The Multiple Perspectives Approach as a framework to analyse social systems in a developing country context

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Abstract: The Multiple Perspectives Approach (MPA) of Mitroff and Linstone is presented here as a promising framework to analyse messy social systems in a developing world context, and in particular to analyse the social context into which information systems are introduced in this environment. Two applications of the framework are discussed, one in a poverty alleviation context and the other as part of a Masters course in Systems and Decision Making. The MPA has to date only been described at a very high level, and needs to be translated into a method. In both cases, methods were tried out to generate Multiple Perspectives on a problem situation, namely Technical, Organisational, Personal, Ethical and Aesthetic perspectives. In the second case, the use of a Group Support System (GSS) was evaluated as a means to reach perspective synthesis. It is shown that the MPA succeeded in broadening analysts' perspectives on a messy problem, and that the appropriate use of GSS can assist with perspective synthesis.

Keywords: multiple perspectives, unbounded systems thinking, information systems theory, group support systems, decision support, developing countries.

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1. INTRODUCTION

The Multiple Perspectives Approach is presented here as a framework for analysing messy social systems. From a systems perspective, the approach is holistic and comprehensive. However, it is a philosophy more than a method, and thus a challenge to use in practice. To date, the authors have been involved in its application to two multidimensional South African social systems. In the process, much frustration was experienced, but a large amount of learning also occurred, the essence of which will be reported here. The Multiple Perspectives Approach, with some operational guidance added, is believed to have value as a general systems analysis framework, but in particular for use on messy social problems. In this respect, it could be applied to analyse the difficult social context in which information systems are introduced in developing countries.

The main challenge posed in this paper is that of applying the Multiple Perspectives Approach (MPA) in practice. It has been identified as a new and promising approach for studying messy social systems (Mitroff and Linstone 1993, Courtney 2001). When the authors first attempted to apply it (Turpin 2006, Meyer et al 2007), it was found to lack practical guidance as to its use. In the two studies reported on, several methods have been tried and evaluated that could be used in its application. The areas of the MPA that lacked most clarity as to its application were the Ethical and Aesthetical perspectives as well as perspective synthesis. Of the studies discussed below, the first resulted in a possible means to deal with the Ethical perspective, and the second study with suggestions to capture the Aesthetical perspective and perspective synthesis.

Two case studies were undertaken in the application of the MPA. In the first study, a multidimensional poverty alleviation programme was analysed, using a combination of secondary data and interviews (Meyer et al 2007). The second study occurred in a teaching context, where the students involved each acted as an analyst. The exercise was done as part of an experiment designed within the curriculum of an information systems Masters course. This paper summarises the first study and largely focuses on the second study.

The rest of the paper is organised as follows. We mention the issue of messy problems, after which the MPA is introduced as a suggested way to deal with such problems. The first case study, where the MPA is applied in a poverty alleviation context, is briefly discussed. This is followed by a presentation of the second case study where the MPA is applied in a teaching context. We conclude with what we learnt from trying out the MPA philosophy in practice, including the use of group support systems to reach perspective synthesis.

2. MESSY PROBLEMS

A mess or a wicked problem is a complex issue that contains a high level of uncertainty and disagreement (Pidd 2003:61). There are multiple ways to describe and define the situation, and it is not possible to know upfront whether a solution exists, let alone how to arrive at it. A problem, in contrast, may not be easy to solve but is at least well formulated. Pidd regards a mess as a set of interrelated problems. According to Rosenhead and Mingers (2001),

traditional problem-solving or systems approaches are not suited to deal with messes. Courtney (2001) suggests the use of the Multiple Perspectives approach to assist with decision support in an age where societal problems are increasingly messy in nature.

