

# Regarding Rich Pictures as Tools for Communication in Information Systems Development

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*The literature contains many examples and discussions of what it calls 'rich pictures'. There has been considerable debate about the nature of rich pictures and their inception and use as part of Soft Systems Methodology (SSM) and their consequent use outwith the methodology. Guidelines offered for their construction have been varied and often criticised by those advocating what may be referred to as the SSM 'purist' view of the process of developing rich pictures and their role as part of a process of appreciating some situation of interest. However, the seeming popularity of 'rich pictures', and the fact that they are often considered to be the most memorable and reusable part of SSM, has led to their use in all sorts of situations but of particular interest is their use in the field of information Systems Analysis. It is not the intention in this paper to argue the basis and foundation of rich pictures. Instead, the intention is to explore the diversity and use of diagrams referred to as rich pictures, to examine some published advice for building rich pictures and to comment on rich pictures as tools for expressing and communicating views and ideas.*

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## 1. INTRODUCTION

Studies indicate that poor communication during the analysis and design process is one of the main reasons why new or changed information technology systems are perceived to fail. Systems analysts may blame users for not being able to properly specify what they want and users may think that the jargon, techniques and methods used by IT experts are complicated and arcane. The culture gap between IT developers and business people is seen as a significant problem.

Research carried out on behalf of Price Waterhouse shows that most of the IT directors surveyed say this culture gap is their top problem and that 56% believe the gap is loosing or seriously delaying IT opportunities. Indeed one in four admit that the culture gap has resulted in wrong or ill conceived IT systems and 89% state that they are encouraged merely to automate existing systems rather than consider new ways of doing business. (Grinley, 1995)

Other work, reviewing the outcomes of investments in IT, reports that 80% of IT developments are delivered late and over budget and up to 90% do not meet their goals (OASIG, 1996). The report claims that this

lack of success is caused partly by managers having too narrow an agenda. Focussing only on technological capabilities and efficiency goals can mean that inadequate attention is given to human and organisational factors.

In addressing some of these problems the proponents of traditional Information Systems Design Methodologies (ISDM), such as SSADM, have concentrated more and more on the early phases of the lifecycle and developed first feasibility, then pre-feasibility stages. More recent ISDMs such as Rapid Application Development (RAD) include workshop sessions that involve users in an attempt to improve the requirements analysis process.

Many ISDMs advocate the use of models and diagrams during the enquiry and analysis phases, but these are not normally used to investigate or record human and contextual issues. Rich pictures, on the other hand, even though they sometimes are not used as part of a full SSM inquiry, may fill this gap. Diagrams like those called rich pictures may provide another way to improve communication and understanding about situations of interest and also encourage analysts and clients to consider developments to Information Systems in a wider context. However, students wishing to learn about rich pictures might be surprised not only by the diversity of what rich pictures are taken to be, but also that while the originators of SSM give no clear construction advice, other authors proffer quite precise instructions.

In this paper the nature, development and use of diagrams called rich pictures is discussed. The paper is in two parts. The first part reviews the variety of opinions and suggestions made by those who, arguably, have been some of the most popular and influential authors of work that discusses the format and purpose of Rich Pictures. The second part looks at Rich Pictures as diagrammatic representations and asks what might constitute good advice when creating such diagrams.

## 2. THE NEED FOR DIAGRAMS IN INFORMATION SYSTEMS ANALYSIS

There are many situations where there is a desire to make explicit some appreciation of the messiness of a problem situation and where a tool to assist discussion and shared understanding amongst the participants in

an inquiry would be useful. Diagrams are often used to develop, analyse and summarise ideas and can improve communication and collaborative understanding among participants. Yet many of the diagramming techniques developed for information systems analysis are designed to be of use once the problem to be analysed is chosen or the objectives of the study are known.

As the definitions of, what are referred to as, "Information Systems" become wider, to include "the entire infrastructure, organisation, personnel and components that collect, process, store, transmit, display, disseminate and act on information" (CJCSI 1996), it is ever more important that techniques which facilitate the investigation of context are used. Many of the traditional systems analysis diagramming techniques pay scant regard to people in a situation of interest and their views and relationships, concentrating rather on the flow, storage and modification of data or the 'behaviour' of 'objects'. The popularity of rich pictures suggests there is a need for a style of diagram that can be used to consider and convey perceptions of softer aspects in a situation such as attitudes, problems, roles, conflicts, harmony, tensions, influences, fears, wants, organisational culture and politics. It appears that many analysts have used diagrams they call rich pictures as an effective way to represent and illustrate the relationships and climate of a situation.

### **3. RICH PICTURES AND RICH PICTURE DIAGRAMS.**

Diagrams in the style of a rich picture or entitled "a rich picture of ..." appear in papers, textbooks and student projects where it is not apparent that the image has come from a rigorous SSM inquiry. This popularity of rich picture diagrams in the literature seems to indicate that they have an important niche and that many researchers and commentators may have found that the rich picture diagram is a useful tool for representing certain aspects of a situation. This has led to confusion: Are we referring to a "rich picture" as a mental image generated as part of a full SSM inquiry or to a diagram showing structure, process and climate produced by a stand-alone technique?

Does "building a rich picture" mean assembling a view of a situation as part of a full SSM inquiry or using a technique to produce a diagram that shows human and organisational issues? Is the rich picture diagram seen by some as an effective way to review, record and possibly share particular aspects and perceptions of a situation without the insights that SSM provides?

Commentators give different opinions on the nature of rich pictures and develop their own guidelines on how to compose rich picture diagrams. For example, some seem to know what rich pictures should contain and how one should produce them while others seem to have a less definitive view. Some draw or imply boundaries while others warn against including boundaries since this may restrict the appreciation of a situation or impose a structure. Some prefer hand-drawn cartoons to collections of clip-art symbols. Some propose that a common key of symbols is used in all rich picture diagrams but others regard this as overly prescriptive and are concerned that aspects of the situation may be ignored because one does not know a diagrammatic sign for them.

What follows is a review of comments on the development and use of what are referred to as rich pictures in the information systems literature. Many of the sections that have been quoted are long to try to reduce the problems of misrepresenting author's views or taking statements out of context. The order of the work reflects the degree to which authors seem to think of rich pictures as imagined or real and how definite their construction guidelines are.

#### **3.1 Checkland (1972; 1975; 1981; 1990; 1997)**

In his initial descriptions of a 7 stage SSM process Checkland (1972) does not mention rich pictures. Three years later he suggests that, by the end of stage 2, the analyst, along with the participants of the problem situation, should have developed the richest possible picture of the situation. "*The end point of this stage in the analysis should be a picture of the problem situation, one as rich as can be assembled in the time available.* (Checkland, 1975, p281). It seems that this "rich picture" is primarily an appreciation in the form of a mental image, not a two dimensional drawing.

By 1981, with the publication of Systems Thinking, Systems Practice, Checkland begins to offer some advice on how to compose a picture of the problem situation:

"Stages 1 and 2 are an 'expression' phase during which an attempt is made to build up the richest possible picture, not of 'the problem' but of the situation in which there is perceived to be a problem. The most useful guideline here - in the interest of assembling a picture without, as far as possible imposing a particular structure on it - has been found to be that this initial analysis should be done by recording elements of slow-to-change structure within the situation and elements of continuously changing process, and forming a view of how structure and process relate to

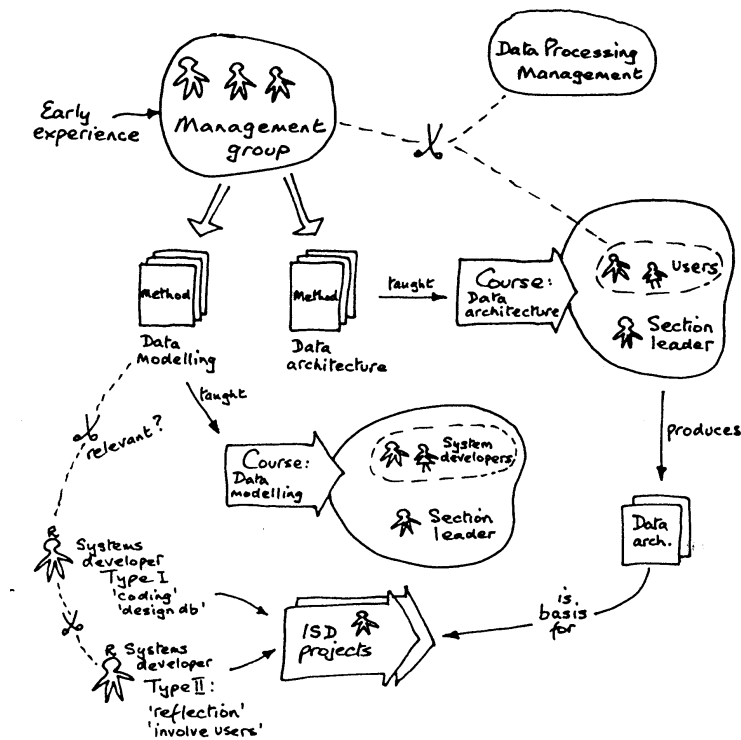


Figure 1: Checkland – Insurance

each other within the situation being investigated.” (1981, pp163-4).

