Information Technology & Human Values: The Social and Ethical Implications of Frog Dissection Simulations

Kenneth R. Fleischmann, Ph.D. <kfleisch@umd.edu>

Assistant Professor, College of Information Studies

Funded by the National Science Foundation

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

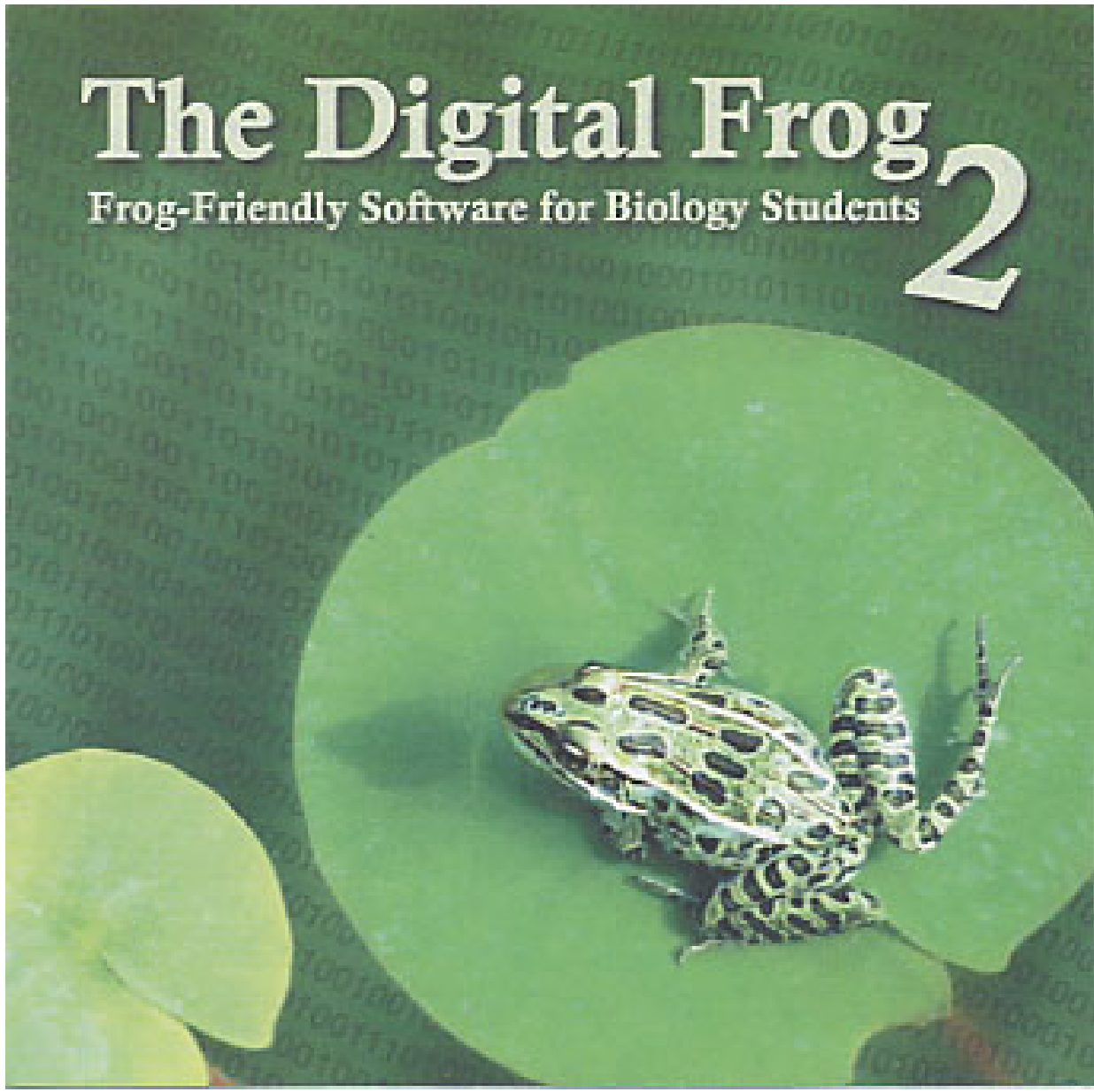
- Frog dissection simulations (“Cyberfrogs”) may be used as supplements to or substitutes for frog dissection

Promotional Materials with Embedded Values:

Froguts

Packaging with Embedded Values:

