Visual Sensemaking for Contested Collective Intelligence

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http://people.kmi.open.ac.uk/sbs

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Acknowledgements

Open Learning Network project (2009-12): olnet.org funded by the William & Flora Hewlett Foundation

OLnet Collective Intelligence workstream: http://olnet.org/collective-intelligence

Developing conceptual foundations and infrastructure (people+processes+tools) for Contested Collective Intelligence on the open social web
The Hypermedia Discourse Group
Knowledge Media Institute, Open University:

http://projects.kmi.open.ac.uk/hyperdiscourse

Funders span disciplines, from basic research to applications:

[Logos of various funders]
overview

the key idea

a framework

CSCA with a simple scheme

probing argumentation

social-semantic web

future directions
the key idea…

it all revolves around conversations (‘discourse’)

we don’t always agree

contested collective intelligence
Where our tools fit... Given a wealth of documents...
Where our tools fit… Given a wealth of documents, and tools to detect and render potentially significant patterns…
Where our tools fit... Given a wealth of documents, and tools to detect and render potentially significant patterns...
Where our tools fit: making *meaningful connections* between information elements...
Where our tools fit: making **meaningful connections between interpretations**
Where our tools fit: making meaningful connections between interpretations

(a hunch – no grounding evidence yet)
Where our tools fit: making **meaningful connections** between information elements

(a hunch – no grounding evidence yet)
Where our tools fit: making *meaningful* connections between information elements

13

(a hunch – no grounding evidence yet)

(b) prevents

(c) Is inconsistent with

(d) Is pre-requisite for

(e) challenges

(f) interpretation

(g) interpretation

(h) interpretation
Where our tools fit: building the story that makes sense of the evidence... i.e. *plausible arguments*
Where our tools fit: building the story that makes sense of the evidence… i.e. **plausible arguments**
Where our tools fit: building the story that makes sense of the evidence… i.e. *plausible arguments*
Where our tools fit: building the story that makes sense of the evidence... i.e. *plausible arguments*

What *kinds of arguments* underpin these claimed relationships? *(Argumentation Schemes)*
The building blocks of this approach

Hypermedia to connect heterogeneous ideas and media

Uncertainty and disagreement are our starting points

Critical thinking is hard: co-evolve literacy + tools
how to deliver the vision?
Human-Centred Computing for Sensemaking
(including Design Rationale, and arguably, many RE tools?)
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(including Design Rationale, and arguably, many RE tools?)
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- Computing Platform
  - Services Interoperability
  - Interaction Design

- Modelling Frameworks
  - Domain
  - Discourse

- End-User’s Fluency
  - Learning Curve
  - Mastery

Learning Curve
Human-Centred Computing for Sensemaking

Modelling Frameworks
- Domain
- Discourse

Services
Interoperability
Interaction
Design

Computing Platform

End-User’s Fluency
- Learning Curve
- Mastery

Learning Curve
Analyst-defined visual connection language
Horst Rittel’s IBIS (1972): Issue-Based Information System

- **Issue**
  - generalises, specialises, replaces, questions
    - is-suggested-by

- **Issue**
  - questions
    - is-suggested-by
    - responds to

- **Position**
  - supports objects-to

- **Argument**
Compendium Java application
visual hypermedia for managing the connections between ideas flexibly

example from yesterday’s Enron exercise
Using Compendium as a workspace to build the emerging “plausible narrative”

Enron dataset, as used in Simon Attwell’s Visual Threads workshop (left-right layout)
Using Compendium as a workspace to build the emerging “plausible narrative”

Enron dataset, as used in Simon Attwell’s Visual Threads workshop (vertical layout)
Human-Centred Computing for Sensemaking

Computing Platform
- Services
- Interoperability
- Interaction
- Design

Modelling Frameworks
- Domain
- Discourse

End-User’s Fluency
- Learning Curve
- Mastery

Learning Curve
Mastery
Wall-size displays: Robert Horn

Fig 1: One version of the 'mirror': data from interviews represented in an information mural
Wall-size displays: Robert Horn

The maximum contribution from nuclear power plants must be the minimum summer load profile which is 30% because Nuclear plants are inflexible. They cannot be turned on and off at will. They can only supply the steady base load. "If the system trips it will take two days to get a nuclear plant up again. There is too much inertia."

If you rely on wind for any more than [15%] you will get voltage collapse."