In the glossary of this text the following definition is given: “Rich Picture: The expression of a *problem situation* compiled by an investigator often by examining elements of *structure*, elements of *process*, and the situation *climate*.” However, there still is no mention of a diagram.

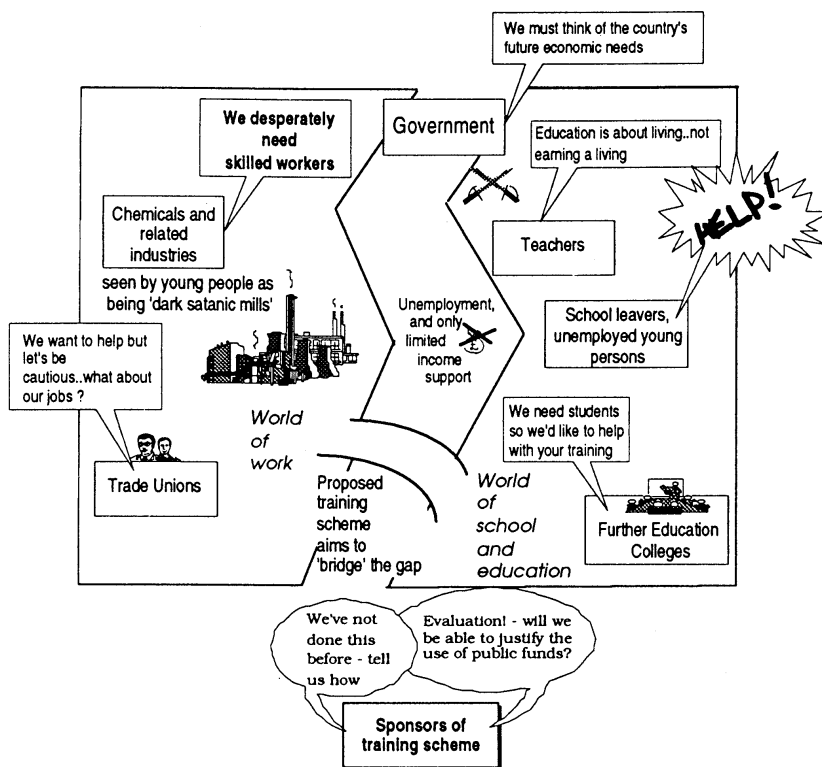
In much later, more sophisticated, discussions of SSM a diagram is mentioned which may be used to assist the analyst in enriching their own appreciation of the situation and to represent an abstraction of the analyst's view. The format of the rich picture diagram is un-prescribed and unstructured.

“A characteristic of fluent users of SSM is that they will be observed through-out the work drawing pictures and diagrams as well as taking notes and writing prose. The reason for this is that human affairs reveal a rich moving pageant of relationships, and pictures are a better means for recording relationships and connections than is linear prose.

Representing root definitions pictorially is one example of the use of pictures in SSM but the best known is the policy of representing the problem situation itself in the form of so called ‘rich pictures’. There is no formal technique or classic form for this ...” (Checkland and Scholes, 1990, p 45)

Later in the same book it is made clear that the rich picture is only one of the techniques that may be used during the appreciation phase:

“Within SSM the ideas of representing the complexities of a human situation in picture form has been a powerful one. ... It is an efficacious way of recording the finding-out phase because relationships and interactions are more briskly captured in pictures than in linear prose. However, the fundamental requirement is to gain a discussible appreciation of a problem situation; pictorial representation is simply one means of doing that which has been found useful. But it is not an axiomatic requirement. The guideline is: do what you find to be insightful and



**Figure 2: Lewis – Training**

comfortable." (Checkland and Scholes, 1990, p 156,7).

Recently he has taken this a step further by not only suggesting that rich picture diagrams be used but also that these diagrams can express and capture aspects of the problem situation.

"In the development of SSM it has been found generally useful to express the problem situations in the form of pictures and diagrams as well as in notes prose and collections of data. This stems from the fact that real world complexity will always be the result of many interacting relationships; and 'rich pictures' are a better way to represent relationships than linear prose. They enable both instrumental and cultural relationships to be captured." (Checkland and Holwell, 1998)

### 3.2 Lewis (1992)

In an interesting and important paper Lewis tried to clarify the background and development of rich pictures and argues that a rich picture diagram is one abstraction of a rich mental model of a situation. He chronicled what he saw as the change of the concept

of a rich picture as something built up in someone's mind to the generation and presentation of a kind of diagram.

Lewis suggests that there are three serious misunderstandings about rich pictures when he concludes :

"The originators of SSM have been consistent in their treatment of the appreciation forming process but have not discussed its nature in such detail as other parts of the methodology. This, together with the novelty and immediate impact of rich picture diagrams, has led to confusion and three serious misunderstandings: that creating a rich picture diagram is sufficient to gain an appreciation of the problem situation; that a single diagram of a particular format will be produced; and that the creation of such diagrams is an axiomatic requirement of SSM." (Lewis, 1992)

He proposes that one of the reasons why rich pictures have proliferated is that they are perceived especially by teachers and students, to be the output from stages 1 and 2 and therefore provide a useful measure of progress.

Lewis seems keen to point out that the rich picture is not simply a technique to be used by an external analyst to communicate their appreciation of the situation to problem owners:

“SSM is primarily a methodology for learning through participative action, in which problem owners, clients and stakeholders may all be part of the problem-solving team working within the problem situation.”

Curiously, having argued that rich pictures are an interpretivist technique, he says that a danger of using unexplained symbolic representations and metaphors is that they are ambiguous, implying that the viewer may get the ‘wrong’ impression:

“Also evident is a trend towards unannotated and unexplained symbolic representations of aspects of the problem situation. This has certain dangers, for the use of symbolism and pictorial metaphor may lead to ambiguity, particularly if no key is provided for the diagram.”

### **3.3 Darzentas et al. (1994)**

Darzentas et al. seem to agree with Lewis that the process of building a rich picture is more important than the finished product and that one’s ideas may not be abstracted into a diagram - but they also recognise that a rich picture diagram may be used for communication (with others).

The term “rich picture” as used in soft systems methodology (SSM) originates from recommendations made by Checkland [1972, 1981, 1990], that the analyst undertake, as one of the first stages in the analysis of a problem situation, to form a picture of the problem situation, and as one as rich as can be assembled in the time available. In this sense a rich picture is an appreciation of the problem situation rather than a diagram as such, and the real utility of the picture is not in the picture itself, but in the process of constructing the picture. However, it is recognised that the rich picture diagram can also be a useful alternative to a textual description of a problem situation - it may, for instance, succinctly convey the description of the situation to a third party.

### **3.4 Stowell and West (1994)**

Stowell and West discuss the notion of a rich picture and comment on the power of using pictures to help one to think about and record ideas about a situation. They suggest that rich picture diagrams can be used distinct from SSM. They also recognise that what

appears in a rich picture can cause embarrassment or resentment. Their analysis includes notions of ‘best’ and ‘good’ implying that there are ways in which rich picture diagrams can be judged or evaluated. They also provide some guidelines for what not to do when drawing rich pictures and discuss the value of using rich picture diagrams to aid communication.