Digital Frog 2

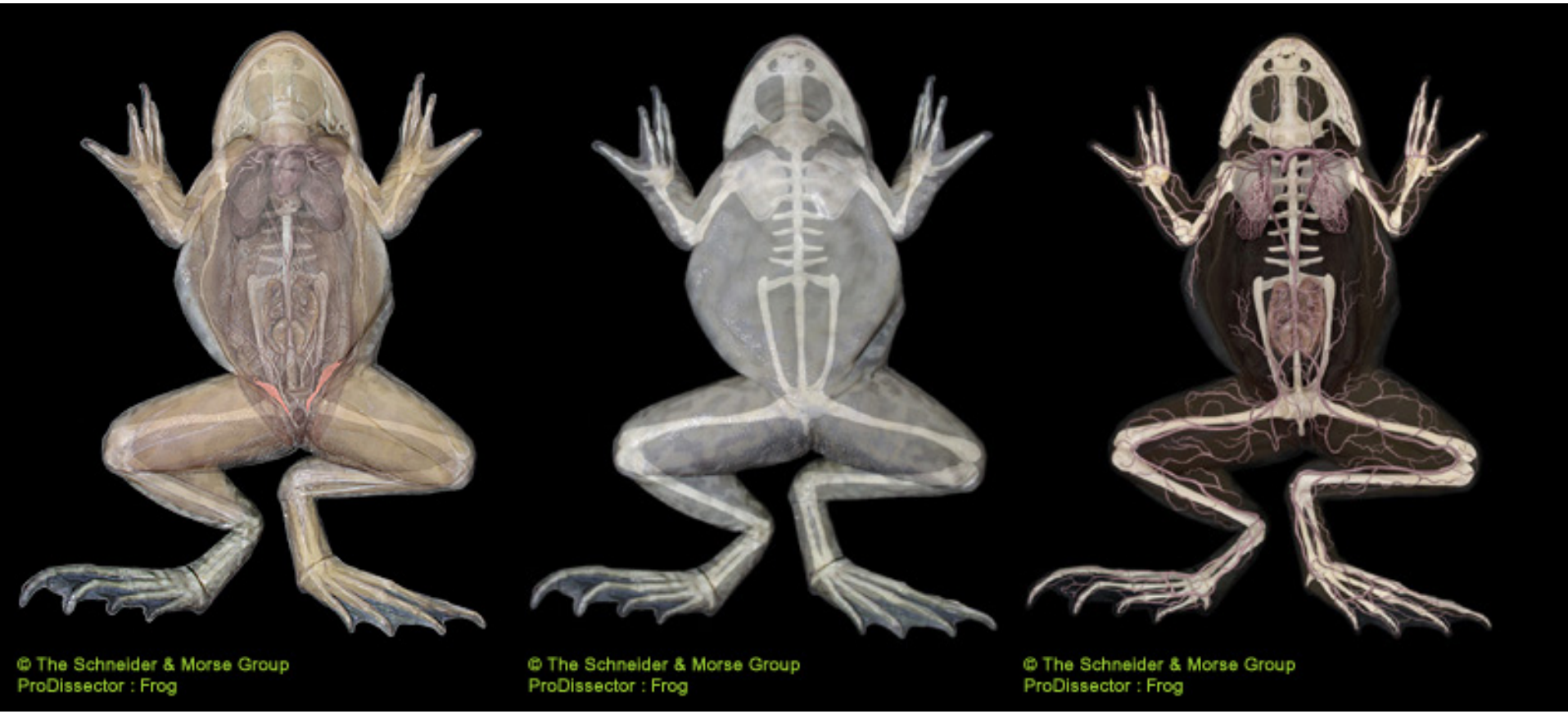


Human-Cyberfrog Interaction

- 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

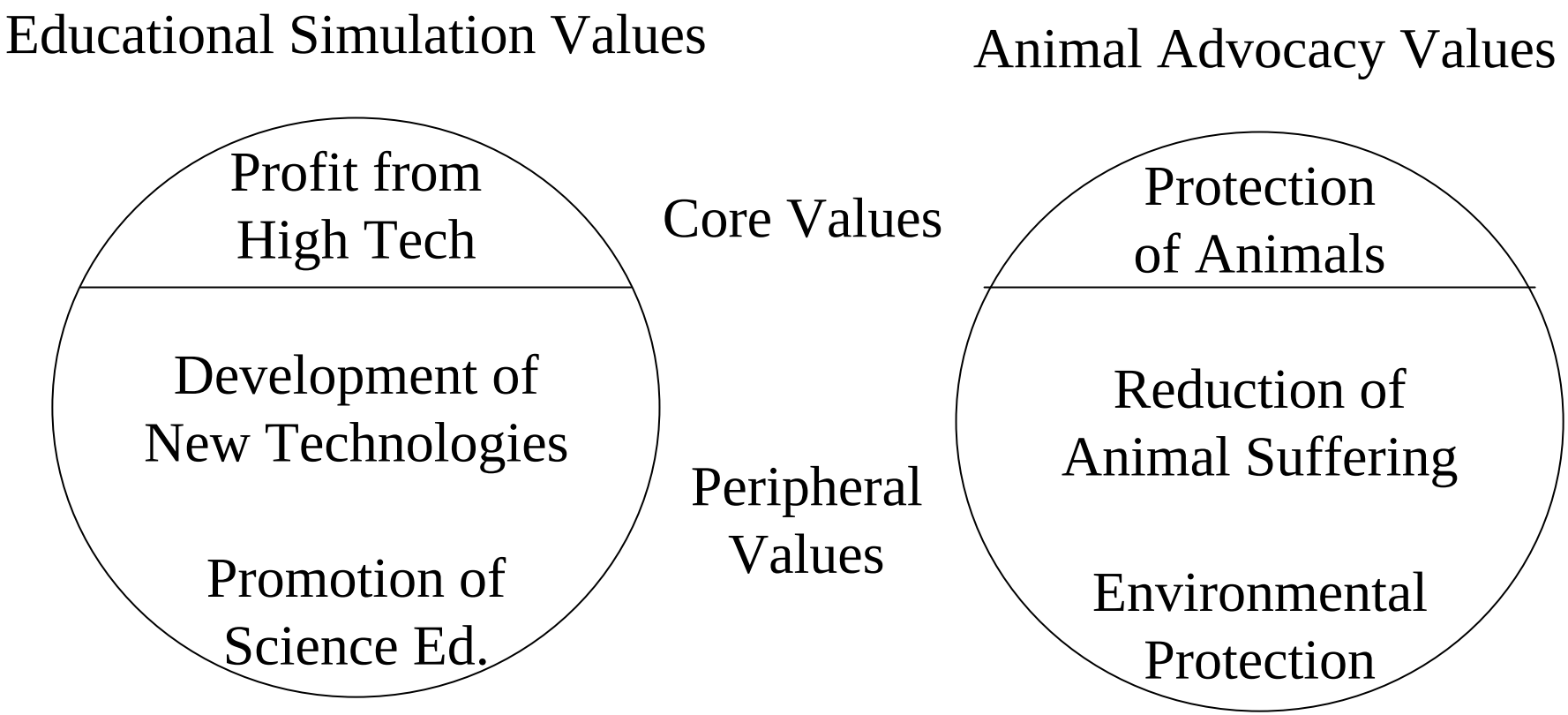