You need to take voltage out of the grid to kick-start the windmills, when they start up, and if the system has a fault you can't get the wind generation going.

"We could have wind power as part of the power system if we used dual feed induction generators. But that is a new technology and not very reliable. This is therefore on the margins of reality for securing energy supply in the UK."

This leads to system instability because of insufficient voltage in the system.

A simple modification make sure only is added to the system support

"The best generating plant to have on the system is coal. It is the most flexible plant for meeting the changing load profile and the coal boiler systems are very resilient."

"The UK cannot rely on the market to secure supply."

Because the UK market connects to a European market that is not liberal and the EU might create incentives and sanctions for their operations so that the price in the UK might not secure supply. because market because electric a part of market from an
What if we could get search results like this?… (Robert Horn)

Can Physical Symbol Systems Think?  
The History and Status of the Debate — Map 3 of 7

An Issue Map™ Publication

Start Here

1. Alan Turing. 1950. Yes, machines can (or will be able to) think. A computational system can possess all important elements of human thinking or understanding.

Can the elements of thinking be represented in discrete symbolic form?

Is the relation between hardware and software similar to that between human brains and minds?

Can physical symbol systems learn as humans do?

MacroVU Press. www.macrovu.com
There are now a number of tools for mapping issues, dialogue and argumentation

Online Deliberation: Emerging Tools Workshop
Online Deliberation 2010, Leeds UK (30 June – 2 July)
www.olnet.org/odet2010

ESSENCE: E-Science, Sensemaking & Climate Change
ESSENCE workshop, KMI, Open University
http://events.kmi.open.ac.uk/essence
David Price, Debategraph.org
Tim van Gelder, AusThinkConsulting.com
ShowCase

- Word document with macros
- Turns Word into an argument mapping application
Which brings us to Wednesday’s violence, and to our two reasons for hope.

**Reason:** First, Otunbayeva, a democrat and leader of the Social Democratic Party, has in the past demonstrated a willingness to leave government when it gets — for want of a better phrase — too draconian.

**Examples...**

**Objection:** Otunbayeva’s predecessor, Akaev, was just as democratic when he came to power, but was pulled in an authoritarian direction.

**Reason:** Second, Otunbayeva will be receptive to the entreaties of foreign stakeholders, which are likely to include calls for democratic reforms within Kyrgyzstan.

**Reason...**

**Objection:** Otunbayeva is only responding positively to calls to become democratic to extract aid and political recognition from Washington; this is unlikely to result in a more democratic government.

For now, we can only wait in anticipation.
SEAS: Structured Evidential Argumentation System (John Lowrance, SRI)

- Extensive work with the intelligence analysis community
- Experimented with automated argument evaluation
- Analysts tend to reject AI that can’t be easily understood

---

SEAS: Structured Evidential Argumentation System (John Lowrance, SRI)

<table>
<thead>
<tr>
<th>Answer 1</th>
<th>Weight1</th>
<th>Answer2</th>
<th>Weight2</th>
<th>Average Weighted</th>
<th>Consensus Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5: Weighted automated fusion methods

SEAS: Structured Evidential Argumentation System (John Lowrance, SRI)

1 GOALS, INTENT, & STRATEGY: Does this terrorist organization intend to carry out a strategic course of action with the goal of harming the U.S. or its interests?

Analyst
SEAS Using Fusion Method Minimum (Closest to Green) on 18 May 2007 13:11:00

1.1 GOALS: Does this terrorist organization have goals focused on harming the U.S. or its interests?

Analyst
SEAS Using Fusion Method Maximum (Closest to Red) on 15 Nov 2004 10:41:33

1.1.1 LONG-TERM GOALS: Does this terrorist organization have long-term goals focused on harming the U.S. or its interests?

Analyst
Lowrance, John D., SRI International on 6 Jan 2006 16:15:34

Question Amplification
- Eradicate U.S. presence from some part of the world
- Overthrow pro-Western governments
- Establish anti-US movement

Rationale
The most recent evidence suggest that Abu Sayyaf is evolving into a terrorist group with deeper Islamic roots and more connections to other Islamic terrorist groups. This likely indicates an alignment of Abu Sayyaf's goals with these other groups' goals, which do intend to harm the U.S. or its interests.

