Personal Health Record Usability

National Cancer Institute Informatics In Action Lecture
Complexity Made Simple: The Science of Search Interfaces

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Outline

- Emerging PHR
- The science of usability
- Usability issues and design space for PHRs
- New user interface styles and implications for PHRs
- Toward PHR usability guidelines

MHR→PHR

- MHRs: health costs, errors, IT culture, high profile
- PHRs:
  - Increase patient empowerment and improve decision making
  - Demographics (baby boomers)
  - IT and installed base of expertise and expectations
  - Health care costs and policies
  - Genetics, data mining, and personal histories
  - Self-serve society
- Growing literature on PHR advocacy but little on usability

Extant PHRs

- Markle Foundation's Personal Health Technology list of 175 PHR products
- Characteristics
  - Connect to MHR? 36 (21%) yes, 139 (79%) no
  - Internet based? 151 yes (86%), 10 (6%) standalone, 15 (9%) device specific
  - Cost? Range from free to $199 with some subscription models

New Interaction Styles

Usability for Installed Base and New Interaction Styles

The Science (and Art) of Usability

- ## What we investigate
  - User interface techniques (treatment interventions)
  - Human capabilities and behaviors (ergonomics, work practices with emphasis on cognitive, affective, and physiological responses)
- ## How we investigate
  - Laboratory experiments and field studies
    - Usability labs with logging (video, keystroke), eye tracking, biometrics (GSR, pulse, respiration, MRI)
    - Field studies with surveys, focus groups, observations
  - Effectiveness, efficiency, satisfaction
    - Time to learn, time to complete, accuracy, error types and rates, general satisfaction, adoption, engagement

PHR Usability Challenges

- Challenges related to interaction design
  - Complexity
  - Vocabulary mappings
  - Older users
  - Health literacy
- Challenges related to access and control
  - Data entry and data collection
  - Error checking
  - Online/Offline
  - Privacy/security
  - Preservation and life long use

PHR Functionality Space

- Find and view data
- Enter and collect data (direct or download)
- Exchange data (send and receive, including local and intermediate devices)
- Make decisions (information, tools)
- Alerts and Reminders
- Manage finances
- Manage PHR (e.g., security, preferences)

PHR Data Space

- Personal Information (individual, family, health care providers and contact info, insurers, history, pets)
- Complaints (problem list)
- Diagnoses
- Procedures
- Lab results
- Immunizations
- Allergies
- Medications
- Advance Directives
- Nutrition and diet
- Exercise
- Personal commentaries
- Information Resources (literature, glossaries, encyclopedias, webpages, listservs)

Design Mockups for a PHR for Pregnancy

- Designs by UNC students: Songphan Choemprayong, Sanghee Oh, and Laura Sheble

- Time as the organizing dimension
  - Calendar motif
  - Timeline motif

- Five key facets: events (appointments), money, health data, journal, and resources

Flat Calendar Design

Vertical Flat Timeline

Layered Timeline

Login as: Magenta Fox | Update Profile |

Today
O
December 7, 2005

| Overview | Daily | **Weekly** | Trimester |

| ◄ Nov. 24, 2005 | Week 11 | Nov. 30, 2005 ► | ◄ Dec. 1, 2005 | Week 12 | Dec. 7, 2005 ► | ◄ Dec. 8, 2005 | Week 13 | Dec. 14, 2005 ► |

Today
- Glucose test with Dr.Lyla (8:30am-10am)

December 4, 2005 (2 appointments)
December 1, 2005 (1 appointment)

December 10, 2005 (1 appointment)
December 11, 2005 (1 appointment)
December 13, 2005 (1 appointment)
December 14, 2005 (1 appointment)

Appointment   Appointment

What a beautiful day (12/7/05)
Home sweet home (12/5/05)
Nothing to worry about, I said (12/4/05)
Mom is coming to town (12/3/05)
Oh la la la (12/3/05)

Diary   Diary

	Week 11		Week 12		Week 13
Total for this week:	$0.00	Total for this week:	$129.30	Total for this week:	N/A
Reimbursement:	$0.00	Reimbursement:	$59.30	Reimbursement:	N/A
Actual Paid:	$0.00	Actual Paid:	$70.00	Actual Paid:	N/A
Accumulative:	$780.32	Accumulative:	$851.32	Accumulative:	N/A
Total Reimbursement:	$490.02	Total Reimbursement:	$551.32	Total Reimbursement:	N/A
Total Actual Paid:	$200.00	Total Actual Paid:	$300.00	Total Actual Paid:	N/A

Finance   Finance

Wikipedia : Pregnancy →
   Overview Information

Dietary Advice →
   Dr.Peter Silverstov

Wikipedia : Pregnancy →
   Overview Information

BBC Pregnancy Timeline →
   Screening for down 's syndrome should be about now.

