



Center for
**LifeLong
Learning
& Design**

University of Colorado at Boulder

**Wisdom is not the product of schooling
but the lifelong attempt to acquire it.
- Albert Einstein**

Beyond 'Couch Potatoes': From Consumers to Designers

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and
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ATLAS TAM Course, Spring 2000

Images of Humans

Examples of a **Consumer** Perspective

early days of computers: human = servant of the computer

expert systems: behaviorally *unacceptable* computational environments — reducing knowledge and skilled professional to marking yes/no answer to multiple choice questions (e.g. MYCIN)

human factors: human is considered a system component with specific characteristics such as: limited attention span, faulty memory, distractable,

ease of use (within CHI): naive users, idiot-proof systems, walk-up-and-use systems, novices

keynote speech at CHI'95 (by Time Warner research director): basic challenge for CHI community: design a remote control for 500 TV channels

Images of Humans

Examples of a Designer Perspective

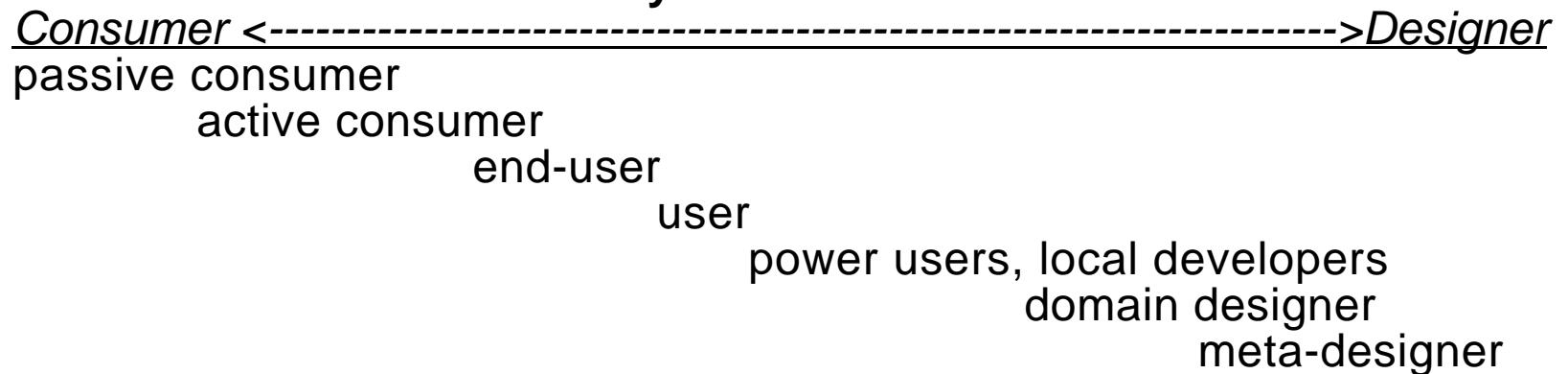
- domain professionals (discretionary users)
- competent practitioners worrying about tasks, motivated to contribute and to create good products
- personal growth (low threshold and high ceiling)
- independence from “high-tech scribes” (unself-conscious cultures of design; Alexander)
- control and conviviality (Illich)
- communities of practice and communities of interest (e.g., transition from a large contribution by a few to a small contribution by many; decentralization)

Beyond Binary Choices

- **claims:**

- there is nothing wrong being a consumer (watching a tennis match, listening to a concert, ...)
- the same person wants to be a consumer in some situations and in others a designer
- consumer / designer is not an attribute of a person, but of a context

- **continuum rather than a binary choice:**



- **problems:**

- someone wants to be a designer but is forced to be a consumer (personally meaningful activities)
- someone wants to be a consumer but is forced to be a designer (personally irrelevant activities)

