# Cooperative Learning Environments

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## Research Problem

In a nutshell, the problem can be stated as: "get the right information to the right person at the right time." In order for organizations to effectively handle rapidly changing technology and continue to innovate, we must support on-going effective communication of information.

Old models are no longer effective. Attending school for 20 years to obtain an advanced degree and then "working" is no longer sufficient. Engineers have to learn new skills at an increasingly rapid rate.

The model of separate classes or sending people back to school addresses part of the problem, but is not sufficiently fine-grained.

Some of this information must be learned -- the model that schools have of

## Proposed Research Methodologies

I have recently been struggling with the question of research methodologies. One of the research areas I'm interested in, computer-supported cooperative work, is attempting to develop a set of productive research methods and theories. The field is characterized by rapid change, not only in the technology, but also in the way organizations function and the ways people work within them. Researchers tend to be highly interdisciplinary, with backgrounds in computer science, experimental psychology, sociology, anthropology, and business. Each field brings a collection of methods and theories; no single one is adequate. Most of the research is too narrow or overly general; the most interesting combine the development of theory with experimental work and field study.

## Relevant Work

## Theoretical Basis

## Proposal

## Introduction

The problem of how to manage technological innovation can be addressed at a number of different levels. Different perspectives - from corporate organization to the management of a group of individuals.

Observation of existing innovation, vs. development of systems designed to enhance it. Argue that you must do both. Theories of coordination seem very relevant...

Information is an issue -- how to get the right information to the right person at the right time. Learning is an issue -- how does the organization learn, how do individuals learn.

Cooperation/coordination is an issue.

Top level: Corporate view

Middle level: Manager of Group view

Bottom level: Individual's view

I am interested in the overal problem of creating a productive environment for innovation, particularly in software/information systems. We can look at this topic on a number of different levels.

From a global view, we have to understand how corporations can best invest their research money into the development of new markets or new technology.

I would like to take this opportunity to write a draft of my dissertation proposal. The working title is "Cooperative Learning Environments", which combines my interests in Managing Technological Innovation, Management of Information Systems, and the Psychology of Learning. Two of the books assigned for this course, *Organizational Culture and Leadership* and *The Behavioral Theory of the Firm* are extremely relevant to this research.

I realize that the topic is ambitious and beyond the scope of a single dissertation. I view it as a step in a longer range program of research that I hope to continue after I complete the Ph.D.. Please let me know if you feel that this would be a reasonable topic for the term paper. I would also greatly appreciate any comments you may have or suggestions about relevant research.

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Ideas for Thesis Term Paper:

I start with several assumptions: 1. On-going technological innovation is important for the health of the economy. 2. The

If we take as given that technolocial innovation is important for the long term growth of the economy. , that education can be useful in stimulating technological innovation,

If we believe that having a work force that is technologicall

The motivation for the research is based on the obsrevation that To be successful, corporations must have a productive, well-educated, and innovative workforce. The model that employees spend the first 20 years of their lives learning and the remaining years working, is inadequate.

I have spent approximately eight years working with different approaches to adult learning, primarily computer-based. I am interested in the effects this has on improved productivity and technological innovation.

My work at Digital lead me to believe that the separation of learning from working is an artifact of many years of formal education, and is not the best model for adult learning in a business environment.

As you've probably noticed, I am struggling with the general problem of how to conduct research in this field. Most of the work strikes me as either too narrow or too general. The problem is how to strike the right balance between experimental rigor and useful insight.

This paper is an attempt to explore a specific set of ideas relating to Lens and ways of thinking about message structure; it is also an attempt to build a more general framework for further research. These ideas resulted from my analysis of the Xerox Parc pilot study, my own experiences with Lens, a re-reading of the "Semi-Structured Messages" paper for the CSCW seminar, and my work at Athena on the "Educational Communication System", which resulted in a three- dimensional framework for examining communication systems. (The three continua are: synchronous/asynchronous, stream/database, and sender/receiver/both.)

My bias is to follow an iterative process: begin with detailed observation of behavior, identify a phenomenon, articulate a principle or theory to explain the phenomenon, apply the theory systematically to generate new predictions, and test the theory empirically. In this particular instance, the Lens pilot provided the opportunity both for detailed observation and the isolation of a problem: people avoided using message types. Although it would have been easy to dismiss this as the result of system problems, my own experiences with Lens and my behavioral psychology background provided an alternative view: that users sometimes decide to what kind of message to send after they begin composing a message.

I was intrigued by the concept of resolving the tradeoff between structure and flexibility within a message by providing "semi-structured" messages and it struck me that this formulation could be extended to the process of composing a message. This turned out to be a productive exercise, generating a proposal for modeless message editing. This supported the claim that the concept of "semi-structured messages" is a powerful idea. The next step was to see how it could be further extended. The three-dimensional framework developed for Project Athena provided a way to systematically extend the idea, to cover groups of messages (result: conversations, coordination processes, etc.) and senders vs. receivers (result: example-based rule and message type editing).

## Management of Technological Innovation

Possible study:

Two questions:

strategic alliances and joint research.

## a new view of educational software

## cooperation

## Communication systems

## Prototyping

## Research Approaches

Observe and measure an existing set of systems. Prototype and test a system.

Techniques:

survey of groups, sociogram observe the results of certain kinds of changes. field studies

lab studies -- controlled studies.

introduction of system and observation

## What makes an organization learn?

As a manager, I noticed an interesting phenomenon. As one of the original developers of a software system, I was aware of a number of errors that were made and subsequently corrected. As we hired new people, it became apparent that they did not make the same errors. In a sense, the organization had "learned" -- we did not know how not to do this,.

## Cooperative Learning Environments

Education in corporations is usually relegated to a particular group that is responsible for the creation of particular courses.... Also, on the job training.

Notion that this is the only way...based on early experience with schools.

A redefinition of this (Mackay, 1986) helps us ...

But, learning is not a solitary activity. The informationa available in a information database should not be restricted to on-line access - people are par tof the network.

here’s where allen’s stuff about gatekeepers comes in.

Maybe put Essay for allen on-line...

coordination processes - lens.

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Cooperative learning environment - includes messages , databases, etc.