

# **Coarse-grained After Action Review in Computer Aided Exercises**

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## Why call it “coarse”

**After-Action Reviews (AAR) look at what has happened, to improve the learning and training experience.**

**They are thus a form of performance assessment.**

**Many experts believe that learning is facilitated by using “Formative” assessments:**

- early assessments used to guide the learning process**
- they can (and should) be very “coarse-grained”**

## In contrast:

### Most After-Action Review (AAR) tools

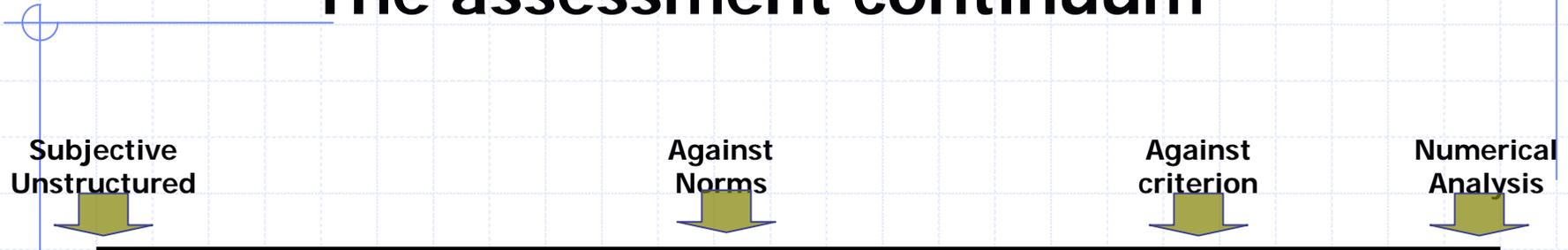
eg UPAS  
Stripes  
Exact  
TAARUS etc

look at the simulator log-files.

They tell **WHAT** happened, but can miss the **WHY**

An Instructor, Observer-Controller, etc, who gives coarse-grained, accurate **WHY** data first, can enhance the learning experience from the **WHAT** data.

# The assessment continuum



**Subjective Unstructured:** Traffic Light systems and, "That was OK, but ..."

**Against Norms:** "Other trainees did it in two hours, you took three ..."

**Against criterion:** "We expect that exercise to be completed with a loss of effectiveness below 5% ..."

**Numerical Analysis:** "Your figures are:  
3.2 rounds per kill from main armament  
Only 2 first round kills  
Mean advance rate of 20 metres per minute  
etc, etc ... ..."

## Take a real-time example:

A junior officer leads a troop of four tanks, advancing cross country, in a SIMNET exercise.

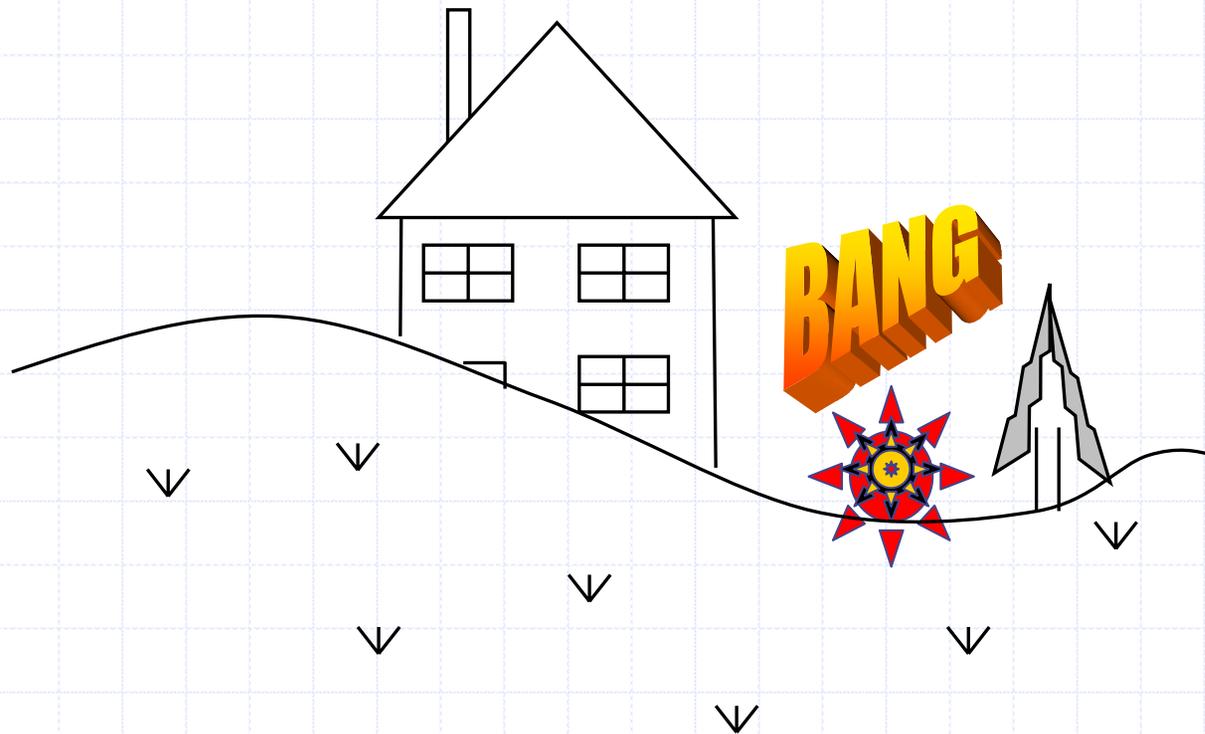
His force is engaged by enemy fire, and one tank is lost.

