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JUSTIFICATION OF GROUP DECISIONS: A CASE STUDY OF USER TRAINING IN GROUP SUPPORT SYSTEMS APPLICATIONS

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ABSTRACT

Decision making, whether by an individual or a group, can be substantially enhanced by a "systems thinking" approach. Because groups are often challenged to justify their decisions, it is necessary that they prepare themselves in advance for a possible challenge. We argue in this paper that this can to some extent be achieved through training the group in a "systems thinking" approach to decision making and using Toulmin's schema of reasoning. The basis of our argument stems from observations made during the presentation of a new Masters module on Systems and Decision Making, conducted as a pilot study to form the basis for future field experiments.

1. INTRODUCTION

According to Giddens' (1984) *model of stratification of the agent*, and in particular his notion of rationalization of action, actors routinely - and for most part without fuss - maintain a continuing 'theoretical understanding' of the grounds of their activity. He is quick, however, to caution that such an understanding should not be equated with the discursive giving of reasons for particular items of conduct, nor even with the capability of specifying such reasons discursively. However, other competent agents expect - and it is the main criterion of competence applied in day-to-day conduct - that actors will usually be able to explain most of what they do, if asked. It is this notion of an assumed competence of actors that is of interest to our argument. As we will soon show through the work of other researchers, this notion of assumed 'competence' of actors is not always sufficient.

It is common knowledge that individuals and even groups would not be unnecessarily asked to give reasons for their conduct. There are, however, many instances, especially where the actions of such actors are decisions which have some social implications, when the giving of discursive reasons becomes necessary. In other words, there are many instances where there is a need for an individual or a group to justify their decision to others. Bacharach *et al.* (1995), quoting Festinger, Janis & Mann, and Wallster & Wallster note that decades of social psychological research suggest that one of the primary factors shaping human decision making is the anticipation of post-decision anxiety and the decision maker's consequent need to reduce it. They indicate that in organizations, a primary source of this anticipatory anxiety is *accountability*. Underlying every managerial hierarchy in complex organizations is some norm of accountability. Again quoting Tetlock (1985, p.307), Bacharach *et al.* (1995) go on to say:

> 'Accountability is a critical rule and norm enforcement mechanism; the social psychological link between individual decision makers, on the one hand, and the social systems to which they belong, on the other. The fact that people are accountable for their decisions is an implicit or explicit constraint upon all consequential acts they undertake (if I do this, how will others react ?).'

According to this norm of accountability, in order to reduce post-decision anxiety, decision makers must be able to explain their decisions as justified and therefore legitimate. According to Bacharach *et al.* (1995), decisions must be justified not only to those whom the decision maker is directly accountable to, but also to others (e.g., peers, self, subordinates). Toulmin *et al.* (1979) agree with this by saying:

> 'It is helpful to start a suitable process of "inoculation", by which we expose our most cherished ideas to systematic attack and begin on the task of building up a more adequate body of reasons in advance of a serious challenge. This may allow us to develop our critical faculties in a way that prepares us to deal more robustly with future attacks on our beliefs.'

De Hoog and Van der Wittenboer (1986) noted:

> 'Parliamentary systems of democratic governments are based on the principle that governments have to justify and defend their decisions before an assembly of representatives of the nation. Although the obligation to justify one's decision occurs rather often, this phenomenon has not received much attention from decision theorists. Research tends to focus more on the limited cognitive information processing capability of the human decision maker, while the prevailing psychological viewpoint is that the "social" aspect of decision making is being neglected.'

In South Africa this need for decision justification goes well beyond the parliamentary system into the rest of the civil society. Section 33 of the New Constitution of South Africa talks about the right to administrative justice, where every member of the society has the right to administrative action that is lawful, reasonable and procedurally fair. It states that everyone whose rights have been adversely affected by administrative action has the right to be given written reasons.

