



Laboratory for Interactive Learning Technologies
Department of Information and Computer Sciences
University of Hawai'i at Manoa

Kukakuka: An Online Environment for Artifact-Centered Discourse

Dan Suthers
Jun Xu

Mahalo to Bruce Harris, Trudy Lin, Bin Ma, and the Fall 2001 class members
of ICS 463 Human Computer Interaction

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Plan

- ❑ Artifact Centered Discourse and ways to support it
- ❑ Kukakuka's design
 - Interface
 - Technical
- ❑ Lessons from Use in Practice
- ❑ Research Directions

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Artifact Centered Discourse

(a.k.a. Anchored Discourse, Contextualized Discussion, Document-Centred Discourse)

- ❑ Human discourse in (face to face) learning and work uses external artifacts
 - as topics of conversation
 - as resources for conversation
- ❑ To be effective, online learning should also support ACD

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Example Applications

- ❑ Project oriented computer science courses
 - Class diagrams, source code, interface mockups ...
- ❑ K-12 inquiry learning in science
 - Project plans, data visualizations, concept maps ...
- ❑ K-12 Educators engaged in professional development
 - Examples of student and teacher work

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Support for Online ACD

Most commercial course management systems provide impoverished support

- Student upload areas and discussion tools are completely disjoint

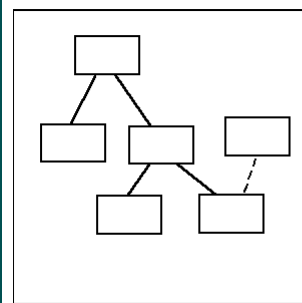
Solutions

- Minimally, associate artifacts with discussions
- Better, support referencing through linkages between the two

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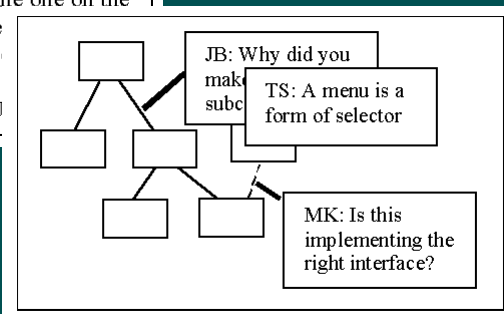


Parallel and Embedded ACD



JB: Why did you make this a subclass of that?
 TS: I don't know which you mean.
 JB: The one on the top level or the one below?
 TS: U

Optimize discourse chronology at cost of context



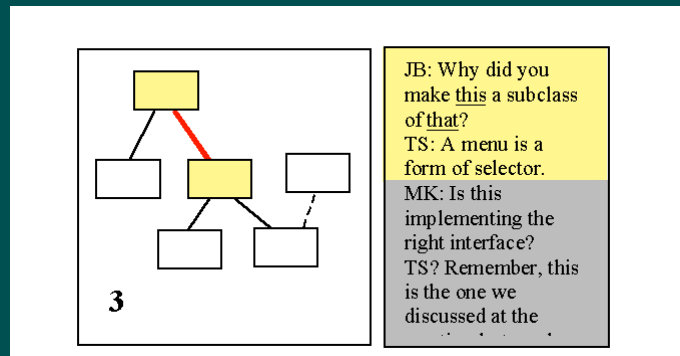
Optimize context at cost of discourse fragmentation

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Linked ACD

- ❑ Independent discourse representation
- ❑ Linked to artifact for context



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Kukakuka Design Criteria

- ❑ Linked ACD
- ❑ Focused Discussions: threads for artifacts
- ❑ Multiplicity of Artifacts: discuss multiple related artifacts
- ❑ Guarantee of Context: Artifact always visible
- ❑ Universal Artifacts: any web page regardless of location
- ❑ Ease of Access: standard web browser

