

Maritime Decision-Making in an Evolving World



TRAINING

EXPERIENCE

CRISIS

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The bottom line

- ▶ Decision-making is a critical skill for maritime operations
- ▶ Judgment and decision-making will be more critical as automation increases
- ▶ Effective decision-making and experience can be trained
- ▶ Engaging, efficient training is the key to increasing performance
- ▶ Remote, scenario-based training can augment classical approaches to education and training

Decision-making in maritime operations

- ▶ The most critical skill for maritime operations?
 - Multiple high-stakes decisions every day
 - ~100 ships lost and ~1,000 fatalities every year
- ▶ Effective decision-making a “soft” skill
 - Difficult to develop, train, maintain
- ▶ Examples
 - Maneuvering actions
 - Collision avoidance
 - Emergency anchoring
 - Stand on / give way

The challenge of decision-making

- ▶ Judgment-based decisions are difficult
 - Especially those made in chaotic, error-prone situations
- ▶ Characteristics
 - High consequences for failure
 - Limited time to decide
 - Complex, evolving situations
 - Limited (or too much) data, varying accuracy
- ▶ Result: cognitive overload, errors, freeze-up

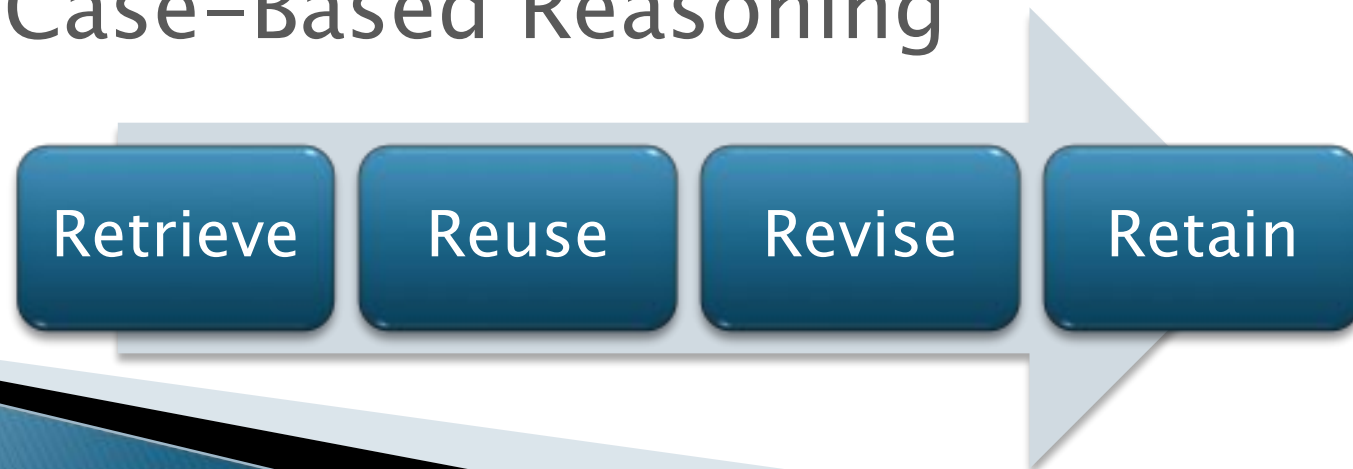


How will automation affect?

- ▶ Automation will help
 - Analyze data – provide information and assessment
 - Reduce cognitive load
 - Make simple, straight-forward decisions
- ▶ Human role will evolve, with focus on
 - Judgment
 - Complex decision-making
 - Value-based decisions (commander's intent)