Although rich pictures originate from Soft System Methodology (SSM), they can be used, distinct from SSM, as a powerful way of recording one’s understanding of a problem situation. The notion of a rich picture has been developed into one that takes as its convention a cartoon-like appearance. One reason for using pictures is that it enables one to minimise the constraints that language itself imposes on any description of a situation. The value in being able to do this should not be underestimated since our vocabulary and the way in which we express ourselves contains many nuances and meanings that can be easily misunderstood. This is not to deny the bias that may exist in pictures, but to propose that symbols may reduce the bias and at the same time provide a rich source of information.

The best rich pictures are often rough-and-ready sketches that are added to and developed during the process of analysis; they do not have to be neat, beautifully produced graphics but should provide a dynamic working document.

In addition to using the diagram as means of recording one’s understanding of a situation it may also be used as a method of communicating with other people. For example, showing a rich picture of one’s appreciation of a situation to a client is one way of facilitating discussion, gaining feedback and validating one’s understanding of the problem. Furthermore, a good ‘rich’ picture may contain a large amount of information on one page, which means that anyone looking at the picture can gain an appreciation of the whole situation at one glance – there is no need to read pages of explanatory narrative. On the strength of this ‘ease-of-reading’ characteristic, the use of a rich picture within a formal presentation may be one way of helping the presenter to talk around a particular area of concern while at the same time enabling the audience to gain their own appreciation of the situation through the eyes of the author of the picture. It should not be forgotten that because the rules



Figure 3: Harry – Dogs

for drawing a rich picture are minimal, it can soon be adopted and used by the client as a means of recording understanding and appreciation.

The analyst also needs to take care that the way in which aspects of the problem situation are represented do not cause embarrassment or resentment. (Stowell and West, 1994)

### 3.5 Harry (1994)

Harry seems to believe that a diagram of our rich mental picture is needed when he proposes that a way of diagramming that is loose, open and undefined is needed as it helps us to keep a holistic view. He goes on to say that a technique which does not have a predetermined emphasis but provides a way to record anything of interest helps us not to exclude issues prematurely.

“If our heuristic aims mean that we want to keep our minds open to record anything about a situation which may be of interest, a way of diagramming which does not have a predetermined emphasis might be useful.

As we shall see, such a diagram is the rich picture. Its aim is to provide a holist, open

way of recording any situation as we meet it. The lack of strict rules about what sort of symbols, words, or any other way of recording that can be used is deliberate. It is an attempt to prevent us prematurely excluding things just because they can't be neatly pigeon-holed, or only selecting certain kinds of evidence. With a rich picture we can record anything that is of interest and sort out later what sort of themes, topics or issues the picture tells us about.” (Harry, 1994)

### 3.6 Flood and Carson (1988)

Flood and Carson are quite clear that the rich picture is a kind of diagram but do not try to explain how it should be created. They describe the process of building up a rich picture as being like brain storming, using cartoons and pictures instead of words, implying that they see this phase as a participative event. They note that although everyone develops their rich pictures in different ways the pictures can still provide a way for individuals or groups of people to communicate their understanding of the problems in a situation.

“Essentially, the development of a rich picture parallels brain storming, but represents the

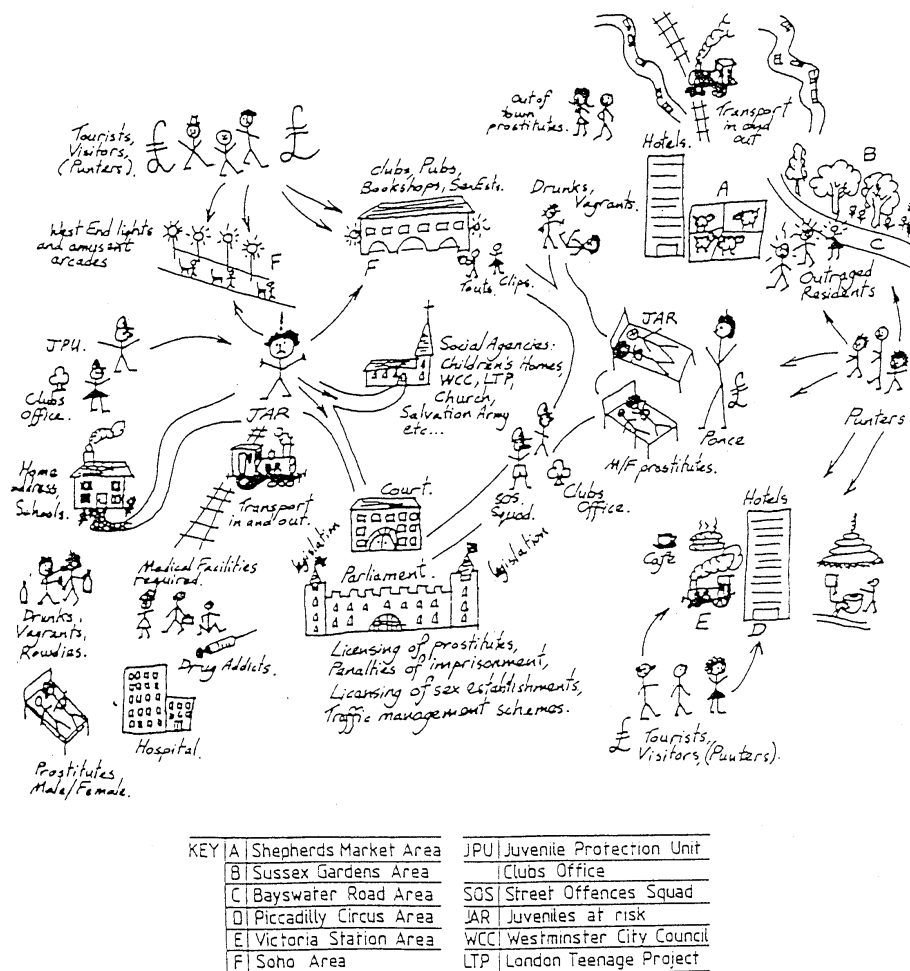


Figure 4: Flood and Carson – Vice

ideas in pictures rather than words. It is like a gigantic cartoon representation of a situation in nonsystem terms. In our experience, we have also seen groups of students developing rich pictures in a “laboratory” exercise, working on a chalkboard, drawing pictorial representations of ideas, arguing and debating over them, and relating and structuring them in a way that seems to make some sense. Although it has been the case that no two rich pictures of the set task have evolved in an identical manner, it is evident that the groups of students have been able to communicate (with mutual understanding) their appreciation of the problem with other groups through their own rich pictures.” (Flood and Carson, 1988)

### 3.7 Pidd (1996)

Pidd agrees that rich pictures are devices for thinking about the problem but goes further to suggest: (i) that there is more than one approach to SSM, (ii) that rich

picture diagrams can be used outside SSM, (iii) that they are a mixture of hard and soft and (iv) that several different rich picture diagrams may be used to represent different viewpoints.

Rich pictures form part of one approach to soft systems methodology, but they also can stand alone in their own right.

They are an attempt to sketch out the main participants in the work and to show their interests and interactions. The idea is to include information which could be regarded as “soft” (such things as people’s attitudes, roles and assumptions) as well as “hard” or technical data (such as numerical data and details of computer systems).