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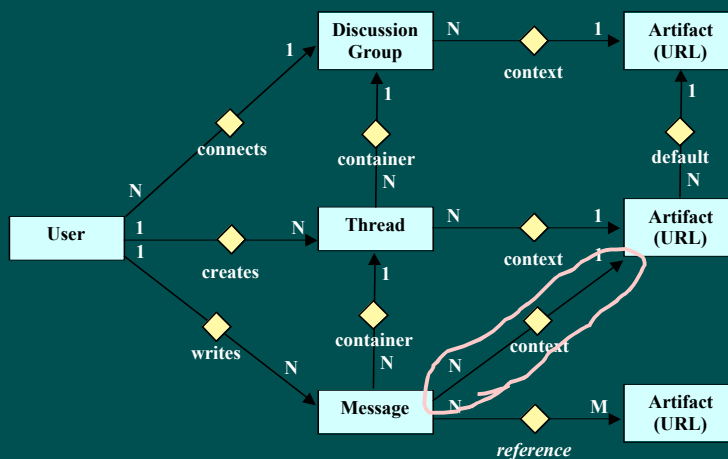
Technical Motivations

- ❑ Rapid Prototyping
 - Quickly demonstrate and experiment with the concept of artifact centered discourse
- ❑ Simplicity and Interoperability
 - Build on existing newsgroup server technology without special modification or impairing other uses
- ❑ Find and Push Limitations of Browser-based Solutions

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Conceptual Architecture



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Entry Page (earlier version)

Welcome to the Kukakuka server for ICS463

Intro to Human Computer Interaction Design

Instructor: Dan Suthers, suthers@hawaii.edu
Kukakuka developer: Jun Xu, junx@hawaii.edu

News

A new version was installed 11/16/01 with some minor improvements in navigation tools. We are working on a more fundamental redesign of the internals.

Usage Notes

Use HTML for formatting. Otherwise it all runs together.

Use your email address for From and giving an informative Subject.

To create a new thread, select NEW_THREAD and manually paste the URL of the page to be discussed into the Reference field. Once you have done this anyone replying to your message will have their message automatically associated with the URL you specified.

The "back" and "forward" buttons in the artifact frame only work in Netscape 4.7.

Please send feedback to kuka-developers@hawaii.edu if you have suggestions.

>ics463

>2001-fall

- assignment-2
- assignment-3
- assignment-4
- assignment-5
- assignment-7
- gallery
- nielsen-alertbox
- projects
 - auto-fluid-monitor
 - bc-chat-system
 - bulletin-board
 - clickage-dot-org
 - course-scoop
 - hawaiian-jewelrey-store
 - ics-map-system
 - instant-messaging
 - japanese-tutor
 - online-purchasing
 - quizbank
 - tours-ru
 - trouble-call-management

>assignment-1

>kuka

>test



Group Page

Back Forward

KUKAKUKA_HOME GROUP_HOME NEW_THREAD RELOAD

ICS 463: Intro to Human-Computer Interaction Design, Fall 2001

General Info *Assignment 1 (Due Sept. 19th)*

Overview

- Write a one page "executive summary" style argument for why your software development company should commit to a user-centered design methodology at the outset of a new project. (If you wish, you may invent a scenario in which a particular kind of software is to be developed.)
- Choose one of the methodologies in Ch. 17-18 and argue for your choice.
- Write this as if it will be read by your boss.
- Post the argument on a web site and email me the URL by Sept. 19th. (We will discuss in Kuka.)
- Hand in a printed one-page document to me on Sept. 20th.

News

Name	Making The Case
XXXXXXXXXXXX	html 9/19
XXXXXXXXXXXX	html 9/19
XXXXXXXXXXXX	html 9/19
XXXXXXXXXXXX	html 9/19

Subject From Date

Subject	From	Date
Discussion of Assignment 1	Dan Suthers	27 Sep 2001 10:06:47 GMT
JCD comments	XXXXXXXXXX	27 Sep 2001 16:54:15 GMT
XXXX's exec summary	XXXXXXXXXX	27 Sep 2001 21:02:11 GMT
XXX summary	XXXXXXXXXX	1 Oct 2001 11:40:48 GMT
General Review	XXXXXXXXXX	1 Oct 2001 20:37:57 GMT
XXXXXXXXXX Exec Summary	XXXXXXXXXX	2 Oct 2001 05:30:25 GMT

-----no message-----

LILT Thread

Back Forward

KUKAKUKA_HOME GROUP_HOME NEW_THREAD RELOAD

Subject	From	Date
Project Plan	suthers@hawaii.edu	13 Nov 2001 11:58:06 GMT
Re: Project Plan XXXX	XXXX	16 Nov 2001 09:09:45 GMT
6 week plan	suthers@hawaii.edu	20 Nov 2001 08:57:47 GMT
Storyboard	XXXX	25 Nov 2001 18:56:34 GMT
Horizontal Prototype?	XXXX	27 Nov 2001 06:58:53 GMT

