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Soft Systems Methodology: Other Voices

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This issue of *Systemic Practice and Action Research*, celebrating the work of Peter Checkland, in the particular nature and development of soft systems methodology (SSM), would not have happened unless the work was seen by others as being important. No significant contribution to thinking happens without a secondary literature developing. Not surprisingly, many commentaries have accompanied the ongoing development of SSM. Some of these are insightful, some full of errors, and some include both insight and absurdity. Checkland (1999, p. A42) opines, in the recently published 30-year retrospective, that “SSM has been ill-served by its commentators.” Scrutiny of the secondary literature on SSM provides support for this view and also identifies some general characteristics and trends that are important to the development of SSM and, incidentally, reinforces some existing conclusions.

KEY WORDS: soft systems methodology; Peter Checkland.

1. INTRODUCTION

Selecting a base bibliography for a review of these “other voices” is far from being straightforward. References to SSM and citations of Checkland’s work are found in the literature of many disciplines, as diverse as: agriculture, geography, and nursing, for example, as well as management and IS. Here, pragmatically selection has been limited to the management (including systems) literature on general problem-solving and the IS literature.

Given this limitation, you would expect SSM to be treated unambiguously, particularly as many are would-be straightforward expositions of the work. This is not the case. The management and systems literatures include references to both SSM and Checkland’s work on SSM in IS, and the IS literature includes contributions that only describe SSM as a problem-solving approach (even in IS textbooks).

The 250-item References section used here is drawn from a wide range of

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journal papers, conference papers, and textbooks. In it there are of four kinds of references:

- (1) *general citations* (many of which are “honorific” in the sense that they are intended to recognize the whole body of work);
- (2) *student texts* [inclusion of SSM in student (particularly IS) texts is a relatively recent phenomenon (e.g., Harry, 1994; Mason and Willcocks, 1994; Pidd, 1996)];
- (3) *specialized journal* articles (papers more specifically concerned with SSM); and
- (4) *specialized IS books* [a small group of books, strongly influenced and informed by Checkland’s work (e.g., Avison and Wood-Harper, 1990; Davies and Ledington, 1991; Jayaratna, 1994; Lewis, 1994; Stowell, 1995b; Stowell and West, 1994)].

The References are considered as a whole and the critical exegesis that identified the arguments, concepts, and language which have been noticed outside Lancaster and how they are understood is described in detail elsewhere (Holwell, 1997). Where references are cited here, they are by way of example or illustration and may not necessarily reflect the overall view of those authors. They are not intended as being definitive of either type or content.

Some general observations are relevant. First, there are two very different levels of discussion. One is a basic level that broadly covers Checkland’s work as it is described in *Systems Thinking*, *Systems Practice* and *Soft Systems Methodology in Action*. These accounts are found in textbooks or are explanatory overviews in journals that do not have a history of discourse on SSM, such as Cavaleri’s (1994) account. One obvious aspect is that most accounts not only use the same language and concepts as Checkland but also closely follow the logical structure of his account. Such close paraphrasing of Checkland’s work means that they are broadly only repetitions of it. But this is not surprising given the purpose that such expositions serve.

The other discussion is at a more sophisticated level. Here much of Checkland’s work is taken-as-given and the focus is on particular aspects [for example, the multiple uses of *Weltanschauung* (Fairtlough, 1982), modes of SSM use in Australia (Barnden *et al.*, 1995), the phenomenology of SSM (Davies, 1992; Probert, 1999), and the status of soft systems models (Gregory, 1993a)].

Second, the quality of understanding is mixed, regardless of the level of discussion. There are accounts full of misunderstandings, accounts that lurch between understanding and misunderstanding through to sophisticated argument.

Third, recent reference to the early Lancaster work, work that inevitably includes more systems engineering characteristics than Checkland’s recent work, also complicates the picture. Here the observation that SSM developed at a pace “which might render consideration of the early work as anachronistic and dated”

(Burrell, 1983, p. 125) remains apposite. Of interest is that *Systems Thinking, Systems Practice* (Checkland, 1981) is the most frequently cited primary source (although it is not always evident from the context which part of the book is being referred to). The obvious question in each particular case is, Is this deliberate or an oversight? Clare and Stuteley (1995), for example, which was published 5 years after *Soft Systems Methodology in Action* cites only *Systems Thinking, Systems Practice*. Is this deliberate?

Finally, the secondary literature is becoming more influential in the sense that reference to this literature for definition and justification, rather than to the primary literature, is now occurring. For example, in “a root definition ‘is an idealised view of what a relevant system should be,’” Ellis (1995, p. 206) cites Flood and Jackson (1991, p. 197); Tudor and Tudor (1995) refer to descriptions of Multiview (Avison and Wood-Harper, 1990) as the source of definitions; and Biggam and Hogarth (1996) cite work by Gregory, Jayaratna, Miles, Mingers, Ormrod, and Probert.

Differences between the work on SSM originating from Lancaster (Checkland and Wilson) have given rise to the notion of an SSM family or “genus” (Atkinson, 1986) of SSM methodologies; yielding, for example, the form of SSM in use in Australia (Barnden *et al.*, 1995; Ledington and Donaldson, 1997) and in the United Kingdom (Mingers and Taylor, 1992) being described.

Differences have been noticed by other authors (e.g., Klein, 1991): in style [Checkland’s use is “liberal” and Wilson’s is “professional” (Atkinson, 1984, 1986)] and in the form of root definitions and conceptual models (Forbes, 1989; Hitt, 1991). These have been seen as the inevitable consequences of use of a methodology rather than a method: differences that emerge from the interaction of methodology, the user of it, and the situation in which it is used.