Symbiotic Relationship Between Simulation Designers and Animal Advocates

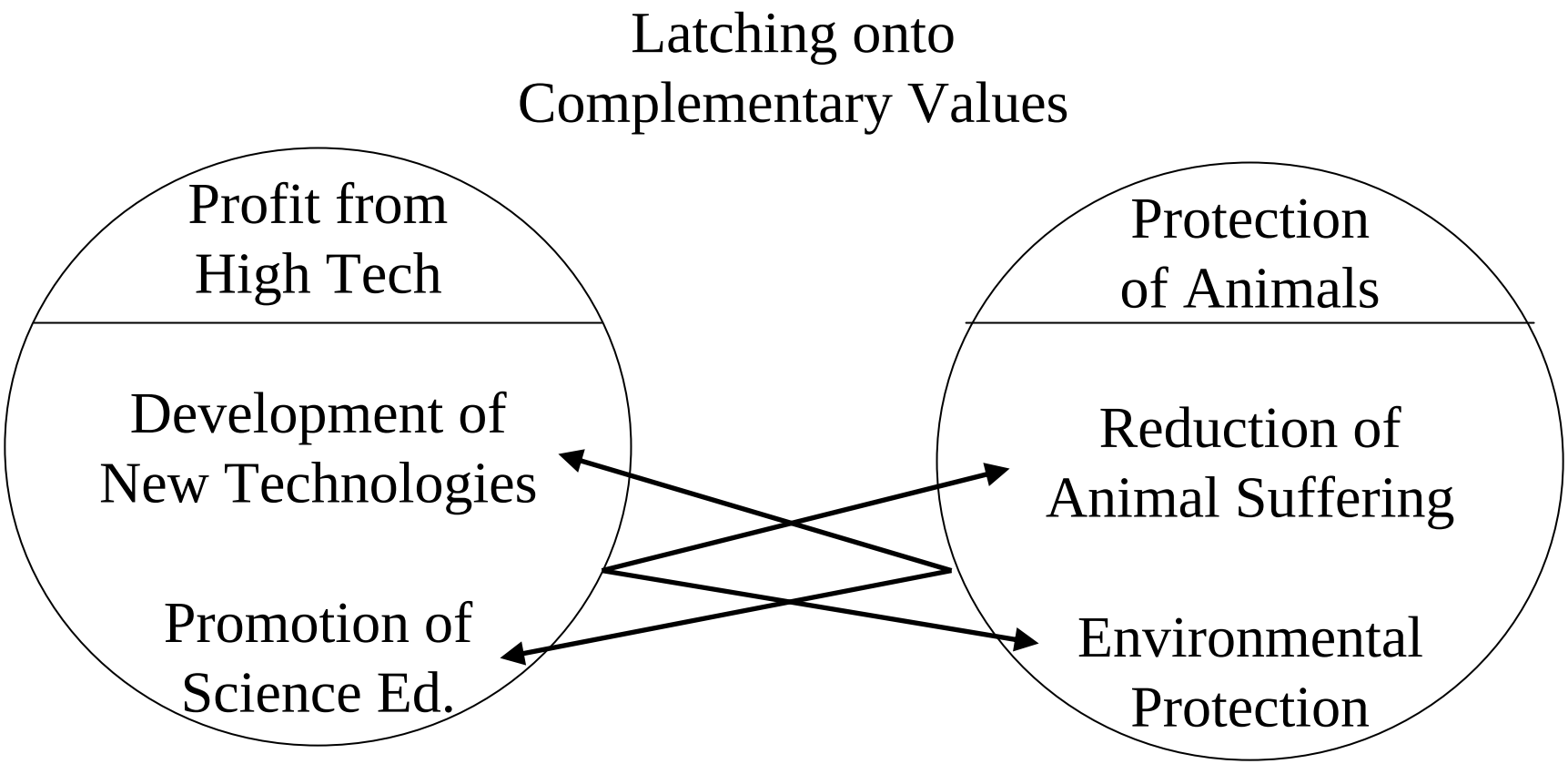
- Due to interaction between simulation designers and animal advocates, dissection simulations contain embedded animal advocacy values

