

Workshop Report: Computer-Supported Collaborative Argumentation for Learning Communities

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This workshop held at Stanford University on 11th - 12th December, 1999 as part of Computer-Supported Collaborative Learning'99 (12th - 15th December)
<<http://sil-6.stanford.edu/CSCL99/>>

Organizing Committee

Chad Carr (Northern Illinois University, USA)

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Argumentation research finds roots in fields including philosophy, education, law and design. *Computer-Supported Collaborative Argumentation (CSCA)* is concerned with the design of human-computer interaction to augment and mediate argumentation in groups. It has come to embrace efforts to support individuals and groups in:

- Mapping and analysing the structure of meetings, arguments, conversations and ill-structured problems;
- Representing and debating the merits of different perspectives.

In this report I briefly review the emergence of CSCA within hypertext research and summarise the workshop's activities. Position papers and linked pre-workshop discussions (which remain open) are on the workshop website. A longer version of this report is on the website with the notes from the workshop breakout groups, plus — in the spirit of practising what we preach — 'conversation maps'

capturing some of the discussions, created using the QuestMap CSCA tool [4] (see also the papers by Conklin, Carr, Selvin and Sierhuis for application examples).

Argumentation: the white rat of early hypertext systems

Within the hypertext research community, for a decade from the early 80s to early 90s, argumentation became something of an 'experimental white rat', with many of the pioneering systems for 'idea processing' [6] and then collaborative hypertext demonstrating the ability to represent argument structures as graphical node-link structures. Think of systems such as Textnet [16], NoteCards [7], gIBIS [3], rIBIS [10], SEPIA [14], AAA [11], Colab [15], and Aquanet [8]. Argumentation also attracted a lot of attention within the HCI and CSCW communities for its potential in supporting software design rationale [9]. As discussed elsewhere [1], driving forces and inspiration behind this work were the visions of Bush and Englebart of technological support for complex human intellectual work—what better challenge than trying to support argumentation, negotiation and debate about thorny, ill-structured problems?

However, after the initial flush of excitement at hypertext's representational possibilities, subsequent analyses of CSCA began to draw more sobering lessons. A number of analyses highlighted critical cognitive and social challenges for CSCA, and by extension, any approach that seeks to support intellectual work with semi-formal or formal

The workshop website can be found at: <http://kmi.open.ac.uk/sbs/csc/csc99/>

representations (most recently, see [13], and for further details, critiques of research into CSCA and design rationale [1,2], groupware [5], and collaborative modelling [12].

It has become apparent that CSCA's successes and failures result from complex interactions between factors including domain and argumentation knowledge, training in CSCA tools, user interface design, and motivation to use CSCA. A focus on any one factor in isolation has proven to be shortsighted. This all sounds rather obvious in hindsight — don't we all know that a wholistic approach is required? The fact that technology led the way gives pause for thought on how technology stimulates innovation, and on how well the Hypertext, HCI and CSCW research communities practise what they preach regarding the integration of technology into real work practice. This checkered history set the context for the workshop.

Workshop theme and process

The workshop focused on the intersection between CSCA and CSCL: what properties of CSCA environments can support learning? "Learning" was defined from a lifelong learning perspective, embracing physical and distributed communities of practice in both academic school/university contexts, and professional workplaces.

We invited participation from researchers and practitioners actively engaged in the design or evaluation of CSCA systems for learning communities:

- **Academic learning communities** include high school and university students (e.g. learning to analyse debates and construct scholarly cases), and 'qualified researchers' (e.g. analysing a research literature; formal peer review; conducting structured debates about problems).
- **Non-academic learning communities** have CSCA-relevant concerns such as analysing ill-structured problems, improving reflective practice and

maintaining group memories and rationale (which are course also relevant for academics).

We succeeded in bringing together about 20 participants from a very wide range of backgrounds, from hypertext, groupware and artificial intelligence technologies, with applications from academic education to business meeting facilitation. The workshop was conducted in a highly interactive manner, with minimal time spent on paper presentations (having been read and discussed to some extent in advance). Time was devoted to thematic breakout discussion groups and software demonstrations, with the conclusion that this process worked extremely well.