This, together with Checkland’s “modern” SSM has resulted in references to the 1981 seven-stage version as *the* soft systems methodology (as an ideal type) (Atkinson, 1986), the “classical version” (Hirschheim *et al.*, 1995), the “formal” (Atkinson, 1984), or the “generic version” (Watson and Smith, 1988).

2. UNDERPINNING ASSUMPTIONS

Holwell (1997) has argued that an interpretive foundation is a *necessary* (and a defining) characteristic of SSM. There is no equivalent argument to this in the secondary literature, although the importance of the interpretive stance is noticed in passing remarks, for example, “ssm relies on philosophical concepts in support of its foundations” (Biggam and Hogarth, 1996, p. 249). The importance of an interpretive perspective and/or the centrality of subjectivity is evident in both the basic and the more sophisticated accounts, although this is generally in the context of a paraphrasing of Checkland’s work.

Detailed debate of the philosophical foundation of SSM is relatively limited,

although there are examples (including Atkinson, 1984; Flood and Carson, 1988; Rennie, 1989; Stowell, 1993; Visala, 1991). It is broadly agreed that it is within the phenomenology tradition (Atkinson, 1984; Crowe *et al.*, 1996; Flood and Carson, 1988; Hirschheim *et al.*, 1995; Jackson, 1982; Mingers, 1984; Probert, 1991; Rennie, 1989); although it was not necessarily fully embraced in the early work (Burrell, 1983; Mingers, 1984; Rennie, 1989) or in the modeling (Davies and Wood-Harper, 1989; Hirschheim *et al.*, 1995). Others simply accept Checkland's view that SSM is phenomenologically based and see this as a strength (Jayaratna and D'Arcy, 1993; Stowell and West, 1994; Visala, 1991; Willmott, 1989).

The "interpretive" stance of SSM is more widely discussed and accepted as a strength (Crowe *et al.*, 1996; Dahlbom and Mathiassen, 1993; Doyle and Wood, 1991; Flood and Jackson, 1991; Flood and Ulrich, 1991; Hitchins, 1991; Tsoukas, 1992; Walsham, 1993). Stowell (1993, p. 98) relates this to mode 2 use especially, arguing that this is "the clearest example of interpretive systems that exists in a practical form".

There is virtually no disagreement that SSM is an interpretive approach and that this attribute is a particular strength of SSM. However, what is understood by "interpretive"² is varied—ranging from that it is based on the thinking of a particular school of philosophy to simply that it takes subjectivity seriously (as in Lane, 1993).

Both the importance of subjectivity and that SSM takes it seriously feature prominently in the literature (Avison, 1989; Benyon and Skidmore, 1987; Cavaleri, 1994; Crowe *et al.*, 1996; Doyle and Wood, 1990; Lane, 1993; Mears-Young, 1995; Mingers, 1984; Rosenhead, 1989; Walsham, 1993). Similarly, but a step away from subjectivity as such, is the concern with meaning (Burrell, 1983; Feng, 1993; Romm, 1995) and the emphasis on understanding the problem-situation in the fullest way (Avison and Wood-Harper, 1991; Harry, 1994; Mason and Willcocks, 1994; Wade, 1991; Wood and Doyle, 1989; Wood-Harper and Fitzgerald, 1982). Associated with this are the points that SSM is a holistic approach (Anderson, 1989; Jackson, 1982; Mingers and Taylor, 1992), i.e., that it is not reductionist or "scientific" (Avison and Fitzgerald, 1988; Benyon, 1990; Lyytinen, 1987a; Rosenhead, 1989; Tudor and Tudor, 1995), and that its concern and outcome are learning (Brown, 1992; Lyytinen, 1988; Mathiassen *et al.*, 1991) or sense making (Lyytinen, 1992).

Here the SSM concept of *Weltanschauung* and of multiple views of a problem-situation are important (Avison *et al.*, 1992; Cavaleri, 1994; Davies and Ledington, 1991; Doyle and Wood, 1990; Lyytinen, 1988; Mathiassen *et al.*, 1991; Mingers and Taylor, 1992; Romm, 1995; Skidmore, 1994; Walsham,

²What is understood as constituting interpretivism varies considerably, and here an author's use is taken at face value.

1993), as is that it is a pluralist (Flood and Jackson, 1991; Mason and Willcocks, 1994) and/or participative approach (Mason and Willcocks, 1994; Miles, 1988).

Three other features of SSM also link to an interpretive perspective. First is the use of “system” as a construct (or more recently as an epistemological device), i.e., systemicity in the process of inquiry rather than existing in the world (Anderson, 1989; Cavaleri, 1994; Flood and Jackson, 1991; Mathiassen *et al.*, 1991; Walsham, 1993), record the value of the conscious abstraction and reflection that comes from the above–below the line distinction (Benyon, 1990; Mathiassen *et al.*, 1991; Saunders, 1989).

Finally, the consideration of social, political, and historical aspects relevant to a problem-situation are also important characteristics of SSM (Lyytinen, 1988; Mason and Willcocks, 1994; Mingers and Taylor, 1992; Wood and Doyle, 1989) [although the perceived social theory of SSM is seen by some as being inadequate (Mansell, 1989; Willmott, 1989)]; indeed, Dudley (1995) sees cultural analysis being at the heart of SSM.