Fleischmann, K.R. 2003. “Frog and Cyberfrog are Friends: Dissection Simulation and Animal Advocacy.” *Society and Animals* 11(2): 123-143.

Symbiotic Relationship Between Simulation Designers and Animal Advocates

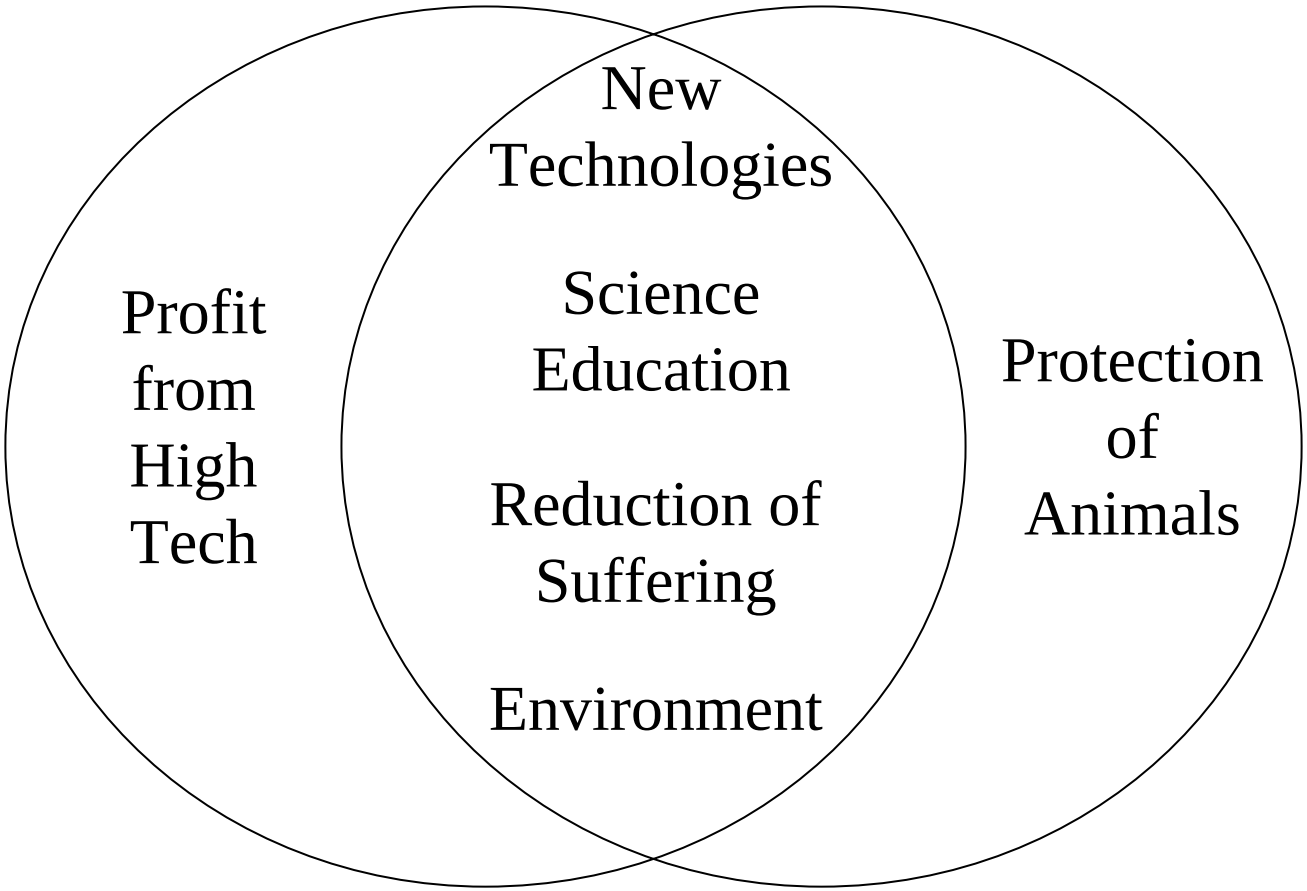


Symbiotic Relationship Between Simulation Designers and Animal Advocates