It takes skill, insight and practice to capture the essence of anything in a picture and part of this is framing on the subject. Rich pictures are intended to help the analyst to do the same

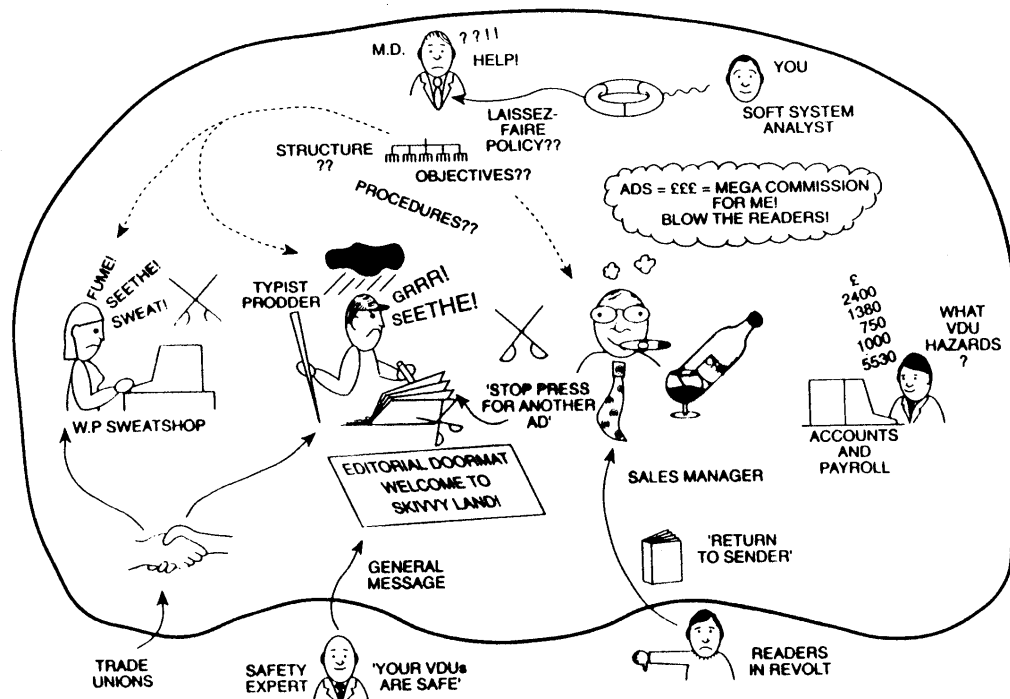


Figure 5: Waring – Lucrative

by providing an abstract representation of the problem situation.

Rich pictures are devices for thinking about the problem. There may thus be a number of rich pictures from a range of viewpoints.”

### 3.8 McDermid (1990)

McDermid mentions the rich picture as a real-world description reflecting many views and gives the impression that he sees the rich picture as an artefact that can be studied.

“Through the achieving of consensus the problem is described (structured) in real-world terms. This is sometimes called a rich picture, because it is supposed to reflect the width of view felt across all participants. There are no rules as such for the format that a rich picture must conform to. What is important is that the users get the opportunity to describe the problem as they see it. Much insight can be gained by analysing a rich picture.”

### 3.9 Waring (1996)

Waring seems to regard the rich picture diagram as an essential part of SSM, rather than one of the techniques one might use. He also appears to think that the rich picture diagram is devised quite secretly by the analyst, not in collaboration with others. This opinion seems to lead him to the idea that to avoid offending people who may appear in this rich picture

diagram another version of the diagram should be produced that can be shown to everyone.

“To create a rich picture of the whole setting, get a large sheet of drawing paper and draw the pictures conjured up in your mind’s eye by the description you have. The result, probably after several improvements, should be a mixture of ‘structural components’ or things which are relatively stable in the setting such as editors, Sales Manager, Managing Director, accounts section, and ‘processes’ or activities, transient relationships, and connections of some kind.

The style of your rich pictures reflects your personality and your world-view in general. Those having vivid mental imagery tend to draw them on the rich side, like those in this book. Bear in mind, however, that you may wish to show your rich pictures to other people, and especially to ‘actors’ in the problem situation. You can avoid possible offence by having two versions – one for your own reference and a cleaned-up version for showing to other people.” (pp81-83).

### 3.10 Wood-Harper, Anthill and Avison (1985)

The purpose and form of the rich pictures referred to in Multiview are clearly defined and explained. The authors refer to Checkland’s work at Lancaster University and claim that they have developed



techniques from this work for inclusion in Multiview. It is apparent the authors consider rich picture diagrams to be tools for communication. They introduce the idea that more than one rich picture diagram may be needed and that the relative size of symbols can indicate a perception of their importance. They give detailed and prescriptive instructions on how to "construct" a rich picture diagram, which a student might find quite easy to follow. Such instructions are likely to appear anathema to SSM purists.

(Note: those parts of the following quotes highlighted in bold indicate those phrases or sentences that reappear across the authors' work. In the later quotes these are, for the most part, omitted to avoid repetition.)

The first technique for analysing human activity systems is the rich picture. This is a pictorial representation of an organisation and is an invaluable tool for explaining what the organisation is about. It should be self-explanatory and easy to understand.

The picture is constructed first by putting the name of the organisation that is the concern of the analyst into a large 'bubble' at the centre of the page. Other symbols are sketched to represent the people and things that inter-relate within and outside the organisation. Arrows are included to show these relationships. Other important aspects of the human activity system can be incorporated. Crossed-swords indicate

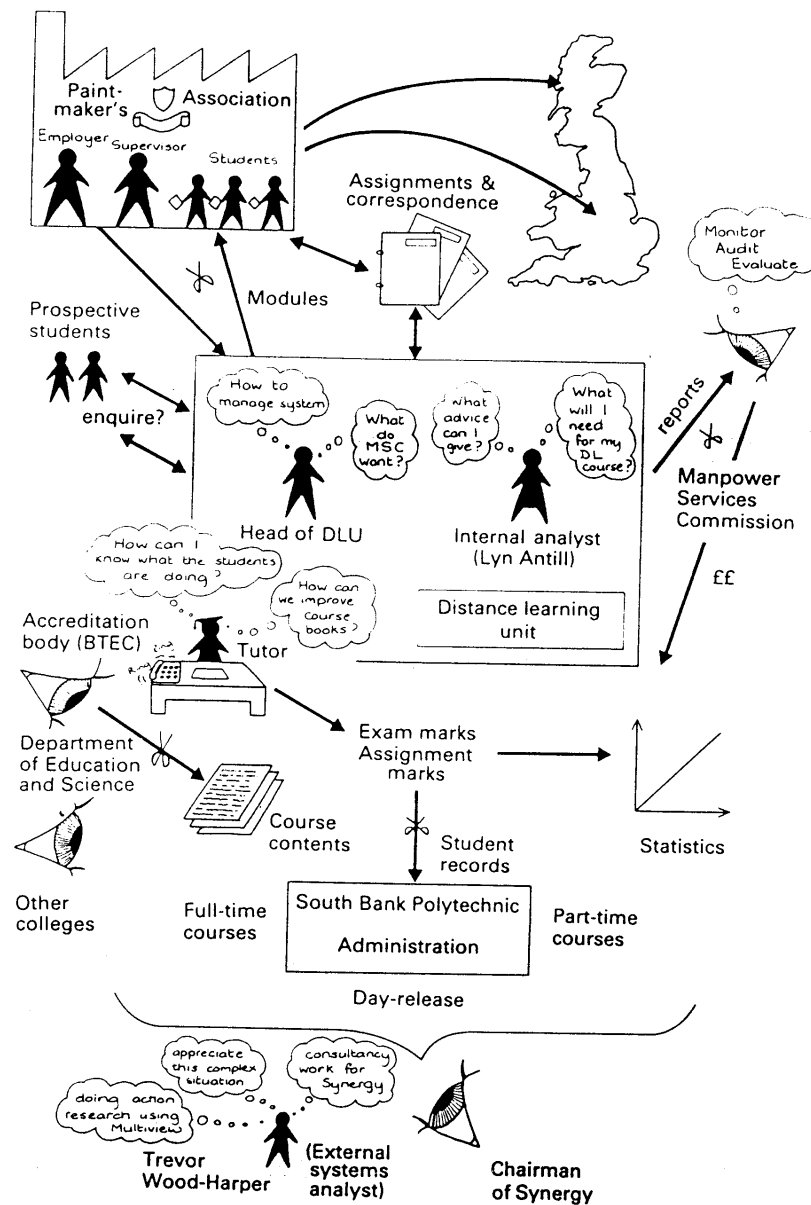


Figure 6: Wood-Harper, Anthill and Avison – DLU

**conflict and the ‘think’ bubbles indicate the worries of the major characters.**

In some situations it is not possible to represent the organisation in one rich picture. In this case, further detail can be shown on separate sheets. The perceived relative importance of people and things should be reflected by the size of the symbols on any one rich picture.