▶History (1)

Evidence
Analyst: Lowrance, John D., SRIInternational on 31 Aug 2004 16:00:38
TIME Asia Magazine: The Return of Abu Sayyaf -- Aug. 30, 2004: Abu Sayyaf has evolved into a much more ferocious band. A new leadership has abandoned the kidnapping that brought in millions of dollars in ransom. Now, the group is returning to its Islamic roots and is using the familiar weapons of terror—bombing and assassination—in an attempt to achieve an independent Muslim republic in the southern Philippines.

Analyst: Lowrance, John D., SRIInternational on 31 Aug 2004 15:59:08
Naval Postgraduate School: Terrorist Group Profiles, Abu Sayyaf, 2003:
Although from time to time it claims that its motivation is to promote an independent Islamic state in western Mindanao and the Sulu Archipelago—areas in the southern Philippines heavily populated by Muslims—the ASG has primarily used terror for financial profit.

Exhibits
Sayyaf May Become International Terror Group-- newsflash.org-- STAR-- by Marvin Sy, Manila, July 21, 2004

Figure 10: Summary depiction of a portion of an argument
Compendium

“it’s like Excel, but for knowledge”

http://compendium.open.ac.uk/institute
NASA e-science field trials

Simulated distributed Mars-Earth planning and data analysis tools for Mars Habitat field trial in Utah desert, supported from US+UK

www.kmi.open.ac.uk/projects/coaktng/nasa
Issue/concept mapping

Mapping the ideas, themes and arguments in a complex debate (Iraq)

An overview map of pro-invasion authors

www.kmi.open.ac.uk/projects/compendium/iraq
Issue/concept mapping

Detailed argument map of an author’s article

www.kmi.open.ac.uk/projects/compendium/iraq
Using Compendium for personnel recovery planning

*Example of Conversational Modelling:*
real time dialogue mapping combined with model driven templates (AI+IA)

Co-OPR Project (with Austin Tate): http://www.aiai.ed.ac.uk/project/co-opr
Personnel Recovery: Planning Cell
Doctrine for Situation Analysis extracted as an Issue Template

Link to the source doctrine document

Issues that require attention (as specified in the doctrine document)

Joint Doctrine for Personnel Recovery, (Draft 2, 19 July 2004).pdf

Relevant extract from doctrine publication inside the node for reference

SITUATION: (e.g. adversary activity, OPSEC concerns, and terrain)
Mission Briefing: *Intent* template

```
- Intent:
  - Mission Statement
    - "Rescure the isolated diplomats from Britins Ranch without loss of life or upsetting CA."
  - Commanders Intent
    - Goals
      - Goal/Action (GA)
        - Political Index
          - Military Index
            - Economic Index
              - Social Index
                - Informational Index
      - Intent For PMESII
        - Infrastructure Index
          - Use civilian transport to extract IPs if possible
```

Options may be constrained by predefined 'doctrine'.
Capturing political deliberation/rationale

The collective intelligence available in the room and online: Dialogue Map capturing the team's deliberations

Visual background structures the display for planning
Option Comparison matrix

Summary of how options trade off against each other, derived from each option analysis

<table>
<thead>
<tr>
<th>Constraints</th>
<th>Restraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe return of hostages</td>
<td>Do not destabilize region</td>
</tr>
<tr>
<td>Maintain good relations with nations</td>
<td>Preserve regional stability</td>
</tr>
<tr>
<td>Achieve surprise?</td>
<td>Do not disturb CA balance of power or gov't structure</td>
</tr>
<tr>
<td>UN approved (5)</td>
<td>Could have a destabilizing influence (3)</td>
</tr>
<tr>
<td>Could have a destabilizing influence (3)</td>
<td>No hostage can be named</td>
</tr>
<tr>
<td>Follow-on plans</td>
<td>Follow-on plans can be better evaluated</td>
</tr>
</tbody>
</table>
Issues on which the I-X planning engine provided candidate Options
Compendium has played a number of roles in supporting collective sensemaking.
Argument Mapping

Using argumentation theory to probe reasoning in more detail
Argument Mapping 101

Argument Mapping 101


The public should be concerned about the rising rat population.

A rising rat population is a public health risk.
Argument Mapping 101

Argument Mapping 101

Argument Mapping 101

The conventions of argument mapping—utilizing space, line and color—are designed to be intuitively easy for the visual brain to follow and to relieve it of the considerable burden of having to extract the reasoning going on in a piece of prose and think about the soundness of that reasoning at the same time.