Symbiotic Relationship Between Simulation Designers and Animal Advocates

Intersection of Complementary Values

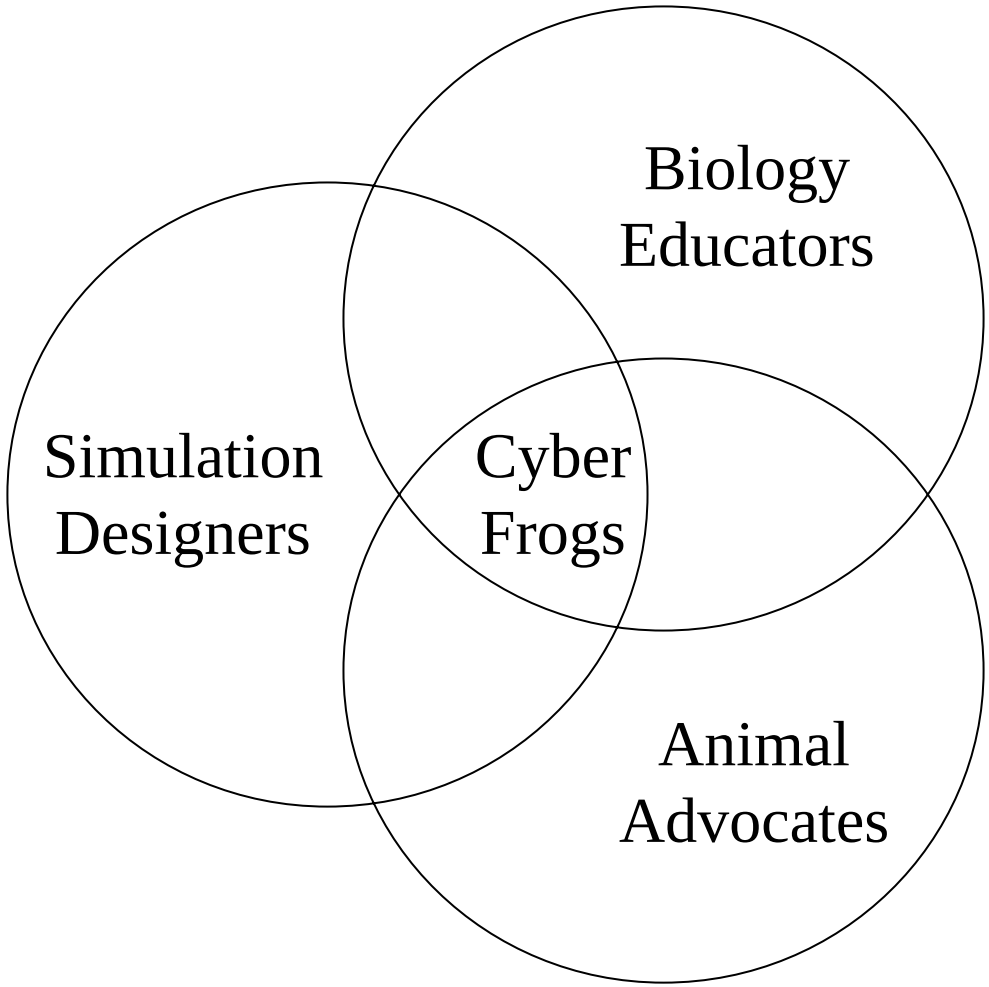


Cyberfrogs as Boundary Objects

- 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

Fleischmann, K.R. 2006. “Boundary Objects with Agency: A Method for Studying the Design-Use Interface.” *The Information Society* 22(2): 77-87.

