Collaborative Environments

Guest Lecture in DLC 2002

Jonathan Ostwald

http://www.cs.colorado.edu/~ostwald

Overview

Many of us use collaborative environments

There are many uses, many systems, many groups of users

No one can possibly know it all

We all have some things to teach, and other things to learn

I have a lot of slides - I hope I don't have to use them all!

Activities

- Framework
- Discussion
- Show and Tell
- Discussion

Essential Dimensions

Medium - what does a system do, allow to be done?

Community - who uses a system?

Practice - how is the system used?

Why?

Why do you use collaborative environments?

What would you LIKE to use them for?

What do you HATE using them for?

Why are most web sites not collaborative environments?

Who?

Who uses the environments you like?

- Are you a contributor or a consumer?
- What is your relationship to other users?
- Are there leaders?
- Do you have other interactions with them?

Does an environment define a community?

- How like or unlike other types of communities?

How??

How do we use collaborative environments?

- Share Information - a place to put things where others can find and possibly modify them
- Archives - access to past work
- Integration - helping to find relations between information
- Communication (synchronous, asynchronous) - reaching out and touching someone
- Co-authoring - working on the same artifact
- Co-presence - knowing who is in the environment, and possibly interacting with them

Types of Collaborative Environments

Web Site - special-purpose information space

Shared File Structure - Physical storage, shared access

Portal - Special - purpose index / collection

Discussion Forums - multilogue

Conference - Discussion (moderated) plus membership

Mud/Moo - multi-user

Organizational Memory - serving needs of specific group / context

Design Environment - integrated tools for designing, redesigning artifacts

???

A Community of Users

Users

Domain workers who solve problems, collaborate, and contribute to shared knowledge

Power Users

Having both domain and developer knowledge

Interested in modifying/adapting environment

Developers

System builders with technical knowledge but limited knowledge of application domain

Layers of Collaboration

Users

- collaborate to work and learn as a group

User <-> Power User

- Get advice and discuss changes

User <-> Developer

- Participatory design and ongoing evolution

Developer <-> Power User

- Meta-design putting owners in charge

Developer <-> Developer

- Collaborative Software desgin

Collaborative Knowledge Construction

Exploring a particular problem or area

Creating artifacts

Communication

Reuse and Redesign

Evolution and Integration

Examples

Swiki

DynaSites

LivingBook

livingOM

Open Resource Environments

Swiki vs DynaSites

Similar

- Aim to support a *constructionist* model of education/work
- Open Systems, End-user Authoring
- Central information repository
- Easy Linking (see DynaGloss)

Different

- DynaSites is typed and hierarchically structured
- Swiki is homogeneous and network structured
- Swiki has a simple but powerful model

Reader-Extensible Documents

Living Book

- Based on a Large word document (+400 pages)
- Authors struggle for completion in changing domain
- A new angle on organizational memory
- http://seed.cs.colorado.edu/LivingBook.home.fcgi