Our intention in this paper is to demonstrate that approaches can be developed (we describe one of them) to help prepare groups for a decision justification process in order to satisfy this norm of accountability as described by Bacharach *et al.* or just to be ready in case of a challenge. We believe that the approach described has important implications for user training in GSS applications. The literature has surprisingly little to say about the subject: users are, it would seem, simply assumed to be competent actors who would, when involved in a group decision making process, contribute naturally to the process. The process, led by a competent facilitator using an established GSS, steers the group towards a group decision with ease, achieving much in terms of process gains, as pointed out by GSS researchers. What is unfortunately forgotten, however, is that the members of the group have in the process lost any form of rational reasoning which might in situations as described above, afterwards be necessary to justify its decisions. The group has, in effect, just become a synergistic whole creating lists of ideas which are prioritised and fleshed out with action items. We would not argue that this does not have its place in the broad spectrum of group decision making activities. We do believe, however, that when justification of group decisions are called for, one has to do better than providing stimuli for the mental activities of a group of people and structuring the resultant cognitive results.

We describe in this paper our observations made during the presentation by the first author of a module on systems and decision making for masters students in the Department of Informatics at the University of Pretoria in South Africa. The module was presented during the period July – October, 2000 and embodied a framework to prepare groups for group decisions where justification of the decisions made is called for. Our observations were made while acting as observing participants as described by Bernard (1988) in Ngwenyama (1996) during the presentation of the module.

Four main reasons therefore motivated us to undertake this pilot study to form the basis for future field experiments:

a. There are very few suitable textbooks linking systems thinking and decision making which one could easily use. The only exception we could find is the book by Daellenbach (1994).

b. It was also our intention to structure and present the module in such a way that the students *learn* and at the same time *practice* the skills of systems thinking and decision making. In other words, we wanted to teach a *systems and decision making* module by using a *systems and decision making* approach.

c. We wanted to see whether Toulmin's schema of reasoning (Toulmin *et al.* (1979)) used in combination with systems thinking concepts could serve as a good organizing framework to prepare groups for a decision justification process which could suitably be supported by any GSS software.

d. Although Group Support Systems researchers do mention user training as one of the critical success factors in GSS applications (simply mentioning " provide extensive and proper training of users", Turban (1998), p370)), there is virtually no attention paid to how this training could be conducted or how the skills of the group to be supported could be acquired. They tend to focus their research more on the facilitator and the GSS technology itself. We thus wanted to establish a comparison basis for future studies on user training in GSS applications.

The module described was structured into four broad themes. Each theme is briefly discussed below in Sections 2.1 – 2.4, indicating the learning activity undertaken by the group and points to the relevant references for the reader. The schema of reasoning as presented by Toulmin *et al.* (1979) was introduced together with the first theme. Observations, lessons learned and implications for user training are discussed after the themes and the paper concludes with a discussion on further research work. Attached to the paper are teaching notes for instructors and a complete reading list for the module.

Judging the module on the basis of the content of each theme, one can immediately label it as over-ambitious, especially because it constitutes only a third of one prescribed masters course. However, the content of the themes was carefully packaged into a sufficiently balanced module to achieve the intended outcome.

We conclude this introduction by mentioning at the outset that we are aware of the limitations of our study. First, researchers in GSS are in agreement that because of a myriad of important variables that could be examined in the study of GSS, it is difficult to pinpoint those to be studied.

Kerr (1982, p.62), e.g., puts it as follows:

> "Social interaction in decision-making groups is characterized by such variety, complexity, and apparent disorder that it seems to defy neat analysis. The key difficulty seems to be choosing an appropriate aspect of the group's behavior for observation"

Secondly, while many researchers in GSS have used students as subjects in laboratory experiments, Introna and Whitley (1999) has presented a very valid critique of the general validity of such results. However, the nature of our research interest makes the context of our study a 'natural setting' according to Pettigrew (1985). In addition, Nunamaker *et al.* (1991) noted that foregoing laboratory research in favour of an exclusive focus on field research is not a viable answer, given the difficulty to assemble groups, measure phenomena, and assign cause and effect in the field.

2. THE LEARNING PROGRAMME OF THE GROUP

The group consisted of five students in a Master of Commerce in Information Systems programme. The module took four sessions of three hours each. A complete work programme was given to the students at the beginning of the module (see teaching notes for instructors). They had to read a selected set of articles for each theme. (The complete reading list for the module is included in the attached teaching notes for instructors.) Each theme was completed during one session. The sessions were facilitated by the first author and they included discussions of the prescribed literature, assignments, presentations by the students and scheduling for each subsequent session/theme. The students completed a ten page assignment for each session/theme. The facilitator was able to assess the learning progress of the students through their written

assignments, presentations during sessions and the degree to which they were able to appropriately critique the literature.