A second (and then a third) are sent forward to look, and are also lost.

Detailed AAR will tell him the exact location of each tank, and the exact time when it was hit.

Coarse AAR could tell him **WHY** they were hit

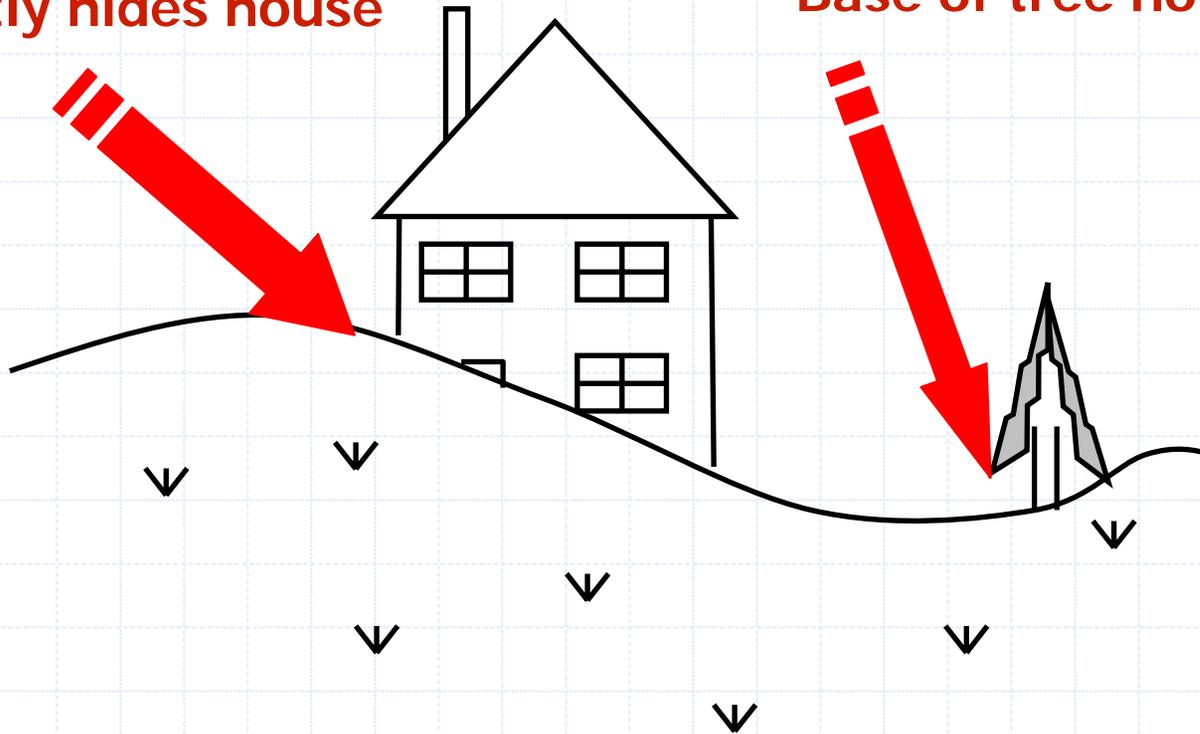




