DESIGNING VALID AND RELEVANT TRAINING AND TESTING SCENARIOS FOR INDUSTRY.

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CONTEXT FOR THE WORK

Environmental and Occupational Challenges

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ASH: physical, physiological and cognitive performance changes under conditions of sleep restriction, heat and smoke.

Aim: to provide an evidence base on which decisions about manning, workload, task allocation can be made using a risk management process.

THE CURRENT EVIDENCE

What we do know?

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Currently available evidence:

- Laboratory data – not specific to volunteer bushfire-fighters
- Observational field data – not controlled

Proposed Research

- Builds a bridge between the laboratory and the field
- Aims to measure performance in a *controlled* but *realistic* environment

SIMULATION FIDELITY

Ensuring research objectives can be met

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Definition of Fidelity

The degree of correspondence between real-world operations and simulated activities in terms of cues, responses, and actions that can be performed (Miller, McAleese, & Erickson, 1977).

Major Dimensions

a) **Fidelity (Engineering**) - referring to the physical correspondence of the simulator's hardware.

- *Does it look the same?*
- *Does it work the same way?*

b) **Realism (Perception**) - refers to the perceptions and subjective judgments of the people using the simulation.

- *Does is seem realistic?*

c) **Validity (Suitability)** - referring to the suitability of the simulation for a specific application.

- Does is meet the project objectives?
- Does is produce valid and reliable measures of performance?

SIMULATION FIDELITY

Ensuring research objectives can be met

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Simulation Fidelity and Research

Simulation in the research environment must achieve a balance between various dimensions of fidelity and the rigours of experimental control. This balance results in inevitable trade-offs, each of which must be carefully considered in order to maximise the overall value of the research process.

Ultra-High Fidelity Representation of Bushfire Scenario

Highly dynamic environment

DANGEROUS

DIFFICULT TO REPEAT & CONTROL

DIFFICULT TO ACCURATELY MEASURE PERFORMANCE

Low Fidelity Representation of Bushfire Scenario

Laboratory Experiment

ABSTRACTED FROM REAL WORLD

HIGHLY CONTROLLED

EASY TO ACCURATELY MEASURE PERFORMANCE

SIMULATION SCENARIOS

Advantages

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Simulation scenarios:

- Control variables we are interested in
- Consistency in assessment of key measures
- Repeatable conditions

Three stages in the construction of the simulation:

- *Phase One:* Data collection
- *Phase Two:* Design and development
- *Phase Three:* Trial and refinement

SIMULATION CONSTRUCTION

Phase One: Data Collection

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Physical aspects of the firefighter task:

- Brad has talked about this
- Will use physiological parameters to assess fidelity
- Designed to mimic workload and work tasks

SIMULATION CONSTRUCTION

Phase One: Data Collection

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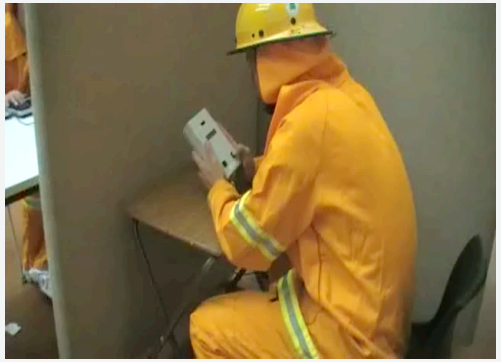
Cognitive aspects of the firefighter task:

- Modified applied cognitive task analysis
- Selected simple tasks that can be done in the simulation
- Option to include communication and situational awareness



SIMULATION CONSTRUCTION

Phase Two: Design and Development

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Design and Development is done:

- Validation of physical task battery completed
- Cognitive tasks well-established in laboratory settings

Videos reviewed by stakeholders including experienced volunteer firefighters

SIMULATION CONSTRUCTION

Phase Two: Design and Development

SIMULATION CONSTRUCTION

Phase Three: Trial and Refinement

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Timing, validity, reality

- All test batteries piloted in two sites
- Videos reviewed by firies and Human Factors specialist
- Feedback provided by volunteer firies and changes made to ensure fidelity is maximised

Refinement ongoing

Option of using this down the track for more testing (IMT etc) and also for training and assessing FFD

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