Knowledge Management Meeting
March 28, 2006

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Plug for ISR Forum – June 2

- Industry and Academic Talks
- Poster / Demo Session / Mixer with Students and Faculty
- And more
- See Debi Brodbeck, brodbeck@ics.uci.edu, for details

Schedule for Today

1000 – 1030 Arrival, Welcome, Introductions

1030 – 1115 Thomas Herring, SCE, KM in Nuclear Power

1115 – 1200 David Redmiles, UCI, Experiences in KM Related Software

1200 – 1300 Lunch, Break, and Networking

1300 – 1345 Moderator TBD, NASA conference whole group discussion

1345 – 1415 Break out, small group discussions

1415 – 1430 One sentence summaries and farewells

Other Logistics

- Rest rooms
- Lunch
- Break out rooms

Introductions

Who you are and why you came / what your interest is in today?

Revised Schedule for Today

1000 – 1030 Arrival, Welcome, Introductions

1030 – 1130 Thomas Herring, SCE, KM in Nuclear Power

1130 – 1145 Stew Sutton, Aerospace, New Forum Software

1145 – 1245 Lunch, Break, and Networking

1245 – 1330 David Redmiles, UCI, Experiences in KM Related Software

1330 – 1400 Moderator TBD, NASA conference whole group discussion

1400 – 1430 Break out, small group discussions

Homework: Short summaries from breakouts for next meeting in June at Aerospace Corp.

Experiences Related to Knowledge Management Software

Knowledge-Based Systems

Domain-Oriented Design Environments

Intelligent User Interfaces

Group Memory

Design Rationale

Activity Theory

Distributed Cognition

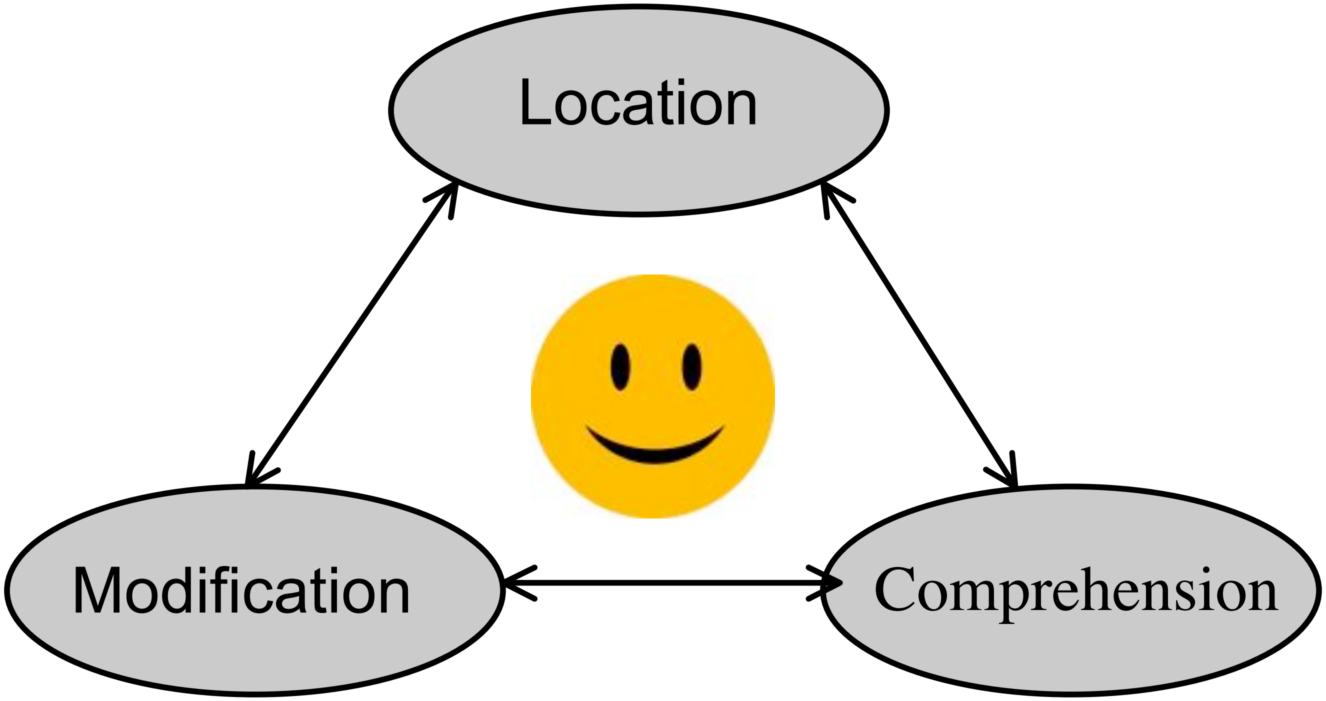
Talk Objectives

- To let you know about some things that have been tried and the degree or conditions under which they have met success.
- To convey the conclusion that knowledge-based systems are affected by factors beyond individual end users and individual user interfaces.
- To stimulate your thinking about the role of software tools in knowledge management.

- Preaching to the converted.