Central to the students' programme was the use of Toulmin's schema of reasoning, applied within a Systems Thinking paradigm. Each student used the Unified Systems Hypothesis (USH) proposed by Hitchins and Shrivenham (in Jackson *et al.* (1991)) to construct their own conceptual 'systems view' on the Mozambique flood disaster situation (see below).

2.1 Session One:An Overview of Systems Concepts

In order to remove the notion of a classroom lecture situation, a module handout was given to the students emphasizing that the sessions will be conducted in a meeting format. The lecturer is the learning process facilitator and does not necessarily know 'how to make good decisions'. The complete agenda is attached (see teaching notes for instructors). Additional reading on the work of Ackoff (in Emery (1969)) and Toulmin *et al.* (1979) was given and also briefly discussed during the meeting. Each student was given an opportunity to lead a discussion based on one article. The facilitator made a presentation on various models of decision making, including those of Simon in Harrison (1981) and the strategic choice approach developed by Friend and Hickling (1997). There was a discussion on how an understanding of systems could assist in the complex task of decision making. At the end, the students were required to hand in a ten page assignment a week before the next meeting on the following topic:

An application of USH to the Mozambique flood disaster situation; arguments to be presented using Toulmin's Schema of reasoning.

The assignment was based on a flood disaster which befell Mozambique, a poorly resourced African country sharing a border with South Africa. In February 2000, the devastating floods destroyed almost the entire infrastructure in Mozambique and many lives were lost. South Africa, together with many other countries of the world, provided support, first on rescue operations and later with some resettlement and relief support. The students had to conceptualise all this using the USH and then make a claim about their conceptualisation. Their claim was to be supported using Toulmin's schema of reasoning.

More on Toulmin's schema of reasoning and the need for decision justification

According to Toulmin *et al.* (1979), when certain types of utterances, assertions or claims are made, it is expected of us to support them by giving reasons. The process of giving reasons is called *reasoning*. The importance of reasoning is perhaps best introduced by the following example given by Toulmin:

> ' a guest professor was directing a seminar when a student asked him, "Professor Black, the statement you just made is quite different from what you said this morning. Aren't you contradicting yourself ?". The professor simply answered , "No", and proceeded to relight his pipe. The students waited , expecting him to add reasons in support of this negative response as soon as the pipe was going again. Instead the professor looked up and remained silent, as if waiting for the next question. The group shuffled nervously, and finally there was embarrassed laughter. Later on, the student who asked the question was heard to say he felt that the professor had put him down. He was angry. The professor had violated a strong social demand requiring him to provide reasons for disagreeing with his questioner' [Toulmin, 1979, p. 4].

The practice of providing reasons for what we do, or think, or tell others we believe is built firmly into our accepted pattern of behaviour. This is so much the case that situations in which people fail to supply voluntarily the reasons we are expecting can be shocking or humorous as seen in the example above.

Toulmin identifies six elements that can be found in any wholly explicit argument. These are: *Claims, Grounds, Warrants, Backing, Modal qualifications* and *possible Rebuttals.*

Claims: When we are asked to embark on an argument, there is always some 'destination' we are invited to arrive at, and the first step in analysing and criticizing the argument is to make sure what the precise character of that destination is. So the first set of questions is:

What exactly are you claiming? Where precisely do you stand on this issue? What position are you asking us to agree to as the outcome of your argument?

Grounds: Having clarified the claim, we must consider what kind of underlying foundation is required if a claim of this particular kind is to be accepted as solid and reliable. The next set of questions will therefore have do to with these foundations:

What information are you going on? What grounds are your claim based on? Where must we ourselves begin if we are to see whether we can take the step you propose and so end by agreeing to your claim?

Warrants: Knowing on what grounds a claim is founded is, however, only the first step towards getting clear about its solidity and reliability. Next we must check whether these grounds really do provide genuine support for this particular claim. So the next set of questions is:

Given that starting point, how do you justify the move from these grounds to that claim? What road do you take to get from this starting point to that destination?

