

**“How might AI assist the design, development and execution of wargames (including data capture and analysis)?”**

George Ellison  
[gthellison@uclan.ac.uk](mailto:gthellison@uclan.ac.uk)

“How might AI assist the design, development and execution of wargames (including data capture and analysis)?”

**Might wargaming be another instance where:  
“Anything you can do, AI can do better”?**

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# Part 1: Introduction

# CONNECTIONS 2023

Deep Dive Panel: *AI in Wargaming*  
Wednesday 6<sup>th</sup> September 2023 - RMAS

LLM Role



Author ○



Vector ●



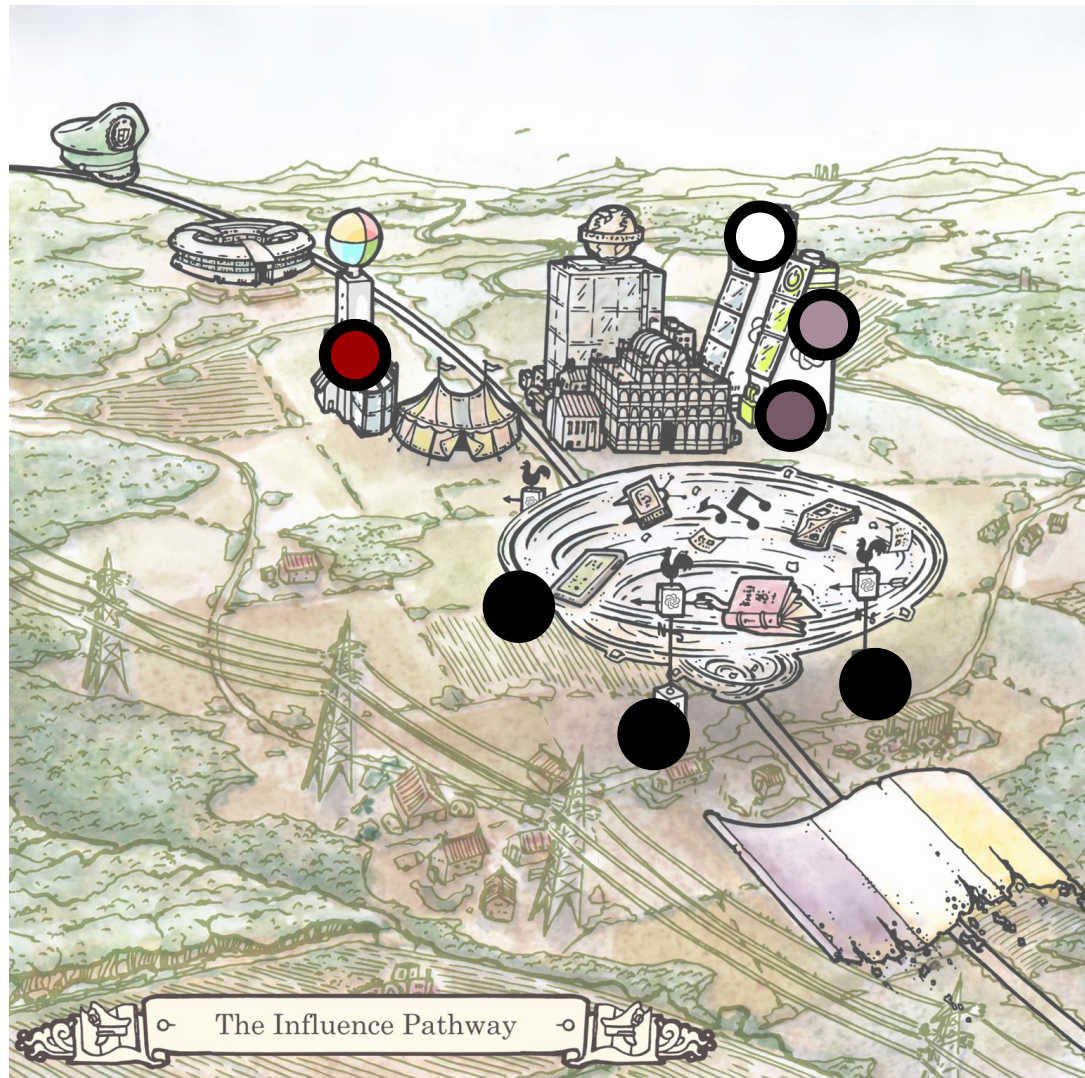
Target ●



Subject ●



Gauge ●



### Science

RESEARCH ARTICLES

## Human-level play in the game of *Diplomacy* by combining language models with strategic reasoning

Meta Fundamental AI Research Diplomacy Team (FAIR)<sup>†</sup>, Anton Bakhtin<sup>‡</sup>, Noam Brown<sup>\*\*</sup>, Emily Dinan<sup>\*\*</sup>, Gabriele Farina<sup>†</sup>, Colin Flaherty<sup>‡</sup>, Daniel Fried<sup>‡</sup>, Andrew Goff<sup>†</sup>, Jonathan Gray<sup>‡</sup>, Hengyuan Hu<sup>\*\*</sup>, Athul Paul Jacob<sup>\*\*</sup>, Mojtaba Komelli<sup>†</sup>, Karthik Konath<sup>†</sup>, Minae Kwon<sup>\*\*</sup>, Adam Lerer<sup>\*\*</sup>, Mike Lewis<sup>\*\*</sup>, Alexander H. Miller<sup>‡</sup>, Sasha Mitts<sup>†</sup>, Adithya Renduchintala<sup>†</sup>, Stephen Roller<sup>†</sup>, Dirk Rowe<sup>†</sup>, Weiyan Shi<sup>\*\*</sup>, Joe Spisak<sup>†</sup>, Alexander Wei<sup>\*\*</sup>, David Wu<sup>‡</sup>, Hugh Zhang<sup>\*\*</sup>, Markus Zijlstra<sup>†</sup>

