



# Towards a Framework for Distributed Collaboration: A Study of Technology Impact on Isolation in Distributed Extreme Programming.

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## INTRODUCTION

Over the last decade, the notion of contained systems has decreased significantly with the globalization of networks, systems and businesses of varying forms. With the increased scope of traditional networks comes a wealth of new opportunities for utilizing a more virtual presence in teamwork in order to facilitate distributed collaboration (DeMarc, Hendrickson, & Townsend, 1998).

For purposes of this research, the terms distributed collaboration and virtual teams will be used interchangeably to represent the aggregation of personnel in an organization for the accomplishment of a specific and designated task of prescribed and measurable duration at a distance. A systems approach is applied to a case study of distributed extreme programming teams.

This research focuses primarily on gaining an understanding of the issues faced in building a distributed software product development organization (virtual software development team).

## METHODOLOGY

Firm X is a 30 year old publicly traded professional services firm. Over the course of the last year, the firm has experienced a significant amount of turbulence. The organization is introducing further perturbations by developing horizontal service offerings that cut across existing virtual business groups. One of these groups will continue to develop the firm's flagship credit and risk collections products. The group will represent the deconstruction of at least three existing businesses spread across a number of states and two countries.

In addressing distributed collaboration environments in this firm and working towards a framework for understanding the issues and opportunities that such an exercise presents, the researcher will use an interpretive, nomothetic, case study approach which applies systems level framework analysis with *no a priori* hypotheses. The researcher is working to develop an initial framework on which to evaluate the efforts of the virtual team built upon the team dispersion work of Cummings and O'Leary (2002). Using the notion of isolation, the research will examine the impact of spatial dispersion in the virtual team on the use of special technologies for development. The unit of analysis is the entire virtual team at a professional services firm with the measurable outcome being a comparison of the connectedness of the individual groups initially (prior to the horizontal group formation) and post group formation as determined by a representative group sample survey. The framework will further build on a combination of the Levitt Rhombus model and Quershi (1995) systems level distinctions for evaluating activities in the virtual team.

Although many have focused on technology in the past, the people and process and association aspects of the complex distributed system are often more important than the implementation of technology (Hendrickson & Strader, 1998; Reinsch, 1997; Bui, Higa, Sivkumar, & Yen, 1996; Evaristo & Munkvold, 2002; Spinks & Wood, 1996; Sia, Tan, Teo, & Wei, 1998). This work will build on the Quershi (1995) case study model to examine Technology, People, Process, and Associations. It is assumed that the charter of a virtual team will have a clear statement of the task (mission) and timeline, therefore, these as-

pects of the analysis are considered attributed of the virtual teams and not necessarily areas of review in the research. The impact of the constraint of the attribute, however, may be a point of discussion in the conclusion of the case study.

The focusing element of the research builds on the emerging area of distributed extreme programming. A limited body of work in this young area has been developed over the last two years (Maurer, 2002; Cursaro, Jain, Kircher, & Levine, 2001).

## INITIAL FRAMEWORK COMPONENTS

**Technology.** Technology involves a number of issues in the virtual team. Primarily these items are infrastructure and application dependent.

**People.** People aspects are sometimes the most difficult aspects to resolve. In several early pilots, the people issues have been overlooked. A key theme in the recent writings of James Champy has been on the omission of people in the haste to implement technologies.

**Process.** Process aspects are key to understanding the readiness and strategies of the organizations that contain virtual teams. It is important to remember that process is present in all facets of the organization. The purpose of examining process is to understand the intersections of actions and the virtual teams purpose.

**Association.** Association manages the interconnections between the virtual team and other entities. These other entities could be other virtual teams, traditional teams, or other organizations.

This work will be undertaken in a limited active researcher environment to better ensure the objectiveness of the research. A mediating third party will work to develop a pilot for technology implementation on the virtual team. The researcher serves as an expert advisor to the pilot formation and operation, while simultaneously using the pilot as a data collection vehicle for the research.

The principles of the interpretive case study will be modeled on the work of Klein and Meyers (1999), which calls for some definition in the interpretive case study even though a pure interpretive study would not employ any mechanisms such as surveys which are traditionally held as conventions of positivism.