Backing: Warrants themselves cannot be taken wholly on trust. Once we know what rule or law, formula or principle, is being relied on in any argument, the next set of questions can be raised:

Is this really a safe move to take? Does this route take us to the required destination securely and reliably? And what other general information do you have to back up your trust in this particular warrant?

Modal qualifiers: Not all arguments support their claims or conclusions with the same degree of certainty. Some warrants lead us to the required conclusion invariably; others do so frequently, but not with hundred percent reliability; others do so only conditionally, or with significant qualification - "usually," "possibly," "barring accidents," and so on. So, the next set questions is:

Just how reliable does this warrant lend weight to the given step from grounds to claim? Does it absolutely guarantee this step? Does it support it with qualifications? Or does it give us, at most, the basis for a more-or-less risky bet?

Possible rebuttals: Unless we are faced by one of those rare arguments in which the central step from grounds to claim is presented as " certain" or "necessary", we shall also need to know under what circumstances the present argument might let us down. Hence the final set of questions:

What kinds of factors or conditions could throw us off the road ? What possibilities might upset this argument? And what assumptions are we implicitly relying on in trusting such a step?

The *basic pattern of analysis* as presented by Toulmin is then summed up in the following diagram:

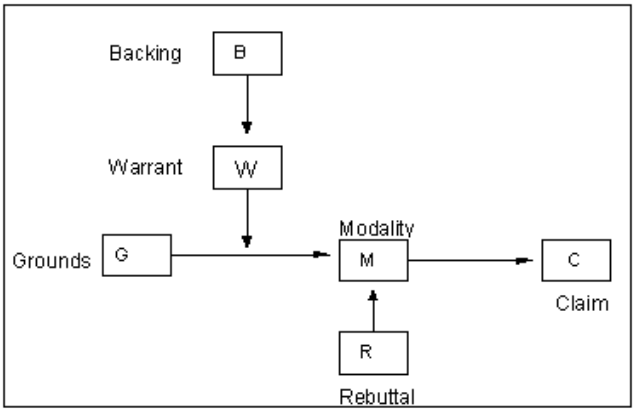

Figure 1: *Logical structure of argument (source: Toulmin et al. 1979, p. 78)*

> "Given grounds, **G**, we may appeal to warrant, **W** (which rests on backing **B**), to justify the claim that **C** - or at any rate, the presumption (**M**) that **C** - in the absence of some specific rebuttal or disqualification (**R**)."

Having understood the logic encapsulated in systems concepts and Toulmin's schema of reasoning, and having demonstrated their understanding through conceptualising a real life problem situation, the students were ready to engage in a broader systems thinking mode.

2.2 Session Two: Systems Thinking, Problem Structuring Methods and Ethics in Decision Making

The procedure remained the same as in the first meeting. Once again the students took turns in leading the discussions on one of the prescribed articles (see teaching notes for instructors). The facilitator then summed up the session discussions on the board. The students were ready to do their second assignment (see teaching notes for instructors).

2.3 Session Three: Critical Systems Thinking (CST)

The facilitator made a presentation on critical systems thinking based on the work of Jackson *et al.* (1991) and Midgley (*op. cit.*). The five 'commitments' of critical systems thinking as presented by Jackson were analysed and discussed. The article by Midgley on what it means to be critical about systems was also discussed.

After the presentation by the facilitator, each student was given 30 minutes to make a presentation on his or her work on the 'messy problem' (the second assignment). The students were given an opportunity to grade each other based on the presentations and how well they thought their colleagues succeeded in answering questions. Feedback from the students after this session indicated a great level of understanding and satisfaction.

There was no discussion about Information Systems and the students were given an additional reading on the work of Hirschheim and Klein (1994).

2.4 Session Four: The Use of GSS and Toulmin's Schema of Reasoning

This was the last session. Here the students brought together all their knowledge about systems, systems thinking, critical systems thinking, problem structuring methods, decision making and ethics as well as information systems design ideals. They were to use all their knowledge and reflect on their individual claims about the Mozambique flood disaster situation. The requirement was that they submit their cherished individual claims to the rest of the group for an argument in accordance with Toulmin's Schema of reasoning and then come up with a 'consensus claim' of the group. They did this through an electronic meeting in a Group Decision Room (GDR) facility. The software used in the GDR was GroupSystems, a well-known GSS (although not yet well explored in South Africa) which was originally developed at the University of Arizona in the USA.