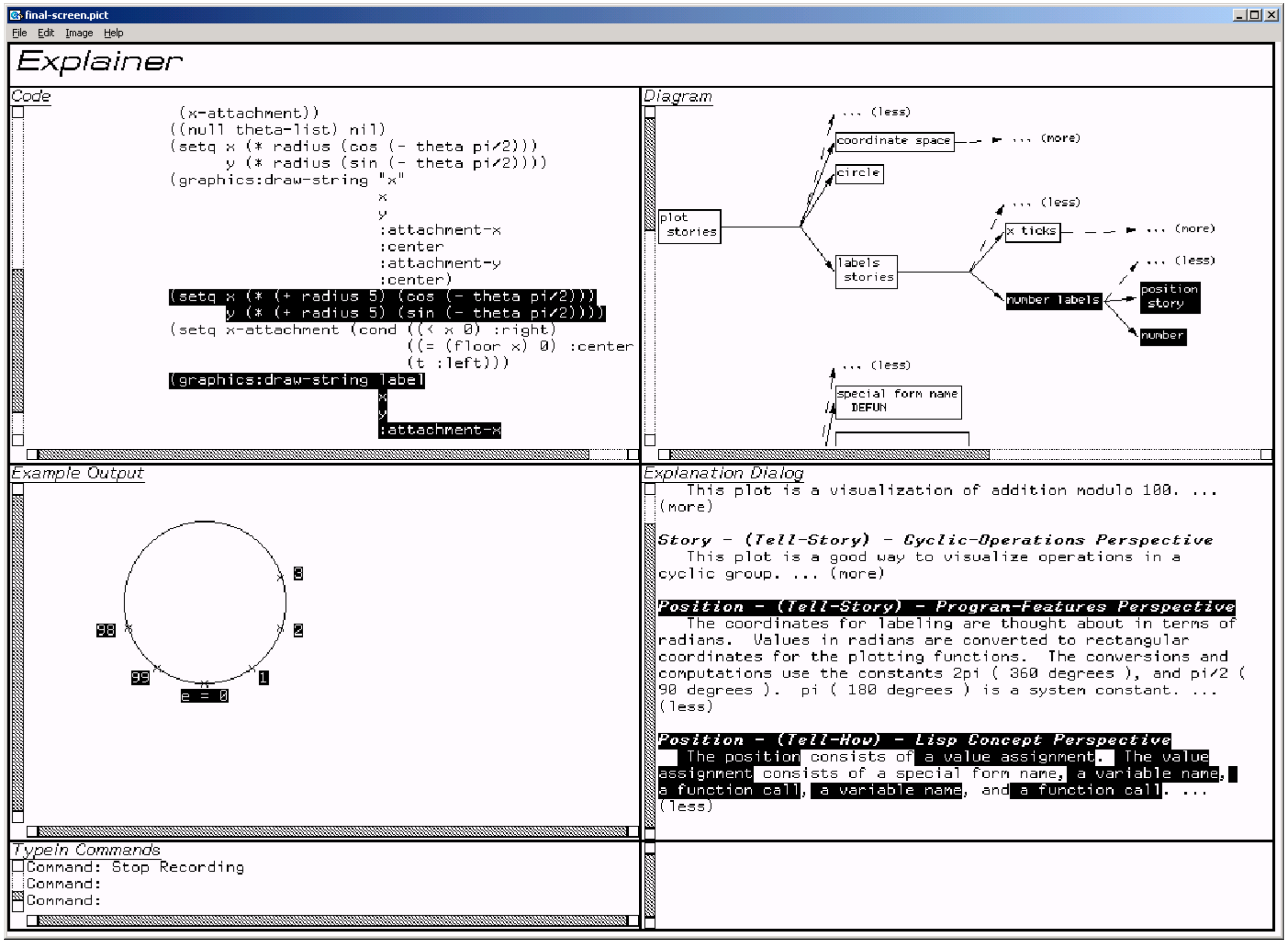
- Warnings of a cynic of sorts.

L-C-M Model of Knowledge Reuse [Red93]



Explainer [Red93]

- Library of Programming Examples for a Graphics API
- Hypermedia with E*xtreme* Granularity
- Incremental [Minimal] Explanation
- Multiple Perspective
- Human Performance Variability Reduced



```
 (x-attachment))
((null theta-list) nil)
(setq x (* radius (cos (- theta pi/2)))
      y (* radius (sin (- theta pi/2))))
(graphics:draw-string "x"
                      x
                      y
                      :attachment-x
                      :center
                      :attachment-y
                      :center)
(setq x (* (+ radius 5) (cos (- theta pi/2)))
      y (* (+ radius 5) (sin (- theta pi/2))))
(setq x-attachment (cond ((< x 0) :right)
                         ((= (floor x) 0) :center
                         (t :left)))
(graphics:draw-string label
                      x
                      y
                      :attachment-x
```

This plot is a visualization of addition modulo 100. ... (more)

Story - (Tell-Story) - Cyclic-Operations Perspective

This plot is a good way to visualize operations in a cyclic group. ... (more)