How to read an argument map
An argument map consists of a set of claims (contentions or premises), hierarchically organized to display their logical relationships. These relationships follow a simple rule: claims are supported or opposed by the reasons or objections immediately below them. Such support or opposition is specified by the colored lines connecting the claims.

A reason to accept the contention.
A reason consists of at least two linked premises ("co-premises"), all of which must be true in order for the reason to support the Contention. (Note: In this report we have left many obvious co-precises implicit for the sake of readability.)

Premise 1
Information that, taken together with Premise 2, directly supports the contention.

Premise 2
Information that, taken together with Premise 1, directly supports the contention.

Premise 3
Information that, taken together with Premise 4, counts against the contention.

Premise 4
Information that, taken together with Premise 3, counts against the contention.

An objection against the contention
Objections oppose whatever is above them. This one opposes the contention. Objections, like reasons, have two or more linked premises, all of which must be true for the objection to successfully oppose the claim above it.

Reason
This reason supports the claim in the reason above it.

A separate, independent reason for the claim above.
Many independent reasons and objections may bear upon a single claim.

Objection
This objection opposes the claim in the reason above it.

Rebuttal
A rebuttal is an objection to an objection and is shown orange. The rebuttal and the objection above it are on "opposite sides" of the debate.

Reason
Note that this reason supports the objection above it. They are on the "same side" in the debate.

Figure 1. The Method: Conventions of Argument Mapping

A report prepared for the Australian Army, reviewing the arguments bearing upon the controversial decision to purchase the Abrams battle tank. An “industrial strength” application of argument mapping.

http://austhinkconsulting.com/resources/
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Premise 1
Information that, taken together with Premise 2, directly supports the contention.

Premise 2
Information that, taken together with Premise 1, directly supports the contention.

Contention
The main issue being debated, stated as a sentence to be accepted or rejected.

Reason
This reason supports the claim in the reason above it.

A separate, independent reason for the claim above.
Many independent reasons and objections may bear upon a single claim.

Objection
This objection opposes the claim in the reason above it.
Contention
The main issue being debated, stated as a sentence to be accepted or rejected.

Premise 3
Information that, taken together with Premise 4, counts against the contention.

Premise 4
Information that, taken together with Premise 3, counts against the contention.

An objection against the contention
Objections oppose whatever is above them. This one opposes the contention. Objections, like reasons, have two or more linked premises, all of which must be true for the objection to successfully oppose the claim above it.

Objection
This objection opposes the claim in the reason above it.

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Reason
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Large Scale Argument Mapping

WHY TANKS? WHY ABRAMS?
The application of argument mapping to a contentious public policy debate

FINDINGS, SELECTED MAPS AND OBSERVATIONS

A report prepared for the Australian Army, reviewing the arguments bearing upon the controversial decision to purchase the Abrams battle tank. An “industrial strength” application of argument mapping.

http://austhinkconsulting.com/resources/
Large Scale Argument Mapping

**Map 2: The ‘6:24 problem’**

**4A-a**
Across the full spectrum of missions, the tank capability will be required if the Army is to deal efficiently with the dangers it could face.

**5C-a**
It is only for missions within our immediate region that we should prepare our Army.

**5C-b**
For missions in our immediate region, the Army will not require tanks to efficiently deal with the dangers that it will face.

**6F-a**
The Army will not need tanks to deal with the kind of land forces it will face in our immediate region.

**6F-b**
The Army will not need tanks to demolish the kinds of bunker defences it will encounter in our immediate region.

**6F-c**
Land forces and bunker defences are the things for which tanks are generally required.

**6J-a**
We haven’t use tanks in fighting land forces in our immediate region since Vietnam.

**6J-b**
If we haven’t used tanks in fighting land forces in the recent past, then we won’t be doing so in the future.

**6K-a**
Even if tanks were never used in actual fighting, they would be needed as a deterrent.

**6L-a**
We have had to demolish sophisticated bunker defences in the South West Pacific and Vietnam in the past.

---

A report prepared for the Australian Army, reviewing the arguments bearing upon the controversial decision to purchase the Abrams battle tank. An “industrial strength” application of argument mapping.

http://austhinkconsulting.com/resources/
Hypothesis Mapping  (Tim van Gelder, Austhink Consulting)

Argumentation Schemes

Using argumentation theory to probe reasoning in more detail
Recall this…

What’s the reasoning behind this asserted *challenges* link?