3. THE MULTIPLE PERSPECTIVES APPROACH

The Multiple Perspectives approach to problem solving is introduced by Mitroff and Linstone (1993). It is based on what they call unbounded systems thinking, namely "sweeping in" as many perspectives as possible on a situation when analysing it. This approach is introduced to decision support system practitioners by Courtney (2001), who uses it as a basis for a new paradigm in decision support. Courtney's work has attracted significant interest, as can be seen in e.g. Cil et al (2004), Chae et al (2005), Hall et al (2005), Hall and Davis (2007) and Petkov et al (2007).

The Multiple Perspectives approach is believed to be attractive for two reasons. Firstly, its underlying philosophy is well expressed and very satisfactory from a systems point of view. It attempts to incorporate the methods of inquiry of four philosophical schools, namely the inductive-consensual school, represented by Locke, the analytic-deductive school, represented by Leibniz, the multiple realities school, represented by Kant, and the dialectic school, represented by Hegel. These schools of inquiry are integrated and enriched by what Mitroff and Linstone (1993:90) introduce as Unbounded Systems Thinking (UST), based on Singer's and Churchman's work that refers to the interrelatedness and inseparability of all systems. UST is translated into an approach called the "Multiple Perspectives Concept or Method" (1993:97). From here onwards, this will be referred to as the Multiple Perspectives Approach (MPA) as it is more of an approach than it is a method. The MPA classifies the possible perspectives on a situation into the categories of Technical, Organisational, Personal, Ethical and Aesthetic. The Technical (T) perspective reflects the scientific method as found in science and engineering, and thus any rational approach to problem-solving (Mitroff and Linstone 1993:101). The Organisational (O) and Personal (P) perspectives represent the respective subjective views of the groups (formal and informal) and individuals involved. Mitroff and Linstone's discussion and examples focus on the T, O and P perspectives, while the Ethical (E) and Aesthetic (A) perspectives are added as an afterthought and not elaborated on.

The second reason for the MPA's attractiveness is that it can be used to address three of the sociological paradigms given in the classic paper by Burrell and Morgan (1979), namely the functional (T perspective), interpretive (O and P) and radical humanist (E) paradigms. These correspond quite closely with Habermas's three interests, namely technical, practical and emancipatory (Mendelsohn & Gelderblom, 2004). Nepal and Petkov (2002) present a framework that also attempts to cover these three paradigms with a particular combination of methods. However, their framework differs from the MPA in that it uses Critical Systems Thinking (Jackson, 2000) as a philosophical foundation.

The MPA is an attractive framework but has been found to pose a major challenge, namely that it is a philosophy more than a method, and contains little guidance as to how it should be implemented in practice. As will be described below, an attempt was made to apply it to the analysis and evaluation of a South African poverty alleviation programme. The project team had to do some hard thinking and improvisation to "operationalise" the MPA, the lessons of which are currently being recorded and will be briefly summarised.

3.1. Previous work: applying MPA to a poverty alleviation programme

During 2004 – 2007, the Council for Scientific and Industrial Research (CSIR) in South Africa embarked on a research project where a combination of systems approaches were used to study the effectiveness of the South African Poverty Alleviation System. This system was not formally defined and managed, and was assumed to consist of the combined poverty alleviation efforts of multiple government departments, non-government organisations (NGOs) and other role-players. In one of the case studies undertaken, the MPA was used to study the effectiveness of the Community Based Public Works Programme, an initiative of the National Department of Public Works. This programme was meant to assist with job creation and skills development while maintaining government's public buildings and facilities across the country as well as building new infrastructure for communities. A new process was created where local contractors from poor communities were employed and trained to do building and maintenance, instead of using large established contractors. The Programme was carried out country-wide and spanned all levels of government, namely national, provincial and local. It contained all the challenges of coordination, implementation and interfacing with the poor that the CSIR team wished to study. At the time of the CSIR research project, the first phase of this Programme had been completed and documented, leading to easier access to both operation-oriented and reflective information on the Programme.