REPUBLIC OF BOLIVIA
Capital: La Paz
Population: 8,300,000
Area: 1,098,518 sq km
Languages: Spanish

URU RILUOR TAFICZALY#MNOZGZUW

Subject	From	Date
Storyboard	XXXX	25 Nov 2001 18:56:34 GMT

ARTIFACT **REPLY**

This storyboard is what I showed to my users. It was hard to represent some aspects of the UI to the users via paper. I will give a report of the user responses as soon as possible. Also this idea was one of many recommended by the boss hence it is not in my initial 6 week plan.

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LILT Reply

Back Forward

KUKAKUKA_HOME GROUP_HOME NEW_THREAD RELOAD

Subject	From	Date
Project Plan	suthers@hawaii.edu	13 Nov 2001 11:58:06 GMT
6 week plan	suthers@hawaii.edu	20 Nov 2001 08:57:47 GMT
Storyboard	XXXX	25 Nov 2001 18:56:34 GMT
Horizontal Prototype?	XXXX	27 Nov 2001 06:58:53 GMT

Suggest user to move in a variety of strategy at

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This image is one of the initial screens. A global map which the user starts from

Reference: <http://www2.hawaii.edu/XXXXX/463/mmapex.html>

From: suthers@hawaii.edu

Subject: New sketches

Message Text:

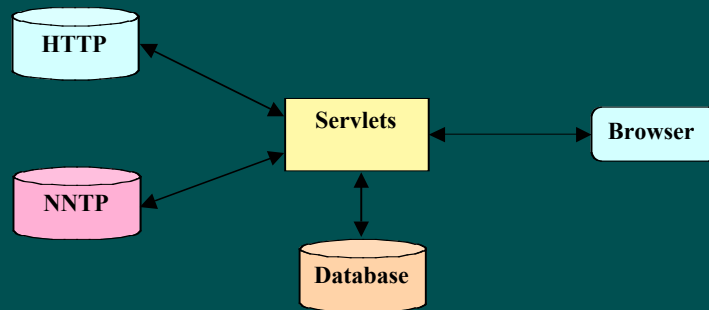
XXXXX,
<P>
Thanks for posting your new sketches.
<P>
Could you tell me more about this scenario and your session with the users? It would be good to have a summary of the storyline annotated with users' comments.

Send it now! Clear Entries

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Abstract Architecture



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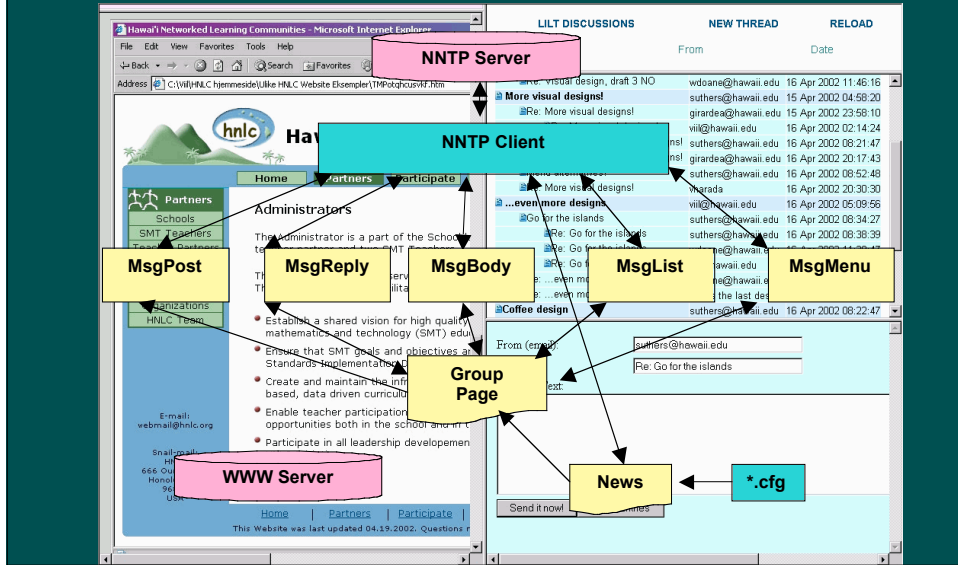
Configuring a Server