Breakout groups were formed to address several persistent themes in CSCA work. We started with the following three:

- **Integrating CSCA with other tools and modes of working:** most work/learning involves more than just argumentation...
- **Visualizing argumentation:** pros and cons of visual argument mapping for different user groups
- **Boosting the 'CS' in CSCA:** possibilities and pragmatics of giving the computer more domain or argumentation knowledge

which led to the identification of two more issues that were addressed on day two:

- **Re-using CSCA:** just as the process of creating CSCA representations has its own costs and benefits, re-using them is potentially one of the biggest benefits of CSCA, but also opens up a whole new set of issues.
- **Analysing CSCA:** how to analyse CSCA process and repositories, for research purposes as well as to make sense of a group memory.

The notes produced by these groups are on the workshop website.

Discussion Papers

CSCA in business/industry Seven Years of Industrial Strength CSCA in an Electric Utility

Jeff Conklin, Group Decision Support Systems, Inc.

Argumentation in Different CSCA Project Types

Albert M. Selvin and Maarten Sierhuis*, Bell Atlantic Corporation and *NASA Ames Research Center*

CSCA Issues Raised by Mission Control for the International Space Station

John O'Neill & Roxana Wales, NASA Ames Research Center

CSCA in academic contexts Scholarly CSCA: Supporting Distributed Research Discourse

Simon Buckingham Shum, Enrico Motta & John Domingue, Knowledge Media Institute, The Open University

CSCA in Legal Education

Chad Carr, Educational Technology, Research & Assessment, Northern Illinois University

Who will make the argument for CSCA? Factors in Faculty Use of CSCA Systems

Margaret Chambers, Institute for Distance Education, University System of Maryland

Distance Learning Applications of the Zeno Mediation System

Thomas F. Gordon, Sylvia Johnigk, Barbara Schmidt-Belz, Angi Voß, Ulrike Petersen, German National Research Center for Information Technology

Making Use of Tertiary Courseware

Katrin Hartmann, Department of Computer Studies, Glasgow Caledonian University

Dialogue Games for Computer Supported Collaborative Argumentation

Nicolas Maudet and *David Moore, Institut de Recherche en Informatique de Toulouse & *Leeds Metropolitan University

Supporting Collaborative Learning with 'Thin' Interactive Problem Scenarios

Jörn Nilsson, School of Art & Communication, Malmö University College

Common Ground in Computer-Supported Collaborative Argumentation

Duska Rosenberg and Sillince John Sillince, Management School, Royal Holloway, University of London

KISHURIM: An Environment for Helping Teachers in Argumentative Activities

Baruch Schwarz, Reuma De Groot and the Argumentation Group, School of Education, The Hebrew University

Perspectives on Collaborative Knowledge-Building Environments: Toward a Cognitive Theory of Computer Support for Learning

Gerry Stahl, Center for Lifelong Learning & Design, University of Colorado at Boulder

Interfaces for Supporting Informal Discussions in Over-The-Shoulder Learning

Michael Twidale, Graduate School of Library and Information Science University of Illinois

Collaborative Learning Through Computer-Mediated Argumentation

Arja L. Veerman, Jerry E.B. Andriessen and Gellof Kanselaar, Department of Educational Science, Utrecht University

Combining Computer Supported Collaborative Argumentation and Problem-Based Learning: An Approach for Designing Online Learning Environments

Jörg Zumbach & Peter Reimann, Institute of Psychology, University of Heidelberg

Consolidating the community

I am constantly surprised at the extent to which related research communities inhabit 'parallel universes' of professional bodies, listservs, workshops, conferences and journals, and it's always extremely satisfying to make new links. The verdict from the final workshop discussion (also captured and on the website) was that extremely valuable links had been forged between diverse communities. We are now exploring various avenues to consolidate CSCA research, including the development and decentralisation of the CSCA website to section owners <<http://kmi.open.ac.uk/sbs/cscsca>>, publications, and future workshops. The best way to track developments is to join the CSCA discussion group <<http://www.mailbase.ac.uk/lists/cscsca>>.