Cyberfrogs as Boundary Objects

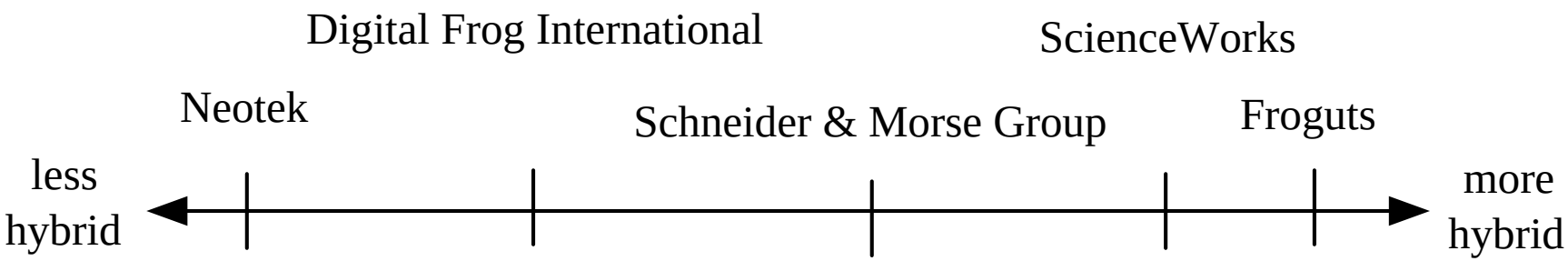


Role Hybridization of Educational Software Designers and Users

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

Fleischmann, K.R. 2006. “Do-It-Yourself Information Technology: Role Hybridization and the Design-Use Interface.” *Journal of the American Society for Information Science and Technology* 57(1): 87-95.

Role Hybridization of Educational Software Designers and Users



Spectrum of Hybridity of
Frog Dissection Simulation
Design Companies

Education Standards and Software Design

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

Fleischmann, K.R. “Standardization from Below: The Impact of Science and Technology Standards on the Design and Use of Educational Software.” Forthcoming in *Educational Technology & Society*.