## Poor Terrain Awareness:

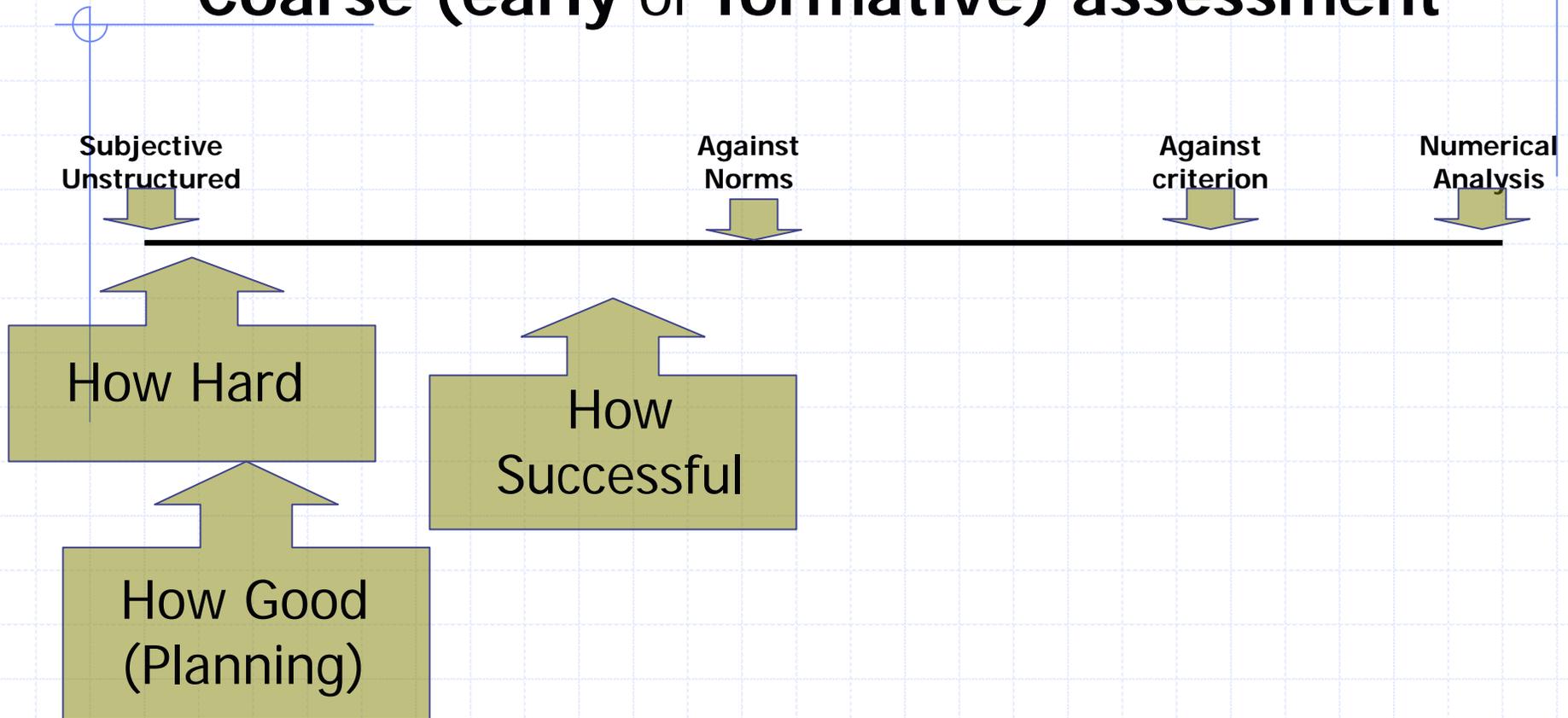
Ground partly hides house

Base of tree not visible

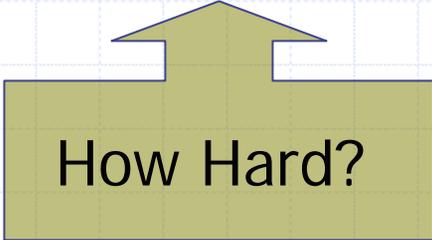


Clear signs of dead ground

# Coarse (early or formative) assessment



How can we make these early assessments?  
And, make them quickly ... ..



How Hard?