Position - (Tell-Story) - Program-Features Perspective

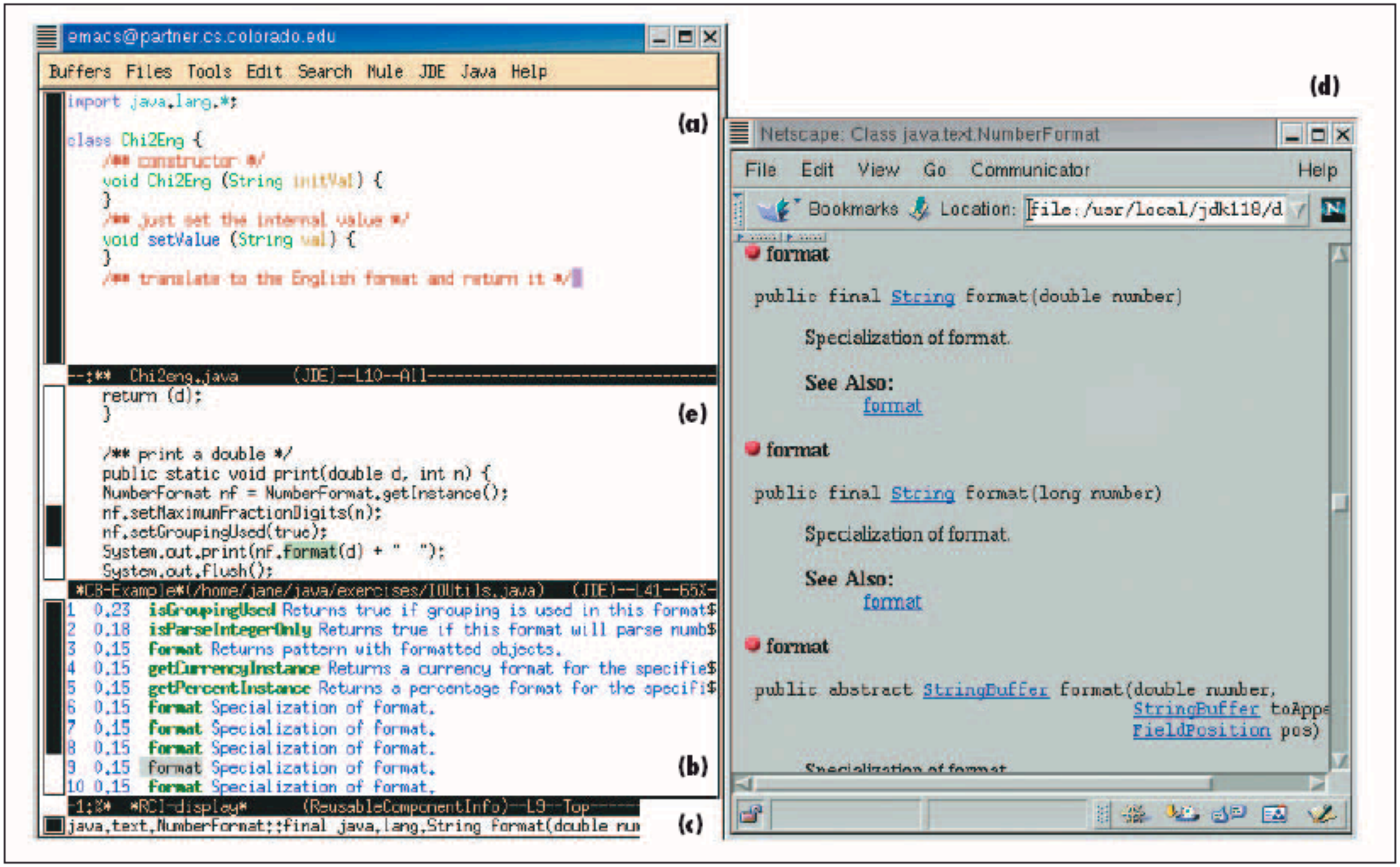
The coordinates for labeling are thought about in terms of radians. Values in radians are converted to rectangular coordinates for the plotting functions. The conversions and computations use the constants 2pi (360 degrees), and pi/2 (90 degrees). pi (180 degrees) is a system constant. ... (less)

Position - (Tell-How) - Lisp Concept Perspective

The position consists of a value assignment. The value assignment consists of a special form name, a variable name, a function call, a variable name, and a function call. ... (less)

```
Command: Stop Recording
Command:
Command:
```

Codebroker [Ye03]


emacs@partner.cs.colorado.edu
Buffers Files Tools Edit Search Mule JDE Java Help
(a)
(e)
(b)
(c)
(d)
Netscape: Class java.text.NumberFormat
File Edit View Go Communicator Help
Bookmarks Location: file:/usr/local/jdk118/d

```
import java.lang.*;

class Chi2Eng {
    /** constructor */
    void Chi2Eng (String initVal) {
    }
    /** just set the internal value */
    void setValue (String val) {
    }
    /** translate to the English format and return it */
--:** Chi2eng.java      (JDE)--L10--All-----------------------------------
    return (d);
    }

    /** print a double */
    public static void print(double d, int n) {
    NumberFormat nf = NumberFormat.getInstance();
    nf.setMaximumFractionDigits(n);
    nf.setGroupingUsed(true);
    System.out.print(nf.format(d) + "  ");
    System.out.flush();
*CB-Example*(/home/jane/java/exercises/IOUtils.java)   (JDE)--L41--65%-
1  0.23  isGroupingUsed Returns true if grouping is used in this format$
2  0.18  isParseIntegerOnly Returns true if this format will parse numb$
3  0.15  format Returns pattern with formatted objects.
4  0.15  getCurrencyInstance Returns a currency format for the specifie$
5  0.15  getPercentInstance Returns a percentage format for the specifi$
6  0.15  format Specialization of format.
7  0.15  format Specialization of format.
8  0.15  format Specialization of format.
9  0.15  format Specialization of format.
10 0.15  format Specialization of format.
-1:%*  *RCI-display*      (ReusableComponentInfo)--L9--Top-----
java.text.NumberFormat::final java.lang.String format(double num
```

format

```
public final String format(double number)
```

Specialization of format.

