

# COMPUTER MEDIATED COMMUNICATION WITH INTEGRATED GRAPHICAL TOOLS USED FOR HEALTH CARE DECISION-MAKING

**Peter Maclaren**

Learning Technology Centre  
Auckland University of Technology, New Zealand  
*peter.maclaren@aut.ac.nz*

**David Seedhouse**

Centre for Health and Social Ethics  
Auckland University of Technology, New Zealand  
*david.seedhouse@aut.ac.nz*

## **Abstract**

*This paper discusses the development of a set of graphical tools for health care decision-making integrated in a threaded discussion forum. The capability to draw a graphical representation of a health care situation enables decision-makers to conceptualise their decision-making visually. The integration of these tools in a threaded discussion environment allows collaboration with others in developing a common understanding and provides a permanent textual and visual record of the process of decision-making. This development of the text based CMC environment to include graphical tools has potential application across a wide range of disciplines.*

## **Keywords**

*graphical and visual tools, computer mediated communication (CMC), interactive and collaborative technologies, health care decision-making*

## **Introduction**

Computer Mediated Communication (CMC) has become a fundamental tool of the online teaching and learning environment (Harasim, 1989; Hara, Bonk & Angeli, 1998). Although the human mind grasps and processes complex facts more efficiently when they are presented visually (Weiskrantz, 1988), the emphasis of CMC has been on the use of text-based asynchronous threaded discussion forums, with only limited use of graphics (Spoon & Guzdial, 1999). Purely text-based CMC may limit our ability to express our thoughts (Kuehn, 1994 in Hara et al., 1998). The use of graphical tools within a CMC environment offers the potential to provide a new channel of communication that may enhance our ability to collaboratively construct and agree on meaning (Van Boxtel & Veerman, 2001).

Over the last fifteen years David Seedhouse has developed and documented a range of visual decision-making tools for health professionals (Seedhouse, 1998, 2001). Their use has previously required either some physical means of representing the tool or required continual manual (and therefore time-consuming) redrawing of a graphic image.

This project involved the development of computer-based versions of Seedhouse's healthcare analysis tools in a format that would allow the graphical images to be manipulated and recorded within the context of a threaded asynchronous discussion forum.

Four tools (the Ethical Grid, Rings of Uncertainty, Foundations of Health and Autonomy Test) have been developed for use in an online environment using a standard web browser; the first two are described here. The tools were constructed within *LearnOnline*, a Lotus Notes based online virtual learning environment developed at the Auckland University of Technology. The graphical tools use specialised subforms that are incorporated within standard topic/response forms in a threaded discussion forum. Responses inherit the graphic state of the posting to which the response is made (unless reset), so that the progressive development of the graphic and text based collaboration is explicitly recorded.

## The Ethical Grid

The ethical grid consists of a set of 20 tiles, arranged in 4 concentric rectangular rings of different colour. Each tile makes a simple statement open to interpretation, within a category represented by a different colour. The outer (black) ring represents practical considerations, the next consequences and priorities (green), then duties (red) and finally the inner four tiles represent health care purpose (blue).

