

# The New Computing: Ending User Frustration

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# *A Systematic Approach to Change*

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The old computing is about  
what computers can do,  
The New Computing is about  
what people can do



# *An Inspirational Muse: Leonardo da Vinci (1452-1519)*

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## Renaissance Man

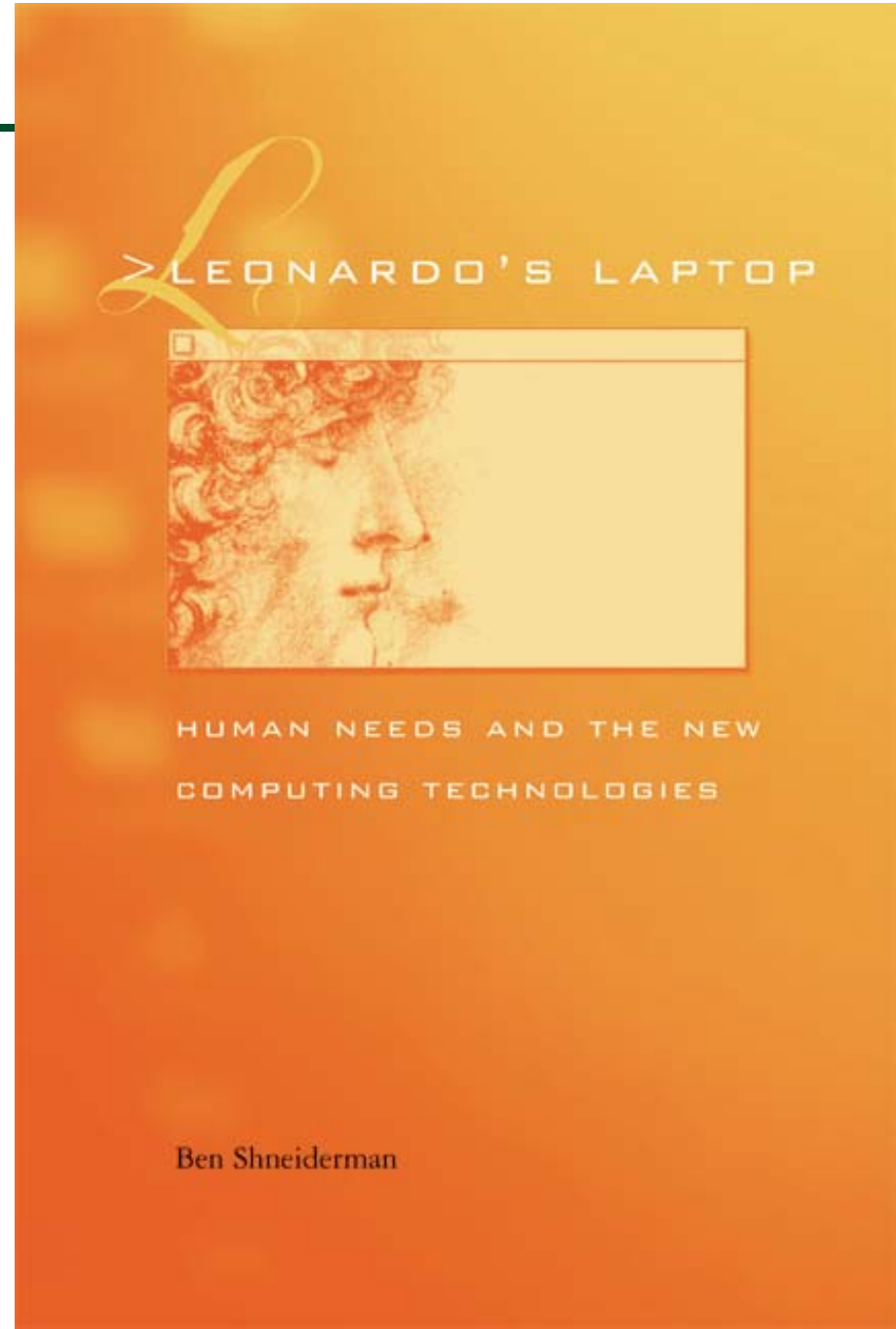
- Combined science & art
- Integrated engineering & esthetics
- Balanced technology advancement & human values
- Merged visionary & practical

# *Leonardo's Laptop*

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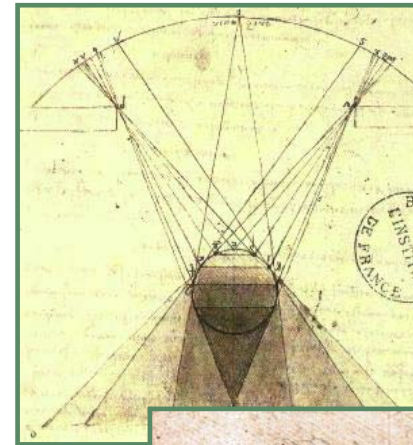
HCIL Symposium  
paying attendees will  
receive a copy around  
September 15.