Standard preparations (see Nunamaker *et al.* (1991), De Vreede *et al.* (2000)) in conducting this kind of electronic meeting were followed, except that we were not interested in measuring any aspect of the group's behaviour. Our interest was rather on the justification process followed by the group, based on their broad understanding explained in the sessions above. In other words, our interest was more on the "thinking" and the "sense-making" of the group *prior* to the use of the GSS. We wanted to make some observations as to *whether* and *how* the group engages in a critical reflection based on this "thinking" as they use the GSS software to support them in the justification process.

3. RESULTS OF SESSION FOUR

The technical set up of the Group Decision Room together with the functioning of the GroupSystems software were briefly explained to the group. The agenda of the meeting had been distributed beforehand and was displayed just to refresh the participants' minds.

The group used their individual claims from the first assignment, typed them into the categorizer facility of GroupSystems following Toulmin's schema of reasoning. The facilitator observed the intensity of their arguments as they converged towards a consensus claim. Finally, the group reached the following consensus claim:

***Claim*:** *Mozambique's dependent and unsophisticated socio-economic infrastructure contributed to the fact that they would not have been able to deal with the flood situation effectively without international help. This international help can be supplied by South Africa's infrastructure but international relief funds should be channelled through South Africa to help.*

Grounds: *Mozambique is poorly developed : she is one of the poorest countries in the world and officially the one most dependent on foreign aid. South Africa is one of the most feasible countries to assist her and to channel relief funds.*

Backing: *Based on the statistics/history from previous national disasters.*

Warrants: *For a country to help itself in times of a disaster it must have a developed infrastructure. Countries with developed infrastructure and sufficient funds can help those in need, and if they have the infrastructure, but not the funds, and they are the best to do the job, funds should be provided by those who have the funds but are not the best to provide help.*

Modal qualification: *Which leads us to think ...*

Possible Rebuttal: *Mozambique might have been able to help itself if they tried hard enough. Other countries might not really have enough resources to help Mozambique and why should they have to help if they do not want to?*

4. OBSERVATIONS

Observation 1: The students were able to consciously and critically reflect on what kind of support they needed from the GSS software in assisting them to accomplish their task. Evidence to this could be found in the following statements by the participants:

"... is it not better to look at one person's claim, deal with it and complete it before we moved to the next one ?"

" No, I do not think that is better; you see, I think the power behind this GSS is precisely that fact ... to be able to engage in more than one issue at the same time. That way we can simultaneously be able to see everyone else's claim..."

Observation 2 : Toulmin's schema of reasoning enabled the group to see transparently the audit trail of their arguments as they converged towards a consensus claim. A participant remarked with great satisfaction:

"...yes, we have actually reached a consensus..., and I can see how."

Observation 3: The knowledge of the students about systems thinking and critical systems thinking enabled them to discover some of the design considerations embedded in the GSS software as demonstrated in the following remark:

"...can I change the submission I have just made about my backing? OK, so only the facilitator can do that after everyone else has seen it. It means I have to be more careful before submitting"

Observation 4 : The students acknowledged in their written evaluation at the end of the module that the kind of thinking skills they acquired in the module enabled them to look at issues in a much broader context than usual.

5. LESSONS LEARNED: THE IMPLICATIONS FOR USER TRAINING IN GSS APPLICATIONS

One can very easily argue that the observations mentioned above could as well have been made from any other group, whether they went through the kind of learning programme we have described or not. This may or may not be true. We have not found comparative studies from the GSS research literature focusing on *prior training* of groups before using GSS software. It is not our intention to speculate about the possible reasons for the lack of such a study because we are aware of the myriad of conditions facing GSS researchers for a possible investigation. For us, the observations are significant and we will attempt to present their implications as follows:

First, each individual coming to a GSS software facilitated session comes with an agenda, expecting the other people to listen to him/her, and if possible to accept his/her viewpoints. For this to happen he or she must present a good argument which is compelling and make sense to the rest of the group. This sense making and shared understanding has to happen *before* the use of GSS technology. This is where prior knowledge of soft systems thinking by all group members could be helpful. Once this has happened, the issue under consideration becomes "harder" and the use of technology is likely to deliver benefits. Training of group members in systems thinking before the use of GSS software could thus be expected to be beneficial.