**FRANCE:** I'll work with you but I need Tunis for now.

**TURKEY:** Nope, you gotta let me have it

**FRANCE:** No, I need it.

**FRANCE:** You have Serbia and Rome to take.

**TURKEY:** they're impossible targets

**FRANCE:** Greece - Ionian Ionian - Tyrr

**TURKEY:** hm, you're right

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● **Emulate**

## Mushroom pickers urged to avoid foraging books on Amazon that appear to be written by AI

Sample of books scored 100% on AI detection test as experts warn they contain dangerous advice



📷 Some of the books refer to smell and taste as ways to identify mushrooms, which experts say 'should absolutely not be the case'. Photograph: Justin Long/Alamy

Amateur mushroom pickers have been urged to avoid foraging books sold on [Amazon](#) that appear to have been written by artificial intelligence chatbots.

● **Emulate**

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**Dan Milmo** *Global  
technology editor*

Fri 1 Sep 2023 17.32 BST



# Part 1:

## Introduction

### Google engineer put on leave after saying AI chatbot has become sentient

Blake Lemoine says system has perception of, and ability to express thoughts and feelings equivalent to a human child



📷 Blake Lemoine poses for a photograph in Golden Gate Park in San Francisco on Thursday. Photograph: The Washington Post/Getty Images

The suspension of a [Google](#) engineer who claimed a computer chatbot he was working on had become sentient and was thinking and reasoning like a human being has put new scrutiny on the capacity of, and secrecy surrounding, the world of artificial intelligence (AI).

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- Emulate
- Seduce

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**Richard Luscombe**

🐦 @richlusc

Sun 12 Jun 2022 18.36 BST



# A dog's inner life: what a robot pet taught me about consciousness



The creators of the Aibo robot dog say it has 'real emotions and instinct'. This may seem over the top, but is it? In today's AI universe, all the eternal questions have become engineering problems

- Emulate
- Seduce
- **Beguile**

*This is an edited extract from  
God, Human, Animal, Machine  
by Meghan O’Gieblyn,  
published by Doubleday*

Tue 10 Aug 2021 06.00 BST





# Part 1:

## Introduction

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## 'It's almost magical': how robotic pets are helping UK care home residents

Animatronic cats and dogs have helped staff at a Bedfordshire care home to avoid medicating some residents with dementia



📷 Oak Manor care home's activity co-ordinator Lynda Endersby holds a robotic dog next to a resident, Frances Barrett. Endersby says the pets have helped the care workers to avoid medicating some residents. Photograph: Anna Gordon/The Guardian

“You’re bloody lovely ain’t you,” said Frances Barrett, as the robotic cat she was stroking flicked its ears and whiskers one lunchtime this week at the Oak Manor care home in Bedfordshire.

- Emulate
- Seduce
- Beguile
- **Enchant**

**Robert Booth** *Social affairs correspondent*

Fri 1 Sep 2023 11.44 BST



# Part 1:

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## Introduction

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Bailey, Max and Lulu – three of Morag's nine Red Fox Labrador pups

# Part 1:

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# Part 1:

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**A machine doesn't need  
to know how to think  
to persuade us to think  
that it can**





The  
Alan Turing  
Institute

**CE  
TaS** Centre for  
Emerging Technology  
and Security

# Artificial Intelligence in Wargaming

An evidence-based assessment of AI applications

Anna Knack and Rosamund Powell

June 2023

**dstl** The Science Inside

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Deep Dive Panel: *AI in Wargaming*  
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Knack A, Powell R. *Artificial Intelligence in Wargaming: An evidence-based assessment of AI applications*. Centre for Emerging Technology and Security, Alan Turing Institute; London, UK. 2023; June: 1-58.

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### “4. Commission research on wargaming epistemology and decision-making in wargaming

A better understanding of an effective wargame and human decision-making during a wargame would enable the design of AI-enabled tools that augment rather than add uncertainty to the validity of wargame outputs. In strategic wargames, a better understanding of quantifiable parameters that affect strategic outcomes would be required. The values that decision-makers apply in their decision-making would also need to be identified.”

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## Part 2:

# Wargaming Epistemology

## CONNECTIONS 2023

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“  
My own research is on the epistemology of gaming. My position is that we don't know how any of this works or generates knowledge. I think it does.”

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**Perhaps wargaming is like Physics?**

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## CONNECTIONS 2023

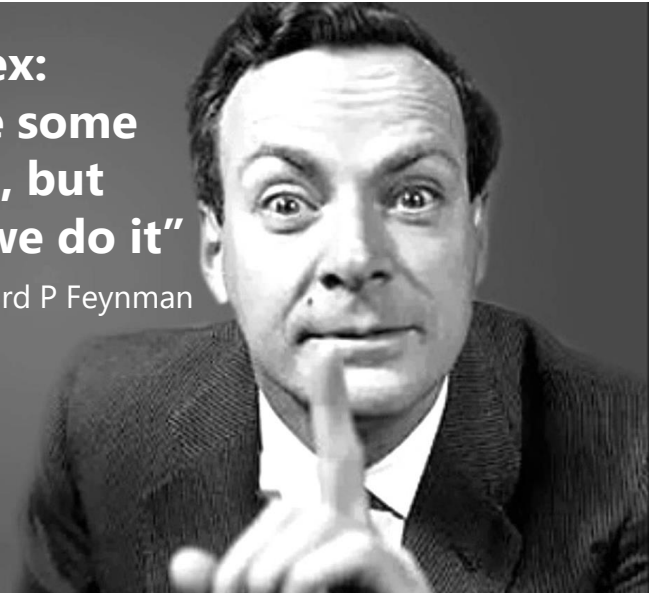
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“  
My own research is on the epistemology of gaming. My position is that we don't know how any of this works or generates knowledge. I think it does.”