Answer

**Challenging Argument…**
Compendium Libraries of IBIS templates with critical questions to probe different kinds of argument scheme

Argument Interchange: These XML files were transformed from another format, generated from Chris Reed & Doug Walton’s work on modelling Walton’s argumentation schemes
Compendium Libraries of IBIS templates with critical questions to probe different kinds of argument scheme

| Argument from an Arbitrariness of a Verbal Classification |
| Argument from an Established Rule                        |
| Argument from an Exceptional Case                        |
| Argument from Analogy                                    |
| Argument from Bias                                       |
| Argument from Cause to Effect                            |
| Argument from Commitment                                 |
| Argument from Consequences                               |
| Argument from Correlation to Cause                       |
| Argument from Evidence to a Hypothesis                   |
| Argument from Example                                    |
| **Argument from Expert Opinion**                         |
| Argument from Falsification of a Hypothesis               |
| Argument from Gradualism                                 |
| Argument from Popular Opinion                            |
| Argument from Popular Practice                           |
| Argument from Position to Know                            |
| Argument from Precedent                                   |
| Argument from Sign                                       |
| Argument from Vagueness of a Verbal Classification        |
E is an expert in domain D

Is E a genuine expert in D?

Is A relevant to domain D?

A is within D

A may (plausibly) be taken to be true.

Is A consistent with known evidence in D?

Is what the authority said clear? Are there technical terms used that are not explained clearly? If the advice is in layman's terms, could this be an indication that it has been translated from some other form of expression given by the expert?

E asserts that A is known to be true

Did E really assert that...
E asserts that A is known to be true

In layman's terms, could this be an indication that it has been translated from some other form of expression given by the expert?

Did E really assert that A is known to be true?

Is A consistent with what other experts in D say?

If more than one expert source has been cited, is each authority quoted separately? Could there be disagreements among the cited authorities?

Is the expert's pronunciation directly quoted? If not, is there a reference to the original source given? Can it be checked?

If the expert advice is not quoted, does it look like important information or qualifications may have been left out?
enter the social-semantic web...
web annotation for sensemaking

(A winner in the Mozilla/MacArthur Foundation Jetpack for Learning Design Challenge)

http://cohere.open.ac.uk
How can we build a robust evidence base to support and enhance the design, evaluation and use of OERs?
— annotating documents with Firefox plugin

Nodes in the semantic network containing geolocation data can be visualized in Google Maps.
Nodes in the semantic network containing temporal data can be visualized in MIT Simile’s timeline.
seeing the connections people make as they annotate the web using Cohere

Visualizing all the connections that a set of analysts have made between web resources — but this may also be confusing

Visualizing multiple learners’ interpretations of global warming sources

Connections have been filtered by a set of semantic relationships grouped as Consistency

“Semantic Google Scholar”: Query: *What is the lineage of this idea?*

2D spatial visualization of topics in database collections

uses-applies-isEnabledBy

Probabilistic LSI

uses-applies-isEnabledBy

Latent Semantic Indexing (LSI)

uses-applies-isEnabledBy

Singular value decomposition (SVD)

EM Algorithm (Expectation Maximisation)

isIdenticalTo

Expectation Maximisation (EM) algorithm

solves

Algorithm to probabilistically label documents

solves

Labeled training data is expensive

What are the *habits of mind* and *skills* that we need, to move from promising technologies, to *sensemaking tools*?
Human-Centred Computing for Sensemaking

Computing Platform

Modelling Frameworks
- Domain
- Discourse

End-User’s Fluency
- Learning Curve
- Mastery

Services
- Interoperability

Interaction
- Design

Learning Curve
Mastery
Knowledge Art (Al Selvin) How can we add immediate value to team meeting with Design Rationale representations?
Extract from a generic framework:

Figure 3: A framework for understanding participatory design rationale practice.