3.1.1. MPA application

The CSIR research team was a multidisciplinary group, consisting mostly of experienced Operations Researchers and IS practitioners with a keen interest in decision support in messy environments. They attempted to apply the MPA in such a way that the project would benefit from the expertise of the various team members. The T perspective was developed making use of available expertise in Systems Engineering as well as Operations Research. The system around the Programme was defined at a high level, and various Systems Engineering diagrams were drawn to map flows and processes occurring during the design and execution of the Programme. The O and P perspectives were obtained by means of interviews and an assessment of documentation and reports on the Programme, carried out by a researcher with knowledge of the social aspects that surround facilities planning in South Africa. The O perspective was enriched by a comparison of the Programme's design with an evaluation approach from Organisational Design literature undertaken by an MBA graduate. Whereas the research team could make use of Mitroff and Linstone's (1993) guidelines as well as a case study for the application of the T, O and P perspectives, there was no help provided by either Mitroff and Linstone (1993) or Courtney (2001) for generating the E and A perspectives. For the E perspective, the team decided to apply Ulrich's (2002) Critical Systems Heuristics as well as Kass' (2001) model, the latter which was developed for health systems. After some debate, the A perspective was shelved, since the team could not reach agreement on how to define and apply it in this context.

3.1.2. Findings

Some elements of the findings will be supplied. The Systems Engineering diagrams drafted for the T perspective helped to uncover a number of design flaws in the Programme. These mainly related to Programme as well as project reporting and coordination functions. For example: "in certain cases the contracting body was not the body that the contractors had to report to, thus creating confusion and a lack of accountability. Functional analysis also

revealed missing functions such as monitoring and evaluation" (Meyer et al 2007:96). Frustrations resulting from the design could be confirmed from the information supplied by role-players in the O and P perspectives. The E perspective assisted in uncovering ethical concerns in the Department's interaction with the poor communities and small contractors, and within the communities themselves as they interfaced with projects of the Programme. An example of an ethical concern was that it appeared that the Programme was operationally serving the interests of the Department of Public Works as opposed to those of the beneficiaries (Meyer et al 2007:95).

Much improvisation had to be done in order to arrive at an MPA which was usable at the level of method. The way that the MPA was made operational depended on the knowledge and skills set of the research team, which was fortunately rich and varied. Some conclusions from the CSIR research team on the use of the MPA, as found in the case study project report (Meyer et al 2007:97), are the following:

- "….these perspectives provided a very rich description and analysis of the programme."
- "Each brought unique insights on the system that provided pointers towards redesign."
- "There was also overlap, in for example, the problems that were highlighted, albeit in different languages. This assisted in confirming the major issues and thus identifying and clarifying the key problems of the system."
- "We would recommend that a multi-perspectives systems framework is used in the design process of any intervention of this magnitude."

4. THE USE OF THE MPA IN AN INFORMATION SYSTEMS MASTERS COURSE

The MPA was introduced to students in a Masters course at the Department of Informatics, University of Pretoria, South Africa. The course is called "Systems and Decision Making" (INF 821) and is meant, among other things, to introduce students to general systems thinking approaches that complement and enhance the systems analysis skills taught in undergraduate information systems courses. In particular, students are exposed to messy problems and approaches to deal with these. This should equip them to manage the messiness of the social and organisational environment where they have to introduce information systems. During the 2008 INF 821 Masters course, the students were given an assignment to apply the MPA to analyse a messy South African problem, namely an aspect of a xenophobia crisis. In the process, the lecturer wanted to ascertain the following:

Does the MPA, as presented to the INF 821 students, lead the students to gain a rich and well balanced collection of perspectives on the topic?

During the first INF 821 lecture, the students were requested in a class group exercise to use Daellenbach's (1994) problem structuring approach to analyse the South African xenophobia problem. It was found that most groups (three of four) came up with a very biased description of the problem situation. These groups each took a particular view on the matter and presented Rich Pictures only representing their own view. In the second INF 821 lecture, the MPA was presented to the students, and they received the following individual assignment:

Use the Multiple Perspectives Approach to analyse the current accommodation problem of foreign nationals in South Africa (with particular reference to the temporary shelters provided by government).