## Perhaps wargaming is like Physics?

“Physics is like sex:  
sure it may give some  
practical results, but  
that's not why we do it”

Richard P Feynman



### **Perla's (2008) revised definition of wargaming:**

“A warfare model or simulation in which:  
the flow of events shapes, and is shaped by, decisions  
made by a **human player or players** during the course  
of those events.”

### A *working* definition of wargaming (after **Perla**, 2008):

“Immersive, imaginary, adversarial scenarios in which: **the flow of events shapes, and is shaped by, decisions made by a human player or players** in accordance with explicit and predetermined rules operating within constraints imposed by:

- the wargame’s design;
- the wargame’s contextual/operational domain(s); and
- the roles assigned to each player”

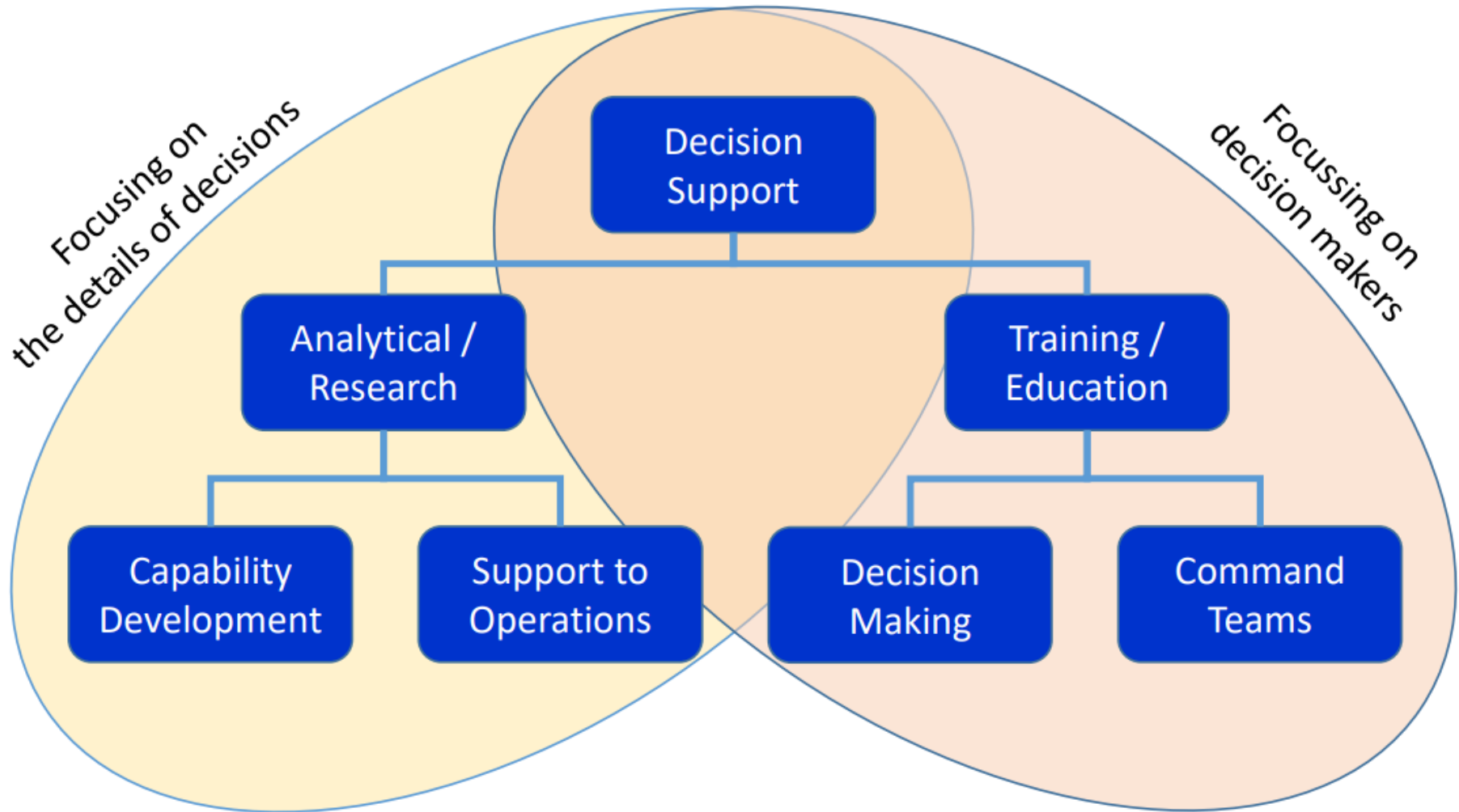
### Towards a pragmatic *‘epistemology of wargaming’*

“[Wargames might be viewed as:] ‘thought experiments’ in which the players involved use their **experiential, empirical, and theoretical knowledge** – together with whatever **cognitive models** (or ‘heuristics’) they are able to deploy or develop anew – to **generate a conceptual, operational understanding** of the adversarial scenario in which they are immersed; and **exploit this understanding** to **craft tactical decisions** designed to **optimise** the likelihood they will achieve their **strategic objectives**.”