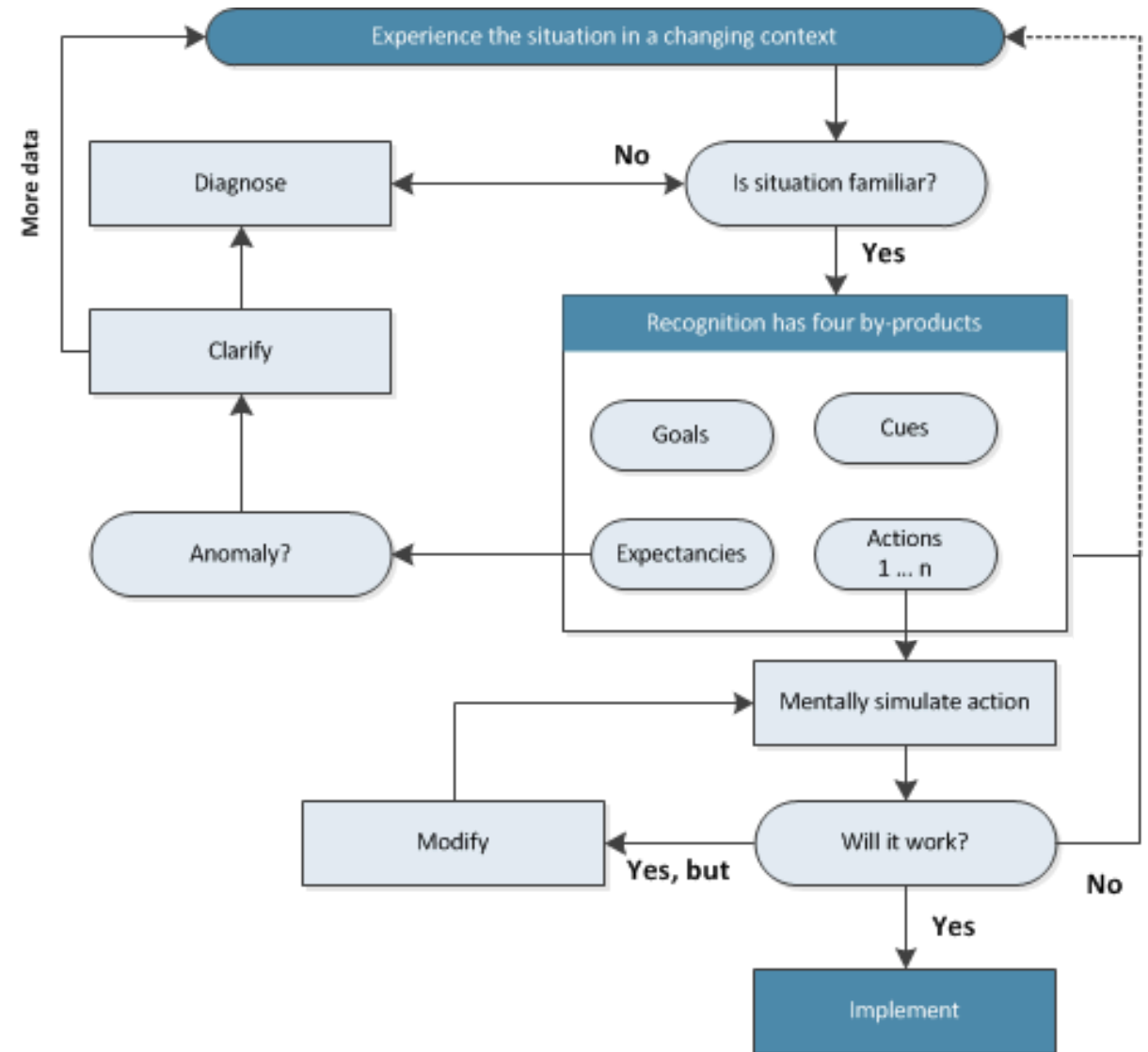
The Psychology of Decision-Making

- ▶ Experience Matters!
- ▶ Solutions are often recycled
 - Adapt a previous solution from a similar situation
 - Experience is used to jump-start decision making
 - Called “Case-Based Reasoning”



A Psychological Model of Decision-Making

- ▶ Recognition-Primed Decision-Model (RPD)
- ▶ Used by more than 75% of effective decision-makers



Recognition–Primed Decision Model



- ▶ Original research by Gary Klein
 - Examined emergency responders and military personnel
- ▶ Essence:
 - Rapid size-up
 - Recognition based on experience
 - Good enough solution – NOW!

How to Improve Decision-making

- ▶ Accelerate experience
 - Provide surrogate experiences to build “rolodex”
- ▶ Teach / train the skill of decision-making
 - Treat decision-making as a mental skill
- ▶ Scenario-based training
 - Makes the skill and experience retrievable
- ▶ Access and repetitions
 - Practice seats the skills – “mental muscle memory”

Professional Development in a Changing Environment

- ▶ Rapid, managed adaptation to new technologies, situations
 - Simulations can produce “future” experience
- ▶ Training must be:
 - Relevant
 - Easily accessed
 - Repetitive
 - Engaging
 - Efficient



One Answer – Remote, Scenario-based Training

- ▶ Software / browser-based
- ▶ Trains skill and accelerated experience
- ▶ Accessible on-board vessels, in port, in classroom
- ▶ Efficient, high-repetition
- ▶ Cost-effective
- ▶ Augments traditional training and “big simulators”



What happens if we don't keep up?

- ▶ If decision-makers don't adapt and become proficient with new systems, tools, information
 - Automation may become a liability instead of asset
 - Cognitive overload and confusion will increase
 - Errors and inappropriate decisions will increase
 - Over-dependence on automation may result
- ▶ The solution:
 - Agile, accessible, engaging education and training
 - “Future experience” acceleration