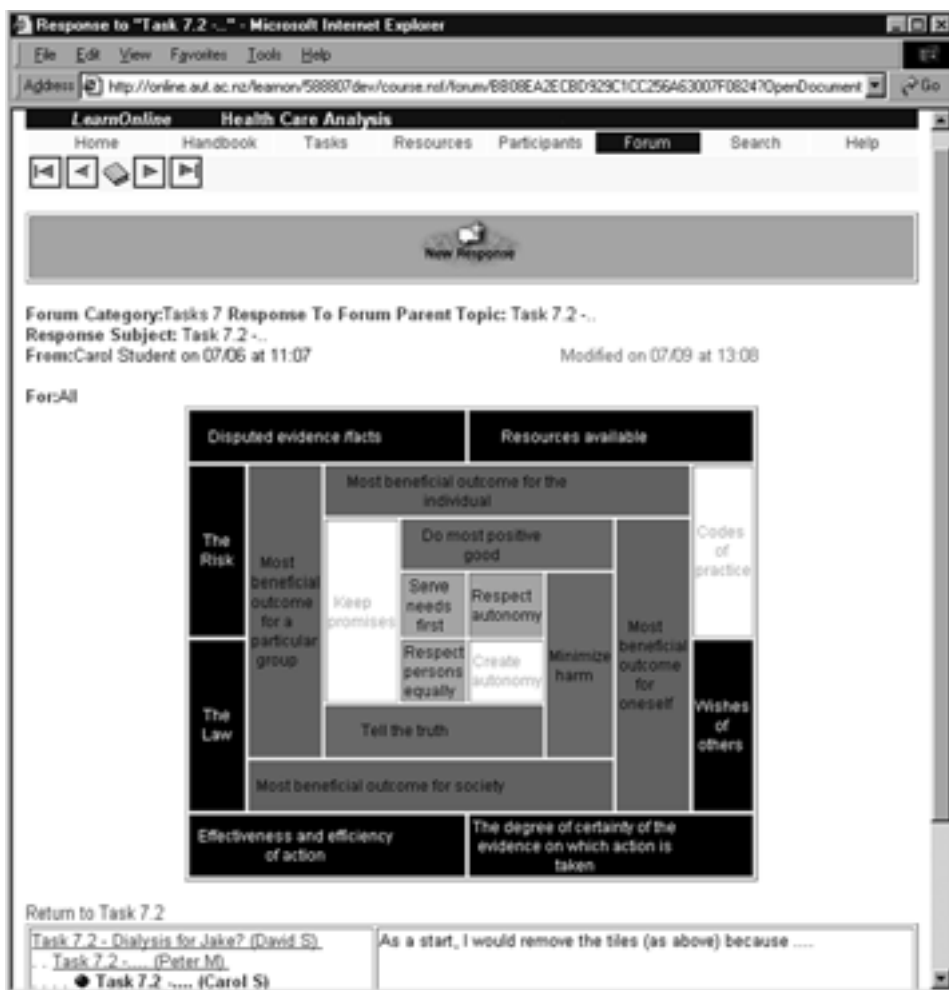


Figure 1: A saved 'Ethical Grid Response', showing the grid diagram (with 3 tiles removed), thread and text comments

As initially developed this tool used Lotus Notes server-based functionality to deliver a simple HTML form to the browser, and to process the responses. Once saved, a response shows the grid, the navigation thread and comments (Figure 1).

One use of the tool involves a group examining a specific health issue or hypothesis by progressively removing (or adding) tiles until the fundamental aspects of the issue are represented by a few key tiles. The process of thinking and negotiating involved in reaching this final state is often more important than the final state reached, particularly when used for educational purposes.

## Rings of Uncertainty

The Rings of Uncertainty is another graphical model which allows users to reflect upon possible roles and interventions and to collaborate to reach a common understanding. The concentric rings represent varying degrees of uncertainty, with uncertainty increasing with distance from the centre. The rings are also divided into sectors, in this version representing ethics, communication, resources, law and technical competence (see Figure 2).

