Report on 2nd Year (1999) of Alliance Project PN 98.128: Towards Designing Scholarly Documents for the World Wide Web

Project Summary

This project is concerned with the design and analysis of next generation publication and peer review environments for electronic scholarly journals. We are focusing on an electronic journal (eJournal) published by the Open University called JIME (Journal of Interactive Media in Education: www-jime.open.ac.uk), published using a web publishing toolkit called D3E (Digital Document Discourse Environment). In Year 2, we have begun analysis of JIME pere review discussions, and prototyped improved user interfaces for the toolkit and discussion environment.

JIME represents a unique convergence of eJournal features. Lancaster (1985)[1] proposed a continuum for classifying journals according to the extent to which they use computer technology. At Stage 1, a journal uses computers simply to produce print, progressing to Stage 6 as follows:

1. computers used for print production
2. journal distributed in both print and electronic formats
3. publication design is rooted in print, but articles are developed solely for electronic distribution
4. interaction between authors and readers is possible; publications can evolve as a result of such interactions
5. the inclusion of multimedia content
6. both interactive participation and multimedia capabilities are supported

JIME's unique set of features qualifies it as a Stage 6 eJournal on Lancaster's continuum.

Accomplishments in Year 2

There were several exchanges of personnel between Université de Provence and the Open University during 1999. Anticipated visits by one OU PhD student (Mwanza) did not take place due to a change in the direction of her PhD. In addition, the year following the end of the project has seen continued interest in D3E and JIME in both research and business/practitioner communities, including invitations to contribute to prestigious conferences and books, and as listed at the end, follow-on PhD research projects and research funding. Year 2's change in circumstances for Tamara Sumner and Mike Wright (moving from the Open U. to University Colorado, Boulder, USA) did not damage the successful collaboration established in Year 1, with work in Colorado (uncosted to Alliance) continuing to feed into this project, with Mike Wright continuing his PhD with the Open University. Year 2 has also involved the disssemination of the project results at several conferences and workshops, in order to solicit feedback.

Key activities from Year 2's work are summarised in the table, and elaborated below.

Date	Project Member	Activity	Cost	to Partner
15-30 Sept., 1999	Aline Chevalier	Visit to Open U.: discourse analysis of JIME web-based journal peer review discussions	6875,22 francs	U. Prov.
7-8 Oct., 1999	Nathalie Bonnardel	Visit to Open U.: discourse analysis of JIME web-based journal peer review discussions	2124,78 francs	U. Prov.
23-30 May, 2000	Mike Wright	Visit to U. Provence, and present paper at *Fourth International Conference on the Design of Cooperative*	754.73	Open U.

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[1]   Lancaster, F. W. (1985). The Paperless Society Revisited. *American Libraries*, 16, (8), 553-555

		Systems, Sophia Antipolis, France		
16 June, 2000	Tamara Sumner, Simon Buckingham Shum, Mike Wright, plus other OU staff interested in D3E	D3E Workshop, Open University, UK, reporting the results of D3E applications and planning new user interfaces	214.76	Open U.
19-20 Sept., 2000	Simon Buckingham Shum	Invited paper to describe Alliance-supported research, presented to *Les Pratiques Collectives Distribuées Sur Internet (Distributed Collective Practices on the Internet) 2000*, Ecole Nationale Supérieure des Télécommunications, Paris, France	552.77	Open U.
19 Oct. – 6 Nov., 2000	Simon Buckingham Shum	Invited paper to describe Alliance-supported research, presented to *Int. Symposium on Knowledge Construction in E-Space*, Greensboro, US	275.00	Open U.

Objective 5   Internationalization of the D3E software and improve user interfaces

This objective had to be defined in order to address the other objectives. It comprised two steps :

1. Update of D3E software (Java v1.0 -> Java v1.2.1)
2. Internationalization of the software and, especially, release of a French version.

Outcome: This objective was completed in April and May 1999 by Frederic Piolat (University of Provence) and Michael Wright (Open University).