MIT Press  
October 2002



# Goals for The New Computing

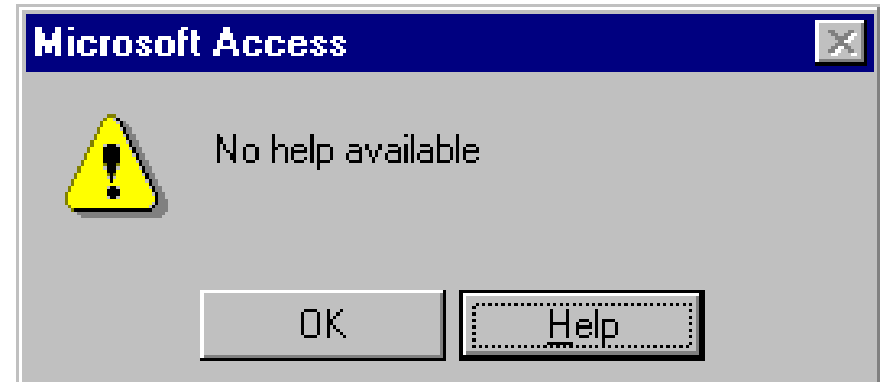
- 1) Usable: Reliable  
& comprehensible
- 2) Universal: Diverse users  
& varied equipment
- 3) Useful: In harmony with  
human needs



# 1) Usable: Ending User Frustration

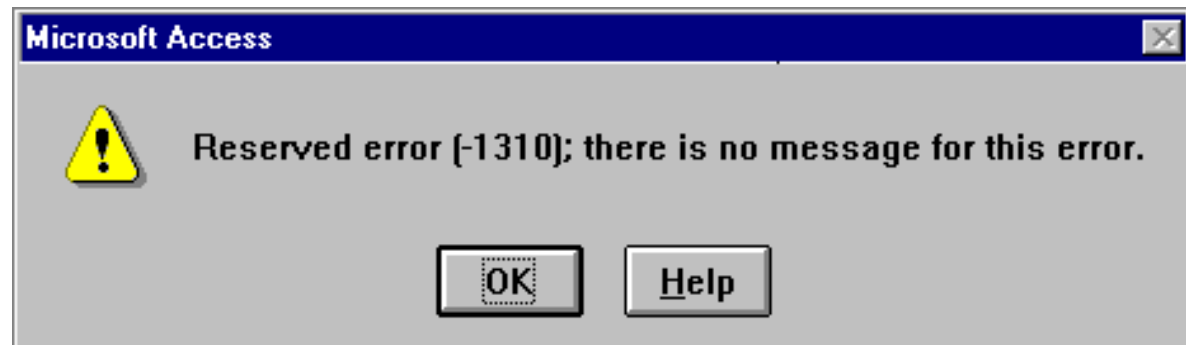
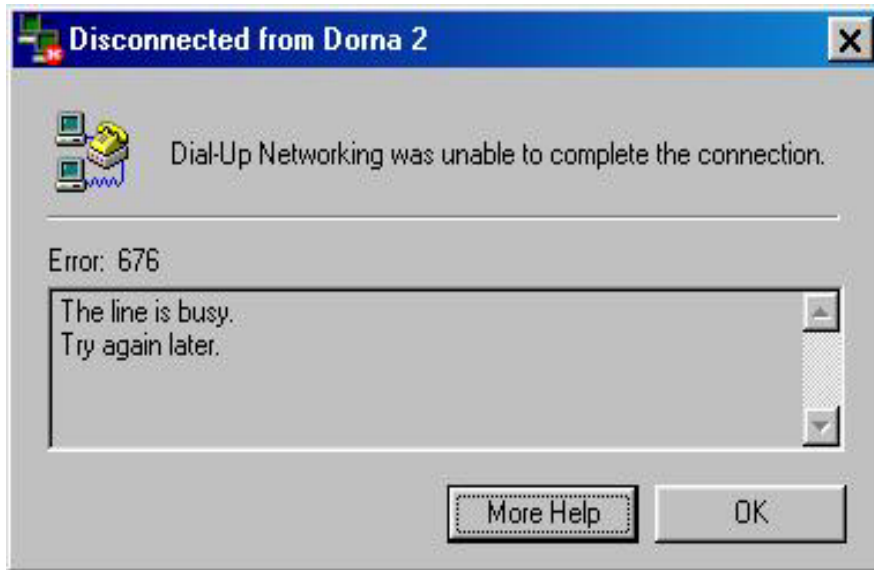
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- Goal - make computer usage less frustrating
  - Identify top ten frustrations
  - Measure severity & frequency in lost time
  - Determine if the situation is improving
- Related areas
  - Errors
  - Time delays
  - Emotional reactions