However, the perceived lack of subjectivity in the models (Jackson, 1991) or the view that the models are inherently functional (Hirschheim *et al.*, 1995; Mingers, 1992) [albeit within the phenomenological SSM process (Davies and Wood-Harper, 1989)] is noted.

So the interpretive foundation is seen as an integral part of Checkland’s work: an important and influential part (Rosenhead, 1989). This may be because of the particular philosophical foundation (e.g., phenomenology), or be less specifically defined as “interpretive” (however defined) through to the acceptance of multiple meanings or the use of models as constructs in a learning process. Holwell’s (1997) argument that it is a necessary and defining part of SSM has been adopted by Checkland (1999) in the retrospective.

It is this, the introduction of interpretive thinking (however it is understood) into the management and IS literature, that is a major contribution, if not *the* contribution, to both the management and the IS fields by Checkland. There are two kinds of evidence for this. First, the extensive and widespread paraphrasing of Checkland’s argument is acknowledgment of its significance; and second, there are examples of explicit recognition of this contribution. Flood and Jackson (1991), for example, explicitly acknowledge the contribution of

- (a) using systems as an organizing framework for thinking, and not as a representation of reality; and
- (b) identifying two “paradigms” (hard and soft), each with different assumptions and therefore methodological principles, particularly the understanding of social situations via perceptions of it.

They argue that Checkland’s distinction between “hard” and “soft” marks an “epistemological break” from positivism to interpretive systems thinking (Flood and Ulrich, 1991, p. 186). For others, Checkland “shook the systems move-

ment to its foundations by introducing the concepts and philosophy of interpretive social science into systems thinking” (Ellis, 1995, p. 212); thus marking “a watershed” (Hopkins, 1995, p. 647) or “paradigm shift” (Crowe *et al.*, 1996, p. 9). Others go further than this: *Systems Thinking, Systems Practice* has been ranked as a pioneering work alongside the work of Bertalanffy and Simon (Yolles, 1994).

The hard–soft distinction is prominent in the literature, although, as used, the distinction has more to do with problem structure (Anderson, 1989; Combs, 1995; Curtis, 1995; Harry, 1994; Tudor and Tudor, 1995) than with any shift of systemicity or paradigm.

Checkland’s work is recognized for adding interpretive thinking to the fields of systems, problem-solving, and IS: so much so, that his argument and language have become part of the general discourse.

The language and logic of Checkland’s work have been widely adopted in two ways. First, the essence of the systems ideas is reproduced (in, e.g., Avison and Wood-Harper, 1991; Rosenhead, 1989; Tudor and Tudor, 1995), including the systems typology (Fuenmayor, 1995), emergent property, adaptive system, systems hierarchy, communication, and control (Mathiassen *et al.*, 1991), and desirable and feasible changes (Benyon, 1990; Oakland, 1993; Skidmore, 1994).

Second, the arguments for looking at a problem-situation (rather than a problem) (Avison *et al.*, 1992; Curtis, 1995; Mason and Willcocks, 1994) and, therefore, consideration of the context as well as the perceived problem (Anderson, 1989; Avison *et al.*, 1992; Combs, 1995; Mason and Willcocks, 1994) are prominent. Such ill-defined problem-situations require a problem structuring (Skidmore, 1994) or problem definition (Mason and Willcocks, 1994) approach that is not of the means–end kind (Avison *et al.*, 1992; Tudor and Tudor, 1995), and one concerned with improvements, rather than finding a solution (Curtis, 1995; Harry, 1994). In this context the cyclic, iterative nature of the SSM process also features prominently (Avison and Wood-Harper, 1991; Brown, 1992; Downs *et al.*, 1992; Hirschheim and Schafer, 1988; Wade, 1991; Watson and Smith, 1988).

3. SSM AS PROCESS

The trend in the developments in Checkland’s work—the shift of systemicity, the increasing emphasis on “soft” notions (subjectivity, learning, multiple views), and the move away from the seven-stage account to the logical and cultural two-stream account—does not feature in the secondary literature when describing the SSM as a process. This is sometimes contrary to the argument for SSM presented in the same account. The most recognized notions of SSM (as distinct from the whole body of Checkland’s work) are the rich picture [diagram (Lewis, 1992), rather than in the sense of a rich appreciation] and the root

definition/conceptual model pairing. These techniques of SSM are described in every overview account. This is evident from reading the literature and reflects empirical findings (Ledington and Donaldson, 1997; Mingers and Taylor, 1992). The prominence of the rich picture is somewhat surprising—in one instance being elevated to definitive status in “the rich picture methodology of Peter Checkland” (Moyes, 1993, p. 144).

Accounts broadly reflect the state of Checkland’s work as set out in the early 1980s; indeed many indicate (and others imply) that *Systems Thinking, Systems Practice* is the prime (and definitive) source. This is so even at the end of the 1990s. It is easy to find accounts of SSM published during the 1990s that repeat the seven-stage description from *Systems Thinking, Systems Practice* (Bentley, 1992; Clare and Stuteley, 1995; Combs, 1995; Curtis, 1995; Oakland, 1993; Wade, 1991). [Skidmore (1994) even reproduces a 1970 conceptual model as an example.] So, the secondary literature accounts are of a seven-stage process conveyed in the language of hard versus soft (structured versus ill-defined) problems.