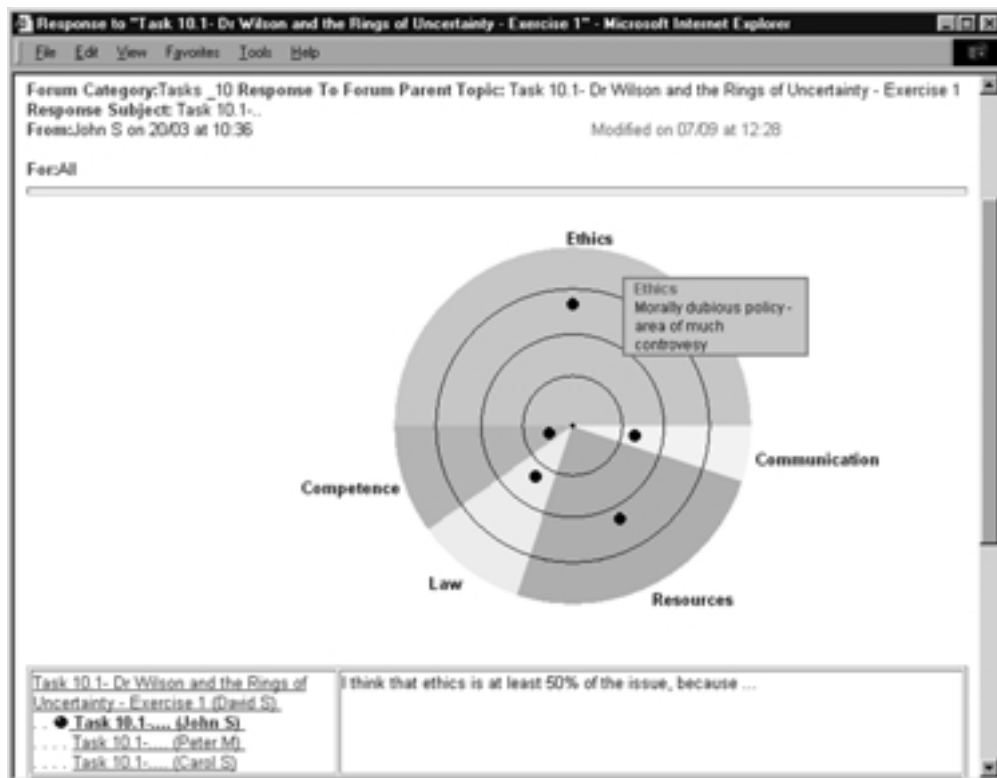


Figure 2: A saved 'Rings of Uncertainty' Response, showing the diagram, comments and thread, and 'roll-over' documentation for 3<sup>rd</sup> Ethics ring

The demands of representing a series of manipulations of The Rings of Uncertainty meant that it had not been possible to develop a simple concrete tool, and the time required to redraw each iteration had limited its practical application.

The online tool uses a combination of Lotus Notes server based functionality and client browser dynamic HTML, again using specialised subforms within the Forum. This allows the position within any sector (represented by the dots) to be varied (by clicking at the required position). The angle allocated to each sector can also be varied according to the importance placed on that factor (by entering percentages). In-built documentation is provided in the form of a 'pop-up' description as the mouse rolls over the relevant ring/section.

## Conclusions

At the time of writing only limited trials have been carried out with these tools in learning situations and they have been mainly used for demonstration purposes. We hope to research the use of these tools in a teaching environment in 2002. Health practitioners are also using these tools in developing and formalising workplace practices.

The incorporation of graphic tools within a threaded discussion forum adds an extra dimension to the capability of Computer Mediated Communication. The ability to store a record of the process of decision-making provides essential documentation to justify decisions and also offers opportunities for research into the effectiveness of such processes.

## References

- Hara, N., Bonk, C., & Angeli, C. (1998). Content Analysis of Online Discussion in an Applied Educational Psychology Course. In N. Hara (Ed.) *Instructional Science*, 28:2 (pp. 115-152). the Netherlands: Kluwer Academic Publishers.
- Harasim, L (1989) On-Line Education: A New Domain. In R. Mason & A. Kaye (Eds.), *Mindweave: Communication, Computers and Distance Education*. Oxford: Pergamon Press, [Online]. Available: <http://www-icdl.open.ac.uk/mindweave/mindweave.html> [1 June 2001].
- Seedhouse, D.F. (1998). *Ethics: The Heart of Health Care, 2<sup>nd</sup> edition*. Chichester: John Wiley & Sons.
- Seedhouse, D.F. (2001). *Health: The Foundations for Achievement, 2<sup>nd</sup> Edition*. Chichester: John Wiley & Sons.
- Spoon, L. & Guzdial, M. (1999). MuSwikis: A Graphical Collaboration System. In C. Hoadley & Roschelle (Eds.) *Proceedings of Computer Support for Collaborative Learning (CSCL) 1999 Conference*. Dec 12-15, Stanford University, Palo Alto, California. Mahwah, NJ: Lawrence Erlbaum Associates. [Online]. Available: <http://kn.cilt.org/csc199/A72/A72.HTM> [7 June 2001].
- Van Boxtel, C. & Veerman, A. (2001). Diagram-mediated collaborative learning: Diagrams as tools to provoke and support elaboration and argumentation. In *Proceedings of the Second European Conference on Computer-Supported Collaborative Learning*. Maastricht, Holland. [Online]. Available: <http://www.mmi.unimaas.nl/euro-cscl/Papers/19.doc> [7 June 2001].
- Weiskrantz, L. (1988). *Thought Without Language*. Oxford: Clarendon Press.

Copyright © 2001 Peter Maclaren and David Seedhouse.

The author(s) assign to ASCILITE and educational non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The author(s) also grant a non-exclusive licence to ASCILITE to publish this document in full on the World Wide Web (prime sites and mirrors) and in printed form within the ASCILITE 2001 conference proceedings. Any other usage is prohibited without the express permission of the author(s).