Safe Workflow Design

Unit 7.1: Workflow Assessment

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Objectives

At the end of this segment, the student will be able to:

- Assess decision-making requirements in health or health care

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Clinical Decision-Making

- Systematic way to handle data and clinical algorithms to decide on a best course of action
- Algorithm = a step-by-step procedure for solving a problem.

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Clinical Decision Making: Uncertainty

Technical	Personal	Conceptual
• What should I do?	• What are the patients' wishes?	• How do I apply abstract concepts to concrete situations?

Clinical Decision Making: Uncertainty

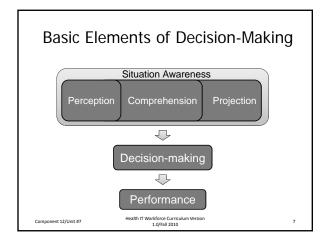| Direct	Indirect
• Knowing what we know • Knowing what is being researched • Knowing what works	• Establishing a communication infrastructure • Establishing evaluation of processes and outcomes of care

Clinical Decision-Making: Expert Decision-Making Systems

- Improve task performance and reduce errors within the clinical workspace
- Depend on:
  - Analysis of clinical requirements and cognitive processes within the workflow
  - Provide optimal situation awareness through information visualization

Basic Elements of Decision-Making

Situation Awareness

Perception | Comprehension | Projection
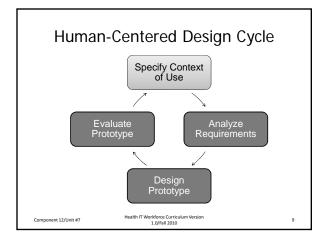
Decision-making

Performance

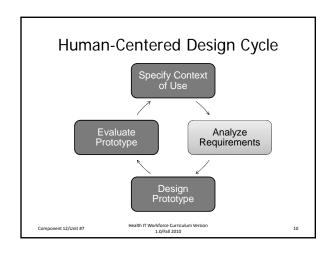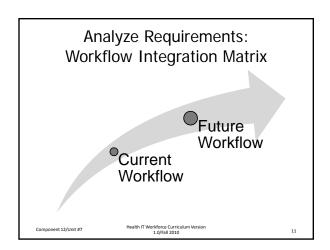## Information Visualization

- Real-time information needed for clinical task performance and decision-making
- Should support 2 levels of complexity
  - Routine tasks
  - Complex (uncertain)tasks
- Comprehensive, integrated across phases of care
- Provide visual cues to avoid ambiguity

Human-Centered Design Cycle

Specify Context of Use

Evaluate Prototype

Analyze Requirements

Design Prototype

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Analyze Requirements: Workflow Integration Matrix

Future Workflow

Current Workflow

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Analyze Requirements: Workflow Integration Matrix

Investigate and verify clinical milestone

Analyze workflow

Verify and prioritize findings with clinicians

Communicate with development team

Conceptualize and evaluate design

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Analyze Requirements: Workflow Integration Matrix

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Workflow Analysis Methods

Qualitative
- Ethnographic observation
- Shadowing of individual clinicians
- Surveys and questionnaires

Human-intensive; produce low-volume, high-quality data

Quantitative
- Sensor technologies such as passive infrared sensors, radio identification tags and pressure sensors.
- Video recordings

Allow time stamping; produce high volume abstract data

Clinical Workflow

Cognitive Decision-Making

Interaction & Communication

Movement

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Jalote-Parmar et. al., 2010

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Human-Centered Design Cycle

Specify Context of Use

Evaluate Prototype

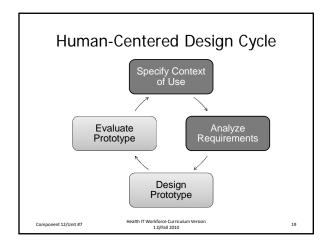Analyze Requirements

Design Prototype
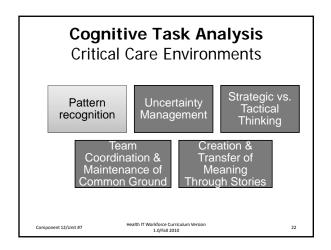
Cognitive Task Analysis

- Family of methods for understanding the cognitive processes that underlie task performance and the cognitive skills needed to respond adeptly to complex situations.
- Used to understand decision-making and communication processes
- Has implications for workflow design

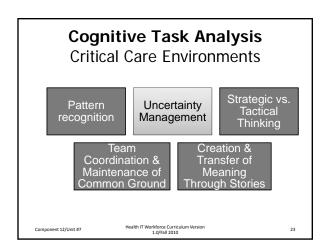# **Cognitive Task Analysis**
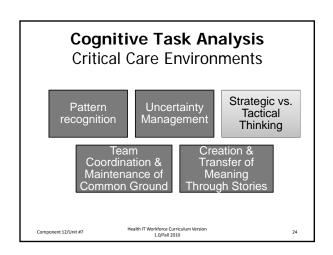## Critical Care Environments

Pattern recognition

Uncertainty Management

Strategic vs. Tactical Thinking

Team Coordination & Maintenance of Common Ground

Creation & Transfer of Meaning Through Stories

Fackler et. al., 2009

Cognitive Task Analysis
Critical Care Environments

| Pattern recognition | Uncertainty Management | Strategic vs. Tactical Thinking |

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Team Coordination & Maintenance of Common Ground

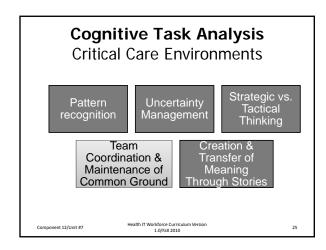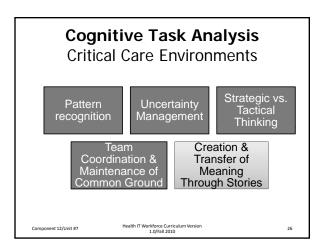Creation & Transfer of Meaning Through Stories

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Summary

- Clinical decision making is a systematic way of handling data and algorithms to decide on the best course of action
- Uncertainty (technical, personal, and conceptual) shapes clinical decisions
- Workflow integration matrices are useful
- Cognitive task analysis uncovers decision-making and communication processes and has implications for workflow analysis