See Also:
format

format

```
public final String format(long number)
```

Specialization of format.

See Also:
format

format

```
public abstract StringBuffer format(double number,
                                    StringBuffer toAppe
                                    FieldPosition pos)
```

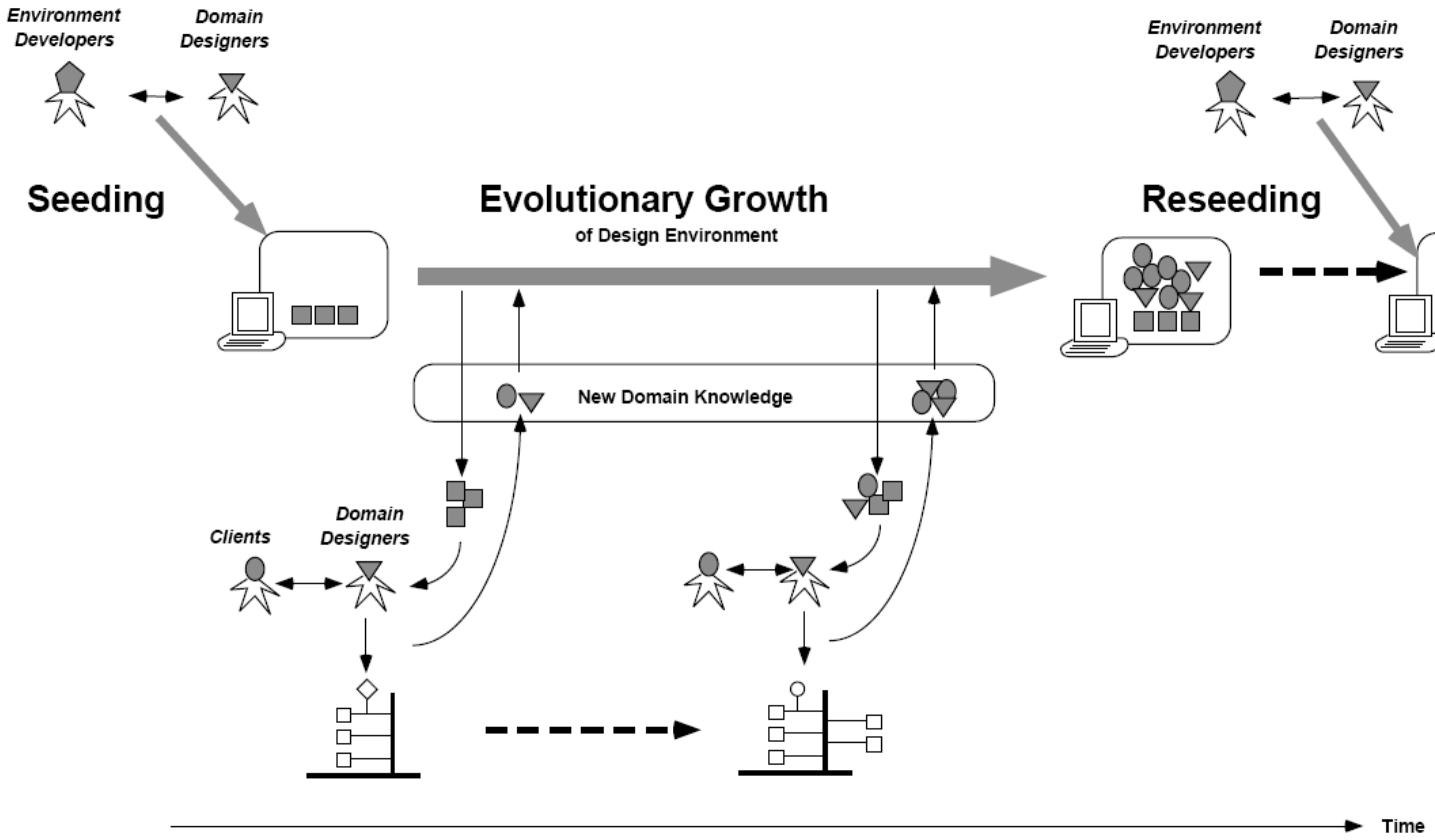
Specialization of format

Lessons (1)

- Knowledge reuse *infrastructure* is expensive.
  - Somehow has to input the knowledge
  - Someone has to maintain the knowledge
- Knowledge reuse adheres to a cost benefits equation.
  - Those who input / maintain / re-use must benefit more than the overhead required (which also implies that the tool is both useful and usable)
- Works when organizational goals and software support are aligned.
  - *Explainer* had a limited intention – support one API
- By the way, tools must be simple and adoptable by end users
  - I left many features out of Explainer

S-E-R Model of Knowledge Maintenance [FGMcC+01]

