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## Fostering and Measuring Collaborative Computing and Learning in (CL)<sup>3</sup>



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ACRL Sailing into the Future 2007

## Picture this:

You are a member of 3-4 person student team working on:

- Designing a computer game
- Writing a computer program
- Editing a digital video



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Where would you rather work? Here:



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Or here?



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What would you rather use? This:



Or this:



What is (CL)<sup>3</sup>?

- Cornell Library Collaborative Learning Computer Laboratory
- Facility that provides patrons with access to **CreationStations** for creation of course-related multimedia presentations
- Collaborative teaching and learning laboratory and classroom
- Also used for Library instruction and training



(CL)<sup>3</sup>



## Who are the "Players?"

- Cornell University Library
- Department of Computer Science
- Cornell Information Technologies with funding from the Provost's Office
- Faculty
- Students



## Team-Based Learning

- Learning models:
  - Collaborative Learning
  - Cooperative Learning
- Original inspiration:
  - Academic Excellence Workshops
  - Pairs collaborating
  - Pilot, Co-pilot
  - Idea: pair-programming tables



## Game Design and Development

- Common features:
  - Interdisciplinary
  - Student Teams
  - Multidisciplinary
- GDIAC:
  - Fall 2001 → Minor in Game Design (Fall 2006)
  - Art, music, writing, programming
  - All do design
  - Where to house?



## Library As Space

- Neutral
- Familiar
- Non-threatening
- Cultural expectations
- Centrally located
- Similar non-computer spaces
- Expand CreationStation project



## What is a CreationStation?



## What Hardware is Available?

- Dell Optiplex GX 270, Pentium4 3.2 GHz, 2 Gb RAM
- 160 GB Hard Drive
- 2 19" UltraSharp Dell Flat Panel Displays
- 2 keyboards and mice
- 250 MB Zip Drive
- 16X CD-RW drive
- 8X DVD+RW/+R burner
- IEEE1394 (firewire) Card
- NVidia 128MB, GeForce FX5200
- Uninterruptible Power Supply



## What Software is Available?

- Office XP Professional
- Macromedia Flash
- Macromedia Dreamweaver
- Adobe Photoshop
- Adobe PageMaker
- Adobe Premiere Pro
- Adobe Illustrator
- Sound Forge
- MatLab
- 3d Studio Max
- Reason



## What Hardware is Available to Borrow?

- Canon Optura Digital Video (DV) Recorders
- Kodak EasyShare 6.1 megapixel Digital Cameras
- Olympus Digital Voice Recorders
- Computer/Video Projectors



## What Hardware is Available for use in the Lab?

- Epson Perfection 3170 PHOTO scanner
- Epson Expression 1670 (large format) scanner
- JVC SRVS30 VHS/mini DV combo deck
- Midi keyboard
- Game consoles (Xbox 360, Game Cube, etc.)
- Wacom tablets
- Xerox Phaser 6250 Color NetPrint laser printer
- HP LaserJet 4100 TN B&W NetPrint printer



## CreationStation



## Collaborative Usage Statistics :

(9/04 to 2/07)

- Total Number of Groups: 2054
- Total Number of People in Groups: 5468
- Average group size: 2.7 people



## Students working in the Uris Library (CL)<sup>3</sup> Facility



## Student being helped by Lab Operator



## Student giving presentation in (CL)<sup>3</sup>



## Design Process

- Collaboration for collaboration:
  - Computer technology people
  - Computer science people
  - Library people
  - Construction people
  - Many other people

## Prototyping

- Fall 2002
- Full-scale mockup
- Testing by using
- Construction process helped!