## LITERATURE

For the most part, work in this space has focused on collaboration and computer-mediation in the academic research organization. Nazer (2001) performed a psychological/sociological-focused thesis that examines the dynamics of a virtual organization and the ability to transfer those behaviors to traditional paradigms. Some research has focused on collaboration and discussion in distributed environments (Burnishe, 2001; Scott, 2002). Other work has been centered on specific technical implementations that facilitate collaboration (Dorochenceanu, Marsic, & Wang, 1999; Greenberg & Roseman, 1996;

Gupta, Grudin, & Jancke, 1999). Additional technical work has been completed in the formulation of generalized technical frameworks (Beca, 2002; Begole, Rosson, & Shaffer, 1998; Brave, Dahley, Ishii, 1998; Lauwers, 1990). Although some have done work in the organizational structures that support distributed collaboration (Ang & Slaughter, 1995; Bailyn, 1989; Nazer, 2001; Schmidt, 2000) and the overall impact of these programs (Burnishe, 2001; Henrickson & Strader, 1998; Scott, 2002, Spinks & Wood, 1996), very little work has been done in holistic frameworks which take into account technical and functional requirements for a robust evaluative distributed collaboration environment classification taxonomy.

## STAGE OF RESEARCH

This dissertation work is in the very early stages of the idea paper. Work refining the topic is currently underway in conjunction with initial coursework in information systems at Nova Southeastern University, where the author is in the second semester of coursework in the Graduate School of Computer and Information Sciences.

## EXPECTED BENEFITS FROM SYMPOSIUM PARTICIPATION

The researcher seeks feedback on methods for strengthening the outcomes of the research while preserving the objective and non-assumptive nature of the research process. Most researchers have conducted laboratory-like studies of distributed collaboration with hard distinctions between distributed and non-distributed teams using surveys as the major vehicle. In this research, an amalgam of a number of data collection mechanisms will be employed, including surveys, however, the survey is not the primary and vehicle for data collection. Given this diversion from the traditional path, it is important to understand as early as possible in the research any mitigating circumstances that may reposition the survey as a more primary vehicle and thus force the research to take on a more positivist role. Particular feedback on interpretive case studies in IS is sought.