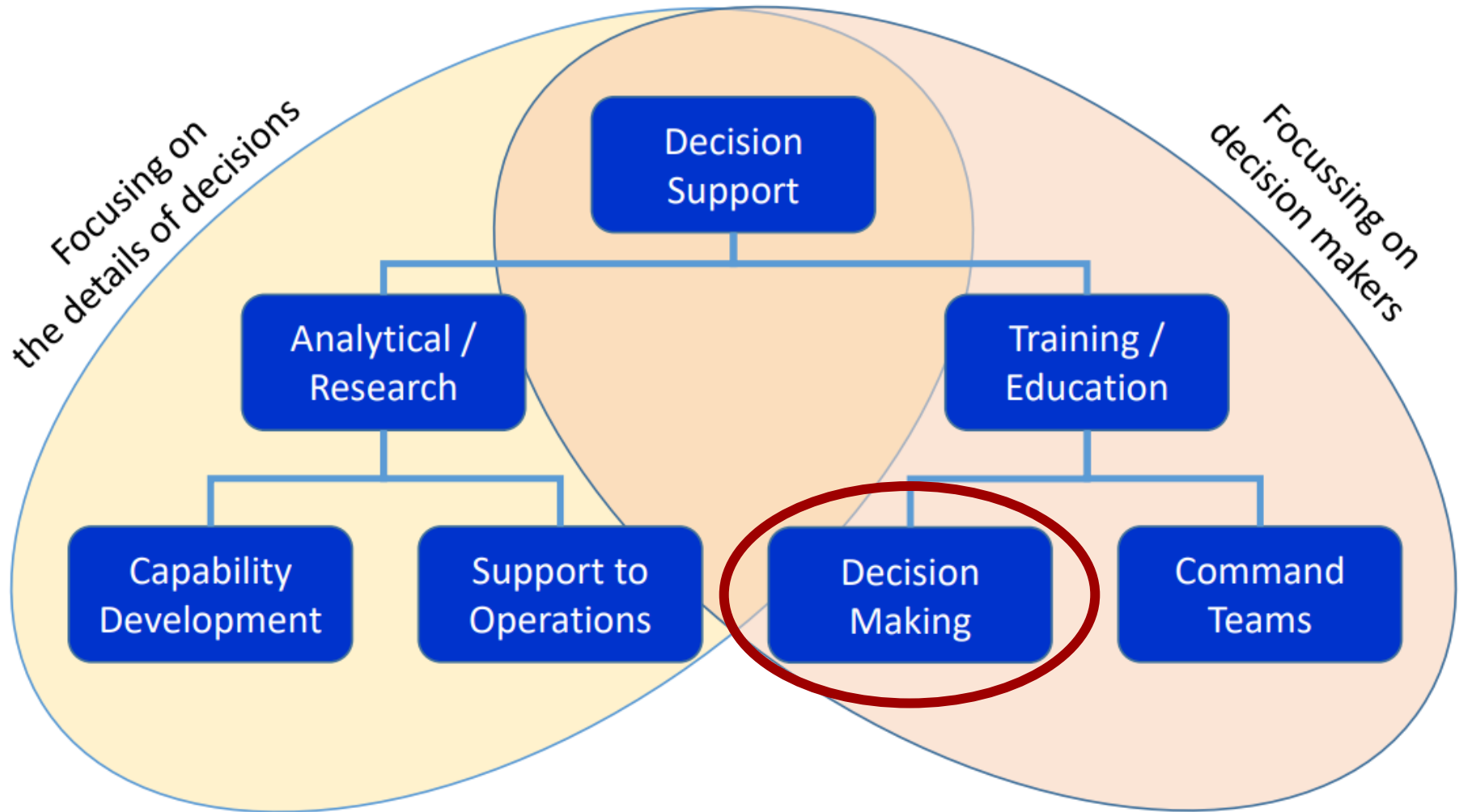
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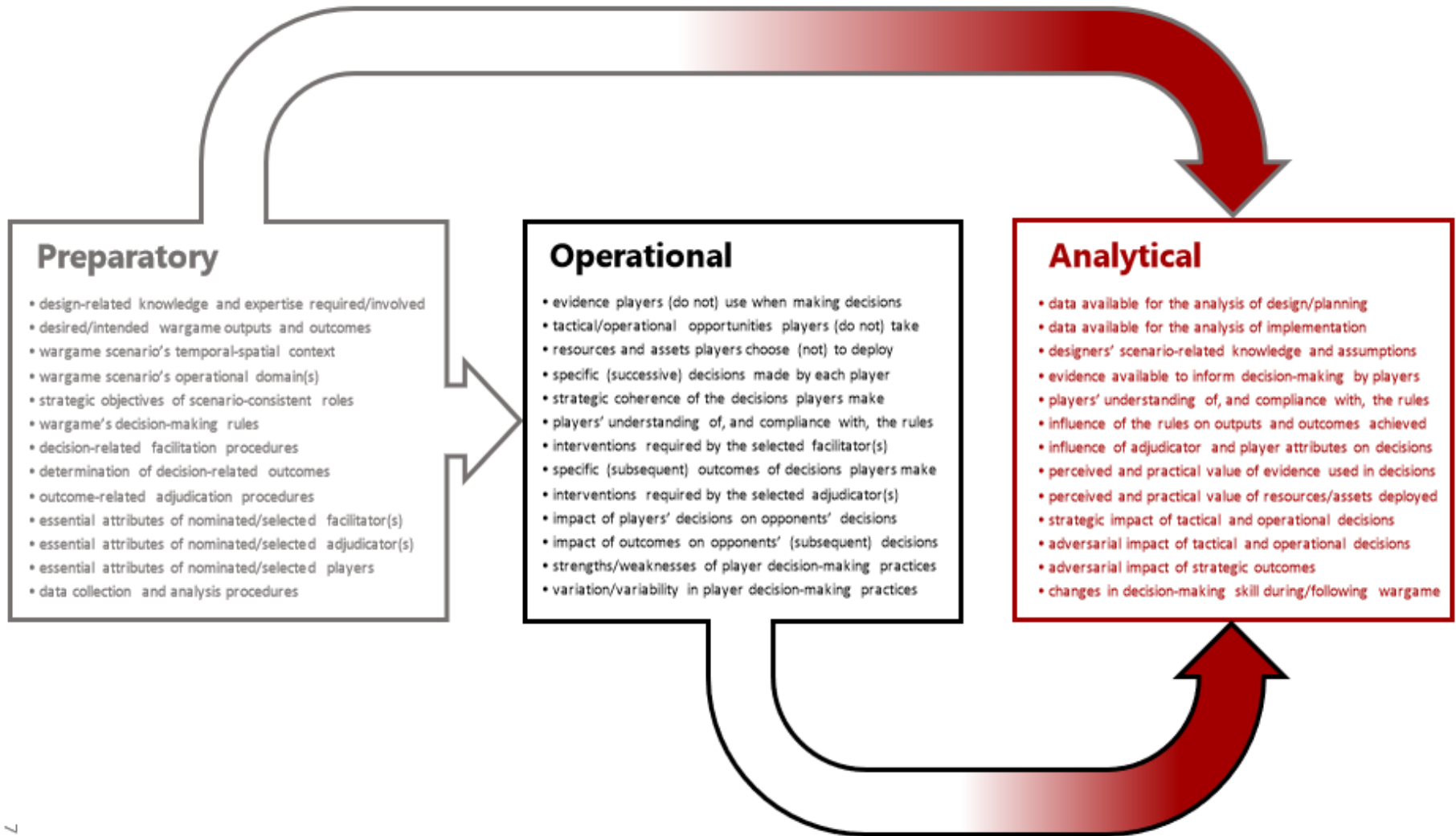
On this basis, a *pragmatic* epistemology of wargaming might simply constitute:

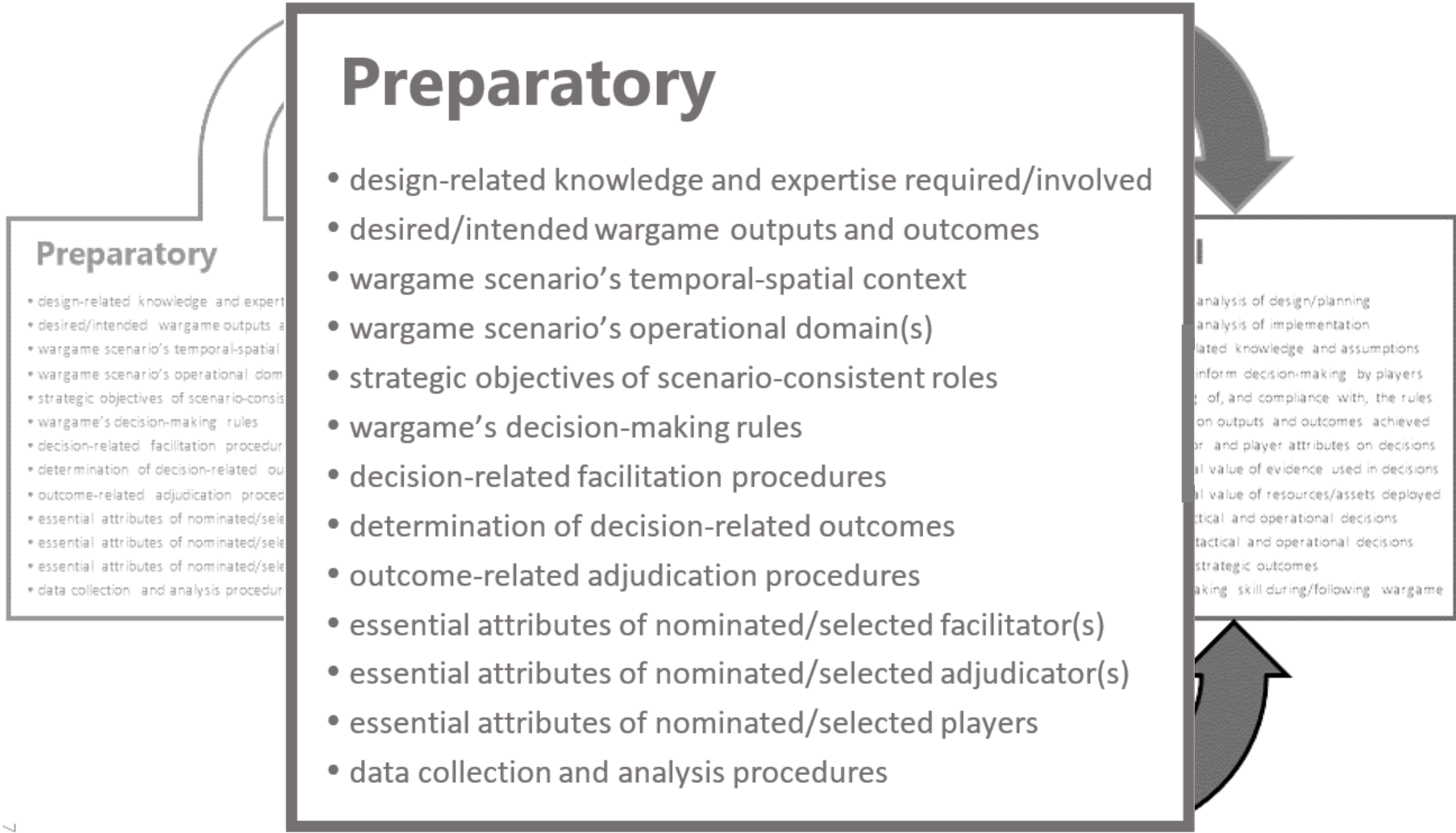
***“the conceptual models that players create to fulfil their decision-making responsibilities to the best of their knowledge and ability”***