These seven-stage descriptions follow the original Constitutive Rules which define several stages, each with a defined, required output. Moreover, the language used is also that which Checkland was using in the early 1980s: of hard versus soft (i.e., structured versus ill-defined) problems and approaches, problem structuring, problem-content system, and found problem-solving system, etc. (in Avison and Fitzgerald, 1988; Clare and Stuteley, 1995; Curtis, 1995). This language has become part of the general management and IS discourse, in, for instance, the notion of “soft OR” (Jackson, 1993; Rosenhead, 1989) and soft methods (Lehaney *et al.*, 1997), but it does not include the “shift of systemicity” and places little or no emphasis on the nature of social reality.

So, fundamentally, the picture is little changed from that which Forbes (1989) found 10 years ago, namely, that the seven-stage process “defined” by the original Constitutive Rules as described in *Systems Thinking, Systems Practice* is the most common description of SSM.

The two-stream version has been noticed, although this is generally in the developed literature (e.g., Avison and Fitzgerald, 1995; Crowe *et al.*, 1996; Dahlbom and Mathiassen, 1993; Hirschheim *et al.*, 1995; Stowell and West, 1994). However, usually where the existence of both descriptions is noted, the two-stream “model” is set aside for pedagogical reasons and the authors revert to the seven-stage version, presumably for simplicity of exposition, although the interpretive characteristics (the view of social reality, models as constructs, and Analysis One, Two, Three) are acknowledged (e.g., in Davies and Ledington, 1991; Harry, 1994; Hirschheim *et al.*, 1995).

One development since Forbes’ (1989) review has significance. What has become evident, particularly with the inclusion of SSM in IS textbooks, is discussion of Checkland’s work in two distinctly separate parts: discussion of SSM

as a stark seven-stage process without elaboration or context, separated from discussion of the balance of his work.

These accounts reproduce a comprehensive version of the main elements of Checkland's work, using the concepts, language, and logical structure of it (Anderson, 1989; Avison and Fitzgerald, 1995; Combs, 1995; Curtis, 1995; Downs *et al.*, 1992; Harry, 1994; Tudor and Tudor, 1995). However, this argument may be separated from discussion of SSM by several chapters in a student text (as in Anderson, 1989; Benyon, 1990; Combs, 1995; Curtis, 1995; Harry, 1994; Skidmore, 1994).

This division of Checkland's work into two parts,

- (1) human activity system modeling within a seven-stage framework (frequently described prescriptively) and
- (2) a set of assumptions and notions *relevant* to the nature of problem-solving in organizations,

is a significant development.

4. ERRORS, CONFUSION, AND MISUNDERSTANDING

In these accounts it is not uncommon for the argument to be used as a general framework of ideas and for the description of the seven-stage "SSM," as either a technique or a modeling language, to be just one of several approaches or methods described later against the framework. The description of SSM in some accounts of this kind does not necessarily conform to the argument in the same text: for example, the description of SSM that Checkland (1999, p. A42) cites (see below) shows little resemblance to the argument set out earlier in the original text.

Furthermore, the extent to which "the argument" is attributed to Checkland varies in these accounts. While his work is cited, this may only be at the level of concepts (such as the typology of systems), and where the whole, the form and content, is clearly a repetition of his work, this may not be acknowledged (as in Cheung and Holden, 1993). Likewise, the concepts "human activity system" and *Weltanschuuang*, for example, are used freely and without acknowledgment, or by reference to the secondary literature. This is not the case with descriptions of the stages of "SSM"; this is invariably acknowledged.

The decoupling of Checkland's argument and process is significant in itself, but when associated with "incomplete" acknowledgment of the origins implies that Checkland's work (argument) has become part of the taken-as-given foundation or conventional wisdom in both the management and the IS literatures. This is a significant achievement.

However, acceptance of the argument does not necessarily mean that it is understood. There are accounts that are fundamentally wrong; there are many

accounts containing inconsistencies and there are accounts which are reasonable expositions of Checkland's work, although these too frequently contain misunderstandings.

The following, not untypical, and error-prone account that happens to come from an IS textbook illustrates some of the difficulties: What does it say about SSM? what does it convey about systems thinking? (Text set **THUS INDICATES ERRORS.**)

This methodology stems from the work of Checkland (1981) who took a radically different approach to the ANALYSIS AND DESIGN OF INFORMATION HUMAN ACTIVITY SYSTEMS. Starting from the premise that ORGANIZATIONS (and therefore their SUBSYSTEM INFORMATION SYSTEMS) are open systems that INTERACT WITH THEIR ENVIRONMENT, he INCLUDES THE HUMAN ACTIVITY SUBSYSTEMS as part of his modelling process. The methodology starts by taking a particular view OF THE SYSTEM and incorporating subjective and objective impressions into a 'rich picture' OF THE SYSTEM that includes the people involved, the problem areas, sources of conflict and other 'soft' aspects OF the overall system. A 'root definition' is then formed ABOUT THE SYSTEM which PROPOSES IMPROVEMENTS to THE SYSTEM to TACKLE THE PROBLEMS IDENTIFIED IN THE RICH PICTURE.

Using THE root definition, VARIOUS conceptual models of the new system can be built, compared and evaluated against the PROBLEMS IN THE RICH PICTURE. A SET OF RECOMMENDATIONS is then suggested to deal with the specific changes that are necessary to SOLVE THE PROBLEMS. These are evaluated in terms of feasibility and used to propose specific remedies for action.

This account could simply be dismissed as demonstrating an incompetent understanding of Checkland's work (which it clearly is), but nevertheless, given that it is not untypical, it is relevant; after all, the authors considered "SSM" to be of sufficient importance to include it in their book, however they actually understand it.