The students received the following guidelines. These are based on experience gained by the authors during the first MPA case study:

- T perspective: perform at least one analysis using influence diagrams or a hard systems method you are familiar with (from systems analysis, operations research or systems engineering).
- O and P perspectives: Try and include the perspectives of as many role-players as you can find. Remember that O and P perspectives need to represent organisations'/ groups'/ individual's own, subjective perspectives as closely as possible.
- E perspective: use a critical systems approach to uncover some of the ethical issues.
- A perspective: address this in one paragraph, in which you have to state your interpretation of aesthetics.

For reading on the MPA, the students received a section from Mitroff and Linstone's (1993) book that includes a case study, as well as Courtney (2001). The case study in Mitroff and Linstone only covers the T, O and P perspectives, and they do not fully explain or show how to apply the E and A perspectives. Some of the recent literature on the MPA attempts to address this shortcoming, for example Chae et al (2005) suggest an E approach. For the INF 821 assignment, students were expected to use one of the two critical systems approaches presented to them, namely Flood and Jackson's Total Systems Intervention (1991) and Ulrich's Critical Systems Heuristics (Daellenbach and McNickle 2005, Ulrich 2002) to generate the E perspective. The A perspective, which has to date received the least attention in the literature, was left open to the students' own interpretation.

4.1. Background to the assignment

In May 2008, a number of xenophobic attacks occurred in South Africa. These were aimed at people from other African countries who resided and worked in South Africa, legally or illegally. Sixty-two people were killed and many thousands left homeless as they fled their residences in fear (Sowetan, 2008). Temporary shelters were set up to accommodate and provide safety to these people. However, the shelters gave rise to a number of new problems. The main one was the need to re-integrate foreigners into the community. Foreign nationals were typically scared to return to their previous residences and unwilling to return to their country of origin. The antagonism in some of the local communities, fired by the perception that the foreigners were taking their jobs, also remained a problem. In August 2008, when the assignment was given, the shelter camp problem was not yet resolved and appeared frequently in the news.

The shelter problem was chosen for its messiness: there is no clear problem definition, let alone a singular solution. The various role-players (government, NGOs, local people, foreigners, neighbouring states, to name a few) all have different perceptions of what the problem is. Many emotions are involved, as well as long-term underlying issues, such as poverty in South Africa and political instability in neighbouring states.

4.2. Analysis of the students' responses

4.2.1. Technical perspective:

Three of the four students presented the T perspective first, all giving diagrams with some explanation. Two students drew an influence diagram (as per Daellenbach and McNickle, 2005), one an activity diagram and the last a kind of process diagram where the blocks were connected with verbs. All the diagrams were fairly comprehensive in terms of their inclusion of major role-players, incidents, causes and effects. However, each chose to highlight and focus on different issues. A clear relationship could be seen between the information collected under the O and P perspectives and the interpretation of the situation as shown in the diagrams, or T perspectives. Here is an example of a T diagram (Mc Alister 2008:8):