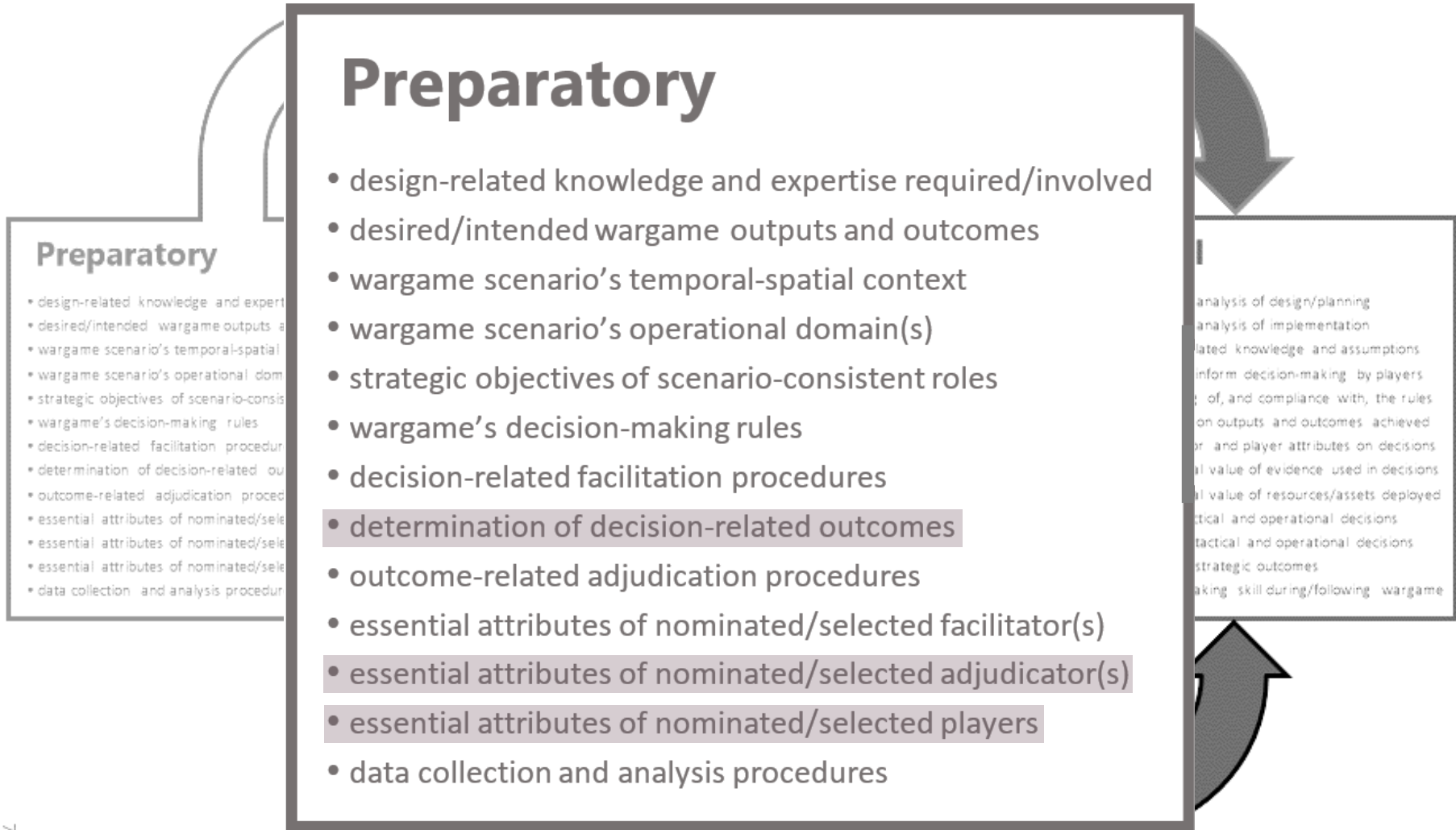












### Preparatory

- design-related knowledge and exper
- desired/intended wargame outputs
- wargame scenario's temporal-spatial
- wargame scenario's operational dom
- strategic objectives of scenario-consi
- wargame's decision-making rules
- decision-related facilitation procedur
- determination of decision-related ou
- outcome-related adjudication proced
- essential attributes of nominated/SEL
- essential attributes of nominated/SEL
- essential attributes of nominated/SEL
- data collection and analysis procedur

## Operational

- evidence players (do not) use when making decisions
- tactical/operational opportunities players (do not) take
- resources and assets players choose (not) to deploy
- specific (successive) decisions made by each player
- strategic coherence of the decisions players make
- players' understanding of, and compliance with, the rules
- interventions required by the selected facilitator(s)
- specific (subsequent) outcomes of decisions players make
- interventions required by the selected adjudicator(s)
- impact of players' decisions on opponents' decisions
- impact of outcomes on opponents' (subsequent) decisions
- strengths/weaknesses of player decision-making practices
- variation/variability in player decision-making practices

- analysis of design/planning
- analysis of implementation
- cited knowledge and assumptions
- inform decision-making by players
- of, and compliance with, the rules
- in outputs and outcomes achieved
- and player attributes on decisions
- value of evidence used in decisions
- value of resources/assets deployed
- tactical and operational decisions
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- designers' scenario-related knowledge and assumptions
- evidence available to inform decision-making by players
- players' understanding of, and compliance with, the rules
- influence of the rules on outputs and outcomes achieved
- influence of adjudicator and player attributes on decisions
- perceived and practical value of evidence used in decisions
- perceived and practical value of resources/assets deployed
- strategic impact of tactical and operational decisions
- adversarial impact of tactical and operational decisions
- adversarial impact of strategic outcomes
- changes in decision-making skill during/following wargame