Technology and Media Support for Consumer and Designer Roles

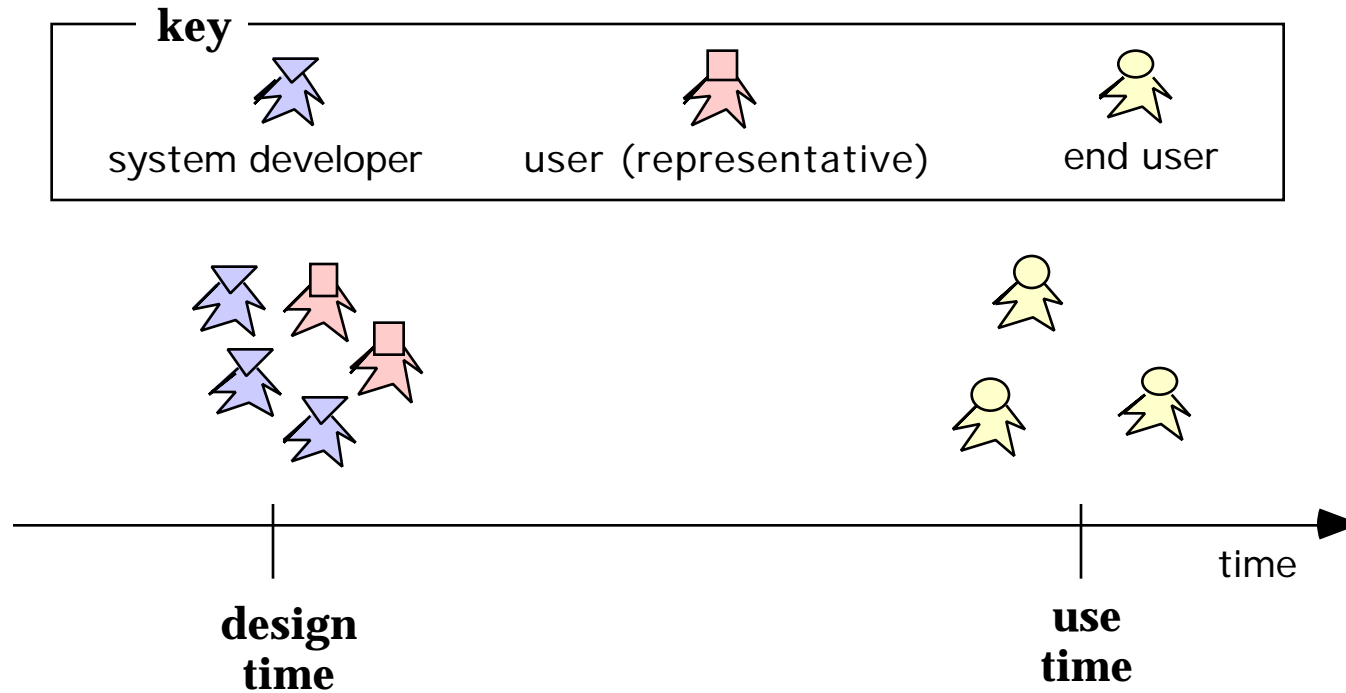
Consumer <----->Designer

TV

Printed Media

Envisioned Computational
Media

Fundamental Difference between Printed and Computational Media

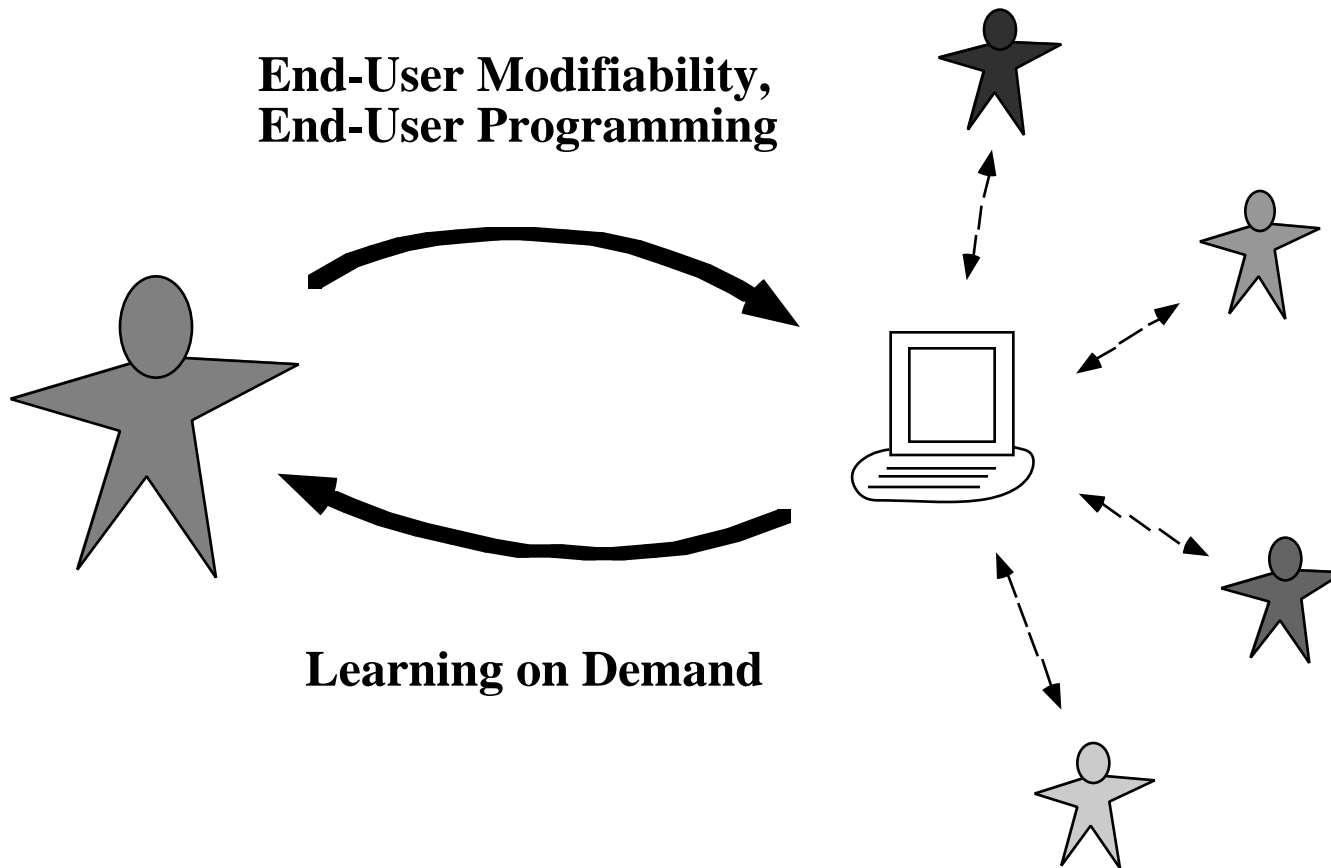


print media: a fixed context is decided at design time

computational media: decision at use time can take advantage of contextual factors only known at use time (e.g., dynamic forms, dynamic websites,)

challenge: articulation of contextual factors at use time (about tasks, users, social systems,.....) — end-user programming, specification sheets, usage data,

Duality between Learning and Contributing



Convivial Tools

- **convivial tools and systems (Illich 1973):** “allow users to invest the world with *their* meaning, to enrich the environment with the fruits of *their* vision and to use them for the accomplishment of a purpose *they have chosen*” (emphasis added)
- conviviality is a dimension that sets computers apart from other communication and information technologies that are **passive** and cannot conform to the user’s own tastes and tasks
- passive technologies offer some selective power, but they cannot be **adapted and extended** in ways that the designer of the systems did not directly foresee
- **convivial systems encourage**
 - users to be actively engaged in generating creative extensions to the artifacts given to them
 - have the potential to break down the counterproductive barrier between programming and using programs (users become co-developers)
- **claim:** current computer systems are not convivial (→ software is not “soft”)

Example: Closed versus Open Systems

— SimCity versus Domain-Oriented Design Environments (DODEs)

- **user control:**
 - end-user modification and programming
 - conviviality (independence of high-tech scribes)
 - putting owner of problems in charge
- **example: SimCity** — too much crime
 - solution supported: build more police stations (fight crime)
 - solution *not* supported: increase social services, improve education (prevent crime)
- **one of our goals:** create end-user modifiable versions of SimCity, because
 - background knowledge can never be completely articulated
 - the world changes