Education Standards and Software Design

No Child Left Behind

Education Standards and Software Design

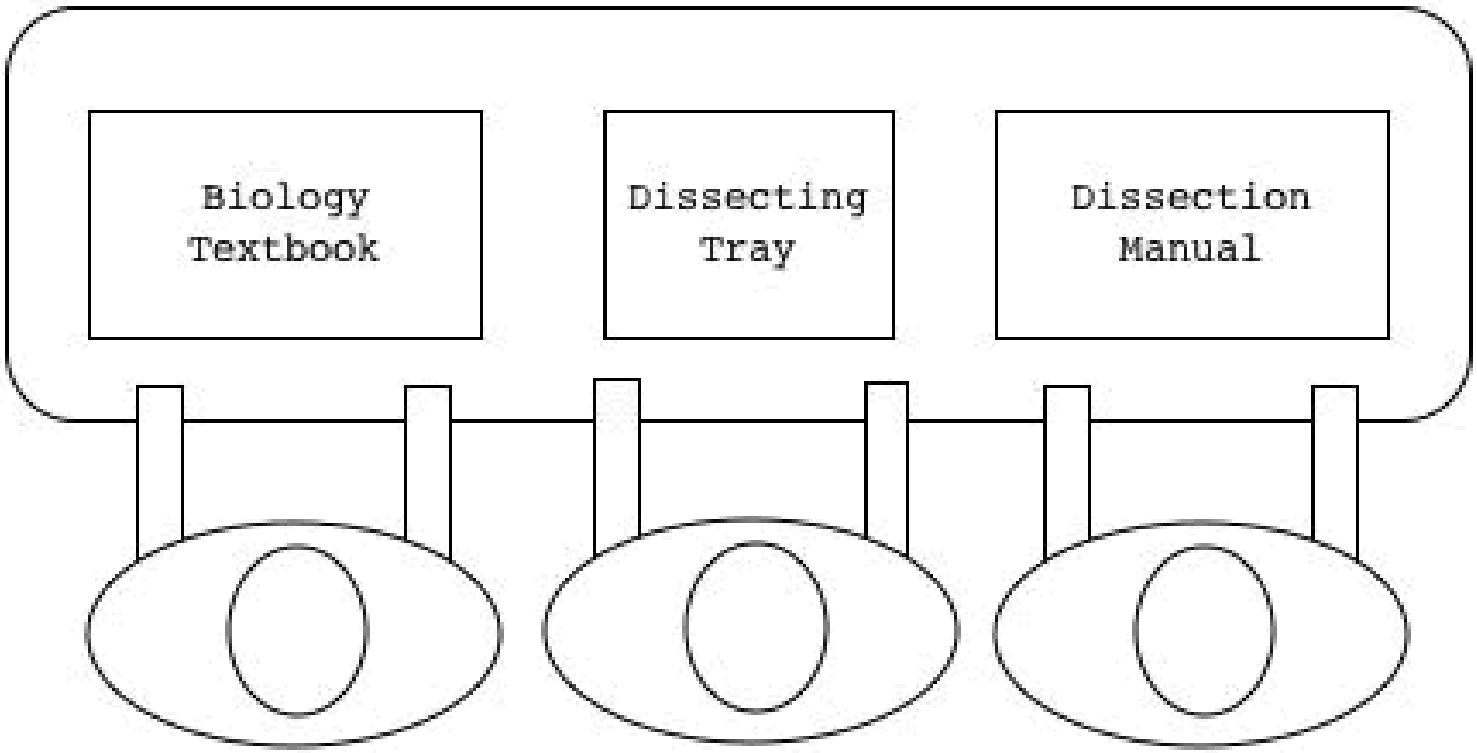
Standardization from Below

Collaboration at the Interface

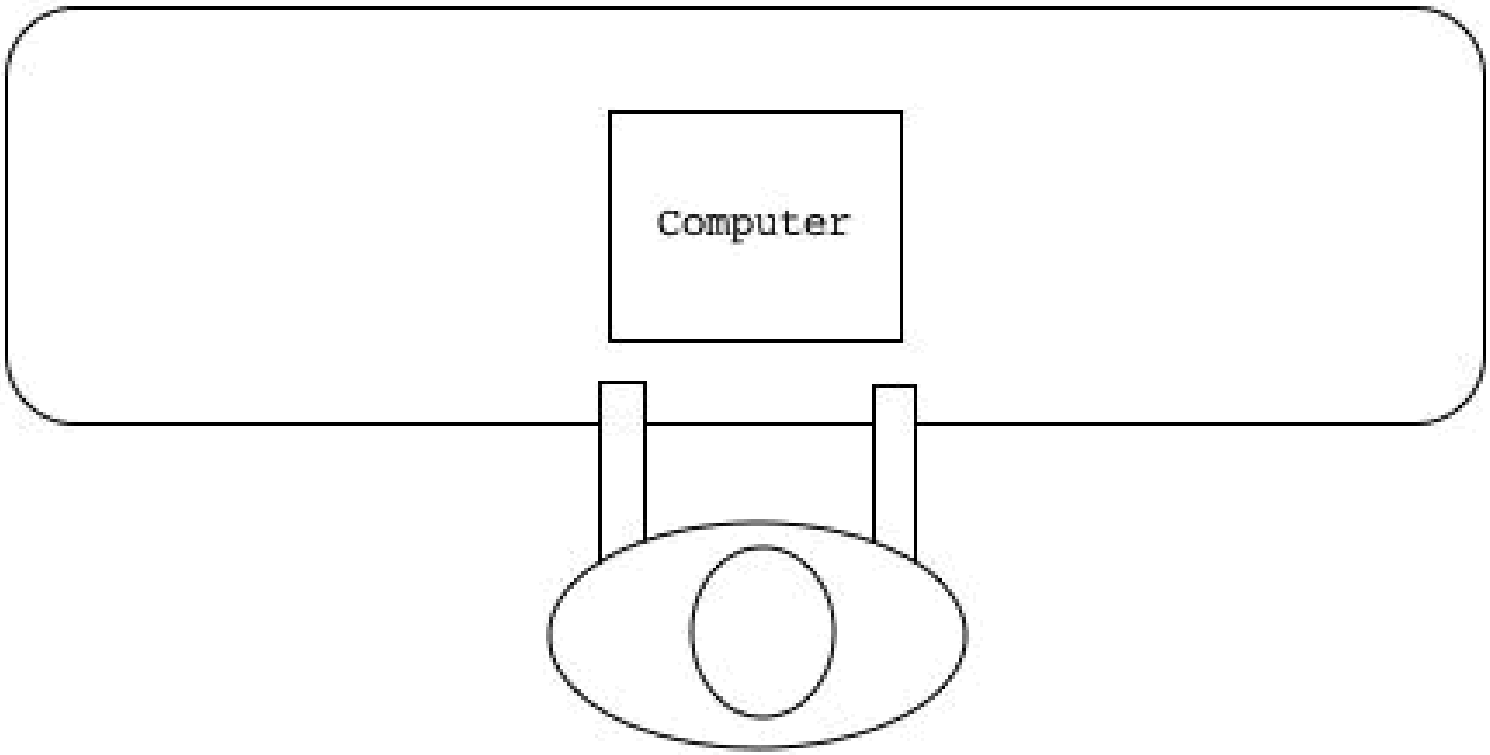
- IT can incorporate not only online sociability but also face-to-face sociability
- Example: science laboratories such as animal dissection have traditionally involved face-to-face sociability, and dissection simulations can also strive for this goal