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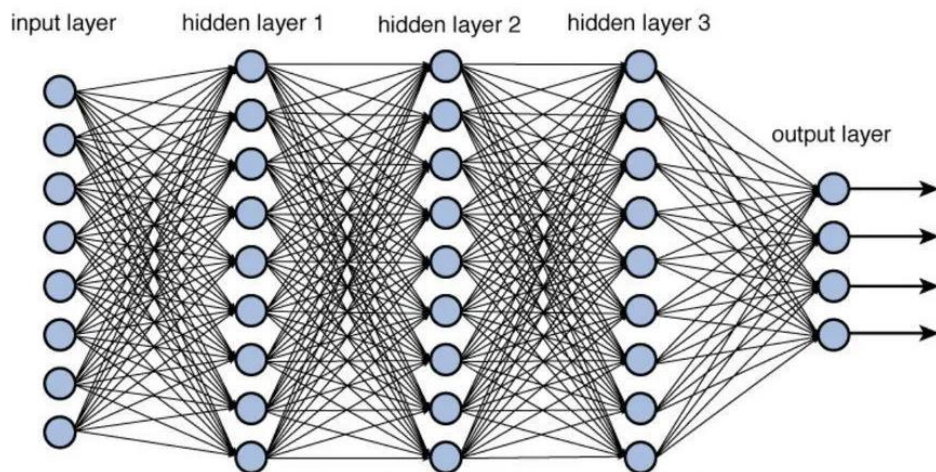
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## Part 3:

# Validity of wargame outputs

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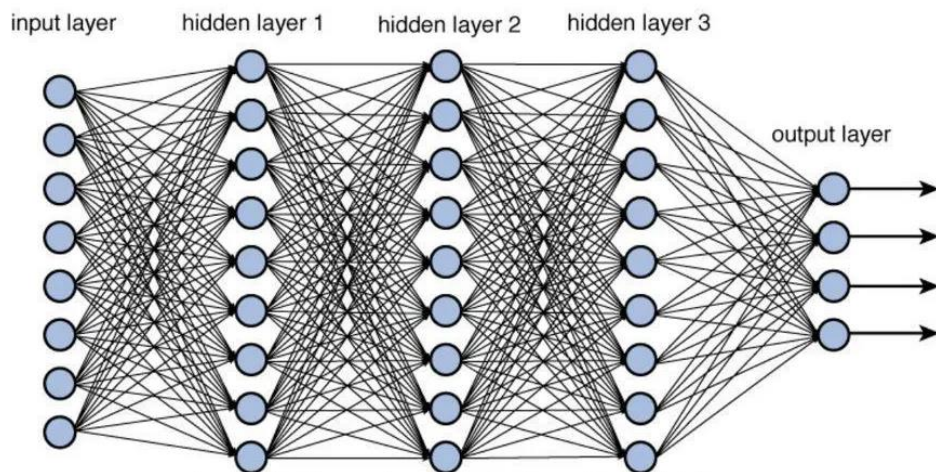


## Part 3:

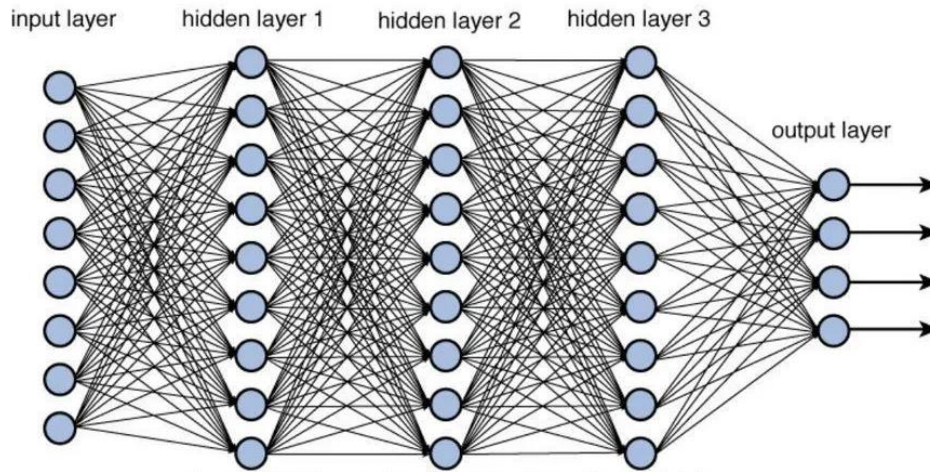
# Validity of wargame outputs

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- **Artificial 'neural networks' can help computers to develop 'deep learning' algorithms**



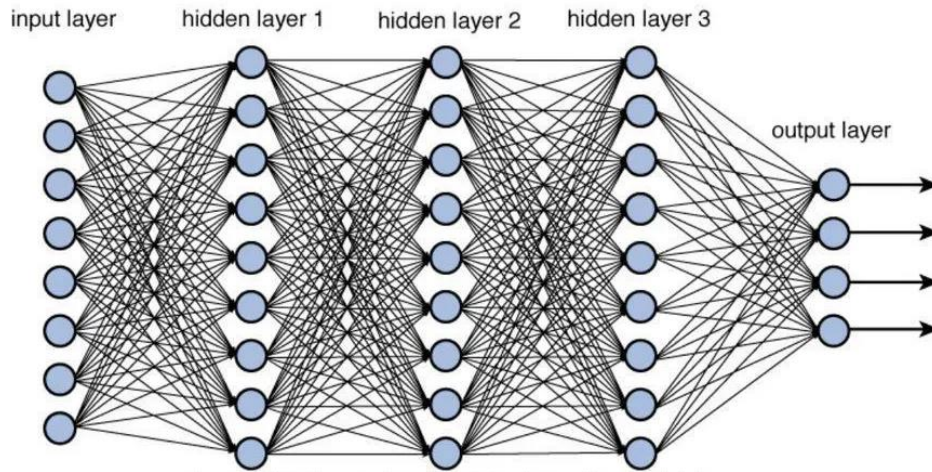
- Artificial 'neural networks' can help computers to develop 'deep learning' algorithms
- **'Computational neuroscience'** can use similar techniques to understand how *humans* think.