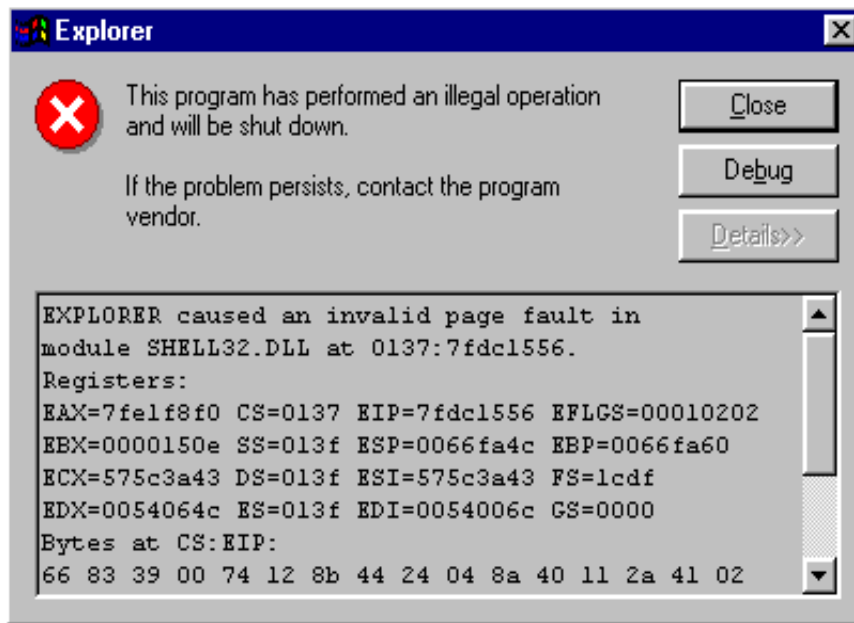
# 1) Frequent frustrating experiences

## Networking & Web



# 1) Frequent frustrating experiences

## Application & System Crashes



WARNING!

... busy or has become unstable. You can wait and see if it becomes available again, or you can restart your computer.

- \* Press any key to return to Windows and wait.
- \* Press CTRL+ALT+DEL again to restart your computer. You will lose unsaved information in any programs that are running.

Press any key to continue \_

# *1) Time diary study*

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Self reports & observations (64 UMD & 47 Towson)

- Pre-session survey:
  - demographic information
  - computer experience and attitudes
  - level of computer anxiety, mood
- Users spent 1 hour & report their frustrating experiences
- Post-session survey:
  - assess mood after the session
  - overall frustration level
  - loss of time





# User Frustration Project

Home > [Main Diary Page](#)> New Frustrating Experience Entry

If you are finished submitting your frustration experience reports and have no more to submit, please click [here](#)

## New Frustrating Experience Entry

Thanks for participating in this study. You may now begin entering your incident reports.

Please enter your frustrating experience here.