If it has been well drawn, you should get a good idea of who and what is central to the organisation and what are the important relationships.

The act of drawing a rich picture is useful in itself because:

Lack of space on the paper forces decisions on what is really important and what are side issues or points of detail for further layers of rich pictures.

- It helps people to visualise and discuss their role in the organisation.
- It can be used to define the aspects of the organisation which are intended to be covered by the information system.
- It can be used to show up the worries of individuals and potential conflicts.

Differences of opinion can be exposed, and

sometimes resolved, by pointing at the picture and trying to get it changed so that it better reflects people’s perceptions of the organisation and their role in it” (p85).

### 3.11 Avison, Golder and Shah (1992)

In this paper Avison *et al.* repeat much of the advice given by Wood-Harper, Antill, and Avison. However, they take the notion of representing ideas in standardised symbols forward to the extent that they describe the development of a computer aided rich picture diagramming tool. They suggest that such a tool might be useful since it permits a user to organise a range, or hierarchy, of views. While standard symbols and keys may be attractive to some, it could be argued that the use of a limited set of pre-defined icons may diminish the richness of the thinking and lead to stereotypical characterisation, blandness and uniformity.

The rich picture diagram represents a subjective and objective perception of the problem situation in a diagrammatic or pictorial form, showing the structures of the processes and their relationships to each other. It can be used to identify problem themes, conflicts, and absence of communication lines, shortages of supply and so on. Through debate within the organisation, it is possible to identify relevant systems, which may relieve problem themes.

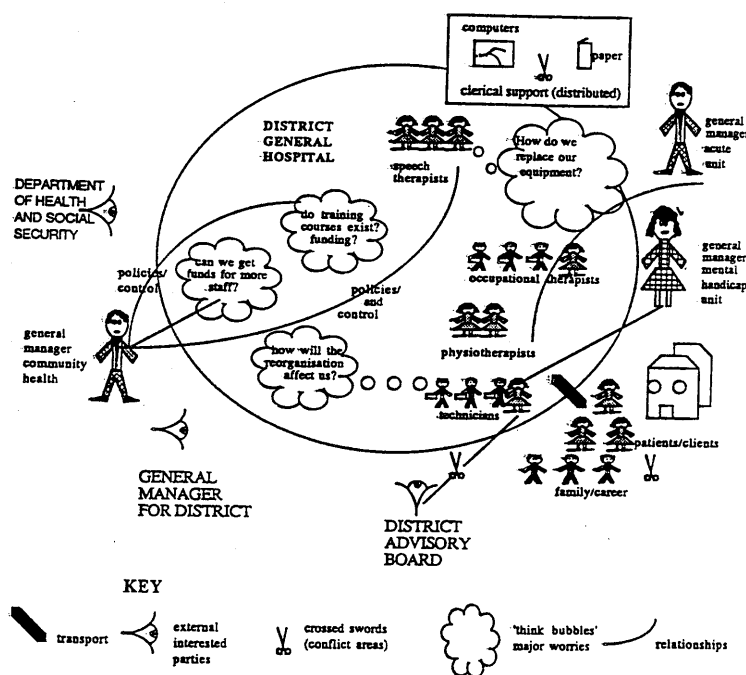


Figure 7: Avison and Fitzgerald – Paramedic

**Typically, a rich picture is constructed first by putting the name of the organisation that is the concern of the analyst into a large ‘bubble’...to indicate worries of the major actors.** All these can be represented by standard symbols included in a rich picture diagramming tool. These standards can be modified by and for particular organisations or analysts.

Differences of opinion can be exposed, and sometimes resolved, by pointing at the diagram and trying to get it changed so that it more accurately reflects people’s perceptions of the organisation and their role in it. A strength of an automated tool is to make these adaptations easier and enable the user to revert back to the old model if this proves to be more appropriate. Another possibility is to enable the drawing of different rich picture diagrams, dependent on the different views of the same situation, and then to use a merge facility to attempt to produce one rich picture from these various interpretations. Further, rich picture diagrams can be decomposed so that one top level diagram is decomposed into several second level diagrams.

A particular boon would be for the user to be able to double-click using a mouse on an item within the rich picture to get further details of that aspect, in other words, to ‘zoom in’. Thus, there can be narrative descriptions of the formal role of an actor or some informal views of a conflict or problem. All these are feasible with present technology” (p402).

### 3.12 Avison and Shah (1997)

Avison and Shah share some of the views of the previous two texts. They are quite clear that a rich picture should be easy to understand and seem in no doubt that a rich picture is a ‘pictorial caricature’, yet return to Checkland’s (1981) advice about looking for structure, process and climate. They also discuss the importance of including both the hard facts and the soft aspects of the situation:

A rich picture is a means to represent the information given following on from the interviewing process. A rich picture is a pictorial caricature of an organisation, and is an invaluable tool for helping to explain what the organisation is about. It should be self explanatory and easy to understand.

One may start to construct a rich picture by looking for elements of structure in the problem area. This includes things like

departmental boundaries, activity types, physical or geographical layout and product types. Having looked for elements of structure, the next stage is to look for elements of process that is ‘what is going on’. These include the fast-changing aspects of the situation such as, the information flow, the flow of goods and so on. The relationship between structure and process represents the climate of the situation. Very often an organisational problem can be tracked down to a mismatch between an established structure and new processes formed in response to new events and pressures.

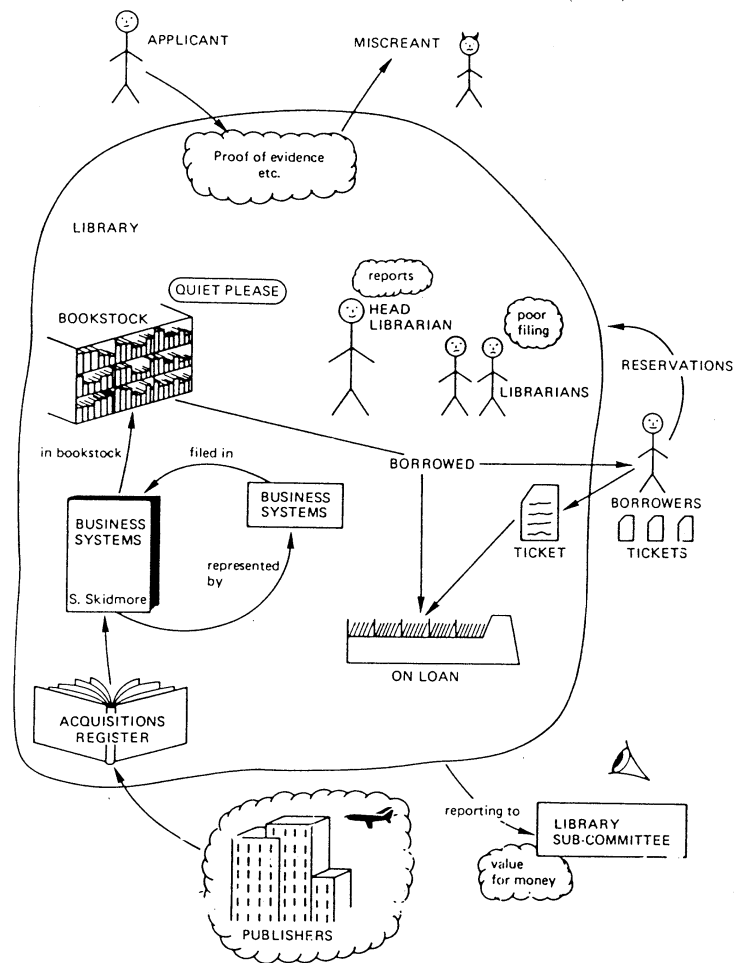
The rich picture should include all the important hard facts of the organisational situation, and the examples given have been of this nature. However, this does not represent all the important information. There are many soft or subjective aspects of the situation that should also be represented, and the process of creating the rich picture serves to tease out the concerns of the people in that situation. This softer information includes the sorts of things that the people within the situation think are important, and the sort of behaviour, which is expected of people in these roles. **Typically, a rich picture is constructed first by putting the name of the organisation that is the concern of the analyst into a large ‘bubble’...to indicate worries of the major characters.** Techniques such as these can be used to clarify and bring into focus the overall picture of the problem situation” (pp97-8).