**Knowledge Art (Al Selvin)** How can we add immediate value to team meeting with Design Rationale representations?

Extract from a generic framework:

![Heat maps from Coherence/Engagement/Usefulness analyses.](image)

---

Knowledge Art (AI Selvin)  How can we add immediate value to team meeting with Design Rationale representations?
Extract from a generic framework:

<table>
<thead>
<tr>
<th>Element</th>
<th>Descriptive and normative questions</th>
</tr>
</thead>
</table>
| (A.1) Imposing their own coherence and values on a situation | o What coherence is the practitioner imposing on the situation?  
| | o What values is the practitioner imposing on the situation?  
| | o In what ways are these congruent (or not) with those of the participants? |
| (A.2) Constructing narratives to account for how the situation arrived at the current pass; causes and breaches in canonicity | o What is the narrative the practitioner is using to construct the situation?  
| | o What is its degree of internal consistency?  
| | o How evocative and inclusive is it?  
| | o How useful is it? |
| (A.3) Eliminating prejudices, preconceptions, and personal desires in their work | o What prejudices may be active?  
| | o What preconceptions may be active?  
| | o What personal desires or goals may be active? |
| (A.4) Personal authenticity in the practice setting | o In what ways is the practitioner acting in an authentic manner (vs. received, affected, etc.)? |
| (A.5) Mediated objects and other interventions should preserve openness and dialogicity | o How do the representations the practitioner constructs or modifies foster openness and dialogicity?  
| | o How do they inhibit them? |

Learning to Learn: 7 Dimensions of “Learning Power”

Factor analysis of the literature plus expert interviews: identified seven dimensions of effective “learning power”, since validated empirically with learners at many levels. (Deakin Crick, Broadfoot and Claxton, 2004)

- Being Stuck & Static ↔ Changing & Learning
- Data Accumulation ↔ Meaning Making
- Passivity ↔ Critical Curiosity
- Being Rule Bound ↔ Creativity
- Isolation & Dependence ↔ Learning Relationships
- Being Robotic ↔ Strategic Awareness
- Fragility & Dependence ↔ Resilience

Professional development in schools, colleges and business: ViTaL: http://www.vitalhub.net/vp_research-elli.htm
Learning to Learn: 7 Dimensions of Learning Power

Factor analysis of the literature plus expert interviews: identified seven dimensions of effective “learning power”, since validated empirically with learners at many levels. (Deakin Crick, Broadfoot and Claxton, 2004)

- **Resilience**
  - **Definition**
  Resilient learners like a challenge. They accept that everyone can find learning hard sometimes and are not frightened by finding something difficult. They have a high degree of ‘stickability’. They are not fragile and can tolerate the feelings of anger, fear, frustration and anxiety that sometimes accompany learning.

- **Strategic awareness**
  - **Definition**
  Strategic learners think about how they learn. They talk about how they will go about something and consider the habits, preferences, strengths and weaknesses they bring to the task. They are aware of their own feelings about learning and know how to manage them. They can talk about personal learning preferences.

- **Critical Curiosity**
  - **Definition**
  Effective learners in this dimension like to delve deeper to find out what is going on. They like to ‘get at the truth’ by asking questions such as Why? What? When? Where? How? etc. They are less likely to accept information uncritically or just because someone says so.

- **Creativity**
  - **Definition**
  Creative learners are playful, they like a challenge and are willing to take risks. They like to look at a problem from many different perspectives and will use their imagination, letting their mind ‘float free’ to find creative solutions. They listen to their intuition and follow hunches in their learning.
Learning to Learn: 7 Dimensions of Learning Power

Factor analysis of the literature plus expert interviews: identified seven dimensions of effective “learning power”, since validated empirically with learners at many levels. (Deakin Crick, Broadfoot and Claxton, 2004)

Meaning Making

Definition
Students who effectively make meaning can link information between subject areas and across learning contexts. They connect learning at home with learning in school and learning from previous years with learning occurring now. Effective learners in this dimension engage their own values and stories in learning and create personal relevance from information they learn.

Learning Relationships

Definition
Learners who have quality learning relationships find it useful and exciting to share thoughts and ideas with others, yet they can work equally effectively on their own. They make good use of adult sources of support and guidance at home and in the community. They draw on their community’s worldviews and traditions.