UCI



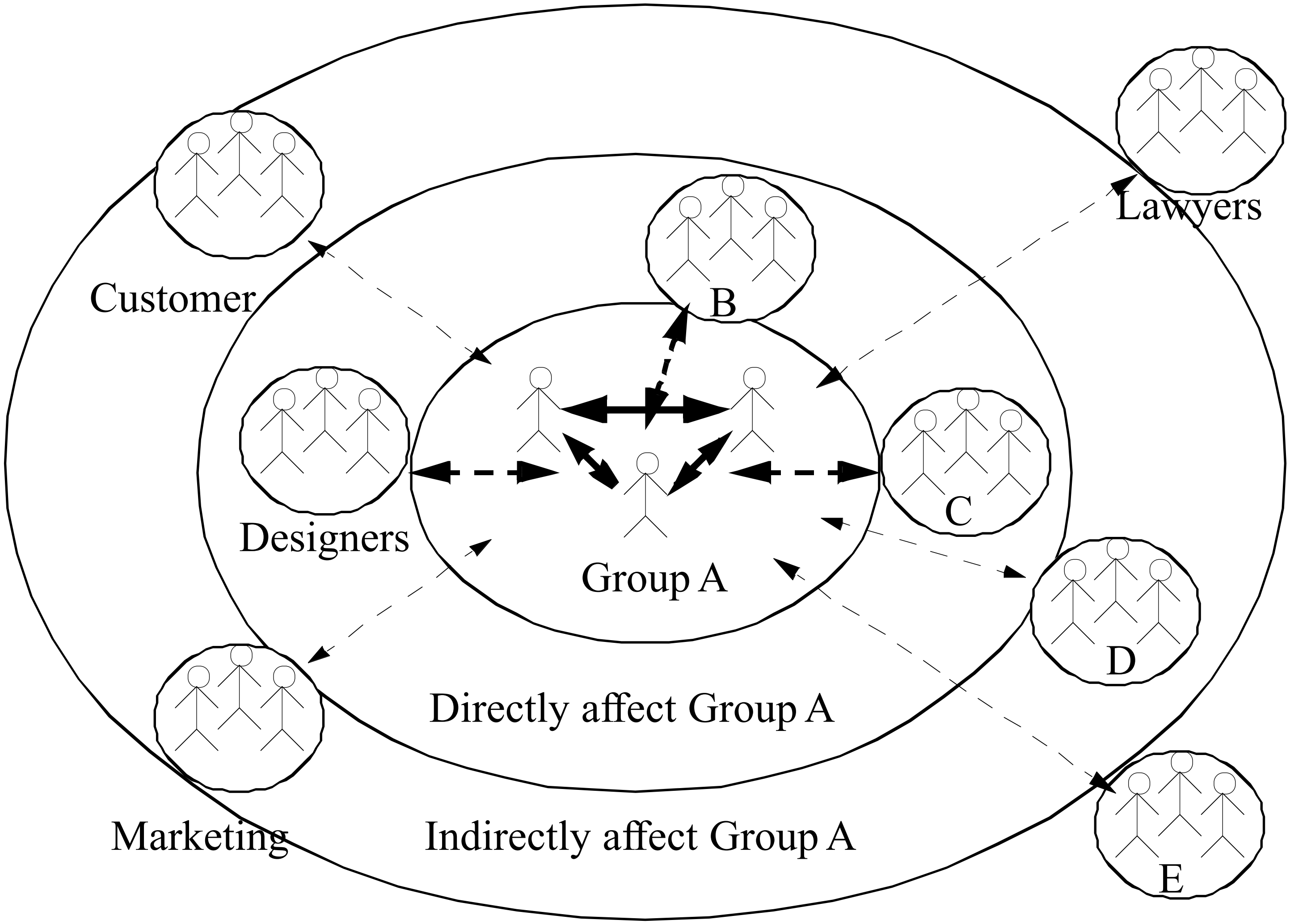
Lessons (2)

All of lessons 1 and …

- Knowledge was being authored for future readers.
  - Hard problem?
- Focusing of attention was part of knowledge authoring.
  - Agents attached to artifacts provided one solution.
  - Also hard problem of anticipation.
- End users had to be involved in knowledge maintenance.