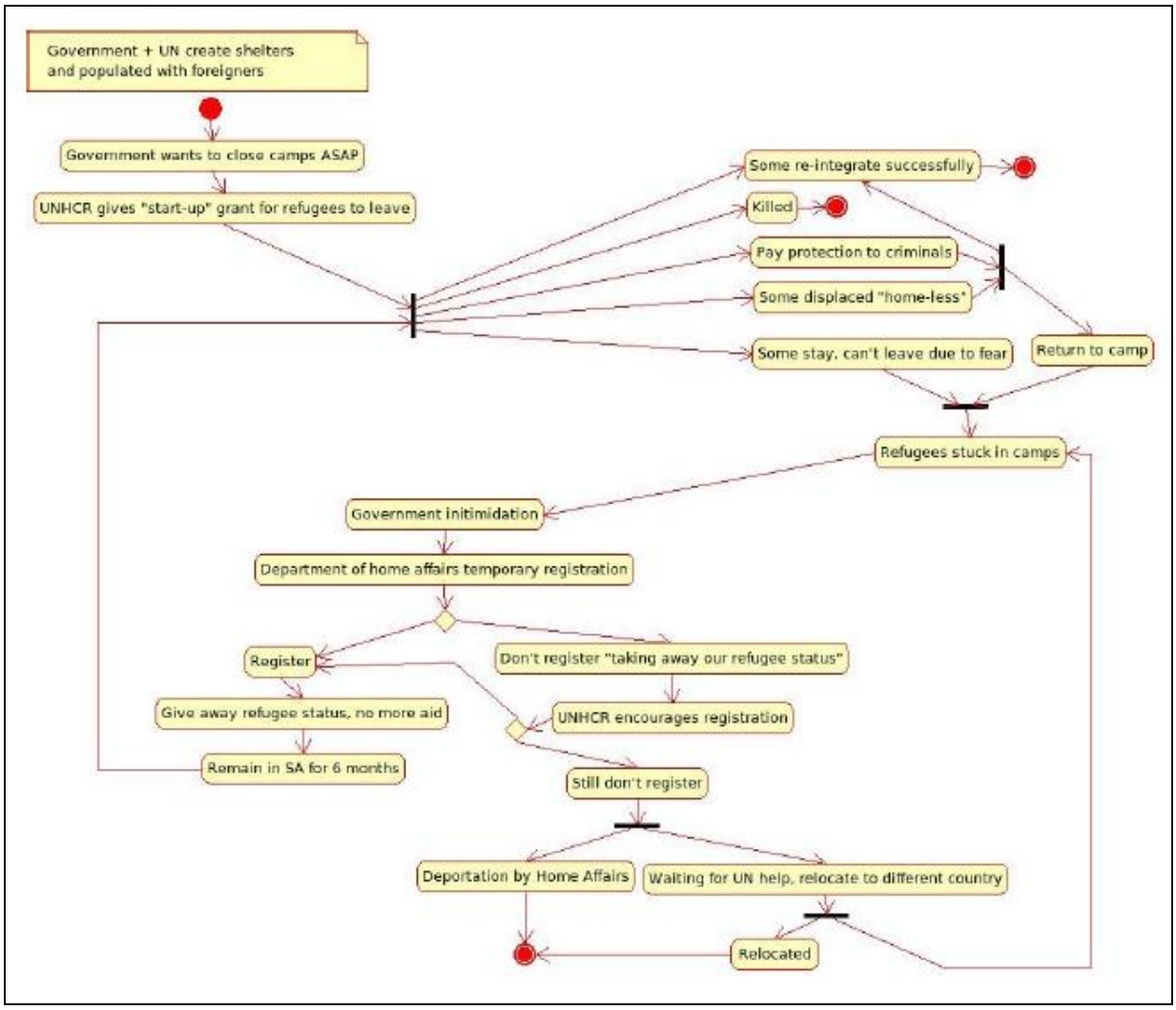

Figure 1: Activity diagram related to temporary shelters for foreign nationals

4.2.2. Organisational and Personal perspectives:

These two perspectives were done in the same exercise, mainly via consultation of the electronic media as a secondary source. Each student consulted a large number of articles, although, surprisingly, each from a single or limited publication pool. One only used articles

from the South African *Mail & Guardian*, two of them only used *News24*, and the latter, a foreign student, some foreign news sites combined with the official South African government web site. This resulted in clear biases in their perspectives. The Mail & Guardian articles were typically critical of government and made an effort to represent NGO perspectives. *News24* sources tried to represent the plight of the local poor, whereas the foreign student's sources led him to omit the local community as a role-player altogether.