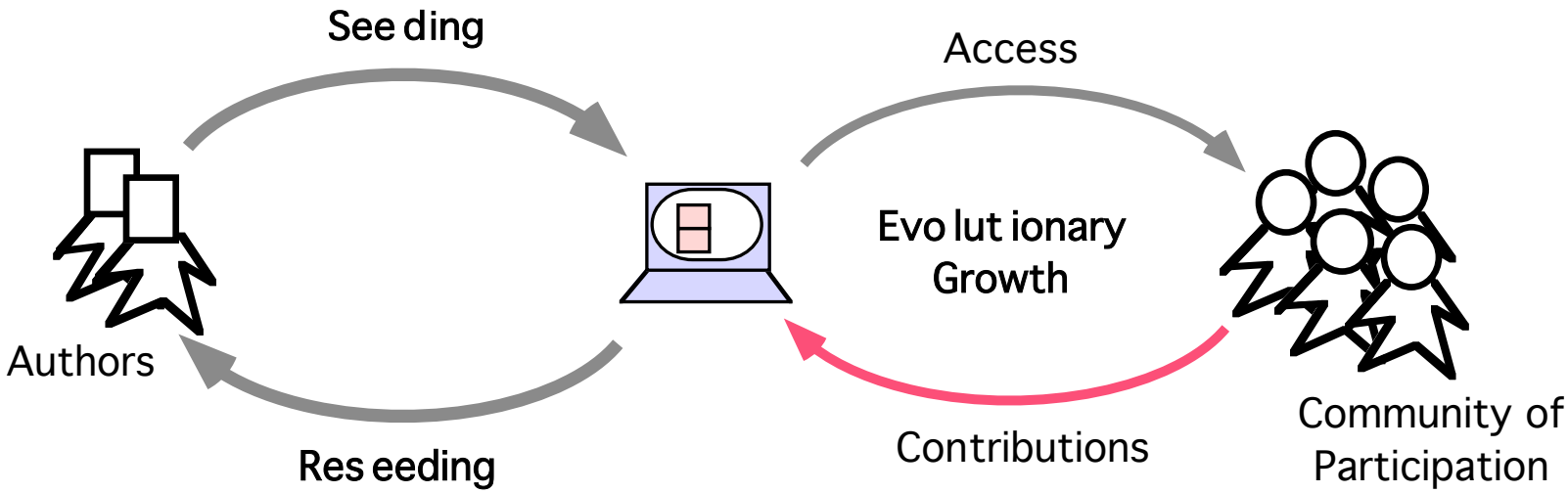
MDS

- Adding discussion to Math Text book
- Students add questions and insights to original text
- Authors get feedback about the book/course

Other Examples

- JiME (http://www-jime.open.ac.uk/)
- Threaded Discussion Forums (newsgroups)
- Wiki (http://www.c2.com/cgi/wiki?)

LivingBook Model



Compared to Paper-based Docs

Paper-based	Reader-extensible
Closed – The content is finalized at write-time.	Open – Content evolves through small contributions at read-time.
Static –the book is always viewed in the same way	Dynamic – views are computed at read-time. Many different ways of viewing the book are possible.
A reference artifact	A medium of communication
Authors known at write-time	New authors can join at anytime.
In danger of becoming obsolete	Long lifecycle driven by continual authoring
Content controlled by Authors	Content contributed ad hoc (but just how this is realized is a design decision)
Linkages between parts of the book and between book and other artifacts are implicit. Reader does work to follow	Linkages are supported by hypermedia (as much as possible).

Steps and Issues

Seeding

- Start with Core Content
- Convert to HTML
- Insert Hooks for annotation
- *what are necessary/sufficient characteristics for seed?*

Evolution

- Mechanisms for extensibility
- Discussion Seeding
- Moderation strategies
- *What is motivation for people to extend the seed?*

Reseeding

- *When should reseeding take place?*
- *Granularity (incremental or big-step)*
- *Should evolution have a stopping point?*

Living Organizational Memory

OM - a shared information space serving some group of people

Living - changing and growing as a side effect of use

livingOM - a substrate for building Living Organizational Memories

What problems does livingOM address?