### 3.13 Bell and Wood-Harper (1992)

Bell and Wood-Harper take the prescriptive discussion of rich pictures even further, giving specific instructions about what to include and in what order. Remarkably, they seem to suggest that rich pictures represent real systems:

“The conventional way to begin is to produce a map or cartoon of the major structures to be involved in the picture. These may be departmental boundaries, system boundaries, national borders, etc. as they are applicable to the problem in view. Working our way towards the eventual picture we begin the exercise by setting out the ‘hard’ structures in the context.” (p67).

They suggest that one should concentrate, first, on identifying and representing what they refer to as “hard” and “soft structures”, and then, on “hard” and “soft processes” which, again, are regarded as



**Figure 8: Skidmore – Books**

realities. They illustrate this activity by means of diagrams that look like systems maps.

“The way in which we produce rich pictures is composed of two elements – structure and process. These are divided into two key areas – technical ‘facts’ (hard areas) and social/ethical/cultural realities (soft areas)....The result of the construction of a rich picture should be the identification by the analyst of what is possible within the problem context.

Hard processes and structures are then connected and laid out in a table, as are soft structures and processes. The reason given for this is that on completion of these tables, sufficient necessary information will have been collected for “the final composition of the rich picture” (p71).

Bell and Wood-Harper state “Rich picturing first requires us to simplify reality” and that we should map

the terms of reference, structure and processes onto one diagram or ‘frame’.

Reading their instruction for producing rich pictures begins to make us wonder about the nature of the thing they are discussing: they seem to have moved on a long way from the discussions about rich picture diagrams we considered at the beginning of this article. For Bell and Wood-Harper, rich pictures take on a whole new meaning and status as part of an overall analysis and design process. Unfortunately, their explanation of this role is difficult to follow, a point illustrated by the following quote:

“One way to think about the question: When is a structure ‘hard’ or ‘soft’? is as follows: the analyst is the final judge. What is hard to one person is soft to another although this is not always the case... As you see, arriving at a judgement is not always a scientific process” (p70).

They obviously regard rich pictures as useful communication devices:

“It is, of course, useful if a rich picture can be attractive and pleasing to the eye – but of much more importance is the meaning of the content. To make hand-drawn pictures for overhead transparency it is of value to use a set of symbols that have a clearly defined meaning. In short, to make our final drawings more understandable it is useful to adopt some sort of a grammar of symbols”. (pp72-3).

### 3.14 Skidmore (1987)

Skidmore indicates, similarly, that he sees rich pictures as models of the system and seems more certain about both what a rich picture is for and how to go about creating them – he is another who says that they should be self-explanatory and are designed to aid communication. He seems to have borrowed some ideas about the construction of rich pictures from Multiview and suggests that the relative size of symbols in the picture matters.

“At the beginning of a systems project the people involved are likely to have only a

fuzzy idea of what they want to achieve. Even if the proposed objectives can be sorted out, they still need to be formulated in such a way that they can be explained to analysts and potential suppliers. A useful technique for modeling the overall system under consideration is the rich picture. It attempts to show what the organisation is about.

The picture is constructed by first putting the system area under consideration into a large bubble in the centre of the page. Other symbols are sketched in to represent people, activities and physical objects of interest and importance to that system. Arrowed lines show relationships, crossed swords indicate conflict and ‘think’ bubbles may be used to show the main worries of the participants. The relative importance of people and things may be reflected in the size of the symbols.... Rich pictures should be largely self-explanatory as they are designed to aid communication as well as helping the analyst to visualise the problem setting”.



Figure 9: Patching – Pub

### 3.15 Patching (1990)

Patching is another author who seems to suggest that a rich picture can be used as an recording device which can capture the system, as though systems were seen as real-world entities in SSM, as opposed to a conceptual device for thinking about a situation. For him the rich picture diagram may represent a non-subjective assessment of a situation since he suggests that the analyst can remain objective. He implies there are facts that must be captured and shown and that the rich picture diagram should not contain assumptions or opinions but rather be based on evidence and, furthermore, that rich pictures can include too much and may need to have their richness trimmed.

“There are hazards to be wary of; assumptions made on too little evidence gain credibility by inclusion in the picture and wherever possible they should be the result of a joint effort between a number of analysts, or with the client or representatives. Never assume that your picture is the right one, and wherever possible keep them factual, with opinions shown only where the source can be identified, or when they can be substituted by sound argument. There is also the danger of the analyst imposing a structure on the picture, allowing preconceived ideas to colour judgement. Whereas it is difficult to remain objective, particularly about a situation that the analyst is now part of, there should be a deliberate and conscious effort to retain a neutral outlook and show only those facts and issues that have been gathered by the investigation. In addition, too much detail and richness can obscure significant points. The early pictures developed during the Case Study described in Chapter 10 were too cluttered to be meaningful, and only showed that the situation was extremely complex, making it necessary to summarise the detail before certain fundamental points became clear”. (p56).

### 3.16 Jayaratna (1994)

Jayaratna sees rich pictures as one of the tools available to the analyst and, like Waring, is convinced of the risk of offending stakeholders, he believes that these diagrams may provide a less emotional way to show issues:

“SSM permits any technique that will help to express or capture the essential aspects of the organisation. These may include graphs, text, animation, pictures, charts, tables, etc. These expressions are known within SSM as ‘rich

pictures’. The encouragement of any form for expressing the diagnoses has several implications. First, it gives SSM users freedom in the selection of relevant tools and techniques which are appropriate to the situation and the understanding of the issues. Secondly, much of the information collected will be of a fairly sensitive nature, e.g. information on clashes and disagreements of Weltanschauungen. The expressions in the form of ‘rich pictures’ enable the presentation of sensitive information in a less emotional form leading to greater client response.” (p185-6).

He comments indirectly on Patching’s ideas when he discusses the confusion he sees in the notion of a system as described in SSM and may have misinterpreted Checkland’s irony when he writes:

“SSM provides the most insightful contribution to boundary construction. The boundaries, problem ownership, problem content and context issues are all open to question. Because of the danger of its users identifying themselves with clients’ and problem owners’ defined systems (as if they exist), SSM avoids the use of ‘systems concepts’ at this stage. While this avoidance is understandable, the non-use of epistemological notions of ‘systems’ deprives SSM users from being able to derive many relevant and useful ways of structuring their understanding of the situation. While the original SSM (Checkland, 1981) did not use ‘systems’ concepts at this stage, in the revised version there seems to be an acceptance of the ontological notion of ‘systems’ (taken as given) as a legitimate way of going about systems development. Commenting on Patching’s (1987) identification of ‘the system’ within a rich picture, the creators of SSM state:

... and the assertion that the ‘rich picture’ (singular) represents a system, rather than a situation, shows that, in terms of the true Constitutive Rules above, what is here being described is a variant of SSM with a strong flavour of hard systems thinking. (Checkland and Scholes, 1990)

Surely this is inconsistent with the epistemological notions of ‘systems’ advocated by the methodology. Taking a system as given and using ‘systems’ as a notion for the construction of a boundary of a potential system leads to different

implications. Does this mean that whatever a potential SSM user does is to be considered as a variant of SSM? This may explain why many methodology users who take systems as given claim to have used SSM. (p183-4).

#### 4. NON-SSM RICH PICTURE DIAGRAMS

While Patching and others may have made assumptions about SSM and rich pictures that the originators of SSM find strange, several researchers have adopted and / or adapted the rich picture diagram for their own use outwith SSM. This section gives some examples of these.