4.2.3. Ethical perspective:

Three of the four students used Ulrich's Critical Systems Heuristics (CSH) (Daellenbach and McNickle, 2005, Ulrich, 2002) as was suggested, while the fourth gave his own interpretation of an ethical perspective and analysed the situation accordingly. The twelve critical questions of CSH query the following: system boundary choices, who decides what observations are relevant as well as assumptions concerning the client of a system, its decision-makers, the system analysts and people affected by a project but not involved. This is meant to lead to "reflection, appreciation and debate about legitimate and alternative views and values" (Daellenbach and McNickle 2005:197). The responses of the students to the twelve questions show clear critical reflection on the situation, in line with the information gathered under the O and P perspectives. For example, a student who used *News24* as source came up with the following response to the last of the twelve questions:

What worldview is (ought to) be determining? That is, what different visions of "improvement" are (should be) considered, and how are they (should they be) reconciled? (Source: Ulrich 2002)

"It is not clear which vision of improvement is considered. There should be justice to all and opportunities for all people to make a fair and just living in South Africa. Instead of everyone blaming someone else, there should be plans and action to understand and include everyone within the country. The government must take action to attempt to reunite the people in South Africa by breaching borders and developing a multi-racial culture." (Kriek 2008:13).

The CSH appears to provide an appropriate means to capture the E perspective in the absence of guidance from Mitroff and Linstone (1993) and Courtney (2001).

4.2.4. Aesthetic perspective:

Two of the four students looked up a definition for aesthetics. A third provided an acceptable definition of his own, while the fourth gave no definition at all. All the students, in some way or other, associated aesthetics with a subjective sense of beauty. Most of them proceeded to indicate the beauty of ideals towards freedom of oppression, the "desire to live in an integrated society, in which chaos and disorder do not reign or take a foot hold" (Mc Alister 2008:10) and contrast these beautiful ideals with the "horrible situation" (Kriek 2008:13) of the xenophobic violence and "non-aesthetic elements like the informal settlements, temporary shelters and dire circumstances of the foreign nationals" (Koekemoer 2008:13). An overlap between ethical and aesthetic issues was also sensed: "the aesthetic perspective highlighted the need to take the collective values into account, and to develop the same level of appreciation from all parties involved" (Mc Alister 2008:12); in other words, it does not help if a situation or process is only aesthetically pleasing to some. The decision to leave the definition and application of the A perspective open-ended was rewarded by innovative responses such as these.

4.3. Assessment of research question

The research question to address was as follows:

Does the MPA, as presented to the INF 821 students, lead the students to gain a rich and well balanced collection of perspectives on the topic?

The responses provided by the students were predominantly framed in a careful, non-judgemental way, in stark contrast to their assessment of the xenophobia problem during the first class exercise, before the MPA was introduced to them. They made a real effort to gather as many perspectives as possible, although some bias was introduced by the particular sources of information used. They took care to apply the paradigms associated with the various perspectives, namely to be rational and detached while generating the T perspective, place themselves in the shoes of role-players while doing the O and P perspectives, and to show empathy for the marginalised while attempting the E perspective. It is our conclusion that the MPA has led the students to gain a richer and more balanced collection of perspectives on the topic than what was displayed beforehand. In the process of the exercise, it has also been shown that the MPA's challenge of being a philosophy rather than a method can be addressed by means of instructions on specific methods to be used when applying it.

4.4. Perspective synthesis by means of Group Support Systems

Another practical challenge of the MPA is to converge the variety of perspectives into a synthesised description for decision-making benefit. This is the step following perspective development as indicated by Courtney (2001:31):

