A Systematic Yet Flexible Systems Analysis Framework

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Background & Problem

- Efforts to improve health care quality have led to an increased push to develop and adopt systems that enforce or encourage consistent procedures based on best practices and evidence-based medicine.
- Standard Operating Procedures
- Clinical Guidelines
- Decision Support Systems
- Hard Stops in EHRs
- Such systems can lead to more efficient and safer care, but health care is filled with complexity and variation, which are not easily captured by idealized processes.

Systematicity & Flexibility

- Systematicity
  - Provides structure to ensure consistency, efficiency, and safety by imposing necessary structure
- Flexibility
  - The ability to constantly adapt to circumstances and still reach the goal state
- Systematicity & Flexibility are at odds with one another.

Goals of a Systematic Yet Flexible (SYF) Framework

- Guide the design of systems that support graceful degradation from idealized practices to those that are more suitable for a given situation
- Allow exploration of trade-offs among designs
- Provide objective measures of flexibility for comparing designs

SYF Systems Analysis (SYFSA)

- Identify a task (a problem to be solved)
- Analyze three problem spaces
  - Idealized space: The best or idealized practice
  - Natural space: Natural constraints on task performance
  - System space: The new or redesigned system
- Quantitatively compare flexibility measures for each space.

Analysis of Simulated User Knowledge

No Flexibility Implementation

Upon selection, dialog closes and selection is recorded—regardless of whether or not the selection is correct.

Corrective Flexibility Implementation - Allows for Error Correction

3.16 bits per task

Summary of Conclusions

Both graphs show a trade-off: the interface that offers no flexibility (red) has a higher task completion rate at all levels of user knowledge (Figure 2), but is less efficient than the interface that allows for error correction (purple). Thus, SYFSA can reveal trade-offs between systematicity and flexibility.

Acknowledgements

This project was supported by Grant No. 10510592 for Patient-Centered Cognitive Support under the Strategic Health IT Advanced Research Projects (SHARP) from the Office of the National Coordinator for Health Information Technology.

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