- Install Servlets
- Create desired NNTP groups if needed
- Create config file referencing NNTP server and root group
- Post initial message in each group with desired group artifact

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Architecture Detail



Message Format

❑ NNTP + Artifact Header

```

Path: lilt.ics.hawaii.edu!not-for-mail
From: viil@hawaii.edu
Newsgroups: kuka.lilt.hnlc-voc.resources
Subject: Re: ...even more designs
Date: 16 Apr 2002 19:07:35 GMT
Organization: Another Netscape Collabra Server User
Lines: 10
Message-ID: <a9hspn$9r224@lilt.ics.hawaii.edu>
References: <a9gbn4$9r213@lilt.ics.hawaii.edu>
<a9hr2r$9r220@lilt.ics.hawaii.edu>
NNTP-Posting-Host: lilt.ics.Hawaii.Edu
Artifact: http://lilt.ics.hawaii.edu/developers/hnlc4/moredesigns.htm

```

I don't think we should have a horizontal menu and a vertical menu unless these two relate to eachother. That would be like having one menu and "bend" it around the screen.

If you look around on the net ...

- ❑ Does not interfere with use by other clients
- ❑ A simple yet powerful way to contextualize messages: standardize?



Use: Undergraduate HCI

COMBINATION OF IDEAS:

Faculty list, clicking will highlight other + change page + pop-up info that is semi-transparent.

ICS MAP SYSTEM

Faculty

COURSES

MISC

example: clicking on "Jon Doe" - Shows "The Best Route"

ICS463 DISCUSSIONS	NEW THREAD	RELOAD
Subject	From	Date
Re: Week 1 Requirements	suthers@hawaii.edu	13 Nov 2001 08:33:51
Re: Week 1 Requirements	suthers@hawaii.edu	13 Nov 2001 08:35:07
Re: Week 2 Analysis	suthers@hawaii.edu	13 Nov 2001 09:30:51
Re: Week 3: Conceptual / Prototyping	suthers@hawaii.edu	13 Nov 2001 09:38:04
Re: Weeks 4 and 5: Implemented Prototype	suthers@hawaii.edu	13 Nov 2001 09:44:32
Your Design	Cliff	1 Dec 2001 01:05:40
Re: Your Design	Nik	3 Dec 2001 22:57:26
Re: Re: Your Design	Cliff	4 Dec 2001 05:10:19

Subject	From	Date
Re: Your Design	Nik	3 Dec 2001 22:57:26 GMT

REPLY

thanks for the feedback cliff i know the map looks kinda imposing as it is drawn do you think with the right color scheme it could work? with the left hand side stuff being more prominent than the map itself perhaps. the shading i did on the sketch makes the right-hand portion seem much more bold than the rest, but the electronic prototypes we are working on offer some new ideas. (should be posted soon)

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Use: Our own design work

Hawaii Networked Learning Communities - Microsoft Internet Explorer

Address: C:\WWW\HLC\hnmessde\More\HNL Website Example\1\Photoupd4.htm

hnlc Hawaii Networked Learning Communities

Home Partners Participate

Partners

- Schools
- SMT Teachers
- Teacher Partners
- Administrators
- Students
- Mentors
- Organizations
- HNL Team

Administrators

The Administrator is a part of the School's teacher partner and two SMT Teachers.

The school administrators serve as the crit through leadership and facilitative support.

- Establish a shared vision for high quality mathematics and technology (SMT) education.
- Ensure that SMT goals and objectives are Standards Implementation Design (SID).
- Create and maintain the infrastructure-based, data driven curriculum in SMT education.
- Enable teacher participation in a range of opportunities both in the school and in the community.
- Participate in all leadership development HNL Initiative.

E-mail: webmail@hnlc.org

Enrollment: HNL Team 444 Chof Street Honolulu, HI 96814 USA

Home Partners Participate

This Website was last updated 04/19/2002. Questions?

