

“DECISION CAN”: A DATABASE OF DECISION CASES

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ABSTRACT

This paper describes a support system for group decision-making. The system is based on a database of typical decision cases and also an underlying model of the group decision process. The model serves to organize the way users interact with the database, exploring, analysing and selecting cases. Currently the database has 75 group decision cases.

Key words: cooperative work, decision-making processes, group decision support systems, group decision cases.

INTRODUCTION

Confronted by the ever increasing complexity of problems found by organisations and also by the natural limitations of individuals, there is no doubt that group decision takes advantage over individual decision. However, this attitude is not free of problems. Group processes are time-consuming, complex and subject to many impediments that decrease productivity and quality of decisions.

For instance, the quantity of irrelevant information and time and money considerations can reduce the search for alternatives. Personality problems, power differences, hidden agendas and groupthink also contribute to decrease the quality of decisions. “Watergate” and “Bay of pigs” are historical examples of bad decisions attributed to problems with groups.

The hypothesis, which is in this work genesis, is that information systems can increase group performance. It was with the aim of testing this hypothesis that “Decision Can” was developed. Decision Can is a database of group decision cases that can be explored using several models of the rational decision-making process, thus contributing to better analyse options taken in the past and also better plan future decisions.

APPROACH

There is empirical evidence showing us that the decision process adopted by a group is decisive for the quality of results (Bostrom et al., 1993; Dickson et al., 1996; Zigurs et al., 1988). This evidence raises the question of how groups select a decision-making process.

To answer this question, researchers make the distinction between experts and novices (Clawson et al., 1993). The first ones have more probability of selecting cases from their personal collection, either well or badly succeeded, and seem also more able to adapt those cases to new situations. On the contrary, novices seem to adopt more uncertain approaches, until they gain conceptual understanding on problems, solutions and resolution strategies.

Information systems may be used in both circumstances in order to bring performance gains to decision makers. To decision experts, providing organizational memory, easier identification and classification of decision cases; and also supporting the adaptation of old cases to new situations. To novices, information systems may support the complex process of gradually elaborating decision-making abilities, based for instance on decision aids and guides.

An approach suggested in the literature has recourse to intelligent agents (Nunamaker et al., 1997; Dickson et al., 1996). These agents could include the automatic recognition and interpretation of decision structures, and provide expert advice on the better course of action. Obviously, this approach is most adequate to novices, but may be seen as unnecessary or even ineffective by decision experts.

Another approach to be considered and here adopted is to supply a database of “decision cases,” such that decision processes may be planned using both personal and others’ expertise.

In addition, the users could also contribute to this database with their own experiences and

outcomes, thus increasing the quality and diversity of available information.

Although we can find several group support systems in market and research laboratories (e.g. Nunamaker et al., 1991), we could not find one that supports this vision: a database with typical group decision cases, supporting the recognition and interpretation of decision processes, while developing organizational abilities.

MODEL

Having decided to implement this vision, we found another problem: how to harmonise the cases in a way that users can explore and develop their comprehension about group decision processes?

After analysing a large set of decision models available in the literature (Kaner 1996; Schwarz, 1994; MacGrath, 1991; Simon, 1997; March and Simon, 1993; Cohen et al., 1972; VanGundy, 1997; Vroom and Yetton, 1973; Schwenk, 1984; Rasmussen et al., 1991; Mintzberg, 1979), we arrived to a model that, we believe, describes the group decision-making process in a concrete and systematic way. This model was thus applied to organize the users' interactions with the decision cases in the database. The model arranges the group decision process in the following steps:

Task characterisation. The decision case is characterized according to the type of task that must be performed by the group. Four different types of tasks are defined, using the MacGrath's (1991) typology: generate (ideas or plans); choose (logic or preference); negotiate (criteria or interests); execute (competition or performance).

Definition of zones. Decomposition of the whole decision process in a sequence of intermediate processes, being determined four such zones (Kaner, 1996; Schwarz, 1994): divergent, groan, convergent and closure.

Selection of strategies. Strategies identify one or more partial goals that must be accomplished within each zone.

