WELCOME

EHR Usability: Present & Future

Organizer: SHARPC
Co-Sponsors: ONC, AMIA, HIMSS
SHARPC

• One of four ONC funded SHARP projects

• Focus on Patient-Centered Cognitive Support

• Operate under National Center for Cognitive Informatics and Decision Making in Healthcare (NCCD)
Meaningful Use of EHR
through
Meaningful Practice of Usability

Jiajie Zhang
Director
National Center for Cognitive Informatics & Decision Making in Healthcare
What is Usability?

• The heart of usability is **Representation Effect**:

  – Different representations of a common structure can generate
    – dramatically different
      • efficiencies
      • complexities
      • outcomes
Stove Tops
Different Designs -> Different Consequences

- Harder to use
- Never memorize
- More errors
Same Variables <-> Different Designs

(A) File Size (K) vs. File Name

(B) File Size (K) vs. Category

(C) File Size = Density

(D) File Size = Shape
DOS vs. Windows
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Aircraft Operation & Maintenance Scheduling

3 people x 3 days

1 person x 11 min

(From Butler, Zhang, Esposito, Bahrami, Hebron, & Kieras, 2007)
Navigation Instruments for Airplanes

(A) VOR

(B) ADF

(C) RMI

(D) 747/FA-18

This type of designs contributed to the increased safety of aviation
(A) Tower of Hanoi

75 seconds to solve

(B) Cylinders

(C) Balls

(D) Analog Clock

(E) Hamilton Problem

(F) Grey Code

None solved it within 2 hours

(G) Ruler

(H) Chinese Ring
7 games

(A) Line

41 games

(B) Number

(C) Shape

(D) Color

(E) Position
Representation of Solar System

- Ptolemy
- Copernicus

- Earth Orbit
- Sun
- Planet Orbit
- Earth
- Planet (time 1)
- Planet (time 2)
- Deferent
- Apparent path of planet
- Epicycles

Kepler’s Laws
Newtonian Physics
Modern Science

(A) Ptolemy
(B) Copernicus
Evidence and Theories for Representation Effect


Representation Effect for EHR?

- This afternoon: TURF
- Monday, 1030-noon: Panel S14
- Wednesday: 830-1000: Paper S85
- Monday-Tuesday: Posters by SHARPC

Review Paper:
TURF Framework for EHR Usability

- **Representation Effect**
- **Intrinsic Complexity**
- **Extrinsic Difficulty**
- **Electronic Health Record**
- **Functions**
- **Users**
- **Representations**
- **Tasks**
- **Useful**
- **Satisfying**
- **Usable**
- **System Usability**