives of the system. (Avison & Taylor 1997, p. 76) Essentially, soft systems methodologies recognise the importance of human activity, which in some respects is the other ‘soft’ part of the equation. Patching (1990, p. 27) supports this claim by stating that human behaviour is largely unstructured, and even though there may be prescribed procedures for certain tasks, individuals will seldom perform them in exactly the same manner.

SSM in general terms, is a participative approach where involvement from clients and representatives is crucial. Advancing through the systems thinking stages in isolation can easily result in ‘the development of ivory-towered ideas and inappropriate models’ (Patching 1990, p. 43) hence, involving people from the organisation during these stages will ensure that their views are reflected in the outcomes and their acceptance of the new system in place.

It is also important to note that in some problem situations, they may share characteristics from more than one class definition; hence it is highly probable that several methodologies may be applied to that particular situation. This concept will be further discussed later in the paper.

Advantages of Soft Systems Methodology

Soft systems methodology can be utilised as a tool to enhance an analyst’s understanding of a problem situation during the early stages of investigation and also at subsequent stages of the development process where clarifications need to be made. The methodology provides clarity in potential areas of weakness, as well as an overview of the situation and a way of identifying relationships that may not initially be apparent through hard techniques. (Patching 1990, p. 33) A structured or hard approach to such a task would inhibit the learning process that is to take place and would not allow for the situation to be viewed as a whole.

Problems with Soft Systems Methodology

Unfortunately, as many writers of this topic have suggested, there is no best methodology that can be applied to all problem situations. (Jackson & Keys and Wood-Harper cited in Avison & Taylor 1997, p. 76) It would seem difficult, if not impossible to implement a hard systems approach to an ill-defined problem situation where the analyst is unsure of the finer details of the current working system. There are also problems with selecting methodologies on the basis of certain characteristics of the systems development project even though it has now become a common way of choosing methodologies. (Davis cited in Avison & Taylor 1999, p. 77)

To further explain this concept, the following example will be used. A common feature of many information systems development projects is that they are
multi-faceted, that is, information systems are complex and usually have numerous different aspects that contribute to making the system a whole. In such a case, the application of methodologies from more than one class would seem appropriate. Information systems projects may also assume different characteristics during the course of their development i.e. a project may initially be classified as unstructured and ill-defined and hence, a *soft* systems technique would be suggested here. At a later stage during the development process, the project may advance to a higher level and consequently achieve clear requirements and objectives. At this stage, a more *hard* approach would deem more appropriate. (Avison & Taylor 1999, p. 77)

With that said, there is also the view that certain system development methodologies are complementary towards each other. Then again, analysts are limited by the methodologies that they have familiarity and experience with. So it may be easy to say “choose a methodology that matches the characteristics of a problem situation” but for an analyst, the task may not always be that straightforward as they may not always be able to choose the appropriate methodology that the situation merits. But then there is the counter argument that every situation is unique, so although experience may assist in some aspects, analysts essentially learn as they go along.

Another limitation of using methodology classifications is that only a brief description of problem situation types are given – as a result, there is only a limited number of problem situation types, and features that may be important to the choice of methodology undertaken are omitted in the classification. (Avison & Taylor 1997, p. 79) For example, one major oversight from the classification description is the consideration of the organisation’s culture. Culture plays a crucial role in determining the effectiveness and success of an approach as people’s different cognitive styles will reflect how certain methodologies are ‘better’ than others.

Other characteristics that perhaps should have been taken into consideration and that are likely to influence the methodology choice include the time scale allocated to the development process and other such constraints that will directly affect development. (Avison & Taylor 1997, p. 79) So despite the benefits that information systems development methodologies can bring, problems may arise as a result of the oversimplification of the characteristics and classification of problem situations.

**When the Soft Systems Approach is Most Useful**

Based on the assumption that no human situation is perfect, it can be said that the soft systems approach can be applied in almost all situations where there is a need to enhance an analyst’s understanding of a problem situation so that improvements can be put in place. (Patching 1990, p. 34) It should also be noted that potential consequences of not fully understanding the problem situation before the development of a system may result in constructing systems that interfere with crucial work practices, whether deliberately or unintentionally through oversight. Consequences of such actions may lead to reduced levels of efficiency and effectiveness, lowered satisfaction and autonomy, along with escalating levels of stress and health related problems for those involved with the system. (Kuhn 1996, p. 275)
**Conclusion**

In conclusion, analysts need to carefully identify the basic characteristics of the environment in which the information system is to be developed in and from this select a methodology or methodologies that will assist in identifying certain aspects of the system. The five different problem situation types help in facilitating this process. A soft systems approach is most effective in cases where the problem situation is ill-defined and lacks clear objectives. The alternative hard approaches are more suited to problem situations where essentially the aim is to construct a best possible solution to address the circumstances.
Bibliography

   
   This article by Avison and Fitzgerald provided a comprehensive insight into different Information Systems Development Methodologies and also specific background information on Soft Systems Methodology. The use of informative diagrams and simple analogies were used to help explain problem situations and difficult concepts which was highly useful. Although the stages involved in Soft Systems Methodology were not directly covered in this paper, Avison and Fitzgerald extensive cover of the topic area was an interesting read.

   
   Avison and Taylor successfully captured the essence of Information Systems Development Methodologies in their following article. In highlighting the different classes of problem situations, they were able to clearly demonstrate when soft and hard methodologies were applicable and the likely setbacks in each respective system.


   
   This article by Checkland was an informative read. It provided in-depth and insightful background knowledge and information about systems thinking, which essentially formulated a good, sturdy foundation to kick-off on in regards to researching into hard and soft systems methodologies.


   
   This article covered Soft Systems Methodology theory in practice at a college institution. It was successful in showing how the applied methodology was
able to achieve its aim in identifying and structuring the problem situation and hence, relating the real world to systemic thinking. It also showed how Soft Systems Methodology was an interactive educational process which was characterised by the constant debates and participation of all the individuals involved.


Patching’s text-book approach provided information about Soft Systems in a format that was easy to read and understand. Diagrams were sparingly used which aided in the understanding of the concepts that were introduced. These two chapters also provided a good introduction to analysing soft system approaches.


This article by Rose talks about the conceptual modelling concepts that Soft Systems Methodology possess, of which includes models of interaction and transformation and their limitations. Recent developments within Soft Systems Methodology was also a topic of discussion which shed some light onto the current issues that Information Systems Development are facing. Overall, a very intense piece of writing.