## REFERENCES

- Ang, S., & Slaughter, S. (1995). Alternative employment structures in information systems: A conceptual analysis. *Proceedings of the 1995 ACM SIGCPR Conference on Supporting Teams, Groups, and Learning Inside and Outside the IS function Reinventing IS*, 181-193.
- Bailyn, L. (1989). Towards the perfect workplace? *Communications of the ACM*, 32(4), 460-471.
- Beca, L. M. (2002). A methodology and platform for building collaborative environments on the Web. *PhD Dissertation*. DAI - B 63/03.
- Begole, J. B., Rosson, M. B., & Shaffer, C. A. (1998). Supporting worker independence in collaboration transparency. *Proceedings of the 1998 ACM Symposium on User Interface Software and Technology (UIST '98)*, 133-142.
- Brave, S., Dahley, A., & Ishii, H. (1998, November). *Tangible interfaces for remote collaboration and communication*. Paper presented at CSCW '98. Retrieved October 2, 2002, from [http://tangible.media.mit.edu/papers/inTouch\\_PSyBench\\_CSCW98/inTouch\\_PSyBench\\_CSCW98.pdf](http://tangible.media.mit.edu/papers/inTouch_PSyBench_CSCW98/inTouch_PSyBench_CSCW98.pdf)
- Bui, T. X., Higa, K., Sivakumar, V., & Yen, J. (1996). Comparison of telework in the US and Japan: A cultural contingency model. *Proceedings of the 1996 Conference on ACM SIGCPR/SIGMIS Conference*, 351-359.
- Burnishe, R. W., Jr. (2001). Fostering exploratory discourse in global, telecollaborative learning projects. *PhD Dissertation*. DAI-A 62/03.
- Computer Science and Telecommunications Board, & National Research Council. (2002). *Broadband: Bringing Home the Bits*. Washington, DC: National Academy Press.
- Corsaro, A., Jain, P., Kircher, M., & Levine, D. (2001). Distributed eXtreme Programming. *Proceedings of XP-2001*, 66-71.
- Cummings, J. N., & O'Leary, M. B. (2002, January). *The Spatial, Temporal, and Configurational Characteristics of Geographic Dispersion in Work Teams* (Paper 148) [Center for eBusiness at MIT Technical Report]. Cambridge, MA: Massachusetts Institute of Technology.
- DeMarie, S. M., Hendrickson, A. R., & Townsend, A. M. (1998). Virtual teams: Technology and workplace of the future. *Academy of Management Executive*, 12(3), 17-29.
- Dorohenceanu, B., Marsic, I., & Wang, W. (1999, October). *Design of the DISCIPLE synchronous collaboration framework*. Paper presented at IASTED International Conference on Internet and Multimedia Systems and Applications. Retrieved October 3, 2002, from <http://www.caip.rutgers.edu/disciple/Publications/iasted-99.pdf>.
- Fitzpatrick, G., & Kaplan, S. (1997). *Designing Support for Remote Intensive-Care Telehealth using Locales Framework*. Retrieved October 1, 2002, from <http://www.dstc.edu.au/Research/Projects/EWP/Papers/DIS97-kaplan.pdf>.
- Greenberg, S., & Roseman, M. (1996). TeamRooms: Network places for collaboration. *Proceedings of ACM 1996 Conference on Computer-Supported Cooperative Work (CSCW '96)*, 325-333.
- Gupta, A., Grudin, J., & Jancke, G. (1999, September 13). *Presenting to Local and Remote Audiences: Design and Use of the TELEP System*. Retrieved October 2, 2002, from <http://www.research.microsoft.com/research/coet/TELEP/TRs/99-71.pdf>.
- Hendrickson, A., & Strader, T. (1998). From silicon valley to silicon prairie: A long distance telecommuting case study. *ACM SIGPCPR Computer Personnel*, 19(3), 20-33.
- International Telecommunications Union[ITU]. (2002, March). *World Telecommunication Development Report*. Retrieved September 27, 2002, from [http://www.itu.int/ITU-D/ict/publications/wtdr\\_02/material/WTDR02-Sum\\_E.pdf](http://www.itu.int/ITU-D/ict/publications/wtdr_02/material/WTDR02-Sum_E.pdf).
- Klein, H. K., & Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 23(1), 67-94.
- Lauwers, C. (1990). Collaboration transparency in desktop teleconferencing environments. *PhD Dissertation*. Technical Report CSL-TR-90-435, Computer Systems Laboratory, Stanford University.
- Maurer, F. (2002). Supporting Distributed Extreme Programming. In *Lecture Notes in Computer Science: Vol. 2002. XP/Agile Universe 2002* (2418th ed., pp. 13-22) Berlin: Springer-Verlag.
- Munkvold, B. E., & Evaristo, J. R. (2002). Collaborative infrastructure formation in virtual projects. *Journal of Global Information Technology Management*, 5(2).
- Nazer, N. (2001). Operating virtually within a hierarchical framework: How a virtual organization really works. *PhD Dissertation*. DAI-A62/04.
- Qureshi, S. S. (1995). Organisations and networks: Theoretical considerations and a case study of networking across organisations (Unpublished PhD Dissertation). *London School of Economics*. London School of Economics Department of Information Systems, <http://is.lse.ac.uk/Research/rescomp2.htm#QURESHI>.
- Reinsch, N. L., Jr. (1997). Relationships between telecommuting workers and their managers: An exploratory study. *Journal of Business Communication*, 34(4), 343-369.
- Schmidt, B. L. (2000). You can go home again: Successful telecommuting for the technical communicator. *Proceedings of IEEE Professional Communication Society International Professional Communication Conference and ACM Special Interest Group on Documentation Conference on Technology and Teamwork*, 25-37.
- Scott, D. M. (2002). Group collaboration in web-based distance education: The effect of computer-mediated communication and personality traits on student productivity, participation, and technology preference. *PhD Dissertation*. DAI-A62/09.
- Sia, C.-L., Tan, B. C., Teo, H.-H., & Wei, K.-K. (1998). Examining environmental influences on organizational perceptions and predisposition toward distributed work arrangements: A path model. *Proceedings of the International Conference on Information Systems*, 88-102.
- Spinks, W., & Wood, J. (1996). Office-based telecommuting: An international comparison of satellite offices in Japan and North America. *Proceedings of the 1996 Conference on ACM SIGCPR/SIGMIS Conference*, 338-350.
- U.S. Federal Communications Commission. (2000, August). *Deployment of Advanced Telecommunications Capability: Second Report* (FCC 00-290, p. 3). Washington, DC.

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