*All fields are required.*

1. What were you trying to do?

2. On a scale of 1 (not very important) to 9 (very important), how important was this to you?

1 2 3 4 5 6 7 8 9

Not very important          Very important

3. What software or program did the problem occur in? If the problem was with the computer system, please check the program that you were using when it occurred. (Check all that apply)

- |   |   |
|---|---|
| <input type="checkbox"/> Email                      | <input type="checkbox"/> Spreadsheet Programs (e.g. Excel)    |
| <input type="checkbox"/> Chat and Instant Messaging | <input type="checkbox"/> Graphic Design Programs              |
| <input type="checkbox"/> Web Browsing               | <input type="checkbox"/> Programming Tools                    |
| <input type="checkbox"/> Other Internet Use         | <input type="checkbox"/> Database Programs                    |
| <input type="checkbox"/> Word Processing            | <input type="checkbox"/> Presentation Tools (e.g. PowerPoint) |
| <input type="checkbox"/> File Browsers              | <input type="checkbox"/> Others <input type="text"/>          |

4. Please write a brief description of the experience

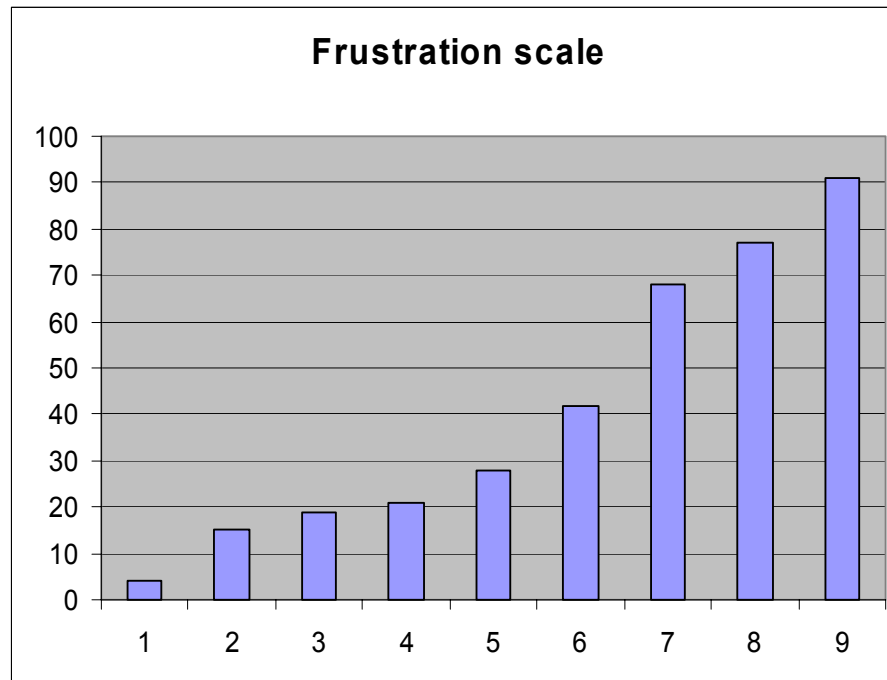
# 1) Results

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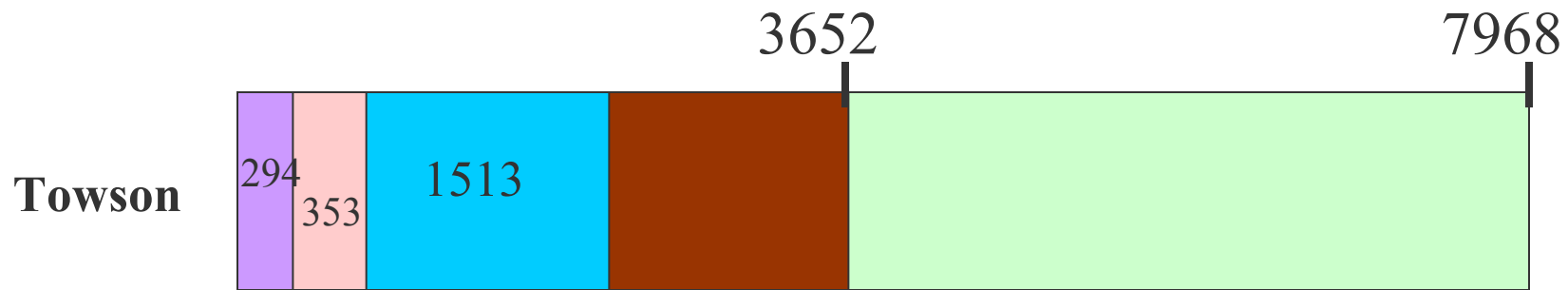
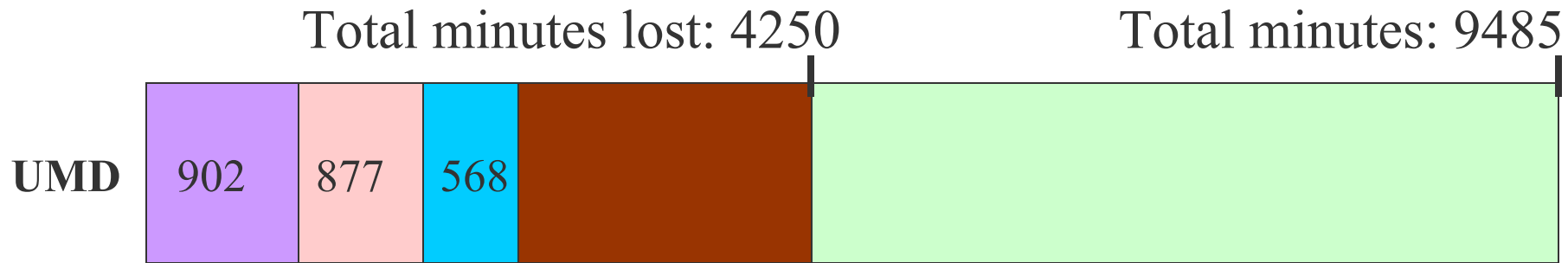
- |                              | UMD | Towson                    |
|------------------------------|-----|---------------------------|
| • Frustrating experiences:   | 228 | 145                       |
| • Top problem sources:       |     |                           |
| • web browsing               |     | • file browsers           |
| • email                      |     | • programming tools       |
| • system (OS)                |     | • spreadsheet programs    |
| • word processing            |     | • graphic design programs |
| • other internet use         |     | • presentation software   |
| • video/audio software       |     | • database programs       |
| • chat and instant messaging |     | • hardware                |
| • Top 3 approaches           |     | • Bottom 3 approaches     |
| • knew how to solve          |     | • consulted manual/book   |
| • unable to solve            |     | • consulted online help   |
| • figured out                |     | • restarted the program   |