**Just how difficult was that exercise ... ..?**

**If you don't know HOW HARD,  
how can you rate performance?**

A tool to help with this is being developed based on SME judgements, which can give a difficulty rating within seconds:

CADI or the **C**ombined **A**rms **D**ifficulty **I**ndex

# CADI

Difficulty Level Entry

TERRAIN

- Flat/Rolling
- Hilly
- Mountainous

WEATHER

- Clear/Overcast
- Mist
- Light Rain
- Medium Rain
- Heavy Rain
- Fog
- Thick Fog

WOODLAND

- None
- Light
- Medium
- Dense

GOING

- Firm
- Soft
- Heavy
- Impassable

WATER

- No Problem
- Bridge Crossing

VISIBILITY

- 3000+m
- 1000-3000m
- 500-1000m
- 0-500m

TIME OF DAY

- Day
- Dawn
- Dusk
- Night

OPFOR HAS TI?

- Yes

Cancel

DIFFICULTY INDEX

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# The CADI Approach is a “Neural-net-in-a-Spreadsheet”

It breaks the problem down into



Factors



Levels within each factor

The levels are weighted for relative difficulty

The levels are summed for each factor

Each factor is reweighted by reference to all other factors

All factors are summed

The total value is corrected to fall within the desired scale

The spreadsheet is easy – the trick is getting data from an SME

The result is a consistent replication of SME judgement

## Future CADI development

The principle is simple - getting data from an SME is hard but:

The approach can be used for any domain where:

- Multiple variables have to be integrated
- Quick SME-type decisions are needed

The example just shown related to Armour - Infantry, or Air Assault, may require a different index

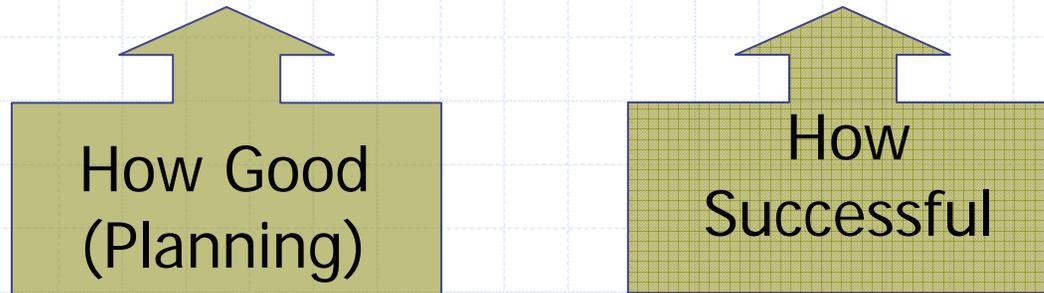
Example ran as an EXCEL overlay

- Could be programmed as a stand-alone tool

and

Part of the Cranfield Cognitive Toolset (CCT) can help with sorting the levels into order of difficulty