End-User Computing

- **competent practitioners** usually know more than they can say — tacit knowledge is triggered by situations, by breakdowns
- **end-users:**
 - are the *owners* of problems, have the domain knowledge, are the users of computational artifacts
 - regard computers as useful machines capable of helping them work more productively, creatively, and with greater pleasure
 - like computers because they get their work done
- **computer scientist / programmers**
 - find computers intrinsically interesting
 - like computers because they get to program
- **ultimate goal / belief:** end-users will use, tailor, extend and create their own computational artifacts if they have a supportive socio-technical environment
- **communities of users** will develop: power users, local developers,

“Open Source”: From Users to Co-Developers

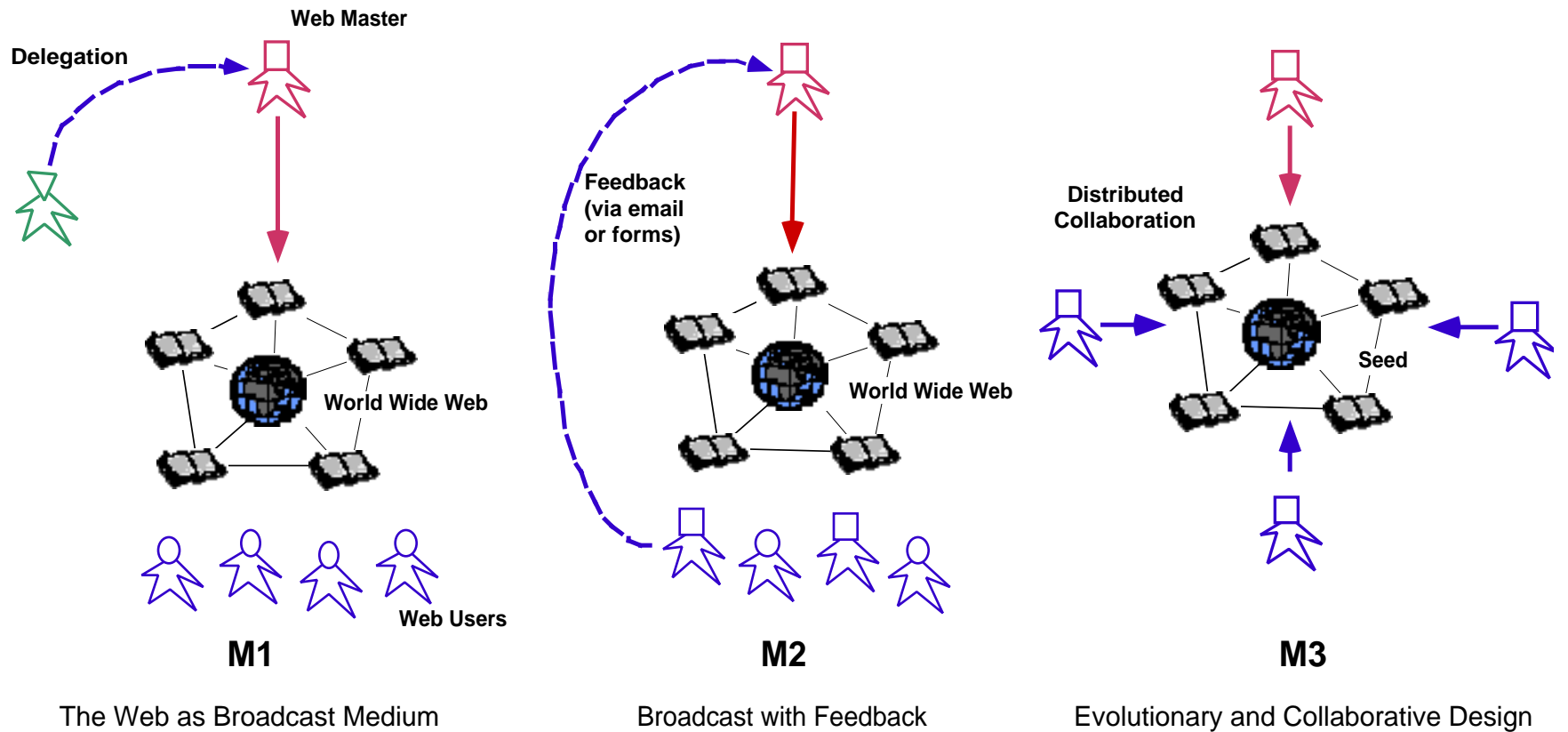
Examples of Decentralized, Evolvable Information Repositories