# 1) Results

Internet	Applications	Operating System
timed out/dropped/ refused connections (32)	error messages (35)	crashes (16)
long download time (23)	freezes (24)	wrong response (10)
web page/site not found (17)	missing/ hard to find features (23)	slow response (8)
email (15)	crashes (13)	unexpected message boxes (6)



# 1) Minutes lost – UMD & Towson



- Email
- OS
- Web browsing
- Other minutes lost
- Productive minutes

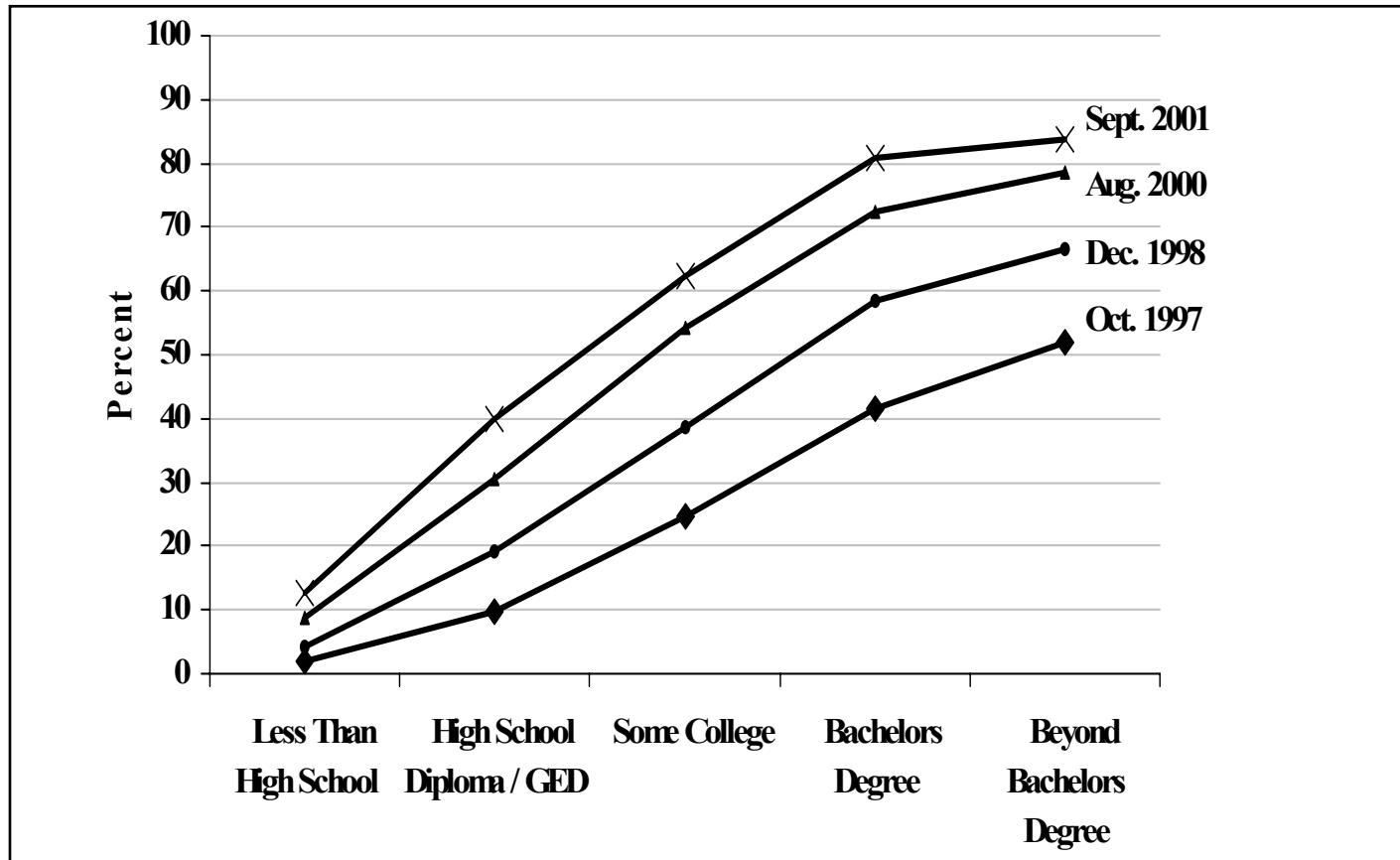
# 1) *Next Steps*

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- Validate results with other users
  - professional
  - elderly
  - novice
- Develop more precise monitoring software  
e.g. `www.bugtoaster.com`
- Explore ways to improve:
  - Online help & help desks
  - Customer service & online communities
  - Education & training
  - Software & interface re-design

## 2) Universal: Digital Divide Remains Troubling

### Percent of Internet Use by Educational Attainment



U.S. Department of Commerce,  
[www.ntia.doc.gov/ntiahome/dn/](http://www.ntia.doc.gov/ntiahome/dn/)



## 2) Universal Usability in Practice



Principles and strategies for practitioners designing universally usable sites

### Users with Disabilities

Blind and low vision users

Color vision confusion

Cognitively disabled

Deaf & hearing impaired

Mobility impaired

### Special User Groups

Children

Elderly

Users with low education, low motivation

Users of other languages than English

Users from other cultures than the US

Cross language information retrieval

### Technology

Users with slow connections

Users with screens less than 640 x 480

Telephone based access to the web (WAP)

Telephone based access to the web (speech recognition)

Textual equivalents for audio/video representations of content