Most errors are associated with the "existence," or otherwise, of systems and the nature of models. The most fundamental and common error is that systems exist. This error can be found in most accounts, including those which argue that systems are constructs, and are otherwise reasonable representations of Checkland's work: one, for example, states that models are epistemological devices and then continues that a conceptual model is a model *of* the area of interest. This misunderstanding is also reflected in comments such as "identify the correct system" and "SSM seeks to improve the human activity system." Other examples are listed in Fig. 1.

Examples of careless reading of the material, such as that conceptual models are checked by the three E's and that, because SSM is a holistic approach, it is not "hard," are too easily found. An extreme example is the statement that Checkland is the originator of critical systems thinking (Ballé, 1994).

Analysis of the errors and misunderstandings is not relevant here, although

Rich Picture	is like a flow diagram is compressed into RD is compressed into conceptual model
Root Definition	captures the essence of the Rich Picture is a statement of objectives is the equivalent of a hypothesis
Relevant System	is the equivalent of a hypothesis a notion of the systems you'd 'like to have'
Conceptual Model	defines the 'target ' system or how it ought to be is an idealised solution is the equivalent of the processes of system operation are the activities necessary to achieve the objectives in the Rich Picture
SSM seeks to	improve human activity systems change human activity systems
systemicity	take the world as consisting of systems holons reside in organisations organisations are comprised of systems or call parts of the situation systems
legacy notions:	identify systems in the Rich Picture 'hard' is a practical perspective and 'soft' is emotional look for Primary Task systems in the Rich Picture human activity systems include people and so are unpredictable

Fig. 1. Illustrative errors and misunderstandings from the secondary literature on SSM.

the sheer number of inadequate and/or wrong accounts is important because the secondary literature is becoming more influential: not because it contains new insights but because errors in one secondary source are being repeated in others. Most commonly these are references to accounts of Multiview (which uses SSM tools and elements of the argument) as being accounts of SSM use or are references to the descriptions of SSM by Flood and/or Jackson. In other words, the primary literature is no longer necessarily the source of definitions and argument.

The same trend is also evident in the more developed discourse. A paper that is critical of aspects of SSM's use of philosophical arguments (Biggam and

Hogarth, 1996) is based on accounts in the secondary literature, citing the secondary literature in support without making adequate reference to Checkland's work. Moreover, these references are to ideas of which Checkland would also be critical.

It is clear from the secondary literature that the nature of SSM is not understood, and not only because it is a relatively simple task to find flawed accounts of it. At the most basic level of what SSM "is" or what its purpose is, there are not only different views, but clearly contradictory views.

At the most fundamental level: SSM *is* a general problem-solving approach (Mason and Willcocks, 1994; Wood-Harper and Fitzgerald, 1982) and SSM *is not* a general problem-solving approach (Biggam and Hogarth, 1996; Jayaratna, 1992). And from the IS literature, SSM *is* an information system development methodology (Avison and Wood-Harper, 1991; Benyon, 1990; Hirschheim and Schafer, 1988; Watson *et al.*, 1995) or it *is not* an information system development methodology (Downs *et al.*, 1992; Harry, 1994; Mason and Willcocks, 1994).

The purpose of enacting the SSM process is also confused. It is variously

- for organizational design or business analysis (Combs, 1995; Mingers and Taylor, 1992),
- for managing organizational change (Benyon, 1995), or
- for general problem-solving (Gregory, 1993a; Mingers and Taylor, 1992; Wood and Doyle, 1989; Wood-Harper and Fitzgerald, 1982), and
- as an approach to learning (Hengerer, 1995; Lewis, 1994),
- as an IS development approach (Avison and Wood-Harper, 1991; Lyytinen, 1987b; Watson *et al.*, 1995; Wood-Harper and Fitzgerald, 1982), or
- as a front end for IS development (Avison and Fitzgerald, 1988; Hirschheim and Schafer, 1988).

It is also understood as a research process (Brown, 1992); a loose framework, a state of mind (Hirschheim and Schafer, 1988); or a problem structuring approach (Goddard *et al.*, 1994).

Whilst not all of these notions have foundations in the primary literature, their existence indicates a problem. A second development evident from examination of the secondary literature has occurred without discussion and is identified only with the benefit of hindsight.

There are two parts to it. First, a variety of terms has appeared in the literature that would seem to flow from Checkland's work and which often occur in conjunction with discussion of it. These are rarely described, let alone defined, but appear to be "common currency" and easily recognized, although uses of them show that they are variously understood. Thus you find reference to: soft systems, soft systems thinking, soft thinking, SSM, a soft systems methodology, SSM tools, soft systems practice, etc. (Figure 2 lists some additional examples.)

soft	facts approaches methods	ideas OR thinking
soft systems	thinking ideas approaches analysis models	paradigm literature thinker methods practice
soft systems methodology	the classical (7 stage)	a one Root Definition and Conceptual Model

Fig. 2. Terms in the literature related to Checkland’s work.

Moreover, they are terms that have emerged out of the discourse of the interested community, apparently unnoticed, reflecting a momentum of development outside that described by the originators.

Some accounts are clear about the usage of terms in Fig. 2 but this is not necessarily helpful in understanding the contribution of Checkland’s work. For example, Stowell (1995a, p. 126) uses the term “interpretive systems thinking,” adapting Checkland’s argument that the perceived world is problematic and that systemicity is in the process of inquiry, to define it. Stowell and West argue that interpretive systems ideas is a philosophy of ideas compared to “the practical (and often limited) use of Checkland’s Soft Systems Methodology (SSM)” (1994, p. 111). While it is all too easy to find examples of “limited” use and understanding of SSM, it does seem unnecessary to invent a new term for a framework of ideas that has already been set out.