Another goal was to improve the usability of the system for non-technical communities, in the light of usability evaluations from Year 1. There are two aspects to this:

1. *User interface to the D3E Publisher's Toolkit* (a Java application). Due to programmer recruitment difficulties (not funded by Alliance), work on the new user interface did not advance as far as hoped. Work at the OU has almost completed a new version of the toolkit. However, in parallel, work at Colorado has prototyped a novel new user interface that makes the steps more intuitive.
2. *User interface to the D3E web document-discussion system* (generated in part by the toolkit). Work on this side progressed very well, and the new discussion system provides better support for navigation, as well as running on the more widespread Windows web servers (as opposed to Unix).

In parallel, as indicated below, we have been deploying D3E in a range of other contexts to test its generality and usability.

Objective 6   Examine the impact of D3E on scholarly discourse.

We analysed the previous two years of review archives from JIME. This analysis looked at the effects of open, web-based reviewing on the formation of distributed scholarly communities. Especially, this analysis allowed us to determine (1) the nature of the interactions between authors and reviewers and (2) their effects to improve the document. Towards this end, we conducted both a quantitative analysis (e.g. to identify criteria that lead to the most frequent interactions) and a qualitative analysis (e.g. to determine the authors' reactions to reviewers' comments and the reviewers' reactions in complex regulations).

Outcome: this objective was completed from June to December 1999 by all the participants. Reflection on the analysis grid, improvements of it and confrontation of a first part of the results were performed, in September, during a visit at the Open University of Nathalie Bonnardel and Aline Chevalier (Université de Provence).

Preliminary results of this work were presented in France by Sumner *et al.* (2000), and this work is continuing beyond the formal end of Alliance. The analyses indicate a number of interesting phenomena in JIME peer review discussions, such as:

- negotiation between authors and reviewers on how to resolve weaknesses in a submission, or disagreements about an idea

- the need to actively model more advanced uses of the discussion environment in order to introduce participants to this mode of reviewing

- instances of failures in interdisciplinary dialogue which demonstrate that the media only enable certain modes of discourse, with appropriate journal policies and online practices required to exploit the technology's potential

In the light of our analyses, we have been reflecting on the generality of JIME's approach to journal publishing and peer review, and have outlined for other disciplinary communities (Buckingham Shum and Sumner, in press) some of the issues they should consider when planning similar publications (e.g. using the D3E system for the infrastructure).

Summary of 2 year's Alliance Project

During the two years supported by Alliance:

- We developed the D3E software and improved it with regard to results from studies in cognitive psychology and ergonomics. Moreover, an internationalization of this system has been realized, which allows us to plan new situations of use of this system (see the paragraph about the extensions of the system).

- We conducted 3 studies in Cognitive Psychology and Ergonomics (objectives 1, 4 and 6), which allowed us (1) to have a better understanding of designers who use the D3E software in order to edit interactive journals and (2) to characterize the interactions between authors and reviewers of scholarly documents, allowed by the Web and the e-journal JIME.

The project involved students in authentic research activities, developing software and conducting studies.

Research Publications/Presentations 1999-present

Bonnardel, N., Lanzone, L. & Sumner, T. (soumis). Designing web sites: The cognitive processes of lay-designers.

Bonnardel, N. & Chevalier, A. (1999). La conception de sites Web : Une étude de l'adoption de points de vue. *Actes de la Journée satellite "Ergonomie et Télécommunications", 34ème Congrès de la Société d'Ergonomie de la Langue Française,* Lannion : CNET, 83-93.

Bonnardel, N. & Lanzone, L. (sous presse). La création de sites Web par des concepteurs débutants : Quels sont les processus cognitifs mis en œuvre et comment en faciliter la réalisation ? In C. Levy-Leboyer, M. Huteau, C. Louche & J.-P. Rolland, *Psychologie Appliquée à la Gestion des Ressources Humaines*, Paris : Editions d'Organisation.

