



The South African Institute for Computer Scientists and
Information Technologists

**ANNUAL RESEARCH AND DEVELOPMENT
SYMPOSIUM**

23-24 NOVEMBER 1998

CAPE TOWN

Van Riebeeck hotel in Gordons Bay

Hosted by the University of Cape Town in association with the CSSA,
Potchefstroom University for CHE and
The University of Natal

PROCEEDINGS

EDITED BY
D. PETKOV AND L. VENTER

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PROCEEDINGS

**EDITED BY
D. PETKOV AND L. VENTER**

SYMPOSIUM THEME:

Development of a quality academic CS/IS infrastructure in South Africa

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FOREWORD

The South African Institute for Computer Scientists and Information Technologists (SAICSIT) promotes the cooperation of academics and industry in the area of research and development in Computer Science, Information Systems and Technology and Software Engineering. The culmination of its activities throughout the year is the annual research symposium. This book is a collection of papers presented at the 1998 such event taking place on the 23rd and 24th of November in Gordons Bay, Cape Town. The Conference is hosted by the Department of Information Systems, University of Cape Town in cooperation with the Department of Computer Science, Potchefstroom University for CHE and and Department of Computer Science and Information Systems of the University of Natal, Pietermaritzburg.

There are a total of 46 papers. The speakers represent practitioners and academics from all the major Universities and Technikons in the country. The number of industry based authors has increased compared to previous years.

We would like to express our gratitude to the referees and the paper contributors for their hard work on the papers included in this volume. The Organising and Programme Committees would like to thank the keynote speaker, Prof M.C.Jackson, Dean, University of Lincolnshire and Humberside, United Kingdom, President of the International Federation for Systems Research as well as the Computer Society of South Africa and The University of Cape Town for the cooperation as well as the management and staff of the Potchefstroom University for CHE and the University of Natal for their support and for making this event a success.

Giel Hattingh, Paul Licker, Lucas Venter and Don Petkov

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ON PROBLEM STRUCTURING IN AN ELECTRONIC BRAINSTORMING (EBS) ENVIRONMENT

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Abstract

Research in the field of Group Decision Support Systems (GDSS) has focused on the following main issues: the Task (task complexity, clarity and rationality); the Individual (the profile of individual group members); the Process (process losses and gains); the Group (composition and size) and the Technology (hard ware, software and configuration settings). Much of the research has focused on group issues. A decision making group consists of two or more people jointly responsible for detecting a problem, elaborating on the nature of the problem, generating possible solutions and evaluating potential solutions. Research on idea generation in a group environment is relatively widespread but there are still areas like facilitator work and problem structuring that require further investigation. To the best knowledge of the authors, there is very little research on the structuring of problem questions in order to maximize idea generation.

In this paper are reported results on laboratory studies at the University of Natal which focus on the problem/question structuring as a means enhancing the quality and quantity of ideas generated during electronic brainstorming (EBS). The case problem area was Information Systems Analysis and Design. Traditionally a survey of major issues on Idea generation and Group Support Systems (GSS) reveals the pre-occupation with the productivity of GSS supported idea generating groups. These productivity issues are social loafing, evaluation apprehension, production blocking. Social loafing is when group members work less than they otherwise would, working by themselves; evaluation apprehension is where group members are concerned about how other members in the group are going to respond to their ideas; production blocking, where members cannot express their ideas as and when they (the ideas) occur to them: they must await their turn. In general, these productivity issues have been frequently researched within EBS environments, so that some definitive solutions have emerged: anonymity to conquer evaluation apprehension; and individual input devices allowing for the simultaneous entry of ideas by members, so that production blocking is virtually removed. In this study some of the issues are explored again within a new environment, **Team Expert Choice's** Q&B, an EBS module for supporting brainstorming groups. Team EC allows groups to enter ideas anonymously and to enter these as they occur to them. In addition, the pool of ideas is stored on a common database where group members only have to "Refresh Items" in order to view the most recent pool of ideas. With respect to the application area one can note that the literature does not show significant indicators of previous cases of uses of such environments with problems from the area of Information Systems.

The focus of this research is on one of the least researched issues about brainstorming: task or problem structuring (and indeed time structuring) within the brainstorming process to further enhance group creativity and productivity. Two comparable groups were presented with exactly the same task, except in the first instance the problem was posed as a unified all-encompassing problem and in the second instance, the problem was broken down into sub-categories, and the problem serially presented in sub-categories. In addition, a fixed amount of time spent per sub-category was allocated. The total time spent on the entire problem by both groups is the same. It was postulated that the group handling the problem sequentially in sub-categories will generate more ideas and ideas of higher quality. It was also postulated that this group will perceive time constraints which will induce them to work faster and thus add to their productivity.

The results of the experiments show that the group solving the decomposed idea indeed generated more ideas of better quality. The group handling the all encompassing problem not only generated less ideas but focused on only one aspect of the problem. These results endorse that more research needs to be done in assessing the impact on group productivity and creativity of structuring the idea generation problem by breaking it down into problem sub-category. More research is needed to explore the role of task complexity and indeed who should structure or decompose the tasks, the group itself or the facilitator? Nonetheless, the results are conclusive and show the benefits to productivity of decomposing the brainstorming problem into sub-categories.