Target user group: L3D or small research group

Goal: organizational learning and social creativity

Multi-use information space

- WebSite
- Work Space

Integrating several types of shared information

Content-based Navigation

Maintainability and Consistency

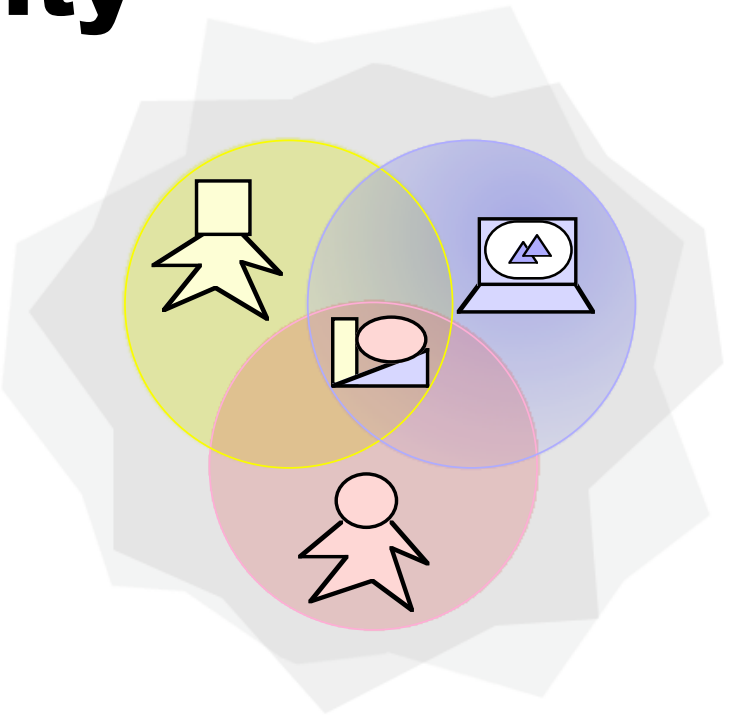
Lifelong Learning & Social Creativity

Lifelong Learning

- self-motivated, self-directed

Social Creativity

- interaction,integration,
- construction



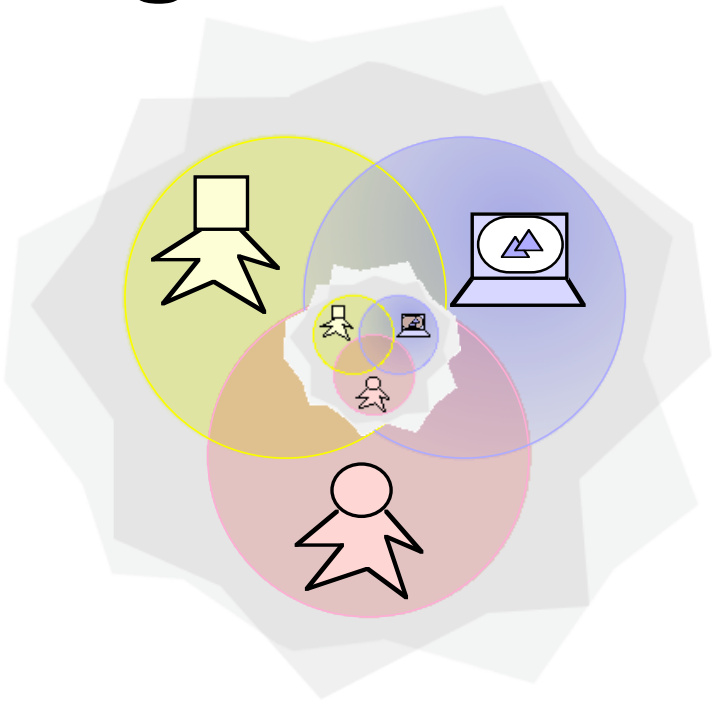
livingOM

- Supporting individual and social creativity with *Living Organizational Memories*