But elsewhere it is *soft* systems thinking that is defined in terms of these two linked assumptions—use of systems as constructs and perceived social reality (Dahlbom and Mathiassen, 1993). In other words, the same two assumptions define interpretive systems thinking and soft systems thinking: suggesting that they are the same thing. For others, soft systems thinking is simply systems thinking that recognises subjectivity (Gammack, 1995).

From both the emergence of the terms listed in Fig. 2 and the explicit linking of the two assumptions relating to social reality and systemicity, it would seem that there is a change in the understanding of “soft” in “soft systems methodology” from the early sense of structure to a meaning that is linked to either these two assumptions or subjectivity.

5. OTHER VOICES ON IS WORK

The three aspects of the IS argument most noticed in the IS-related secondary literature are

- (1) the importance of meaning (including multiple views of meaning),
- (2) that IS and IS development are concerned with more than technology, and
- (3) the idea of understanding the “system served” before considering IS design.

These notions reflect the concerns of those people interested in an interpretive, rather than an objectivist, approach to IS.

Just as with the general SSM material, the acknowledged contribution of Checkland’s work comes from the introduction of interpretive ideas into IS thinking. Again, the accreditation varies from the specifics of phenomenology (Hirschheim *et al.*, 1995) through interpretivism (Walsham, 1993) generally, particularly as an operationalization of interpretive ideas (Dahlbom and Mathiassen, 1993; Lewis, 1994; Stowell and West, 1994) to that it takes subjectivity (meaning) seriously.

There are some problems with the “empirically” derived list (Fig. 3) which merely records what has been noticed. Whether all of these characteristics are justifiably associated with the Lancaster IS work is debatable. Two examples illustrate this: first, the implication that SSM is an IS development approach mentioned earlier—Lyytinen (1987a), for example, makes this point but is questionable [particularly as the reference cited is Checkland (1981)]; and, second, that use of the approach “forces user involvement” (Benyon, 1995) in the process of IS development is not sustainable against any primary account of the Lancaster work.

A significant problem encountered when undertaking this review is implicit in these two examples—both what is taken to be the Lancaster work relevant to IS is confused and the quality of understanding of it is so mixed as to make critical use of it difficult. There are references to Checkland (1981) in IS work as being about SSM and/or IS; there are references to specific parts of Checkland’s work (e.g., Checkland and Scholes, 1990, pp. 53–58) that are clearly relevant to IS, and there are isolated references to Wilson’s IS work: and all of these are likely to attach the label “SSM” to what they perceive and describe. It may refer to Checkland’s pre-1990 seven-stage SSM, Checkland’s two-stream SSM, Wilson’s human activity system modeling, Wilson’s (1990) information systems methodology, or Checkland’s IS work (1984, 1988; Checkland and Holwell, 1993).

The general “impressions” conveyed in the secondary literature are relatively straightforward at one level and difficult to take seriously on another. The first of the straightforward characteristics is the separation of the argument from

(1) Assumptions stance	(a) philosophy/argument	hard vs. soft
		phenomenology to IS
		interpretivism to IS
		constructed social reality
		problem-situation
	(b) characteristics and attributes	pluralist
		multiple views
		meaning
		subjectivity
		holistic
		culture, social characteristics
		understand context understanding
		not reductionist
		organisational change
	models relevant to, not of	
	(c) IS argument	meaning
		looks at social issues
		considers more than technology
(2) process		learning
		cyclical, iterative
		participative
		improvement
(3) tools, techniques		Rich Picture, Root Definition, Conceptual Model
		relevant system
		process/structure/climate

Fig. 3. SSM characteristics noticed as relevant to IS.

description of the “SSM” process that has already been mentioned. [Use of “the argument” is decoupled from the “SSM” process in a different way in the book by Stowell and West (1994) on *Client-Led Design*. There, the argument has been adopted by the authors and they distinguish their work from “mechanical” use of “SSM.”]

In such accounts the language is that of the 1980s, which is not surprising given that most accounts refer to Checkland (1981) rather than to Checkland and Scholes (1990). This is the language of hard and soft problems, problem content and problem-solving systems, and fundamental systems concepts rather than an interpreted social reality and the “shift of systemicity.”

Other accounts indirectly complicate the overall picture. The inclusion of SSM as one of six IS methodologies in a book titled *Information Systems Development and Data Modeling* (Hirschheim *et al.*, 1995) identifies it as an ISD approach, and yet it is “classical” SSM that is described in this book. This is typical of the confusion in the secondary literature. Quite how “classical” SSM is an IS development methodology, as this is generally understood, is not discussed.

Similarly, Avison and Fitzgerald (1995, p. 11) set out six objectives for an IS methodology: that it record requirements accurately, is a systematic process of development so progress can be monitored, produces an acceptable IS for an acceptable cost in an acceptable time, produces a well-documented and easy-to-maintain IS, identifies changes early, and produces an IS liked by users. Despite having these objectives, an account of SSM is included without comment or reference to Checkland’s IS process or argument. How the account of classic “SSM” that is included relates to these objectives is not discussed, and yet the inclusion of “SSM” in the book is not accidental. This mismatch is not commented on, just as the gap between the characteristics for which Checkland’s work is noticed and the impoverished accounts of “SSM” is not mentioned by others.