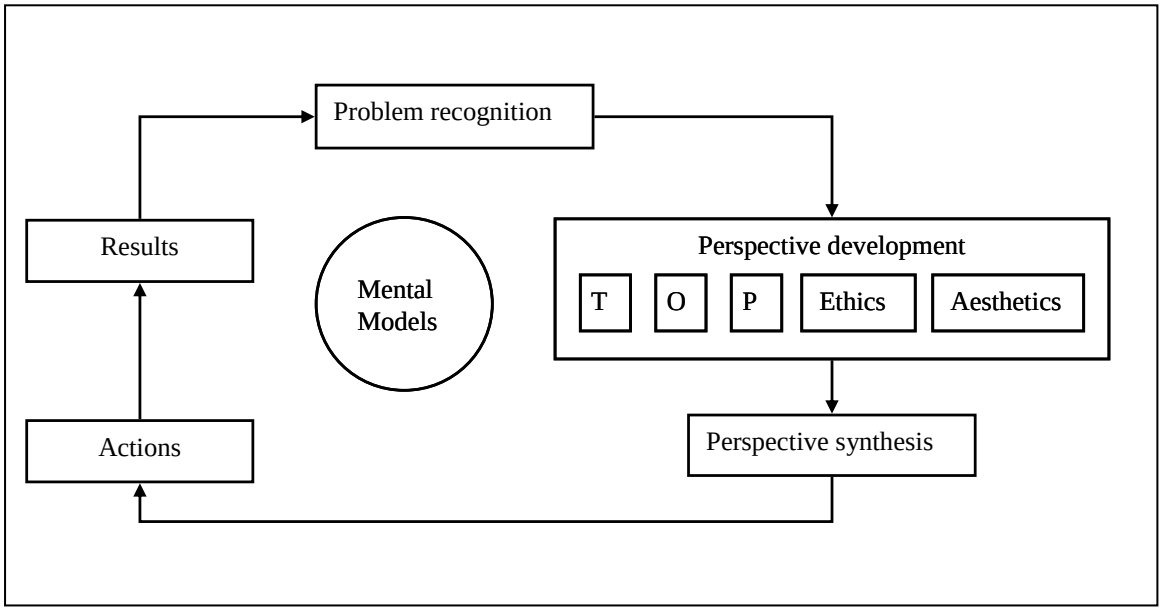

Figure 2: A new decision-making paradigm for DSS

The challenge of perspective synthesis was experienced in the CSIR project discussed above: all the disparate threads of information, collected from different sources, using different means and subject languages and performed by different people, had to be integrated into a coherent, summarised whole, from which the essence of the problem could be distilled for decision-making purposes.

On the INF821 course, one of the course topics is group decision making by means of a Group Support System (GSS). GSS refers to a technology-enabled environment for intellectual collaboration by a group of participants, supported by computers, group support software, meeting procedures and a facilitator (De Vreede et al 2003:203). Previous experience in using GSS as a vehicle to reach consensus, led to the belief that it had the potential to assist with perspective synthesis as part of an MPA process. During the second part of the 2008 INF 821 course, an attempt was made to ascertain the following:

In what way could GSS be used to facilitate a synthesis of multiple perspectives generated through the MPA (Multiple Perspectives Approach)?

During the second part of the course a group assignment was set that was to be done using a GSS. They were given the following brief:

Your group is appointed as an Advisory Council for a joint implementation task team of the Department of Home Affairs and the UNHCR (United Nations High Commissioner for Refugees). The task team has been briefed to resolve the shelter problem of foreign nationals in South Africa.

Provide the joint task team with one synthesised description of the problem situation, to be used during the Home Affairs/UNHCR action planning session. Generate this description using the GSS toolset.

The students were set up in a GSS lab equipped with GroupSystems software, and with the following GroupSystems agenda:

1. Present class with activity description above.
2. Students open their individual assignments which are on an accessible folder.
3. Students type in key aspects of individual synthesis (copying from own assignments) and submit. (Topic Commenter with T,O, P, E, A headings, 20 minutes)
4. Students contribute to synthesised description in a new Synthesis category, with free electronic debate allowed. (Topic Commenter, 30 minutes)
5. Break with coffee (10 minutes)
6. Designated lecturer facilitates the remainder of the session using the patterns of collaboration engineering at his/her discretion. All discussion is online. Students to reach consensus and deliver synthesis paragraph(s). (Variety of tools, 1 hour)