LILT DISCUSSIONS	NEW THREAD	RELOAD
Subject	From	Date
Re: Visual design, draft 3 NO	wdoane@hawaii.edu	16 Apr 2002 11:46:16
More visual designs!	suthers@hawaii.edu	15 Apr 2002 04:58:20
Re: More visual designs!	girardea@hawaii.edu	15 Apr 2002 23:59:10
Re: More visual designs!	wii@hawaii.edu	16 Apr 2002 02:14:24
Re: More visual designs!	suthers@hawaii.edu	16 Apr 2002 08:21:47
Re: More visual designs!	girardea@hawaii.edu	16 Apr 2002 20:17:43
Menu alternatives?	suthers@hawaii.edu	16 Apr 2002 08:52:48
Re: More visual designs!	vharada	16 Apr 2002 20:30:30
...even more designs	wii@hawaii.edu	16 Apr 2002 05:09:56
Go for the islands	suthers@hawaii.edu	16 Apr 2002 08:34:27
Re: Go for the islands	suthers@hawaii.edu	16 Apr 2002 08:38:39
Re: Go for the islands	wdoane@hawaii.edu	16 Apr 2002 11:39:47
Re: Go for the islands	wii@hawaii.edu	16 Apr 2002 18:53:12
...even more designs	wdoane@hawaii.edu	16 Apr 2002 11:44:34
Re: ...even more designs	here's the last design	20 Apr 2002 09:46:56
Re: ...even more designs	suthers@hawaii.edu	16 Apr 2002 08:22:47

From (email):

Subject:

Message Text:

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Observations

- ❑ Quickly learned that “one group = one artifact” is inadequate
 - Most artifacts are structured or collections
 - Group = collection, thread = component
- ❑ Improved support for design oriented activities
 - Messages overwhelmingly “on task”
 - Threads short; discussion moves on to next version of artifact
- ❑ Users asked for total flexibility in linking artifacts to messages, but restricting this flexibility seemed to help

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Issues

- ❑ Navigation within an artifact that has links
 - Usual problems with frames and browser “back” button changing “wrong” frame
- ❑ Security restriction on reading other frame's URLs is problematic
 - Navigation aids
 - Automating insertion of references
 - Mailing fully contextualized messages
- ❑ Lack of user-specific state persistence
- ❑ Not integrated with *the* “killer app”: email
- ❑ Problems comparing multiple artifacts

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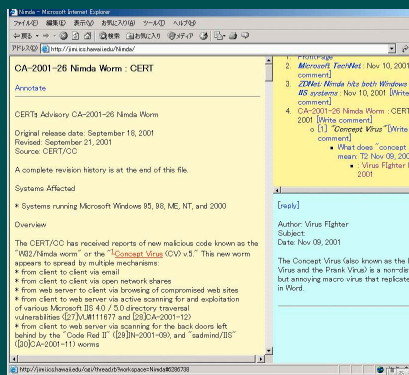
Related Systems

- ❑ Annotation Engine, CoNote, and CritLink
 - Embedded ACD
 - All use proxy servers
- ❑ Ubiquitous-D3E
 - Parallel ACD on external artifacts
 - Kukakuka handles multiple related artifacts in a single discussion
- ❑ JIME, Pink
 - Linked ACD
 - Distinguished by internal versus external external

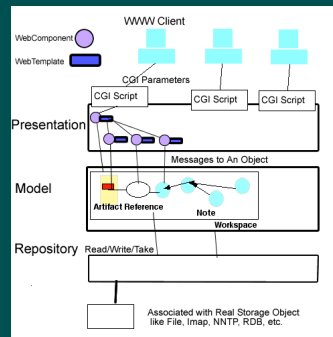
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Pink: Takeda & Suthers



- ❑ Internal and external documents
- ❑ Anchored threads



- ❑ Written in Zope
- ❑ Poster session tonight

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Ongoing and Future Work

- ❑ Access Control
 - Authentication
- ❑ Individualization
 - Read/unread
 - Notification services
 - Database

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Integration with Email

- ❑ Notification by email
- ❑ Reply by email
 - Ensure that reader and writer see same context
- ❑ Mail a particular message including context
 - Need message and context in URL
 - But don't reload entire page for each message
- ❑ Submit new artifacts (create new threads) by email
 - Smart parsing of messages

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Coherence and Convergence

Two problems with threaded discussions:

- Coherence problems when multiple threads of discussion intertwine (Herring)
- Threaded discussion is an inherently divergent representation (Hewitt)

□ Convergence Artifact

- Textual "summary" area
- Concept mapping, argument maps, etc.