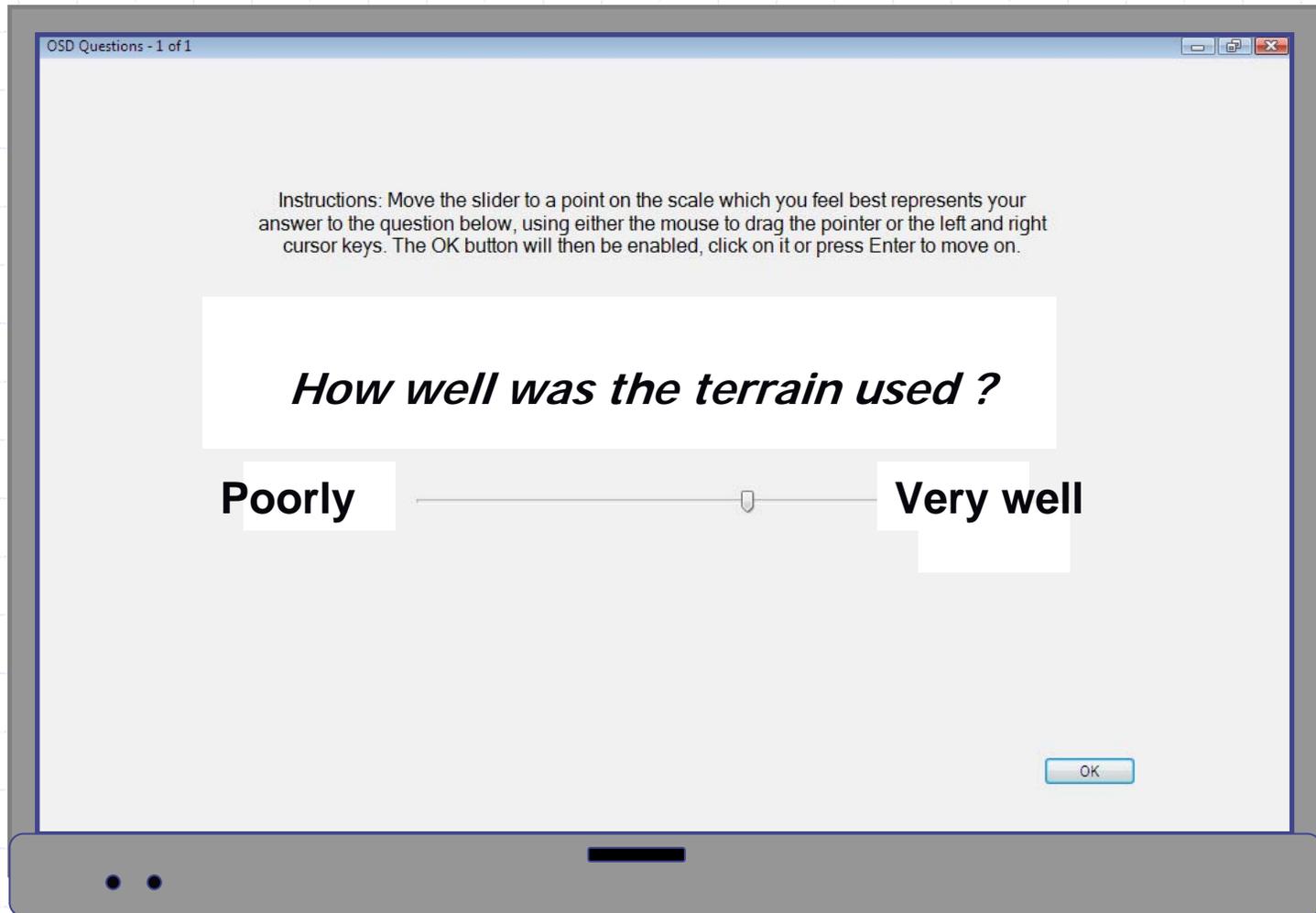
## The next two quick assessments



The concept here is to use a survey and assessment tool that is:

- Fast to use
- Simple to use
- Collects subjective data
- Informs the trainee (must be Formative)
- Uses standard criteria

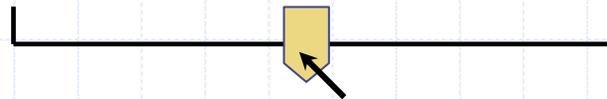
## We have the assessment tool:



# The Tool Appearance

*How well was the terrain used ?*

Poorly



Very well

OK

## The Question Set

**This must be developed in collaboration with SMEs**

**It must relate well to:**

- **The Combat Estimate (or 6-Step Estimate)**
- **The 5-Paragraph model of Orders**

**The questions may need to vary between**

- **Armour, Infantry, and other Arms**
- **different levels of Command**

# The Question Format

- How clearly are Routes and Locations indicated?
- To what extent are waypoint timings achievable?
- How well is artillery support de-conflicted?
- How well is air support co-ordinated?
- How clearly are movement bounds shown?
- To what extent are there omissions?
- How well is the terrain being used?

**Questions are always phrased as a matter of degree**

## The Tool Output

The response is collected as a subjective value

Within the tool it is converted into percentage data, and this can be turned into charts, tables, or traffic-light colours.

Hence, an EXCON or DS could say:

*“Your plan only got a rating of 55%. You were weak on “Use of Terrain”, and you will see how this affected your subsequent performance”.*

The trainee is now prepared for the detailed AAR

# The Cranfield Cognitive Toolset



*One of several freeware tools developed by :*

**Cranfield University  
Defence College of Management and Technology  
Defence Academy of the U K**

## Conclusion

**Coarse-grained, Formative AAR has the potential to enhance the training process**

**BUT**

**Must be easy to use**

**Must be easy to impart to the trainee**

**Exercises should be graded for difficulty**

**Given these, the trainee can get maximum benefit from a detailed AAR**