Secondly, GSS researchers repeatedly point to the need of an appropriate framework, structure or protocol to be used in conjunction with GSS. They are, however, cautious to indicate which one is likely to be useful for all group situations (see DeSanctis and Gallupe, 1987), although they accept that in general, adding structure to the decision process positively impacts decision outcomes. We concluded that Toulmin's schema of reasoning could be a very suitable and flexible structure which could successfully be used with any GSS software. Training groups on how the schema could be used in different contexts of an argument could better prepare the group to use any GSS not just to complete their decision-making task, but also to provide a very clear audit trail of the process they have followed to reach their goal.

Thirdly and lastly, it is a fact that behind every GSS there is a design ideal; an ideal which encapsulates the designer's desire to support the group in achieving their goal. Very often this is hidden from the users as to which aspects in their goal could best be supported. Our view is that training the users along the lines we have presented here could benefit both the designers and the users as GSS design should always be evolutionary. We observed that trained users are able to pick up the hidden design principles of the designer - for instance, the principle of parallel communication in GroupSystems which is aimed at addressing the problem of "process losses" in ordinary meetings.

6. FURTHER RESEARCH

We described a training programme which was presented as a pilot study. The pilot study provides the basis for field experiments in which a number of issues with implications for user training in GSS applications could be investigated:

- User training in systems thinking and Toulmin's schema of reasoning seems to provide users with a suitable and flexible framework which could be used in conjunction with GSS, and which could be useful in the process of justification of group decisions.

- Users of GSS are not just consumers of the products. Properly trained in systems thinking and Toulmin's schema of reasoning, they could be able to add more value during the evolutionary design process of GSS development.
- Furthermore, even the harder problem facing GSS researchers, namely, *what to study*, could be addressed through systems thinking as *part* of a training programme of the group. There is therefore a need for a move towards "*thinking support systems*" as a "*training intermediary*" prior to the use of any GSS software.

We hope that researchers will consider conducting some comparative studies (users trained in systems thinking and Toulmin's schema of reasoning vs untrained users of GSS) in order to investigate the merits of the issues we have raised.

REFERENCES

Angyal, A. (1941). *Logic of Systems*. In Emery, F.E. (ed.) (1969). *Systems Thinking: Selected Readings*, Penguin, Harmondsworth, Middlesex.

Bacharach, S.B., P. Bamberger, and B. Mundell (1995). Strategic and Tactical Logics of Decision Justification: Power and Decision Criteria in Organizations. *Human Relations*, 48 (5), 467- 488

Daellenbach, H.G. (1994). *Systems and Decision Making*, Wiley, Chichester.

De Hoog, R. and G. Van Der Wittenboer (1986). Decision Justification, Information Structure and the Choice of Decision Rules. In Brehmer *et al*. *New Directions in Research on Decision Making*. Elsevier Science, Amsterdam.

Desanctis, G and R.B. Gallupe (1987). A Foundation for the Study of Group Decision Support Systems. *Management Science*, 33 (5), 589 – 609.

Friend, J. K. and A. Hickling (1997). *Planning under Pressure: The Strategic Choice Approach*. Butterworth – Heinemann.

De Vreede, G-J., R.J.S. Mgaya, J.C. Schuuring, B. Cornelissen and R.W. Feenstra (2000). Comparison of the Impact of Electronic Meeting Technologies in Two Less Developed Countries. In *Proceedings of the IFIP WG9.4 Conference on Information Flows, Local Improvisations and Work practices, Cape Town, May 2000.*

Giddens, A. (1984). *The Constitution of Society*. University of California Press, USA

Harrison, E.F. (1981). *The Managerial Decision Making Process*. Fourth edition. Houghton Mifflin, Boston.

Hirschheim R.J. and H.K. Klein (1994). Realizing Emancipatory Principles in Information Systems Development: The Case for ETHICS, *MIS Quarterly*, 18(1), 83-109.