4.5. Outcome of GSS session

The students contributed in a positive spirit. The fact that they could copy from their individual assignments eased their typing burden, but resulted in some lengthy pieces being pasted into GroupSystems. This increased the reading burden on others and also did not force them to summarise their ideas concisely. No confrontational debates with opposing viewpoints were recorded. This could be ascribed to the nature of the group, or possibly to

the MPA, where any number of perspectives on a situation could be added. The students submitted and discussed their contributions under the headings of T, O&P, E and A. The T perspective proved awkward to discuss, since without being able to present influence or process diagrams, they could only provide a linear listing of key role-players, processes and the like. The joint discussion on O and P perspectives was an enriched version of the students' individual contributions, helping them to overcome the bias introduced by the singular media sources of individual students. Even here, no conflicting debate was observed. The liveliest discussion occurred under the A perspective, since consensus was required on the definition of aesthetics. The students were left to their own devices for a limited time to see if they could reach consensus by themselves. Although they gained some ground, it did not happen very fast. After the coffee break, they were assisted in summarising and grouping their ideas into a list of headings by means of a categorising tool, the Group Outliner. The headings were then moved to a voting tool, where students performed a rank order vote. Unfortunately, there was only time to complete this process for the E perspective. The E perspective was chosen to this end, because some clear trade-offs were observed in the ethical concerns listed by the students which made a voting exercise appropriate. The more challenging synthesis aspect of showing the interplay of the perspectives to indicate, for example, how a process problem picked up in a T analysis was worsened by the actions of a key role-player and also highlighted an ethical issue, was only briefly touched upon. More thought needs to be given on how, and whether, the online part of the GSS can assist with this final integration.

The exercise of generating a synthesis and developing an action plan was deliberately kept separate, as this is the way Courtney's diagram was interpreted. In hindsight, an explicit instruction to generate an action plan to deal with the accommodation problem of foreign nationals might have facilitated a synthesis, which would have been implicit in the action plan.

5. CONCLUSION

As part of the 2008 INF 821 Master course in Systems and Decision Making, two research questions relating to the MPA have been addressed, namely:

Does the MPA, as presented to the INF 821 students, lead the students to gain a rich and well balanced collection of perspectives on the topic?

In what way could GSS be used to facilitate a synthesis of multiple perspectives generated through the MPA (Multiple Perspectives Approach)?

Concerning the first question, it is the view of the authors that the MPA assisted students in broadening their views on the accommodation problem of foreign nationals in South Africa. This conclusion is based on the stark contrast between what the students presented during the first class exercise and the rich set of perspectives collected during their second assignment. As mentioned below, the authors' impression will be compared to the students' responses to the same question.

The GSS showed promise as a means to generate perspective synthesis during a MPA process. The best results were obtained when students were guided through a process of free idea sharing and commenting, followed by a process of categorisation and distilment of key

ideas, and ending with a qualitative voting process such as rank ordering. More thought needs to be given to the appropriateness of GSS to assist with a synthesis of diagrammatic information such as was had in the T perspective. In addition, it is suggested that an outcome such as an action plan is requested from GSS participants rather than a synthesis by itself.

5.1. Further work

One of the questions in the INF 821 exam assignment (in progress at the time the article is being written) is to reflect on topics similar to the two research questions posed. The students' responses to the related question will be compared to the findings of this paper.

Further, one of the authors is currently researching suitable systems analysis frameworks to analyse the present-day social context into which information systems are introduced in a developing country. The MPA is one such a framework that holds promise and will be evaluated further, while particular methods for generating the perspectives are being experimented with.

In closing, we suggest that ICT for development practitioners take cognisance of theoretical frameworks such as the MPA to better explicitly deal with the multiple perspectives of role-players. Heeks (2008:31) calls for a new wave of ICT4D 2.0 champions that understand computer science, information systems and development studies. The MPA could play a role in addressing his plea by introducing students as future ICT4D 2.0 champions to an approach that covers computer science and IS aspects (via the T perspective) and development studies (via the O, P E and A perspectives). This would enable them to focus on the complexity of the problem as well as the technical challenges.

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