Meta-Design

Taking it up a level

- Social creativity in
- system and activity design

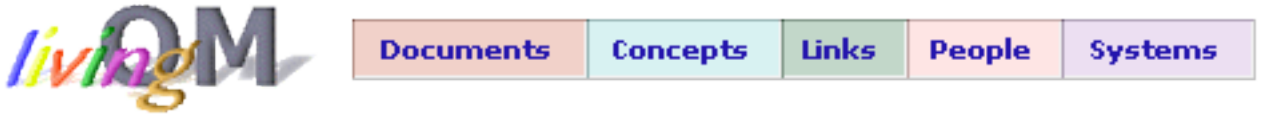


- System and use patterns
- provide boundary objects

livingOM

- Enabling developers and power-users to
- create and evolve creative media

A Tour of the Prototype



Navigation Bar

- Provides access to different information types

Relations

- Integrate information space

Seeded with L3D information

- Endnote, L3D HomePage, Misc Documents

Pages are customizable

- Templates that mix HTML, data, and functionality

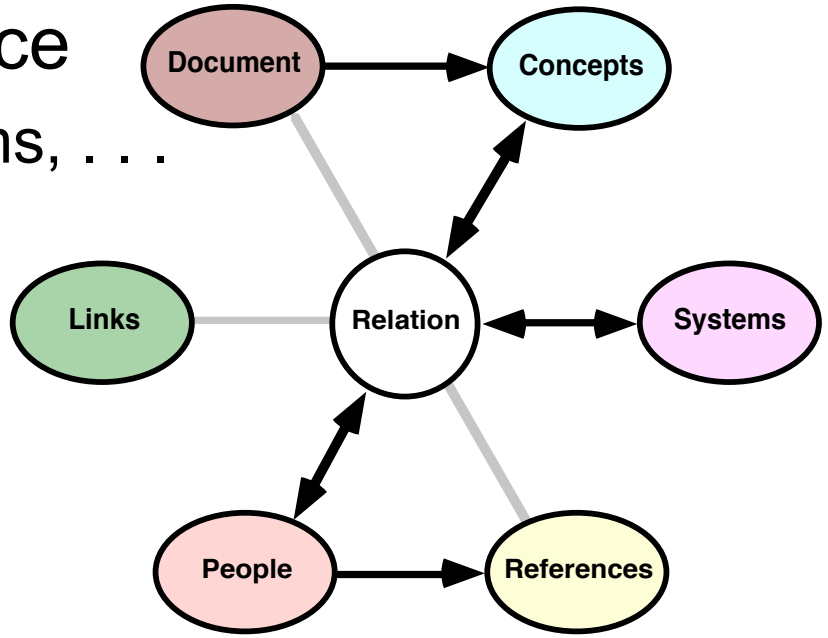
livingOM Documents

- Based on flexible model
  - Collaborative and Evolving,
  - Threaded Discussions,
  - Research Papers, Theses
- Mechanisms
  - Restructuring, Editing, Search
  - Figures, Tables, Contents,
  - Automated Concept Links

Relations

Integrate information space

- Concepts, People, Systems, . . .



First Class Objects

- Annotatable

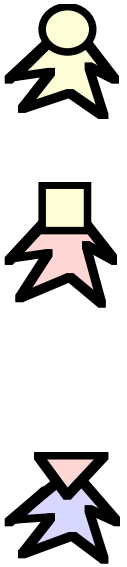
Navigation and Interface Issues

- Current approach: *peek* and *visit*
- Finding and searching

Meta-design

A Layered Architecture in support of Meta-design

Layer	Features/Role	Example
livingOM	Individual and Social Creativity	Collaborative Authoring
DTML/HTML	End-User modification & programming	Changing a page
Zope	Security, Views, Management	Access Policy, Parameters
Python	Object Model, Mechanisms	DOM implementation, Functionality
Database	Sharing and Reuse	References database (Shin'ichi)



Key Aspects of livingOM

Seeded with existing information

Explicit support for different types of information objects

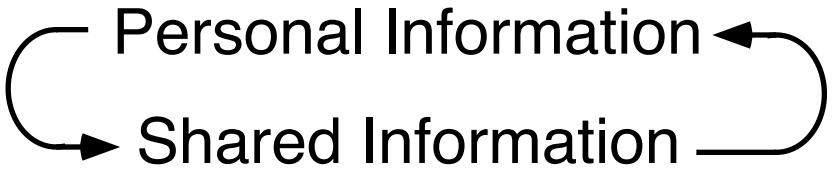
Richly Linked information space

Levels of extensibility / modification

Aiming to be both useful and usable . . .

Missing Aspects of livingOM

No support for individual work



Difficult to add new information types

Need structures that support publishing and contribution (magazine)

System Design Challenges

- Trade-offs
  - Tradition / Transcendence
  - Open / Closed
  - Inside / Outside
  - Personal / Private
  - Reader's interface / Writer's interface
- Issues
  - Conceptual model
  - Navigation
  - Extensibility
  - Maintainability / Sustainability

Activity Design Challenges

- Designing activities that foster collaboration
  - Make collaboration an explicit part of activities
  - Allocate resources
- Motivating participants to interact
  - Provide leadership
  - Integrate participation in reward structure
- Practices to promote collaboration
  - Promote feeling of trust and “safety”
  - Label contributions meaningfully
  - Keep postings short and focused

Open Resource Environments

Provide resources and tools to help users to build media objects

Media objects built to help solve a specific problem

Resources come from within and without the environment

Environment tracks use of resources to improve information utilization

Inside vs Outside

How does an environment relate to the outside world?