### Tutorial methods

Designs to help novice web users

Online help design, email help methods and customer service guidelines

### *3) Useful: Generative Theories*

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Predictive & explanatory theories are useful,  
but the big step forward will be

→ generative theories

Theories of human needs to guide our  
invention of new technologies

### *3) Theories of Human Needs*

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- Jefferson: Life, Liberty & the Pursuit of Happiness
- Roosevelt: Freedom of speech & expression, religion, from want, from fear
- Maslow: Hierarchy of human needs
  - Physiological
  - Safety
  - Love
  - Esteem
  - Self-Actualization
- Covey: Living, Loving, Learning & Leaving a legacy

# *3) Human Needs for Relationships*

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- Relationships
  - Self  
(working on your own)
  - Family & Friends  
(2-50 close intimates)
  - Colleagues & Neighbors  
(50-5000 regular encounters)
  - Citizens & Markets  
(5000 and more)

### *3) Human Needs for Activities*

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- Activities
  - Collect: Information
  - Relate: Communication
  - Create: Innovation
  - Donate: Dissemination

### *3) Activities and Relationship Table (ART)*

#### Activities

#### Relationships

Collect

Relate

Create

Donate

Self

Family & Friends

Colleagues & Neighbors

Citizenry & Markets


### *3) Future Directions*

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- E-learning: The new education
- E-business: The new commerce
- E-healthcare: The new medicine
- E-government: The new politics
  
- Mega-creativity
- Grander Goals & The Next Leonardo