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Recent Additions

hnlc Hawaii'Networked Learning Community

Home Partners Participate Resources About HNLC

Partners
Schools
SMT Teachers
Teacher Partners
Administrators
Students
Mentors
Organizations
HNLC Team

Administrators

The Administrator is a part of the School leadership Team which also consists of a teacher partner and two SMT Teachers.

The school administrators serve as the critical catalysts in this systemic reform. Through leadership and facilitative support, administrators:

- Establish a shared vision for high quality teaching and learning in science, mathematics, and technology (SMT) education in their schools.

SUMMARY [EDIT]

We like design 10 the best. Some work needs to be done on colors, fonts, and the two navigation menus.

LILT DISCUSSIONS **NEW THREAD** **RELOAD**

Subject	From	Date
...even more designs	viii@hawaii.edu	16 Apr 2002 05:09:56 GMT
Menu alternatives?	suthers@hawaii.edu	16 Apr 2002 08:52:48
Re: More visual designs!	vharada	16 Apr 2002 20:30:30
...even more designs	viii@hawaii.edu	16 Apr 2002 05:09:56
Go for the islands	suthers@hawaii.edu	16 Apr 2002 08:34:27
Re: Go for the islands	suthers@hawaii.edu	16 Apr 2002 08:38:39
Re: Go for the islands	wdoane@hawaii.edu	16 Apr 2002 11:39:47
Re: Go for the islands	viii@hawaii.edu	16 Apr 2002 18:53:12
Re: ...even more designs	wdoane@hawaii.edu	16 Apr 2002 11:44:34
Re: ...even more designs	here's the last design!	20 Apr 2002 09:46:56
Coffee design	suthers@hawaii.edu	16 Apr 2002 08:22:47

REPLY

These are combinations of some of the above designs...

-Viii



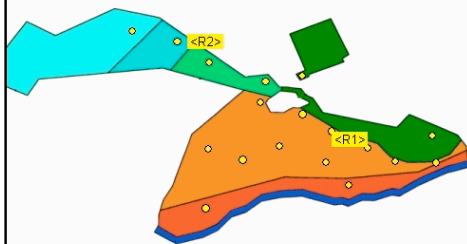
New Applications

- ❑ PODS: Remote Ecological Micro-Sensor Network
- ❑ Scientific and Cultural Voyages to NW Hawaiian Islands
- ❑ How is spatially and temporally organized data reflected in organization of discussion?

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Integrating Representations



Discussion Topics:

- Tracking ant invaders in park
- *Do clouds stop where the rainforest stops?*
- Observations of *Silene* lifecycle

Subject: Revised cloud hypothesis

Date: Tuesday, 30 Oct 2001

From: Maia Kaapena

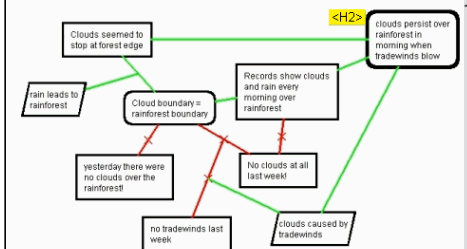
Wazzup. Rodney and the wind tracker group say there were no clouds last week because there were no trades. The trades blow the wet air up to make clouds. This explains why there were no clouds last week here <R1>. I think this means we are NOT wrong about clouds! When the clouds are there they are over the forest. So I made a new cloud hypothesis <H2> and linked it in. I think it is a stronger hypo - what do you think?

Subject: Re: Revised cloud hypothesis

Maia, do you think this stays true as we go up higher? Let's check sensors in region <R2>!

Reply

New Topic



Data Hypothesis Warrant For Link Against Link



Conclusions

- ❑ Social interaction and representational aids are important in learning
- Improved support for Artifact Centered Discourse is needed (especially "linked ACD")
- ❑ Reuse of open-standard system enabled us to quickly build a useful prototype
 - Limitations encountered will require database and client-side processing
- ❑ Coordination of multiple representations is a promising area for research

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