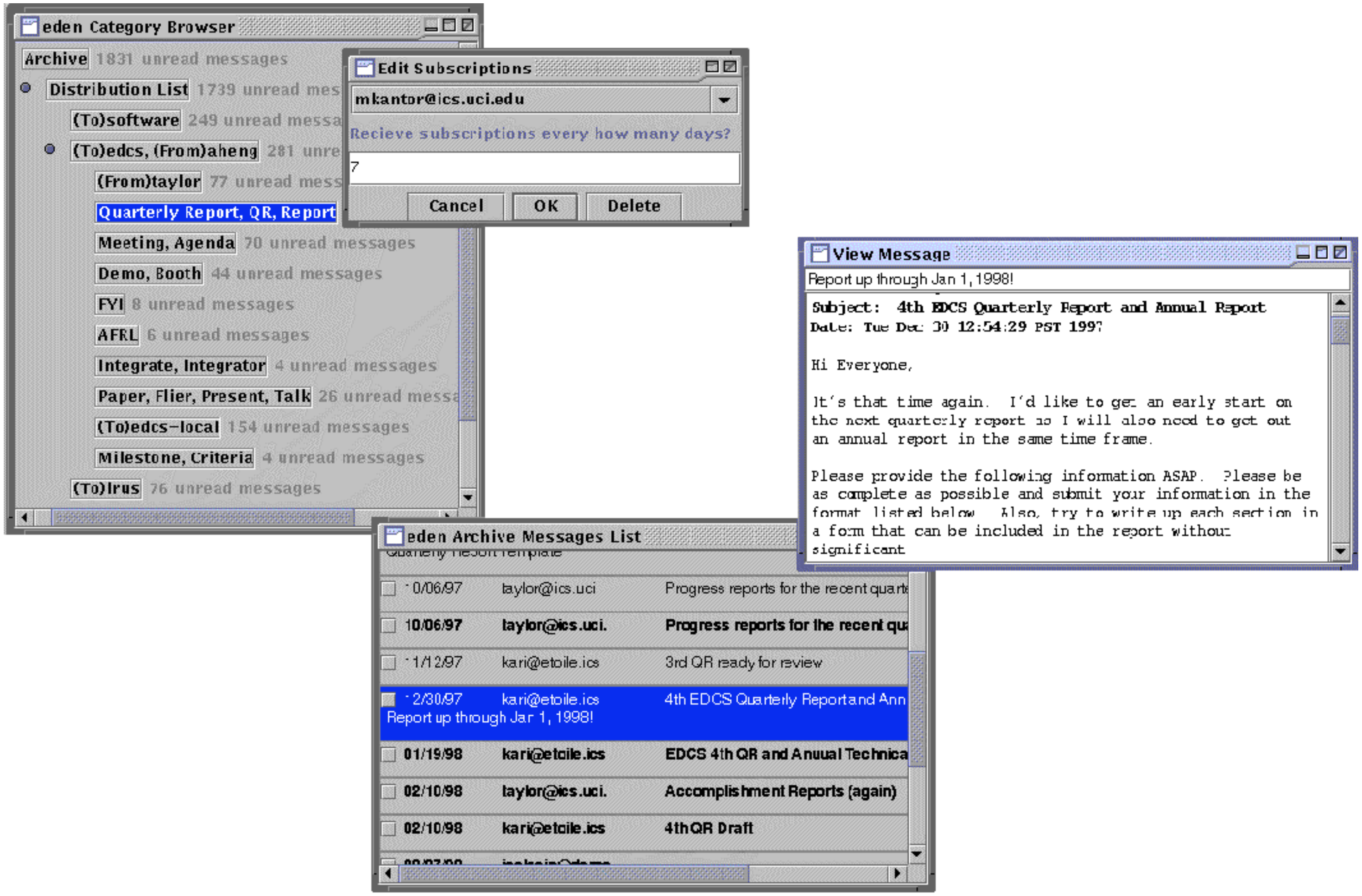
  (applied to a design environment of network maintenance)

Modeling Social Aspects of Knowledge Reuse [KZR97]



Knowledge Depot [KZR97]

- Group memory extracted from email
- Socially constructed categories
- Individual subscriptions for *awareness*



Archive 1831 unread messages
Distribution List 1739 unread mes
(To)software 249 unread messa
(To)edcs, (From)aheng 281 unre
(From)taylor 77 unread mess
Quarterly Report, QR, Report
Meeting, Agenda 70 unread messages
Demo, Booth 44 unread messages
FYI 8 unread messages
AFRL 6 unread messages
Integrate, Integrator 4 unread messages
Paper, Flier, Present, Talk 26 unread messa
(To)edcs-local 154 unread messages
Milestone, Criteria 4 unread messages
(To)lrus 76 unread messages

mkantor@ics.uci.edu

Recieve subscriptions every how many days?

7

Report up through Jan 1, 1998!

Subject: 4th EDCS Quarterly Report and Annual Report
Date: Tue Dec 30 12:54:29 PST 1997

Hi Everyone,

It's that time again. I'd like to get an early start on
the next quarterly report so I will also need to get out
an annual report in the same time frame.