Introna, L.D. and E.A. Whitley (1999). About Experiments and Style: A Critique of Laboratory Research in Information Systems. *Information Technology an d People*, 1(13), 161-173.

Jackson, M.C., G.J. Mansell, R.L Flood, R.B. Blackham and S.V.E. Probert (1991). *Systems Thinking in Europe*. Plenum Press, New York and London.

Kerr, N.L. (1982). Social Transition Schemes: Model, Method, and Applications. In BRANDSTATTER, H. *Group Decision Making*, Academic Press, New York.

Klein, H.K. and R.J. Hirschheim (1996). The Rationality of Value Choices in Information Systems Development, *Foundations of Information Systems,* September 26, 1996. http://www.cba.uh.edu/~parks/fis/kantpap.htm

Ngwenyama, O.K. (1996). Intensive Research into Organizational Processes: An approach to empirical studies of IT in Organizational Processes. Research Tutorial, University of Pretoria.

Nunamaker, J.F., A. Dennis, J.S. Valacich and D.R. Vogel (1991). Information Technology for negotiating groups: Generating options for mutual gain. *Management Science*, 37 (10), 1325-1346.

Pettigrew, A. (1985). Contextualist Research and the study of organizational change processes. In Mumford E. *et al*. (eds.). *Research Methods in Information Systems*. North Holland, Amsterdam.

Rosenhead J. (1996), What's the problem? An Introduction to Problem Structuring Methods, *Interfaces* 26 (6).

Toulmin, S., R. Rieke and A. Janik (1979). *An Introduction to Reasoning*. Macmillan, New York.

Turban, E. and J.E. Aronson (1998). *Decision Support Systems and Intelligent Systems*. Fifth Edition. Prentice Hall, N.J.

TEACHING NOTES

MAIN LEARNING POINTS

The objective of this module is to expose the student to various approaches to decision making within a systems thinking paradigm and to prepare the student for the justification of group decisions. Upon successful completion of the module, the student will:

- Be acquainted with a systems approach in general and a systems thinking approach to decision making
- Understand the difference between structured and messy problems
- Understand Toulmin's schema of reasoning and its application to justification arguments
- Understand the principles of critical systems thinking
- Have gained some experience in the use of Group Decision Support Systems.

MEETING SESSIONS AND THE STRUCTURE OF THE MODULE

The module will be presented in the form of meeting sessions. The relevant literature, references, notes and reading material will be given beforehand to the students. Students will use these to prepare for each meeting. Meetings will be participatory, discussion focused, and very often students will be asked to make short, verbal presentations. The lecturer will serve as a facilitator and may request any student at anytime during a meeting to assume a facilitating role for sometime, while discussing an aspect for which the student has demonstrated sufficient understanding.

ASSIGNMENTS AND EVALUATION

An assignment will be given during each meeting. Assignments are designed in such a way that they form the core for each next meeting. The students must therefore complete them with some thoroughness.

Each assignment will be evaluated by the lecturer on the basis of thoroughness, understanding, appropriate literature interpretation and presentation. Each of the four assignments will contribute 25% of the module mark.

MEETING SESSIONS SCHEDULE

MEETING 1

An overview of systems concepts

1.1 A Logic of Systems (Angyal, in Emery (1969), p. 17)

1.2 Systems approach as a style: a hermeneutics of systems (Gasparski, in Jackson *et al*.(1991))

1.3 A Unified Systems Hypothesis (Hitchins and Shrivenham, in: Jackson *et al.* (1991))

Assignment 1

An application of USH to a recent catastrophic evironmental event (floods disasters, earthquake, etc); arguments to be presented using Toulmin's schema of reasoning. Additional notes and information will be discussed during the meeting.

[**Due date: one week before the next meeting**]

MEETING 2

Systems thinking, problem structuring methods and ethics in decision making

2.1 Systems thinking and concepts (Daellenbach (1994), Chapters 2&3)

2.2 Structured vs messy problems (Rosenhead (1996))

2.3 Ethics as a basis for decision making (Daellenbach (1994), Chapter 20, p. 529)

Assignment 2

Contextual applications to real life problem encounters: find a messy problem (motivate sufficiently why the problem qualifies as messy), preferably from your own work environment and apply Systems Thinking concepts and approach in solving it. Clearly highlight some of the ethical considerations in your solution process.