Buckingham Shum, S. and Selvin, A.M. Invited presentation: Structuring Discourse for Collective Interpretation. *Les Pratiques Collectives Distribuées Sur Internet (Distributed Collective Practices) 2000*, Ecole Nationale Supérieure des Télécommunications, Paris, France, 19-20 Sept., 2000 [www.limsi.fr/WkG/PCD2000].

Buckingham Shum, S. Invited presentation: Mediating Conversation for Collective Sensemaking. *International Symposium on Knowledge Construction in E-Space*, Center for Creative Leadership, Greensboro, N. Carolina, US

Buckingham Shum, S. (in press) Invited presentation: Open Peer Review Meets Open Archives: Towards Open Source, Quality-Controlled Scholarly Publishing on the Net. In *Workshop on the Open Archives Initiative (OAi) and*

Peer Review Journals in Europe, CERN, Organisation Européenne pour la Recherche Nucléaire, Geneva, 22-24 March, 2001 [http://documents.cern.ch/OAi/].

Buckingham Shum, S. and Sumner, T. JIME: An Interactive Journal for Interactive Media. In *Scholarly Publishing: From Frontier to Frameworks,* Peek, R., (Ed.), MIT Press: Boston, In Press

Piolat, A., Bonnardel, N. & Chevalier, A. (sous presse). Rédaction collaborative sur le Web : Analyse des interactions entre auteur, reviewers, commentateurs et éditeurs, durant l'expertise d'un article soumis. In R. Bouchard, M.M. de Gaulmyn & A. Rabatel (Eds.), *Le processus de rédaction coopérative : De situations d'apprentissage aux situations professionnelles,* Paris : L'Harmattan.

Piolat, A., Olive, T., Roussey, J.-Y., Thunin, O. & Ziegler, J.C. (1999). Scriptkell: A tool for measuring cognitive effort aand time processing in writing and other complex cognitive activities. *Behaviour Research, Methods, Instruments & Computer,* 31(1), 113-121.

Sumner, T., Buckingham Shum, S., Wright, M., Bonnardel, N. and Chevalier, A. Redesigning the Peer Review Process: A Developmental Theory-in-Action. In *Proc. COOP' 2000: Fourth International Conference on the Design of Cooperative Systems*, Sophia Antipolis, France [www.kmi.open.ac.uk/tr/papers/kmi-tr-96.pdf].

Wright, M. Constituencies for Users: How to Develop Them by Interpreting Logs of Web Site Access. In *AAAI Spring Symposium on Intelligent Agents in Cyberspace,*, March 22-24, 1999, Stanford University, CA, 1999 [http://kmi.open.ac.uk/tr/papers/kmi-tr-75.pdf].

Other Results Flowing from this Work

The work on D3E and JIME supported by Alliance has been extremely successful in stimulating further interest and funding for research projects.

PhD Project: Inspired in part by the work on JIME and D3E, a PhD project started in October 1999 at KMi, Open University, focused on internet-mediated scholarly discourse.

PhD Project: Our work has also attracted interest from further afield, with a Brazilian PhD student starting a one year placement in KMi to study JIME and D3E as part of her research into the impact of new technologies on scientific publishing and discourse.

Open University application of D3E: Assisted by the funding from Alliance, D3E is now in a state for the Open U. to deploy it as a mainstream technology for internal and student-related web discussion-documents.

Corporate sponsorship: On seeing a demonstration of JIME and description of the related research conducted, a large multinational company sponsored KMi (1999-2001) to implement and evaluate an identical eJournal environment on their intranet, for the internal dissemination and discussion of best practices, in order to keep such documents 'alive' and up to date. Value: £61,000

Wider interest in D3E: We have a long list of educational, not for profit and commercial organizations who have downloaded D3E for their own web document-discussion applications.

Open source distribution: We are working towards a full open source distribution of D3E on the internet.

Research Project: A 3 year project at the Open University has been funded by the UK's Engineering and Physical Sciences Research Council (Distributed Information Management Programme), to extend our existing technologies for scientific publishing and discourse. The work on D3E and JIME supported by Alliance played an important part in establishing our track record to secure this project. [www.kmi.open.ac.uk/projects/scholonto/]. Value: £315,929