A Research Agenda for Exploring Synchronous Computer Supported Collaborative Working

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Introduction

We have been studying synchronous computer supported collaboration with adults working together on shared simulations. We have used Kansas — a new, very general and powerful environment that supports synchronous distributed collaborative learning. Our general research approach involves selecting a technology to support collaboration, finding very hard problems with counterintuitive solutions and then conducting experiments with users systematically altering three key dimensions: the number of learners working together, whether or not they are physically co-located, and the bandwidth of the communication channels available to them.Within this framework we are exploring the general question of how collaborative work changes or is enhanced by different numbers of simultaneous users of such technology.

Kansas

Kansas can be thought of as a virtual reality which allows several physically distributed users to move about in a 2D space (called "Kansas" because it is very extensive and flat). Users each have a window in which they can see their local portion of Kansas. Users can scroll their viewpoints across the vast surface, causing their views to overlap in order to collaborate, or can move away from others to work alone. We build on work in a previous study, (Smith et al., 1991) where we observed subjects linked via various forms of communications devices. Video protocols were analysed and utterances related to eye contact and simulation events revealing distinct effects on the problem solving performance of the students (Scanlon et al., 1993).

The Experiments

The core of this study involves videoing adults at working together on a statistics simulation in different physical locations. The subjects were told, "You are a game show contestant. You have won through to the final round and your final challenge is to choose one of three doors. Behind one but only one of the doors is a Mercedes. You announce your selection but before you open the door the game show host 'helpfully' opens one of the doors which was not the one you have chosen. It doesn't have a car behind it. What should you do, stick to your original choice or change?"

They were asked individually to make a prediction and to give a reason for that prediction. Then they were introduced to their partners and given a Kansas micro world to conduct experiments. Next, students were asked to make a joint statement of their solution and to comment on whether it had changed from their individual statements. Then they completed an individual post experiment questionnaire to establish what their own final opinion was about the best strategy for the game contestant to pursue.

Research Questions and Conclusion

The subjects find the technology very easy to use and they mostly find the question impossibly difficult to answer. Initial findings indicate that the groups can become less effective in both process and product terms as the number of group participants increases above two. Larger groups find it harder to engage in constructive task division. In situations where there is a lot of initial consensus the larger groups display inordinate cognitive fixity and become totally committed to erroneous solutions that are contradicted by the operation of the micro world. However, larger heterogeneous groups that are not dominated by individuals can display more flexibility and creativity than smaller groups. These findings are similar to those found in copresent groups working together but our preliminary finding is that these differences in group problem-solving dynamics are amplified by the use of the collaborative support technology. We intend to add 2 new dimensions of variation (matched or unmatched problem-solving styles and relevant or no subject expertise) to consider how groups of different sizes work together using this new type of distributed computer supported collaborative environment.

References

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