- **Gamelan**
 - content: Java applets (an evolving community repositories of knowledge)
 - users: Java developers
 - <http://www.gamelan.com>
- **Educational Object Economy**
 - content: Java objects designed specifically for education
 - users: teachers and developers interested in producing educational software
 - <http://www.eoe.org>
- **Netscape Communicator**
 - distributed development and centralized integration
 - <http://www.mozilla.org>
- **Open Source (Cathedral and Bazaar)**
 - collaborative development of software (e.g., Linux operating system)
 - <http://www.tuxedo.org/~esr/writings/cathedral-bazaar/cathedral-bazaar.html>

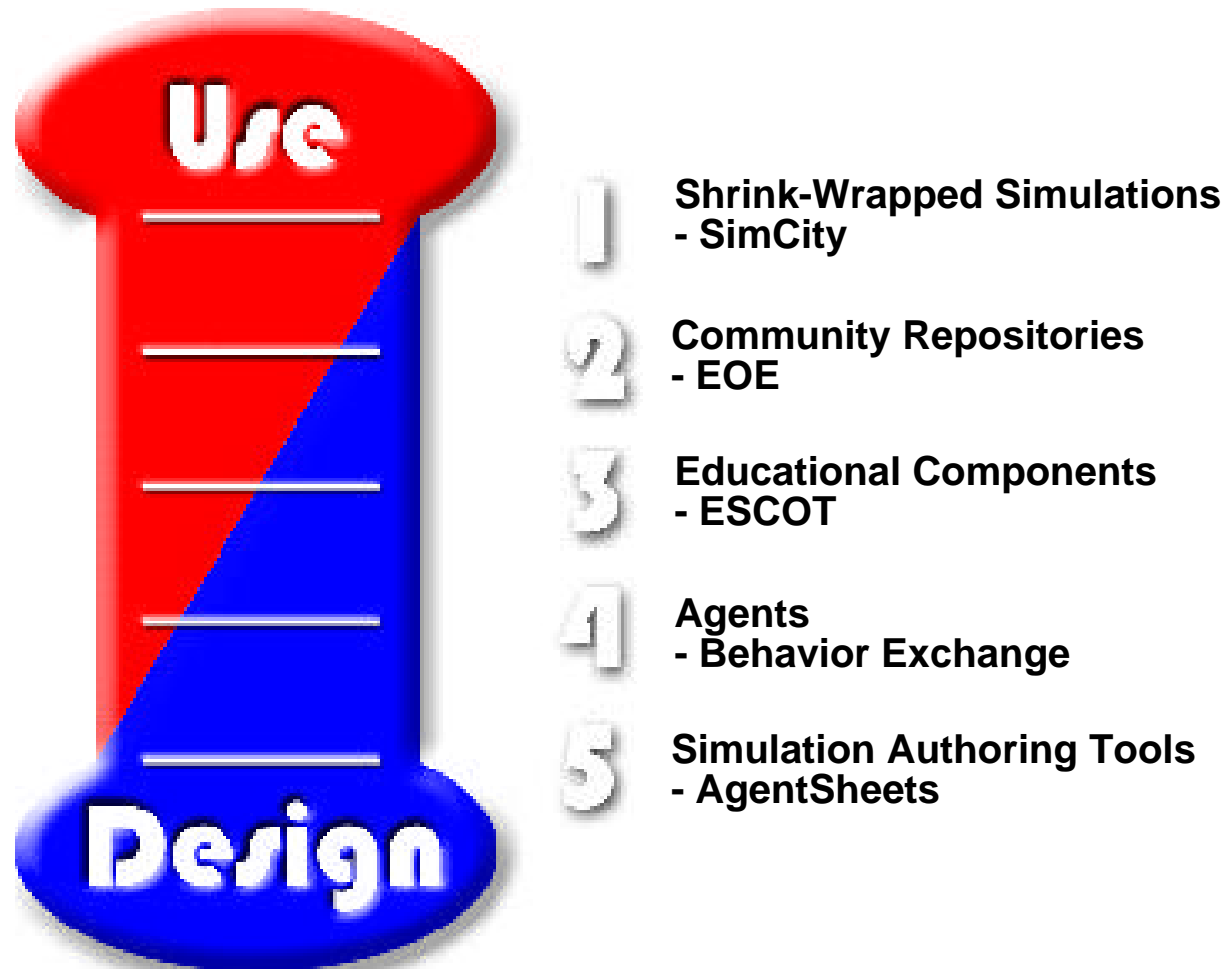
From Users to Co-Developers

- **new conceptualizations of the WWW**
- **Visual AgentTalk**
 - representations of conditions, actions and rules as graphical objects
 - interface support (drag and drop) for end-user programming
 - <http://www.agentsheets.com/>
- **Behavior Exchange**
 - evolvable spaces of sharable computational artifacts (including simulations and agents) on the WWW
 - <http://www.agentsheets.com/behavior-exchange.html/>
- **Dynasite**
 - extensible, web-based information spaces supporting (collaborative) knowledge construction, meaning
 - <http://www.cs.colorado.edu/~ostwald/home.html>

WWW: From Broadcast to Collaboration Medium



The Use / Design Spectrum



see: A. Reppening, A. Ioannidou, J. Phillips "Collaborative Use & Design of Interactive Simulations", Proceedings of the Conference on Computer Supported Collaborative Learning (CSCL '99), Stanford, 1999, pp 475-487

The Use / Design Spectrum

- **Shrink-Wrapped Simulations: SimCity**
 - largest possible city by balancing taxes, crime rate, pollution and many other factors.
 - -the general lack of programmability is a major limitation of SimCity and similar packages