Accordingly with the number of selected strategies, an intermediate process (zone) can be more or less complex. Figure 1 presents the set of strategies that are predefined for each zone.

The divergent zone specifies a sequence of three partial goals: explore the context of the problem; find alternative solutions for the problem; and discuss the alternatives.

The groan zone is characterised by the single strategy of creating a shared context. Here, the

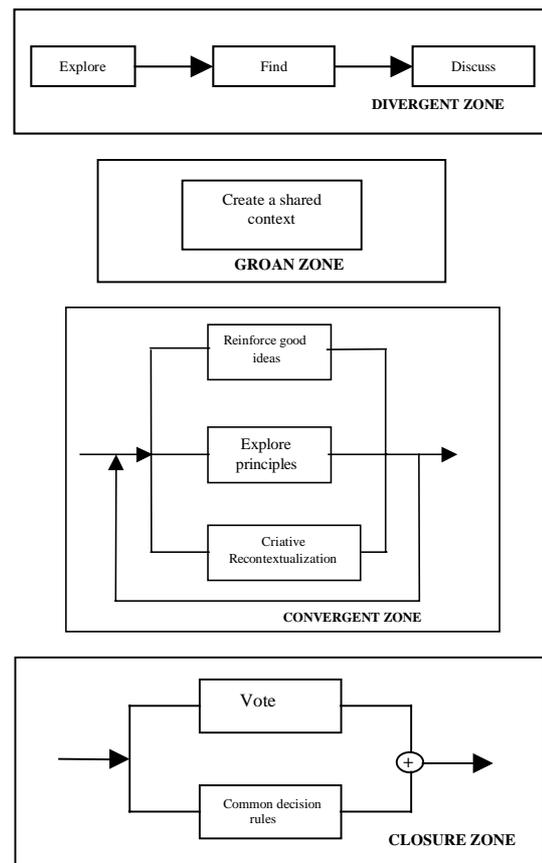


Figure 1 - Strategies

different points of view are questioned in order to get a context shared by everybody.

The convergent zone is characterised by three strategies that can supply each other circularly. So, in most simple situations, it is possible to just reinforce good ideas or, in most hard to converge cases, complement the previous strategy with creative re-contextualization and principles exploration.

The closure zone includes two strategies that may or may not be combined: voting and common decision rules. With this scheme it is possible to vote but do not decide (lack of authority) or vote and decide (the group has authority). In case of consensus, it is possible to decide without voting.

Selection of activities. These activities define how to accomplish the above strategies. At this level of detail, the group executes one activity for each adopted strategy.

IMPLEMENTATION

The structure of the implemented database naturally reflects the model already described. It is shown in Figure 2.

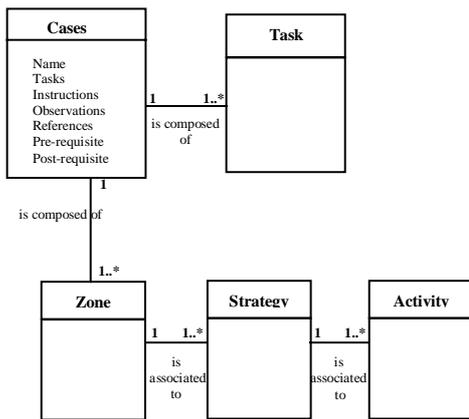


Figure 2 – Database structure

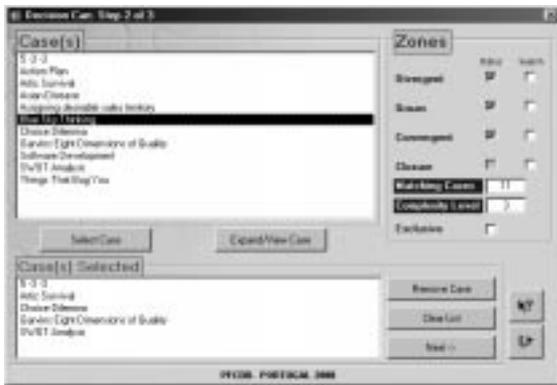


Figure 3 – Selection of zones

From the users point of view, the “Decision Can” prototype provides three different functionalities: (1) select and explore cases; (2) analyse and extend the existing model; and (3) analyse, configure and supplement existent cases.