The authors of Multiview (Wood-Harper *et al.*, 1985; Avison and Wood-Harper, 1990) recommend the use of a stand-alone technique to produce a 'rich picture' during the first analytical stage of their pluralistic approach to information systems development. "*The first technique used in Multiview for analysing human activity systems is to draw the rich picture. This is a pictorial caricature of an organisation and is an invaluable tool for helping to explain what the organisation is about. It should be self explanatory and easy to understand.*" (1990, p 45)

Avison and Fitzgerald (1995) describe rich pictures as a technique common to more than one methodology. They assert that rich picture diagrams "*are being used by analysts who may be following a methodology which does not include them "officially" as part of that approach, but nevertheless find them helpful.*"

Dingley and Shah (1997) refer to a "situation summary diagram" which, they explain, "may be regarded as the generation of a 'rich picture' which summarises the exploration of the 'strategic situation'. This is clearly a climate diagram in the style of a rich picture diagram but outwith the context of an SSM inquiry.

Wilson (1997) describes how she wished to gain an appreciation of a situation from the clients' perspective. She chose "*the rich picture of Checkland's SSM*" as a suitable vehicle for communication. She conducted several interviews with participants of the situation and "*from these interviews a rich picture was created and then used to generate debate amongst the client group.*" This process resulted in identification of issues to be addressed. Wilson does not assert that she followed the full SSM process for her research but chose the climate diagram as an effective vehicle for recording her interviews and communicating her perception of the situation with others.

Williams (1997) has discussed the use of rich picture diagrams in Jungian psycho-analytical studies.

Bratsas (1997) used such a climate diagram as a vehicle for communication in discussions with stakeholders about the operations of the Greek port of Thessalonika and its information systems. He interviewed several parties concerned in the business and activities of the port - such as the Harbour Master, customs officials and quayside fork-lift truck drivers, developing his climate diagram as his appreciation deepened and using the climate diagram to stimulate discussion with the parties concerned. The diagrams format and style was found to reduce barriers, promote understanding and improve people's ability to articulate their views. This diagram was also used during interviews elsewhere to compare the nature and problems of Thessalonika's information systems with other ports such as Greenock. It was noted that the diagram seemed to help to overcome some of the difficulties caused by differences in language and culture

Again, the climate diagram was chosen as an effective tool outwith the context of SSM.

#### 5. WHAT IS USEFUL IN RICH PICTURE DIAGRAMMING?

It seems that rich picture diagrams are being used as a technique in themselves (for example, as a vehicle for communication amongst stakeholders in a situation). It may be worthwhile to learn about how such diagrammatic representations are assessed so that we might better appreciate the potential strength of these diagrams to represent and facilitate the communication of ideas about the climate of a situation. From an investigation into the way that two particular groups react to a set of rich picture diagrams we may be able to identify some ideas about 'best practice' that we could reinvest when using diagrams like rich pictures.

As a way of focusing upon the use of pictures, the research undertaken by Lohse *et al.* (1994) into classifying visual representations was used to help provide a way of inspecting a number of so-called 'rich pictures'. Lohse *et al.*'s research was from a psychological perspective and the constraints and limitations that this placed on the research into rich picture diagrams is recognised. Whilst it is acknowledged that the criteria adopted will not be consistent with the ideas of interpretive inquiry (which provides much of the theoretical basis of SSM) this does not dismiss the value of this exercise since it may help to shed light on the attractiveness of using pictures in the analysis process.

Lohse *et al.* developed a list of 10 keywords. Sixteen people rated 60 different visual representations using these keywords. These images included maps, company logos, graphs, road signs, lists, decision trees

and brain scans. After rating each graphic item, the subjects then sorted them, mostly on the basis of the type of information conveyed by each representation. Lohse *et al.* were then able to classify the images into eleven types, based on the ratings given by the subjects.

In our study we chose a selection of 10 rich picture diagrams and invited over 100 post-graduate students to rate them as visual representations using the set of keywords developed by Lohse *et al.* These students had a wide range of academic and work backgrounds. The study was conducted in two parts, with one group of students undertaking the exercise at the beginning of the course and another group towards the end of their course. The results of the two groups showed some interesting differences, which may be explained, in part, by the fact that students in group B had been exposed to ideas such as SSM.

### 5.1 Methodology

118 post-graduate students starting an MSc in Information Technology at Paisley university divided into two groups – the 97 students in Group A elected to take a traditional computing/IT route in their first semester while students in group B took a more Information Systems oriented route that included a module on SSM and systems thinking. During a lecture in the first week of their course group A were issued with a handout made up of 10 copies of table 1. They were asked to view 10 different rich pictures and, using likert scales, to evaluate each picture according to the ten criteria in table 1 by circling the number that they felt most closely represented their

view.

To begin with a copy of every picture was projected onto a large screen for 30 seconds, to give the group an idea of what the set included; then each picture was redisplayed for 4 minutes to allow time for them to complete that page of the questionnaire. The same procedure was followed with the 21 students in group B; however, this survey was undertaken in the tenth week of their course. The students seemed to find the time sufficient to form opinions about the pictures and record their assessments. This is not to say however that, given more time, there may have been different outcomes.

Students wrote their initials and the main subject they had studied in their first degree on the front page of the handout. Of the 97 students in group A, 5 did not complete the questionnaire, (one of whom wrote “I don’t see the point in this”) and a further 11 stated that they could not see the screen properly. None of the students in group A had seen rich picture diagrams before.

The Rich Pictures used were taken largely from published sources and are shown earlier in this paper (figures 1 to 9). These 9 were picked because they appear in popular textbooks and are examples of some of the variety of diagrams called rich pictures. One rich picture (figure 10 - the ski school), based to an extent on the format of a ‘system picture’ (Quin and Bronte-Stewart, 1995), was taken from a student project. This picture was chosen for inclusion because it was seemed to represent a type of diagram that focuses primarily (and exclusively) upon the

Attractive eye-catching, engaging absorbing	Unattractive uninteresting, does not attract or hold attention
Concrete factual, an accurate representation, attempts to portray reality	Abstract Depicts a derived view, an analytical concept or analogy
Temporal Existing only for a time, temporary, a snapshot	Non-temporal Timeless, not time-stamped
Numeric Mathematical, composed mainly of numbers	Non-numeric Contains No formulas, calculations or numbers
Spatial Relationships between elements are Very important	Non-Spatial Relationships between elements are Not important
Dynamic Process shows change, sequence, flow	Static structure No flow, process or movement implied
Continuous Together, all connected, elements highly linked	Discrete Disjointed, divided into individual separated bits
Emphasises whole Holistic, comprehensive, entire, sum total	Emphasises parts Incomplete, reductionist, shows only a certain amount
Easy to understand Clear, user-friendly, communicative	Hard to understand Obscure, very difficult to interpret the meaning of
Conveys a lot of Information Full of data	Conveys little information Doesn't tell you much

Table 1



relationships and views of the principal stakeholders in the situation.

The assessments of the students in groups A and B were keyed into two separate spreadsheet tables so that statistical analysis could be done.

### 5.2 Findings

The mean, mode, median and standard deviation for each of the criteria applied to each picture were calculated and compared. This section comments on some of the apparent results but a more detailed analysis of the findings of this study may appear elsewhere.

There seemed to be little significant difference between the responses of those with an arts based degree compared to those with a scientifically oriented degree.

The survey responses indicated that there may have been some confusion in the way the attributes were scored: a low score indicates a positive response; a high score indicates a negative response. For example, a picture considered to be highly attractive would be given a score of 1. During the data analysis, it appeared that a few students initially awarded a 10, then corrected it to a 1 as if they expected the scoring

to be on a “marks out of 10” basis. It is assumed that this potential for error has not affected the statistical averages of the results.

The degree of consensus among the responses was assessed by comparing the standard deviations. One attribute, Numeric, had a consistently high score (average 8.9) and low standard deviation (average 1.7) as we would expect considering the nature of rich pictures. Otherwise, the level of consensus was similar for all attributes (averaging 2.2) although particular attributes for particular rich pictures showed marked disagreement – primarily a standard deviation of 3.16 for the attractiveness of Dogs which subjects seemed to love or hate.