## More Pink Foam



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## Implementation

- Collaborative team:
  - CUL, CS, CIT
- Weekly meetings
- Design and Build  
Fall 2003–Spring 2004

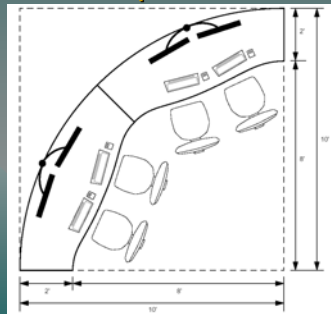


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## Final Table Concept

- Curved 1/8 circles
- Inside curve
- Dual monitor
- Single CPU
- Wheels
- UPS

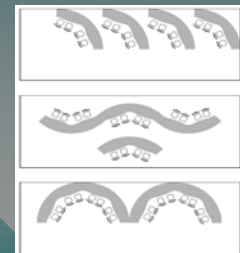


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## Configurations

- Shape-shifting lab
- Plug-n-play tables
- Student/teacher driven



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## Operation

- Lab Manager
- Student Lab Operators:
  - Training by librarians and support staff
  - Security
- Circulation staff assist with checking out equipment
- Librarians are responsible for special services and faculty contact



## Advertising and Promotion

- Direct faculty contacts
- Signage in libraries
- Orientation presentations
- Web pages
- Press Coverage
- High visibility in busy library open 24 hours



## Facility Scheduling

- Web-based reservation form used for on-line scheduling
- Reservations scheduled on an Oracle agenda
- Public hours scheduled around class schedules



## Evaluation

- Two course studies:
  - Human-Computer Interaction
  - Ergonomics
- Collaborations with faculty
- Full reports on CL3 website





## HCI

- 38 responses
- 55% game students
- Some data:
  - 30% moved tables
  - 46% struggled over the mouse
  - 39% struggled over the keyboard
  - 75% of students enjoy working with others in CL3
  - Overall lab satisfaction among class users ranges from 87% to 74%.



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## Ergonomics Study

- 57 users
- 43% move tables
- 37% non-movers unaware of mobility
- 46.5% spend a lot of time collaborating

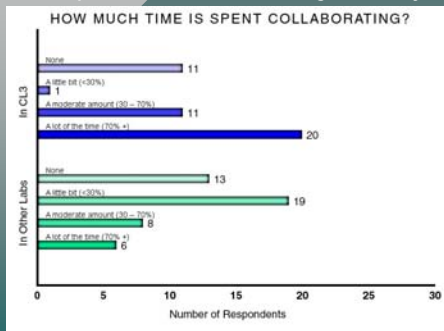


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## Time spent in collaborative activity in CL3 versus other computer labs

46.5% spend a lot of time collaborating in CL<sup>3</sup>, only 13 % in other labs



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## How Important Are the Following Items for Collaborative Work?

	Not important	Somewhat important	Important	Very important
Ability to customize work area by moving chairs, tables, and computers	7	16	12	10
Ability to work with others on the same computer	3	11	19	12
Ability to work with others on multiple computers	2	13	20	10
Quiet conditions to help with concentration and conversation	5	18	14	8
Ability to discuss projects freely without fear of disrupting others	2	6	21	17
Having partitions (such as screens or movable walls)	18	14	7	5
Having open space	2	14	19	9
Having dry erase boards	6	12	19	6
Having 2 screens	6	16	16	7
Having 2 keyboards	6	28	8	3
Having 2 mice	6	22	12	4
Being able to overhear other groups	24	16	2	3
Being able to see other groups	24	15	3	3
Being visually removed from other groups	26	12	5	2



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## Key Comments

- HCI:
  - No need to move (found suitable arrangements)
  - Unaware of mobility
  - Fear of breaking something
- Ergonomic:
  - Confused about public hours
  - Noise level (not quiet!)



## Recommendations

- Advertising
- Training
- Occasionally shift/reset configurations
- More surveys



## Future Work

- What's next?
  - More extensive evaluation
  - Adaptation in other units and schools
  - Other kinds of courses
  - Shape-shifting use and technology
- Next version...?



## Questions?

Websites:

<http://www.cs.cornell.edu/dis/CL3>

<http://CL3.library.cornell.edu>

<http://qdiac.cis.cornell.edu>

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