Cases selection. The selection of cases is accomplished by successively refining the model parameters. The first parameter characterizes the task. When the users select the task types they are interested in, the list of cases covering those tasks is displayed.

Then, the users may select the zones, strategies and activities of interest. Again, the list of cases displayed to users solely covers the selected categories. Figure 3 illustrates the situation where users select the zones of interest.

Finally, users can expand the cases that are found in the list and obtain a set of additional information to decide if cases are according with their interests.

In this final stage, users can also comment and export case reports. There are two possible types of reports supported, case structure (according to

the model) and case description, usually a fairly amount of text describing the problem situation, etc. Note that users can always move back and forth between the cases selections.

Extend model. Users have also the possibility of making some slight changes to the model implemented in the database. Anticipating the event that the activities currently in the database do not cover some future decision-making situations, users are allowed to insert new activities in the database. Note however that the zones and strategies cannot be modified, because they are considered comprehensive enough.

Configure cases. Users can modify any individual attributes of cases available in the database. As expected, it is also possible to append new cases to the database.

PROFILE

The Decision Can prototype currently has 75 cases, which were obtained from systematic research of a set of about 200 papers and a few books. These cases include practically every task of McGrath’s task model, as well as every decision zone of Kaner’s model.

In Figures 4 and 5 we show the distribution of cases amid tasks and zones.

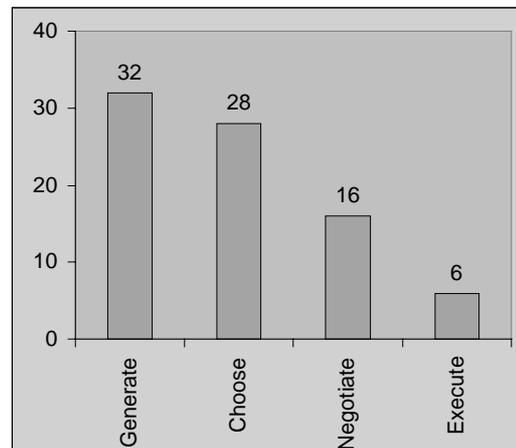


Figure 4 – Distribution of cases by tasks

EMPIRICAL EVALUATION

In order to empirically evaluate the Decision Can prototype, four inexperienced decision makers were asked to resolve two decision-making problems with the aid of Decision Can. These participants in the experiment had then to answer a questionnaire with questions about the model, cases and the tool itself. We obtained the following comments from this experiment.

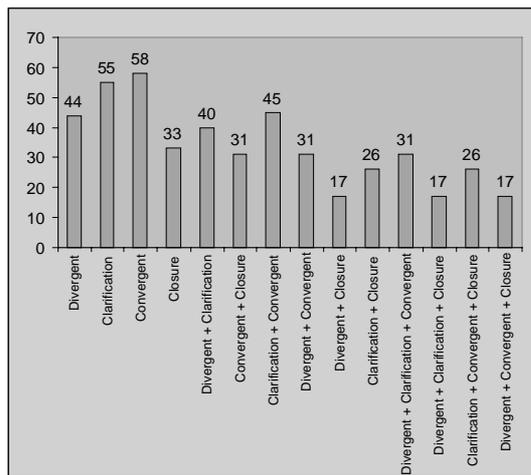


Figure 5 – Distribution of cases by zones

Regarding the model. The model “allows studying the several facets of decision-making”. The selection process was considered “simple and navigable”. However, the users remarked that the model “could also consider other aspects related with organizational processes”.

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Regarding the cases. The mentioned cases are “clear and provide generic techniques”. It was also considered that the available information is “sufficient to plan the decision-making process”.
Regarding the tool. The tool is “clear but could be more user friendly”. It was not considered much adaptable. According to the users, the tool “should also support queries to the database”.

CONCLUSIONS

This paper describes a database of decision cases aiming to improve group decision-making. The selected approach is to allow groups exploring, recognizing and selecting typical decision cases.

A model was defined in order to support the users’ interaction with the database.

Currently, the database has 75 cases, covering a wide range of problems with different levels of complexity.

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