So, if you are working in CSCA (perhaps there is a whole community out there that we have not yet discovered...) and would like to be involved with us, please get in touch! ♦

References

1. Buckingham Shum, S. and Hammond, N. Argumentation-Based Design Rationale: What Use at What Cost? *International Journal of Human-Computer Studies*, 40, 4, 1994, pp. 603-652. PrePrint: <<http://kmi.open.ac.uk/sbs/DR.html>>
2. Buckingham Shum, S., MacLean, A., Bellotti, V. and Hammond, N. Graphical Argumentation and Design Cognition. *Human-Computer Interaction*, 12, 3, 1997, pp. 267-300. PrePrint: <<http://kmi.open.ac.uk/sbs/DR.html>>
3. Conklin, J. and Begeman, M.L. gIBIS: A Hypertext Tool for Exploratory Policy Discussion. *ACM Transactions on Office Information Systems*, 6, 4, 1988, pp. 303-331
4. GDSS: *QuestMap*. Group Decision Support Systems, Washington, USA <<http://www.gdss.com/OM.htm>>
5. Grudin, J. Evaluating Opportunities for Design Capture. In *Design Rationale: Concepts, Techniques, and Use*, Moran, T.P. and Carroll, J.M., (Ed.), Lawrence Erlbaum Associates: Hillsdale, NJ, 1996, pp. 453-470
6. Halasz, F.G. Reflections on Notecards: Seven Issues for the Next Generation of Hypermedia Systems. *Communications of the ACM*, 31, 1988, pp. 836-852
7. Halasz, F.G., Moran, T.P. and Trigg, R.H. Notecards in a Nutshell. In *Proceedings of CHI and GI'87: Human Factors in Computing Systems and Graphic Interface*, 1987, ACM: New York, pp. 45-52
8. Marshall, C.C. and Rogers, R.A. Two Years before the Mist: Experiences with Aquanet. In *Proceedings of the Fourth ACM Conference on Hypertext*, 1992, pp. 53-62
9. Moran, T.P. and Carroll, J.M., (Ed.) *Design Rationale: Concepts, Techniques, and Use*. Lawrence Erlbaum Associates: Hillsdale, NJ, 1996 [ISBN 0-8058-1566-X].
10. Rein, G.L. and Ellis, C.A. rIBIS: A Real-Time Group Hypertext System. *International Journal of Man-Machine Studies*, 24, 3, 1991, pp. 349-367 [Also in Greenberg S. (Ed.) *Computer Supported Cooperative Work and Groupware*, 223-241. (1991) Academic Press: London].
11. Schuler, W. and Smith, J. Author's Argumentation Assistant (AAA): A Hypertext-Based Authoring Tool for Argumentative Texts. In *Proc. ECHT'90: European Conference on Hypertext: Argumentation, Design & Knowledge Acquisition*, Cambridge, 1990, Cambridge University Press, pp. 137-151
12. Selvin, A. Supporting Collaborative Analysis and Design with Hypertext Functionality. *Journal of Digital Information*, 1, 4, 1999 <<http://jodi.ecs.soton.ac.uk/Articles/v01/i04/Selvin>>
13. Shipman, F.M. and Marshall, C.C. Formality Considered Harmful: Experiences, Emerging Themes, and Directions on the Use of Formal Representations in Interactive Systems. *Computer Supported Cooperative Work*, 8, 4, 1999, pp. 333-352. PrePrint: <<http://bush.cs.tamu.edu:80/~shipman/cscw.pdf>>
14. Streitz, N., Hanneman, J. and Thüring, M. From Ideas and Arguments to Hyperdocuments: Travelling Through Activity Spaces. In *Proceedings of Hypertext'89*, 1989, ACM: New York, pp. 343-364
15. Tatar, D.G., Foster, G. and Bobrow, D.G. Design for Conversation: Lessons From Cognoter. *International Journal of Man-Machine Studies*, 34, 1991, pp. 185-209
16. Trigg, R. and Weiser, M. TEXTNET: A Network-Based Approach to Text Handling. *ACM Transactions on Office Information Systems*, 4, 1, 1983