The argument for use of SSM in IS, then, is likely to be based on the importance of understanding the context, and so the relevance of using SSM derives from the view that IS design is both a “soft” problem and a problem that is concerned with meaning. In the developed discourse, on the other hand, the argument is generally based on notions of an interpreted social reality that is known via mental models. However, use of the term “the argument” in both discourses is misleading because both the general argument (i.e., for SSM) and the IS argument are used in different accounts. Moreover, the difference is not commented on. Unexpectedly, the general argument is more prominent in IS textbooks accounts than the IS argument.

So, the ideas have been influential in IS thinking: as evidenced by, for example, the existence of a set of books on IS influenced by Checkland’s work (Dahlbom and Mathiassen, 1993; Davies and Ledington, 1991; Jayaratna, 1994; Stowell, 1995b; Stowell and West, 1994), that the arguments have become part of the framework of ideas deemed necessary for students of IS, and have been explicitly acknowledged as an important contribution to the field—primarily because they are perceived as being part of the interpretive strand of thinking.

The actuality of the process described to realize the argument, however, is

somewhat different. There is an interpretivist argument espoused and the characteristics of “SSM” that have been noticed are those most clearly associated with such an argument (multiple views, learning, iteration, models relevant to, etc.), but the dominant process descriptions are of a “prescriptive” or mechanical version of the seven-stage process. These accounts generally follow the original Constitutive Rules and describe each of the seven stages of “classical” SSM and their “products.” Crucially, stages 3 and 4 (root definition and conceptual model) are emphasized.

This emphasis on modeling from a root definition and the perception of a rich picture (as a product rather than an appreciation of a situation) frequently gives the impression that these three techniques not only are useful tools but that they constitute the essence of the process (and the SSM approach).

The two-stream version is rarely noticed in the IS literature, and where it is noticed it is set aside, sometimes deliberately because the “classic” version is seen as being more applicable to IS (Harry, 1994; Hirschheim *et al.*, 1995). (Why this would be so, given, for example, the emphasis on social considerations in the interpretive IS argument, is not clear.)

The developed discourse is more concerned with the assumptions and concepts, whereas modeling is the prime focus of the less sophisticated discourse, although the interpretive argument and characteristics are recognized. This emphasis on modeling, together with the decoupling of the argument and process, results in impoverished versions of the seven stages of SSM which unduly emphasize modeling at the expense of process—although they may have been preceded by expositions of Checkland’s argument about problem-solving in organizations.

This is not dissimilar to Checkland’s own work in that an interpretive argument is associated with the sparse process (described by Checkland and Scholes, 1990, p. 57), but there is an important difference. The secondary literature accounts are of SSM as a general problem-solving methodology. There is no link to IS analysis and design from such a process, and surprisingly in most textbook accounts this crucial point is not raised. The relevance of the classic SSM to IS in general or to IS development is either left to the imagination of the reader (because nothing is said) or an adaptation is attempted.

Beyond this level of observation, use of the secondary literature becomes more difficult. Reference to the secondary rather than the primary literature for concept definition has already been noted, but this is particularly important if the source referred to is a Multiview description. Multiview makes use of some *techniques* from SSM, such as rich picture and human activity system models, but with a different purpose and status to their use in SSM. In Multiview *a* human activity system model built *from* a rich picture is the first of five stages of analysis. The authors of Multiview recognize that their use of these techniques is different from that of Checkland; others are not so careful. It is clear that other

authors are not aware of this and unknowingly repeat the Multiview use as if this were equivalent to use in SSM. This trend has the effect of adding to the impression that this techniques “constitute” the “SSM” approach noted earlier, and this in turn adds to (and reflects) the misunderstanding of Checkland’s work.

Summarizing then, Checkland’s work, both the general and the IS work, is noticed because of its interpretivist foundation and characteristics; and both the general argument and the IS argument are repeated (i.e., acknowledged) and recognized as being influential in IS thinking. Even though the ideas are influential, Checkland’s IS process (Checkland and Scholes, 1990, p. 57) does not feature in the literature. The “omission” is passed over without debate. At the same time, techniques, particularly rich picture, root definition, and conceptual model, have also been adopted and used independently of Checkland’s work.

Two issues further complicate the picture: first, there is the question of whether the concern of the work is with exploration of the context, or requirements, or both; and, second, there are contradictory views of “SSM.” Some view “SSM” (usually a sparse classical SSM) *as an ISD methodology* (Avison and Wood-Harper, 1991; Hirschheim and Schafer, 1988; Lyytinen, 1987a; Watson *et al.*, 1995) and may even cite *Systems Thinking, Systems Practice* (Checkland, 1981): although neither this statement, nor reference, is justifiable against the primary literature. Others, rightly, point out that it is *not an ISD methodology* and may propose a role for “SSM” as either a front end to some more traditional approach or propose that it be the overarching framework for the development process.

5.1. Adaptations

One indication of the influence of the ideas is the number of extensions and adaptations that have been proposed. Of these, both Multiview and Client-Led Design have been mentioned. Others include Functional Analysis for Office Requirements (FAOR) (Hirschheim, 1985; Schafer, 1988) and Saywer’s OPIUM (1992). Lewis (1994) has taken a different route.

What these different methods have in common is that they are attempts to link the learning and understanding of the situation and requirements gained from an “SSM” inquiry into the requirements of developing a real-world IS. They do this by making use of either techniques or both the ideas and some techniques (especially human activity system modeling).