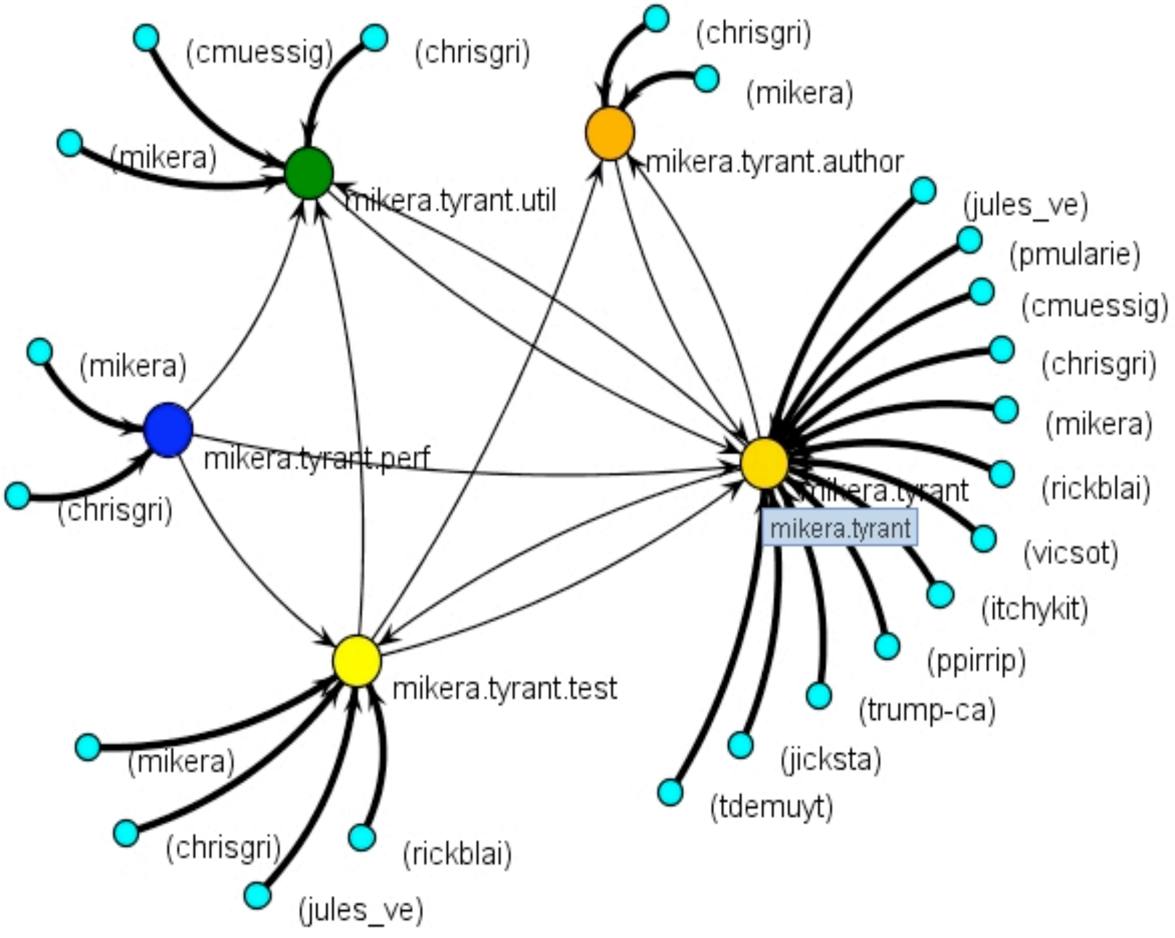
Please provide the following information ASAP. Please be
as complete as possible and submit your information in the
format listed below. Also, try to write up each section in
a form that can be included in the report without
significant

Quarterly Report Template

□	0/06/97	taylor@ics.uci	Progress reports for the recent quarte
□	**10/06/97**	**taylor@ics.uci.**	**Progress reports for the recent qua**
□	1/12/97	kari@etoile.ics	3rd QR ready for review
□	2/30/97 Report up through Jan 1, 1998!	kari@etoile.ics	4th EDCS Quarterly Report and Ann
□	**01/19/98**	**kari@etoile.ics**	**EDCS 4th QR and Anuual Technica**
□	**02/10/98**	**taylor@ics.uci.**	**Accomplishment Reports (again)**
□	**02/10/98**	**kari@etoile.ics**	**4th QR Draft**

Ariadne [TQdS+05]

- Visualizing Social Call Graphs

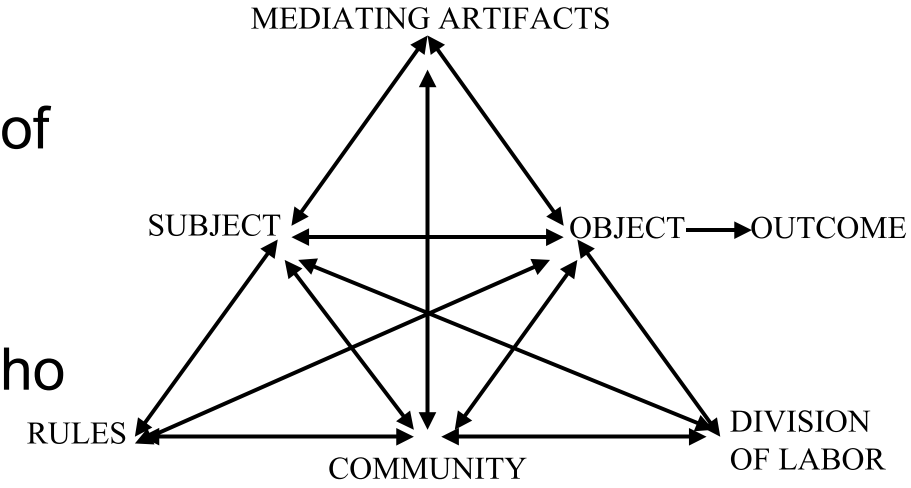


Lessons (3)

- Design and knowledge extend beyond the individual to the social and organizational groups.
- Software tools should similarly extend beyond the individual interface.

Modeling Activity [deSR03] [CSR02]

- Subjects are people within a community that work with objects to obtain an outcome.
- Rules determine the behavior of subjects and their interaction with objects.
- Division of labor determines who performs what actions.
- Mediating artifacts help subjects manipulate objects and obtain outcomes.
- Mediating artifacts have a history with respect to a community.