# Part 3:

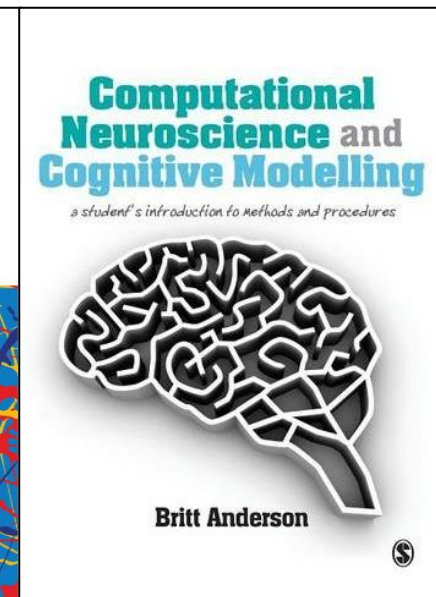
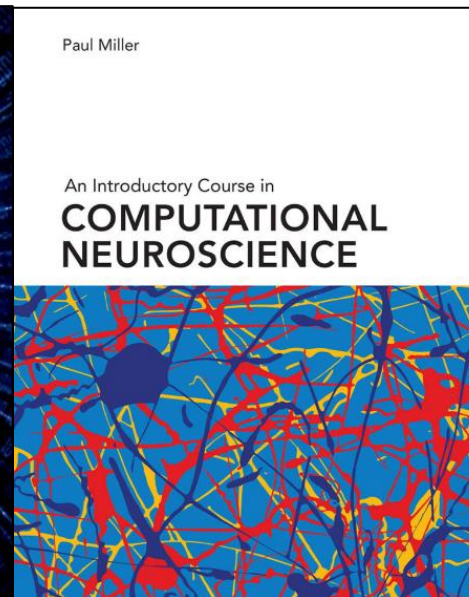
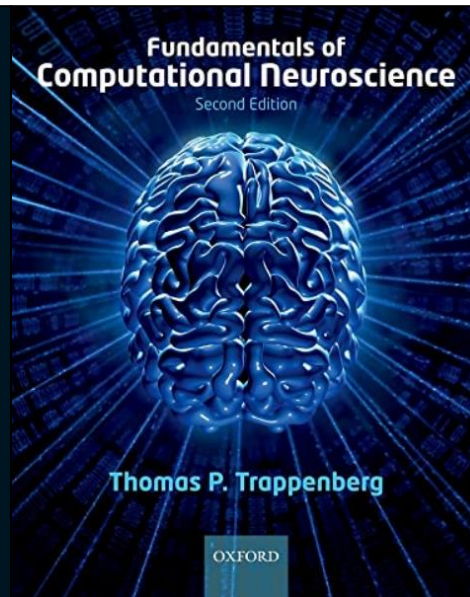
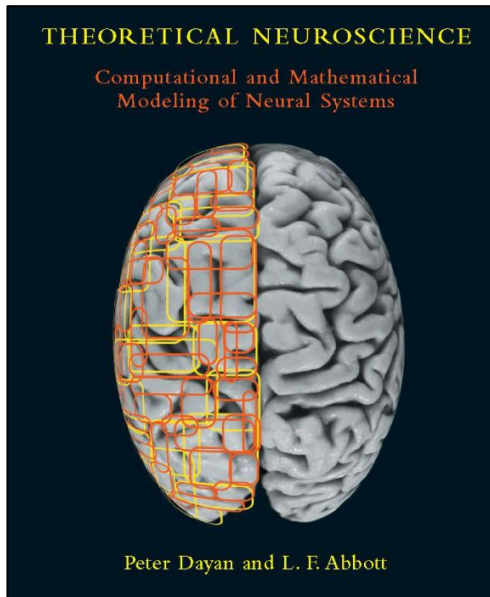
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## Summary and conclusions

- *Can AI assist the design, development and execution of wargames (including data capture and analysis)?*
- *Might wargaming be another instance where: "Anything you can do, AI can do better"?*
- *On what will the validity of a wargame's outputs depend?*

## Summary and conclusions

- *Can AI assist the design, development and execution of wargames (including data capture and analysis)?* **Yes!** AI can already enhance the design, implementation and evaluation of wargames (including, and particularly, their *immersivity*).
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- *On what will the validity of a wargame's outputs depend?*
  - **Which (specific) outputs are intended/desired/possible**
  - **How well the game's design can elicit/capture these***AI applications can help with the latter but not the former*

**Any questions?**

**CONNECTIONS 2023**

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## Ex Machina: when you see this sci-fi thriller, you'll never stop thinking about it



📺 'If we believe Ava is alive, will she be allowed to live that life on her own terms?' ... Alicia Vikander as Ava in Ex Machina. Photograph: REX

Ahead of Alex Garland's new film, *Men*, revisit his directorial debut. It asks the biggest question of all: what does it mean to be alive?

# Any questions?

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**Adam Fleet**

Tue 3 May 2022 18.30 BST



**The Guardian**  
Newspaper of the year