Slightly differently, Checkland’s work has been linked to IS design at the level of trying to link SSM techniques, primarily conceptual models, to traditional IS techniques. Benyon and Skidmore (1987) proposed linking conceptual models to data flow diagrams based on the perceived similarities of them. Mingers (1988), in reply, acknowledged some similarities but indicated that there were fundamental philosophical differences between them; Avison *et al.* (1998)

also point out the philosophical difference and conclude that they are not similar. Other proposals include linking “SSM” to the Jackson System Development method (Savage and Mingers, 1996; Wood and Doyle, 1989) and re-expressing a model in a form that can be expressed in propositional calculus and predicate logic in order to derive a type of DFD (Gregory, 1993a–c; Merali, 1992).

A third facet relates to the argument that different philosophical assumptions underpin “SSM” and traditional IS techniques. Discussion of this is at the center of the “grafting vs. embedding” debate. Miles (1988, 1992) identified two ways of using the ideas in IS: *grafting* on as a front end to conventional approaches, and *embedding* other IS techniques within an overall SSM process. For a time the focus of this debate came to rest largely on the question of the incommensurability of the paradigms presumed for SSM (interpretive) and IS (objectivist). [Contributions include Beeby (1993), Doyle *et al.*, (1993), Doyle and Wood (1991), Miles (1992), Prior (1992), Wood (1992), and Wood and Doyle (1989).]

Others point out that while such questions may be of importance to academics, it either does not cause problems in practice or may be overcome (Sawyer, 1992; Stowell and West, 1994). Doyle *et al.* (1993) suggest a rationale based on a distinction between soft and hard as being concerned with “doing the right thing” and “doing the thing right,” respectively; and it is discussed pragmatically in Crowe *et al.* (1996). In more recent years this debate has “evaporated” and attention turned elsewhere, although it remains essentially unresolved.

Thus far three options for using the Lancaster ideas in IS have been identified (Jones, 1992). These are, first, use as a stand-alone method; second, use as part of an eclectic methodology (such as in Multiview) and as a basis for structured methods (such as in FAOR and OPIUM)—the most common is to use it as a front end to traditional IS methods, which is clearly the case with the addition of a mechanistic SSM to the Feasibility Stage of SSADM (CCTA, 1993); and, third, use of SSM as an overarching framework for the ISD *process*. The developers of Client-led Design would probably not see it as being an example of this approach because they see it as being a “philosophy” or framework of ideas, whereas SSM is a methodology. Nevertheless, the ideas they use have come to IS via Checkland’s work, as have the tools, techniques, and concepts used in the early phases. Moreover, the delineation of their work from impoverished versions of seven-stage “SSM” has been through the adoption of the framework of assumptions that Holwell (1997) argues is a necessary part of Checkland’s SSM.

6. THE NATURE OF SSM

Differences between the accounts of SSM by Checkland and Wilson (1990) have been described in terms of three categories:

- (1) assumptions,
- (2) process, and
- (3) concepts and language (Holwell, 1996).

Topics in the SSM secondary literature can also be grouped into three categories (Holwell, 1997):

- (1) argument, concepts, and assumptions;
- (2) the seven-stage prescriptive process; and
- (3) techniques (modeling and rich picture).

Others have also used three categories or levels to describe aspects of SSM, for example, modes of use (Barnden *et al.*, 1995) and SSM practice (Jayaratna, 1996),³ and Ledington (1989) identified “three levels of abstraction” in the discourse about SSM. Although there are no well-developed arguments in the literature for these schema, they have an important feature in common. In all of them the philosophical assumptions are identified as a separate category.

Ledington and Donaldson (1997) go further, stating that conscious adoption of a particular stance is required to substantiate a claim to be using SSM. Holwell (1997) sets out an argument for making this a necessary and defining characteristic of SSM.

This view is in marked contrast to the secondary literature as a whole. There is no discussion or understanding of the relationship between the two different elements of Checkland’s work: the argument (underpinning philosophy and assumptions) and process (SSM). An exception to this is Avison and Fitzgerald (1995), although their link is novel. They assume that the F, M, A concepts are part of SSM and that the interpretive argument is part of “F” and so is applied via the SSM “M.” Checkland has not argued that this is a part of SSM, but it is nevertheless a not unreasonable view. This lack of argument is crucial. It means that any relationship relies on either assumption or an association that merely rests on both elements being described in a particular contribution. This is broadly the case with Checkland’s own work.

7. CONCLUSION

The difficulties in making use of the secondary literature are inherent in the points made so far. First, it is not obvious what is meant by “SSM”; second, it is not clear how much (if any) of the ideas framework is assumed to be associated with the process; third, the emphasis on modeling techniques reduces the emphasis on process; finally, and crucially, there is the generally poor understanding of the work. These points relate to “SSM” as a general methodology in the IS literature, and to this are added the difficulties that arise because the

³At the University of Central Lancashire, March 1996.

“role” of “SSM” in IS as set out in the literature is confused. All of these factors add to the confusion surrounding the work and also demonstrate a lack of understanding of it.

Checkland’s work as a whole is not well understood; this is despite it being recognized as an important contribution. Soft systems thinking is perceived as being “different” to SSM (Benyon, 1990; Lyytinen, 1987a; Wood-Harper and Fitzgerald, 1982) and some techniques are being used explicitly outside SSM (Avison and Fitzgerald, 1995).

A set of ideas, essentially from Checkland’s work, is acknowledged as being important (important enough to be included in student texts), but at the same time it seems that in many instances it is difficult to see why, given the accompanying accounts of “SSM.” For anyone interested in critical use of the ideas, then these contradictions, gaps, and poor understanding make general use of the secondary literature something of a dubious undertaking.

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