Fleischmann, K.R. 2005. “Virtual Dissection and Physical Collaboration” *First Monday* 10(5).

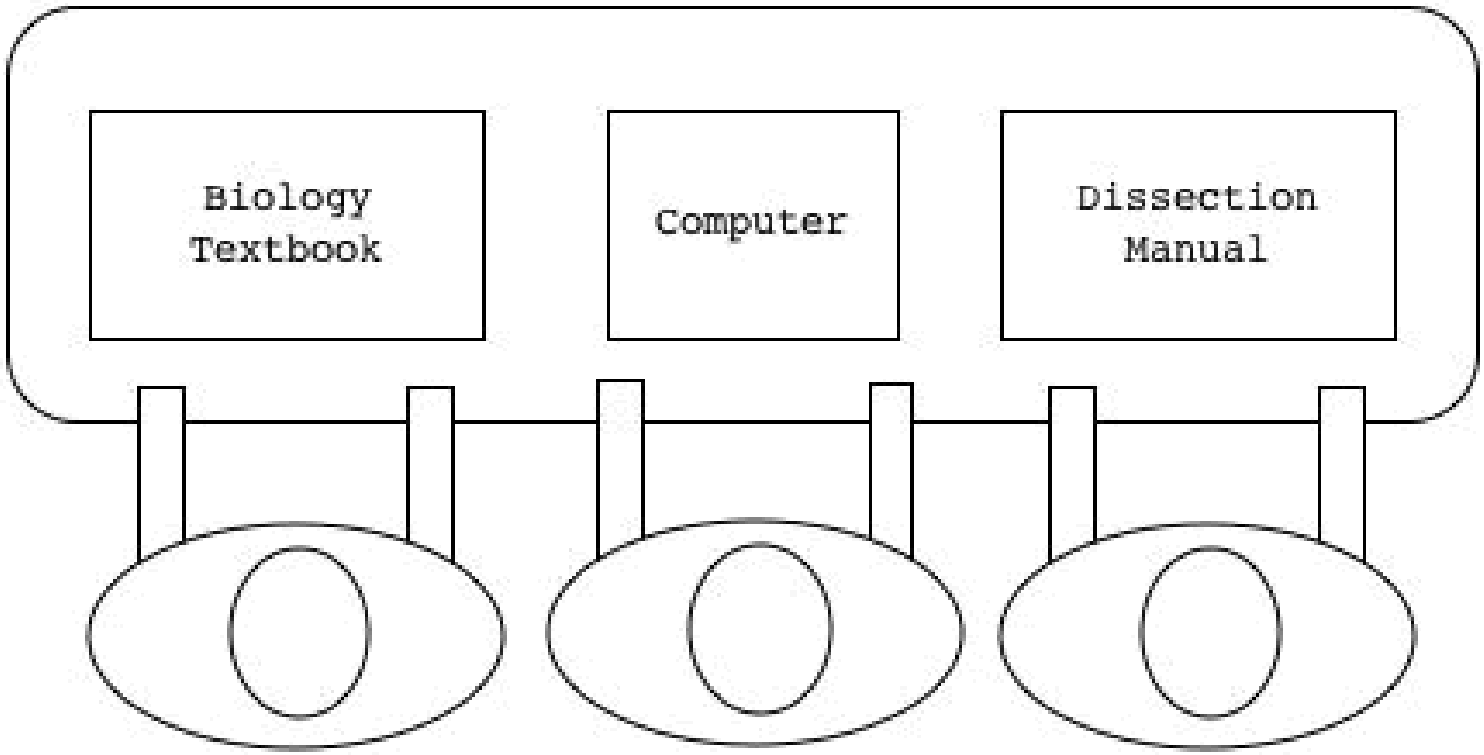
Collaboration at the Interface



Collaboration at the Interface



Collaboration at the Interface



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?

Acknowledgements:

- Funded by NSF Grants #0217996, #0521117, #0639897, #0646392, and a three-year NSF Graduate Research Fellowship

Contact Information:

- Ken Fleischmann, kfleisch@umd.edu