- **Educational Object Economy (EOE) — Community Repositories**
 - community repositories are collections of simulations and other interactive educational objects; the EOE is a collection of educational Java applets
 - educational objects in the EOE are annotated with meta information
 - use consist of the locating and selection of relevant education objects → design is limited
- **Educational Software Components of Tomorrow (ESCOT)**
 - ESCOT project: a conceptual extension of the EOE work
 - ESCOT explores technical mechanisms and cognitive models that let people efficiently combine components based on Sun's JavaBeans technology

The Use / Design Spectrum

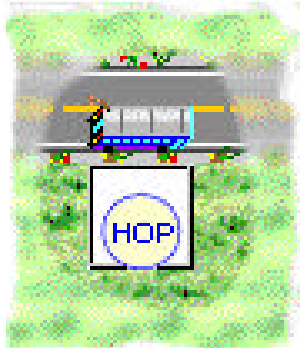
- **Behavior Exchange**

- Behavior Exchange: allows users to exchange individual simulation agents
- for instance: in a city pollution simulation people can exchange agents such as cars, roads, trains, and factories.
- agents downloaded from the Behavior Exchange are “glass boxes” that can be readily opened up to inspect their rules and modify their behavior. Modified agents can be uploaded again to the Behavior Exchange.
- this mechanism allows a community of users to build and incrementally improve simulation content.

- **Agentsheets — Simulation Authoring Tools**

- Agentsheets is a simulation authoring tool allowing non specialists to build complex interactive simulations and deliver them as Java applets and JavaBeans over the web
- Agentsheets: focuses on end-user programming and explores new programming paradigms for non computer specialists.
- Agentsheets innovations include the agent-based graphical rewrite rule implementations

Visual AgenTalk



Visual Behavior Query



The interface is titled "Bus: rules found" and displays two rule configurations. Each rule is structured as "If" followed by "Whenever" and "Then".

Rule 1:

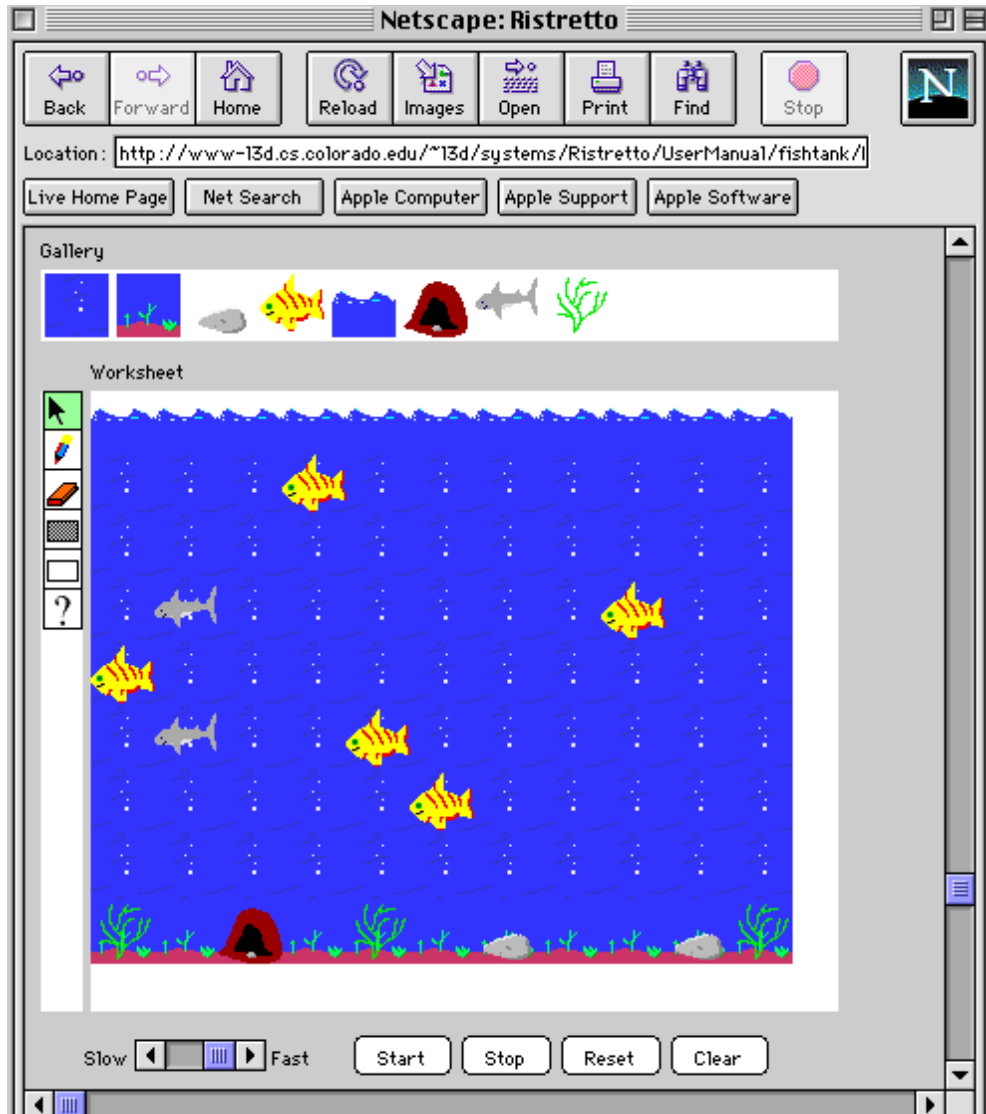
- If:** Two "See" actions. The first "See" action has a red dot and an arrow pointing right towards a road. The second "See" action has a red dot and an arrow pointing down towards a blue "HOP" sign.
- Whenever:** A yellow box with the word "Whenever".
- Then:** Three actions: "Play sound" with a dropdown menu showing "Konk", "Wait" with a dropdown menu showing "<HOP Stop's Wait Time>", and "Move" with a red dot and an arrow pointing right.

Rule 2:

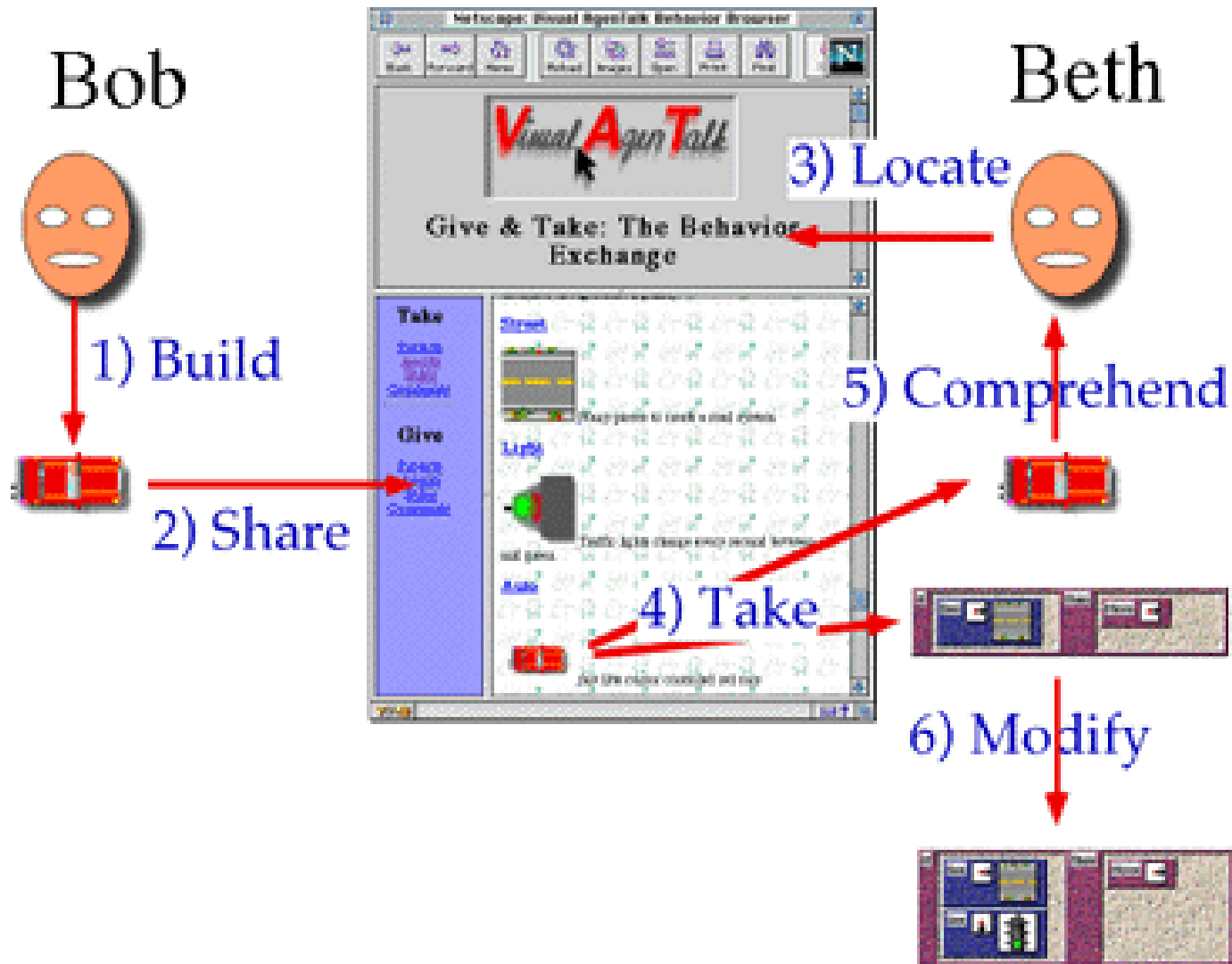
- If:** One "See" action with a red dot and an arrow pointing right towards a road.
- Whenever:** A yellow box with the word "Whenever".
- Then:** One "Move" action with a red dot and an arrow pointing right.

At the bottom of the interface, there are buttons for "Command Form", "Apply", and "OK".

The FishTank — Created by a Community Using the Behavior Exchange



Processes Underlying the Behavior Exchange



Motivational Aspects of a Consumer/Designer Perspective

- **what will make humans want to become designers/active contributors over time?** → claim: serious learning does not have to be *unpleasant* but can be personally meaningful, empowering, engaging and fun
- **what will make humans want to share?** → requires: culture change, community knowledge bases, distributed memories
- **who is the beneficiary and who has to do the work?** → organizational rewards

Conclusions

- differentiate between consumers and designers by **questions asked / problems perceived:**
 - **Consumer:** Is a new future coming? (for example: in developing the new media of the future, the social scientists / humanists should not be content with spectators and Cassandra roles)
 - **Designer:** How can we invent and create a new future?
- being a consumer or a designer is a **mindset**
- **Marshall McLuhan:** “If we understand the revolutionary transformations caused by new media, we can anticipate and control them; but if we continue in our self-induced subliminal trance, we will be their slaves.”