Yahoo Directory →
   second trimester information

Antenatal Class →
   Chülden Hospital

Resources   Resources

Weight	175 lbs	Normal	Weight	160 lbs	Normal
Blood Pressure	N/A		Blood Pressure	110-80	Normal
Urinalysis	Normal	Normal	Urinalysis	Normal	Normal
Gestation	28 inches	Normal	Gestation	30 inches	Normal
Presentation	Head left	Normal	Presentation	Head down	Prompt

Health   Health

| ◄ Nov. 24, 2005 | Week 11 | Nov. 30, 2005 ► | ◄ Dec. 1, 2005 | Week 12 | Dec. 7, 2005 ► | ◄ Dec. 8, 2005 | Week 13 | Dec. 14, 2005 ► |

Multilayered Timeline

Toward Usability Guidelines

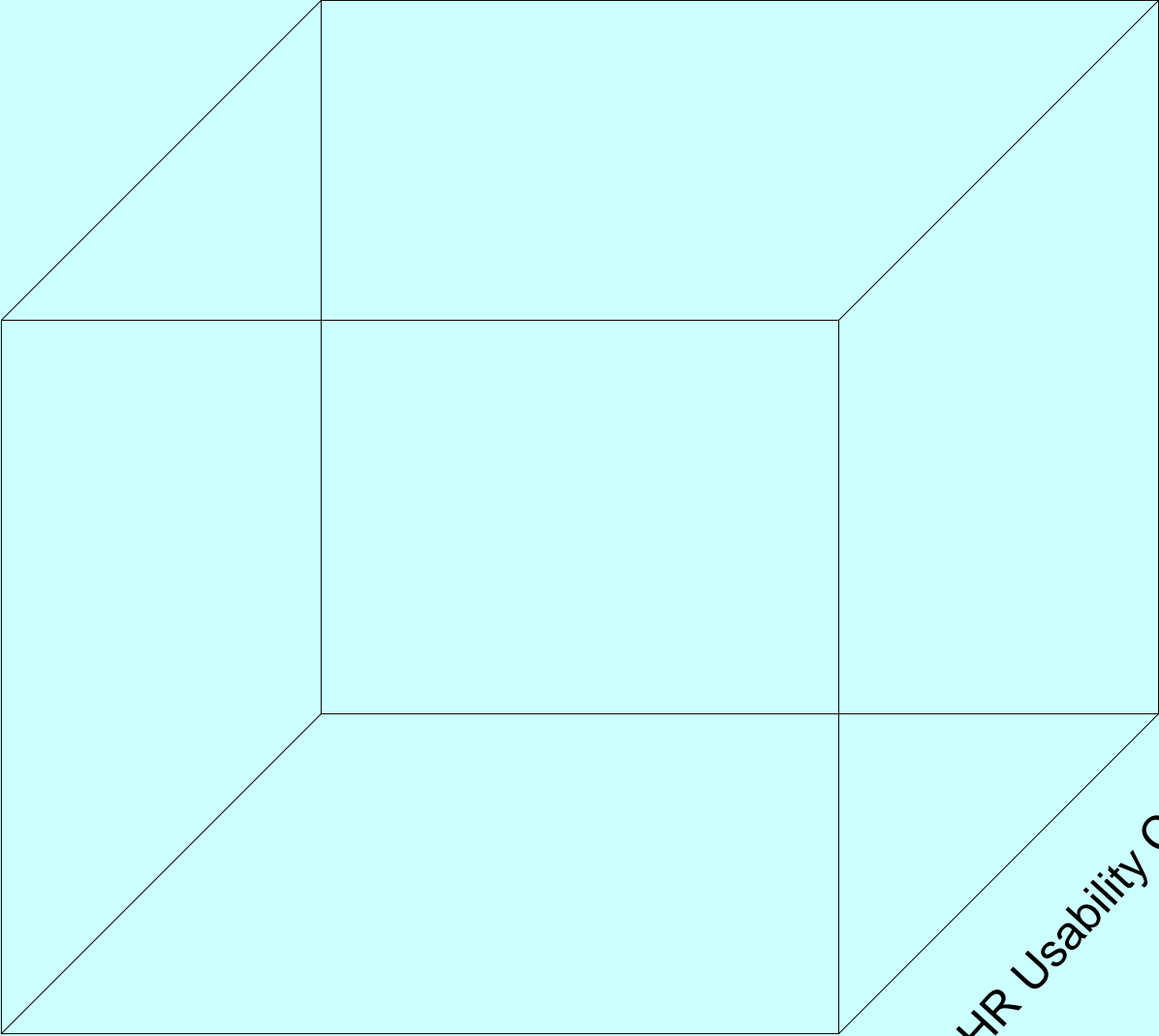- Interdisciplinary team at UNC-CH (Public Health, Medicine, Information & Library Science, Journalism & Mass Communication) integrates different knowledge bases and leverages existing usability labs

- Cross the PHR usability challenges with PHR functions and PHR data types to create a PHR usability matrix

PHR Usability Guideline Framework

PHR Data Types

PHR Functions

PHR Usability Challenges

Develop the PHR Usability Guideline Framework

- Link the cells to evidence
  - Related specifically to PHRs
  - Related to MHRs or other similar systems
  - General studies of usability on systems that could generalize to PHRs
- Evaluate specific vectors within a health behavior framework (e.g., cancer treatment plans)
- Influence new PHR system design to promote adoption and leverage new capabilities

The Vision:
Usable PHRs will be adopted.

this implies:

Patient involvement will increase
People will lead healthier lives
Health resources will be maximized