Values in Educational Simulations

• Values can be defined as subjective ideals that bridge individuals and groups

• Goal: to study how values shape the design & use of educational simulations & how educational simulations shape values

• Ethnographic research methods: interviews, participant observation, and analysis of the software
Case Study: Cyberfrogs and Animal Advocacy Values

- Each year, millions of frogs are taken from the wild and killed for use in dissection, an increasingly controversial practice

- Frog dissection simulations (“Cyberfrogs”) may be used as supplements to or substitutes for frog dissection
Promotional Materials with Embedded Values: Froguts
Packaging with Embedded Values:

Digital Frog 2
Human-Cyberfrog Interaction

- User selects the dissection tools
- Dissection tools appear when needed
- Software leads user through dissection
- User views prosected materials
- User selects and deselects parts to display
- User makes parts transparent
User Selects the Dissection Tools: DissectionWorks
User Makes Parts Transparent: ProDissector
Symbiotic Relationship Between Simulation Designers and Animal Advocates

• Due to interaction between simulation designers and animal advocates, dissection simulations contain embedded animal advocacy values

Symbiotic Relationship Between Simulation Designers and Animal Advocates

Educational Simulation Values

Profit from High Tech

Development of New Technologies

Promotion of Science Ed.

Animal Advocacy Values

Protection of Animals

Reduction of Animal Suffering

Environmental Protection

Core Values

Peripheral Values
Symbiotic Relationship Between Simulation Designers and Animal Advocates

Latching onto Complementary Values

Profit from High Tech
- Development of New Technologies
- Promotion of Science Ed.

Protection of Animals
- Reduction of Animal Suffering
- Environmental Protection
Symbiotic Relationship Between Simulation Designers and Animal Advocates

Intersection of Complementary Values

- Profit from High Tech
- New Technologies
- Science Education
- Reduction of Suffering
- Environment
- Protection of Animals
Cyberfrogs as Boundary Objects

- Step 1: Understand the social worlds that precede the development of IT
- Step 2: Determine how IT emerges as a boundary object at the intersection of social worlds
- Step 3: Evaluate how IT exhibits agency in reshaping relationships among social worlds

Cyberfrogs as Boundary Objects

- Simulation Designers
- Biology Educators
- Cyber Frogs
- Animal Advocates
Role Hybridization of Educational Software Designers and Users

• One way to ensure that the values embedded in IT match the needs of users is for users to become designers.

Role Hybridization of Educational Software Designers and Users

Spectrum of Hybridity of Frog Dissection Simulation Design Companies

Neotek

Digital Frog International

Schneider & Morse Group

ScienceWorks

Froguts

less hybrid

more hybrid
Education Standards and Software Design

- Science and technology standards constrain creativity of educational simulation designers
- Local control of educational standards can boost appropriateness & creativity

Education Standards and Software Design

No Child Left Behind
Education Standards and Software Design

Standardization from Below
Collaboration at the Interface

- IT can incorporate not only online sociability but also face-to-face sociability
- Example: science laboratories such as animal dissection have traditionally involved face-to-face sociability, and dissection simulations can also strive for this goal

Collaboration at the Interface

- Biology Textbook
- Dissecting Tray
- Dissection Manual
Collaboration at the Interface
Collaboration at the Interface

- Biology Textbook
- Computer
- Dissection Manual
Take-Away Messages

• Software design, use, and evaluation are influenced by human values

• HCI is influenced not only by micro-scale factors such as cognition but also by macro-scale societal transformations

• Designers should consider not only interaction with and through computers but also at computers
Thank you! Any questions?

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