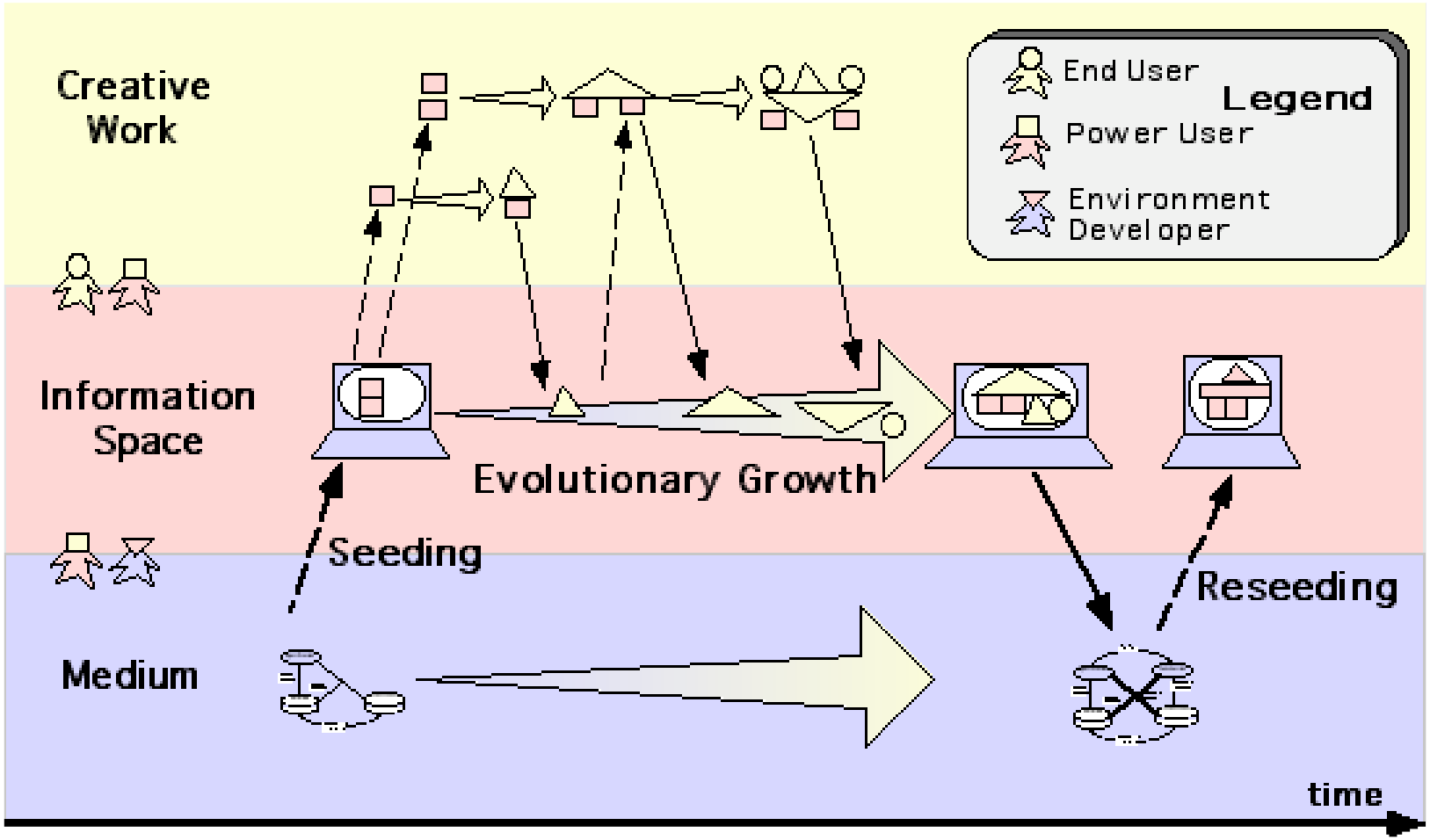
Does it assume that all important information is already inside the system?

Does it enable linking to outside?

- Are links annotate-able?

Does it support users to “utilize” outside information?

SER Model


Creative Work
Information Space
Medium
Legend
End User
Power User
Environment Developer
Evolutionary Growth
Seeding
Reseeding
time