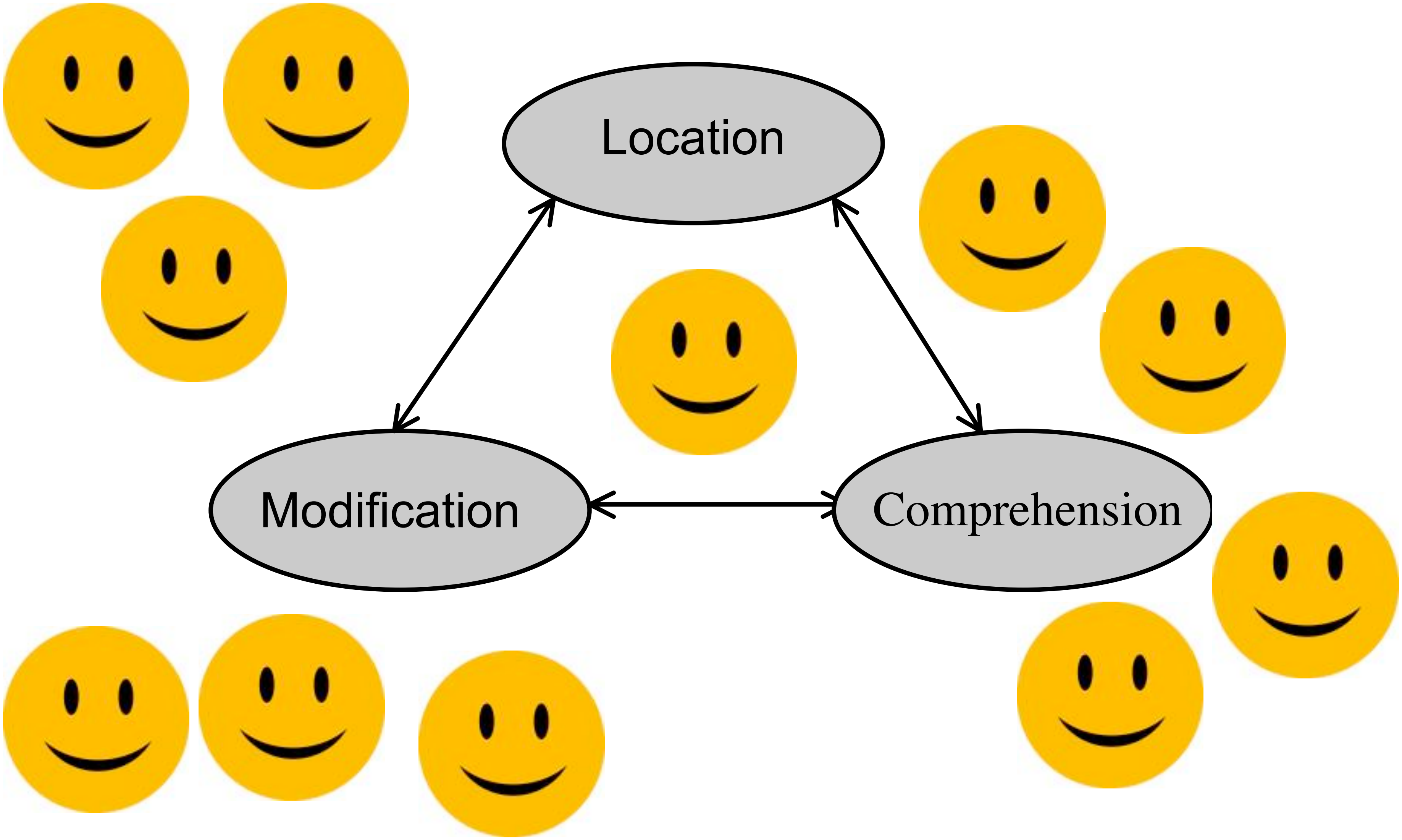


Engeström Activity System Model

Lessons (4)

- Identify the stakeholders in the process.
- Help ensure that technology is designed to the users, other stakeholders, and the organization.
- Work toward alignment between users' rewards and business' needs.
- Work toward alignment between the rewards of the designers of the device and both the end users' and business' needs.
- **Requires human interpretation or transmittal / is dynamic like a process and not static like a literal datum**

Coming Full Circle – Human and Social Dimensions



Location

Modification

Comprehension

Summing up …

- Undeniably, there is a critical role for software in organizations and in general technologies for manipulating knowledge-based artifacts.
- However, a great deal more work is needed to understand the limitations of our knowledge-related technologies.
  - Maintenance, interpretation, cost, …
- Communities and a culture for knowledge management is essential.

Hope?

- There is hope in collective endeavors
  - Wikipedia
  - Open source
- These efforts apply to knowledge artifacts.
- Are people still the best investments?

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Extra Slides

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- Informatics is the interdisciplinary study of the design, application, use and impacts of information technology.
- Students
  - About 35 majors in the new BS in Informatics
  - About 1800 majors in the School of ICS (Information and Computer Science)
  - About 55 PhD students in Informatics Department
  - About 200 PhD students in School
- Faculty
  - 18 Faculty in Informatics Department
  - SW, CSCW, HCI, Org, UBICOMP, PL
  - About 60 Faculty and 20 Lecturers in School of ICS
- Funding (Department)
  - About $7M
  - NSF, DARPA, various industries

Modes of Collaboration

- Unrestricted Gift
- State UC Micro Grants
  - matching
- State UC Discovery
  - matching
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