In retrospect it might have been more interesting not to use Lohse *et al*'s keywords but rather to have chosen concepts that are more appropriate for reviewing aspects of rich pictures. These might include asking subjects if the picture tells them much about a situation's: organisational structure; work and processes; rate and nature of change; culture and politics; environmental influences; those involved and their thoughts and concerns. However three of their keyword criteria did seem to provide some insights – attractiveness, ease of understanding and information conveyed. The means of these three criteria for each

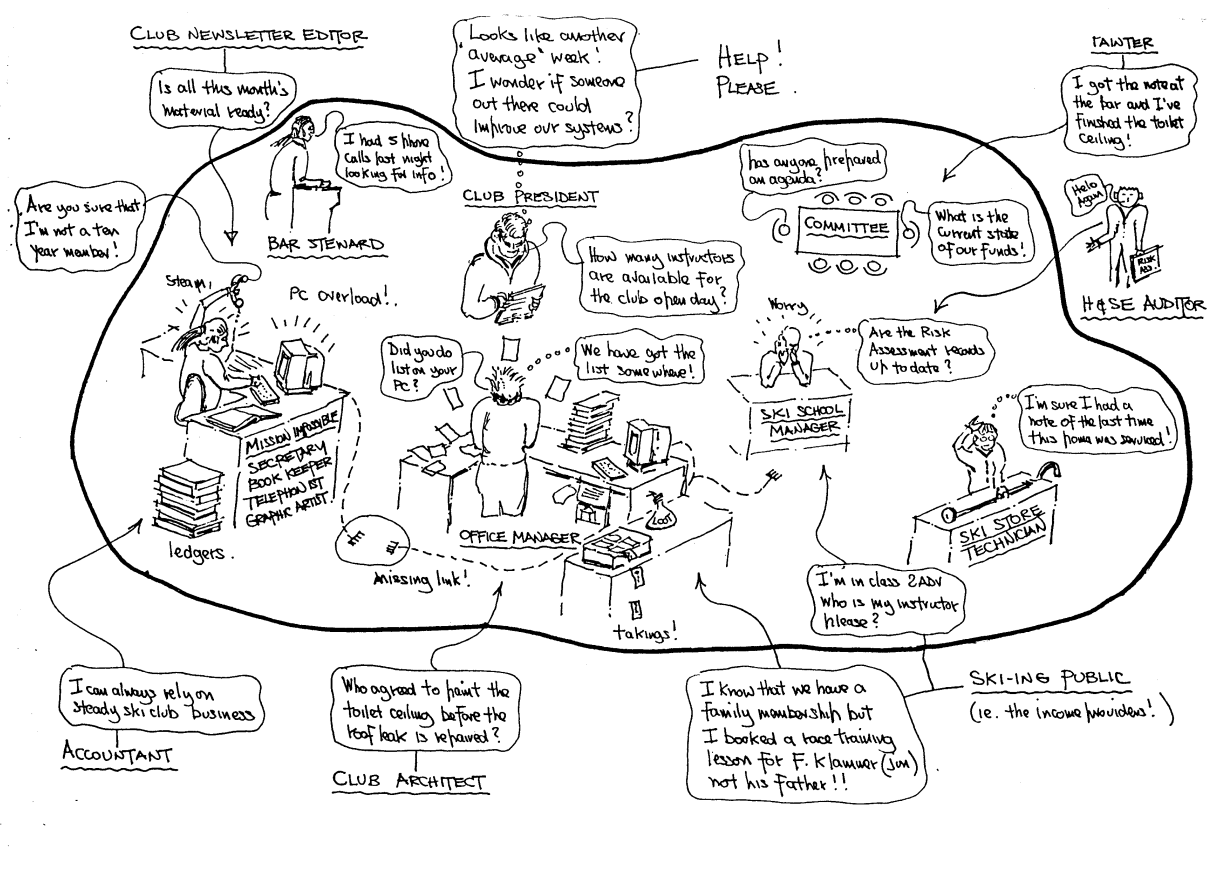


Figure 10: The ski school

<u>Group A</u>			
Rank	Criteria		
(most)	Attractive	Easy to understand	Conveys a lot of Information
1	Training	Training	DLU
2	Pub	Books	Books
3	Books	Insurance	Training
4	Lucrative	Lucrative	Vice
5	Ski	Pub	Insurance
6	Insurance	Paramedic	Ski
7	Paramedic	Ski	Lucrative
8	Vice	Vice	Paramedic
9	Dogs	DLU	Pub
10	DLU	Dogs	Dogs
(most)	Unattractive	Hard to understand	Conveys little information

**Table 2: Group A**

of the example rich pictures were ordered and this ranking is shown in Table 2 and 3.

Those in group A seemed to find the more ordered, neat, simplistic and uncluttered rich pictures such as those by Lewis and Skidmore more attractive, understandable and informative. Patching's sprinkling of sparse and disconnected icons was also rated as attractive. While Harry's more messy spontaneous and frivolous style was regarded as unattractive, hard to understand and conveying little information.

Students in group B on the other hand seem to find the more busy, hand-drawn sketches such as ski, vice, DLU and lucrative (that show more about the relationships and concerns of characters, and often use speech or thought bubbles), more attractive understandable and informative. This may be because this group had seen rich pictures before and had a greater readiness to view and read the format and symbolism of this type of diagram. It is interesting to note that the rankings of the two groups are, in some cases, almost opposite. It seems that those given some appreciation of SSM looked at these pictures in a different way to those in the SSM naïve group. Another factor that may be significant is the self-selecting nature of the group division. Students in group B had chosen to take the Information Systems stream and thus may be representatives of a different mind set to those who opted to take the more traditional IT stream.

## 6. CONCLUSIONS

In his early descriptions of SSM, Checkland does not refer explicitly to a diagramming technique but rather talks about building a richer appreciation of a particular situation. Later he seems to acknowledge that rich picture diagrams have become a popular

<u>Group B</u>			
Rank	Criteria		
(most)	Attractive	Easy to understand	Conveys a lot of information
1	Ski	DLU	Ski
2	Vice	Lucrative	DLU
3	Lucrative	Books	Vice
4	Dogs	Vice	Dogs
5	Paramedic	Insurance	Lucrative
6	DLU	Ski	Insurance
7	Insurance	Dogs	Paramedic
8	Books	Paramedic	Books
9	Pub	Training	Training
10	Training	Pub	Pub
(most)	Unattractive	Hard to understand	Conveys little information

**Table 3: Group B**

technique but still offers no clear guidelines for their production within SSM. Some authors, however, have developed 'harder' views. The debate over the nature of rich pictures reflects, in some ways, the science / art divide. At one extreme, some seem to suggest that rich pictures should be thought of as models of the real-world which have clear and consistent compositional guidelines, whilst others regard rich pictures as highly personal sketches or doodles, which may be used for playing with, structuring and recording ideas but which may be meaningless to anyone outside the situation. Many researchers and commentators, however, seem to have found that one of the most important aspects of the rich picture type of diagram is that it may be used to help one to decide what to look at and to show a perception of the 'feel', or climate, within a situation.

There does seem to be a need for techniques that assist the analyst (whether they are using SSM or not) during the early stages of an investigation to make sense of the problem situation and in fact decide what the situation is, before moving on to decide what 'the problem' is. Using such a diagram may also improve communication amongst people in the problem situation and build a deeper, more shared understanding. More research is needed on how best to achieve these aims.

To alleviate some disagreements and misunderstandings over the name of such a diagram a distinction should be made between the mental images and sketches generated as part of a full SSM inquiry and the climate diagrams produced by a stand-alone technique.

Diagrams of the ski school type (figure 10) may be useful especially if basic recommendations can be developed to give students advice on how to compose

such a diagram. Such diagrams would incorporate a view of stakeholders and their concerns along with their relationships with other individuals and groups within and outwith the organisation and use cartoons, thought bubbles, icons and sometimes, the notion of boundary (for example, to illustrate the scope of the study as opposed to identifying 'systems'), to represent these ideas.

Like any diagram, rich picture diagrams illustrate parts of the whole; decisions still have to be made about what to include and what to leave out.

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