[Due date: one week before the next meeting]

MEETING 3

Critical systems thinking (CST)

3.1 Elements/commitments of CST (Jackson *et al*. (1991), p. 61)

3.2 Selected readings (Jackson *et al*. (1991), p. 397-419)

Assignment 3

Argue the conceptual merits or otherwise of designing an Information System using CST.

[**Due date: one week before the next meeting**]

MEETING 4

DSS design ideals, their applications and the role of the facilitator

4.1 Some design ideals of DSS. Examples: SCA(STRAT)/IDON/ Facilitator

4.2 The Role of the facilitator in using DSS applications (an invited external lecturer)

Assignment 4

Electronic meeting on assignment 1. Based on the merits of individual arguments presented in assignment 1, the group must "agree" on a group strategy. This will be done through the use of a Group Decision Room.

[Due date: depends on availability of GDSS Room and student schedules]

STUDY AND REFERENCE MATERIAL FOR THE MODULE

Boland, R.J., A.K. Maheshwari, Dov Te'eni, D.G. Schwartz and R.V. Tenkasi (1992) Sharing Perspectives in Distributed Decision Making, ACM Conference Proceedings on Computer-supported Cooperative Work, p. 306 – 313.

Checkland, P (1990). *Soft Systems Methodology in Action*. Wiley, Chichester.

Checkland, P. and S. Holwell (1998). *Information, Systems and Information Systems*, Wiley, Chichester.

Churchman, C. W. (1971). *The Design of Inquiring Systems*, Basic Books, New York.

Daellenbach, H.G. (1994). *Systems and Decision Making*, Wiley, Chichester.

Dyer, J. F. and E.H. Forman (1992). Group Decision Support with the Analytic Hierarchy Process, *Decision Support Systems*, 8(1), 99-123.

Flood R.L. and M.C. Jackson. (1991). *Creative Problem Solving. Total Systems Intervention,* Wiley, Chichester.

Friend, J.K. and A. Hickling (1997) *Planning under pressure: The Strategic Choice approach*, Butterworth – Heinemann, 1997

Hirschheim R.J. and H.K. Klein (1994). Realizing Emancipatory Principles in Information Systems Development: The Case for ETHICS, *MIS Quarterly*, 18(1), 83-109.

Jackson, M.C.(1992). An Integrated Programme for Critical Thinking in Information Systems Research, *Journal of Information Systems*, 2, 83-94.

Jackson M.C. (1994). Critical Systems Thinking: Beyond the Fragments, *Systems Dynamics Review*, 10 (2-3), 213- 229.

Jackson M.C.(1995). Beyond the Fads: Systems Thinking for Managers, *Systems Research*, 12, 25-43.

Klein, H.K. and R.J. Hirschheim (1996). The Rationality of Value Choices in Information Systems Development, *Foundations of Information Systems*, September 26, 1996. http://www.cba.uh.edu/~parks/fis/kantpap.htm

Mintzberg, H., D. Raisinghani and A. Theoret (1976). The Structure of "Unstructured" Decision Processes, *Administrative Science Quarterly*, June, 246-275.

Ngwenyama, O.K, N. Bryson and A. Moblurin (1996). Supporting facilitation in group support systems: techniques for analyzing consensus relevant data, *Decision Support Systems* 16, 155-168.

Rosenhead, J. (ed.) (1989). *Rational Analysis for a Problematic World*, Wiley, Chichester.

Rosenhead, J. (1996), What's the problem? An Introduction to Problem Structuring Methods, *Interfaces* 26 (6).

Saaty T.(1994). How to Make a Decision: The Analytic Hierarchy Process, *Interfaces*, 24(6), 19-46.

Simpson, L. (1996). Do Decision Makers Know What They Prefer? *Journal of the Operational Research Society*, 47(7), 919-929.

Taket, A. and L. White (1997). Wanted Dead Or Alive - Ways of Using Problems Structuring Methods in Community OR, *International Transactions in Operational Research*, 42(2), *99-108.*

White, L. and A. Taket (1997). Beyond appraisal: Participatory Appraisal of Needs and Development of Action (PANDA), *Omega, International Journal of Management Science*, (25)5, 523-534.