Changing and Learning

Definition
Learners who are strong in this dimension know that learning is learnable. They believe that through effort their minds can get bigger and stronger just as their bodies can. They gain pleasure and self-esteem from expanding their capacity to learn.
ELLII profile showing pre/post stretch following mentoring and targeted intervention

ELLII: Effective Lifelong Learning Inventory (Ruth Deakin Crick, U. Bristol)
A web questionnaire generates a spider diagram summarising the learner’s self-perception: the basis for a mentored discussion and strategic priorities

ViTaL: http://www.vitalhub.net/vp_research-elli.htm
future trends
machine annotation of sensemaking within text

(Ágnes Sándor, Xerox)
Rhetorical functions in academic articles

CONTRAST WITH PREVIOUS WORK:
—This somewhat unorthodox view resolves a number of apparent paradoxes, such as observations of enhanced superoxide generation by in situ mitochondria during excitotoxic exposure, since isolated mitochondria generate superoxide only under conditions of high delta psi m.
—In contrast with previous hypotheses, compact plaques form before significant deposition of diffuse A beta, suggesting that different mechanisms are involved in the deposition of diffuse amyloid and the aggregation into plaques.
—The patterns of neurotoxicity possessed a complex pharmacological profile, demonstrated an apoptotic-necrotic continuum and were inconsistent with past findings, further outlining the importance of characterizing novel compounds at native receptors.

BACKGROUND KNOWLEDGE:
—Recent studies indicate that ligands of the peroxisome proliferator-activated receptors-gamma (PPAR-gamma) alter cardiac remodeling during chronic ischemia.
—AMH promoter sequence variations or the previously proposed SF3a2-AMH fusion co-transcripts cannot be responsible for aberrant AMH expression leading to Mullerian duct degradation.
—Vascular endothelial growth factor (VEGF) is universally accepted as a primary factor in the regulation of vessel patency in vascular networks throughout the body and including the retina.

OPEN QUESTION:
—Recent studies have implicated ubiquitin-mediated protein degradation in synaptic development, function, and plasticity, but little is known about the regulatory mechanisms controlling ubiquitylation in neurons.
—Although the APC/C has been detected in several differentiated cell types, a functional role for the complex in postmitotic cells has been elusive.
—Current data is insufficient to conclude whether IVF patients who display AR CAG expansion may transfer infertility or premutation of neurodegenerative disease to their descendants.

adding software agents
Software Agents in Support of Human Argument Mapping

Simon Buckingham Shum
Knowledge Media Institute
Open University

Jack Park
Knowledge Media Institute
Open University

Maarten Sierhuis
NASA Ames Research Center
Technical University of Delft
Carnegie Mellon University SV

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Calling a Brahms agent to search remote maps
 Returned Results

<table>
<thead>
<tr>
<th>Question</th>
<th>Query ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>How is climate formed?</td>
<td>19216811021260668487841</td>
</tr>
<tr>
<td>Climate grows from weather patterns</td>
<td>19216811021260668502075</td>
</tr>
<tr>
<td>Climate is affected by humans</td>
<td>19216811021260668520528</td>
</tr>
<tr>
<td>How does weather patterns affect climate?</td>
<td>19216811021260668540872</td>
</tr>
<tr>
<td>This is a climate test node</td>
<td>19216811021261000715106</td>
</tr>
<tr>
<td>What moves the climate?</td>
<td>192168110212666524931655</td>
</tr>
<tr>
<td>Thermohaline circulation impacts atlantic climate</td>
<td>192168110212666524945874</td>
</tr>
<tr>
<td>El Nino impacts pacific climate</td>
<td>192168110212666524958749</td>
</tr>
<tr>
<td>Warm oceans impact climate</td>
<td>192168110212666524995155</td>
</tr>
<tr>
<td>What climate change measures are effective?</td>
<td>19216811021245796204982</td>
</tr>
<tr>
<td>Diseases, such as malaria, spread by mosquitoes depend on local climate, especially temperature.</td>
<td>19</td>
</tr>
<tr>
<td>Different flora and fauna flourish under various climate regimes, but cannot respond quickly to change.</td>
<td>19</td>
</tr>
</tbody>
</table>
Dialogue Map with Query Results added

- Atmosphere
- Oceans
- Cryosphere (ice and snow)
- Interconnected Climate Subsystems?
- Lithosphere (land and ocean floor)
- Biosphere (all life including humans and their technological baggage)
- Coevolution of Climate and Life (Schneider & Londer, 1984)

CT: how does weather patterns affect climate?
CT: climate grows from weather patterns
Human-readable Compendium map of an IBIS agent conversation
adding more formal logics to evaluate arguments

see *International Conferences on Computational Modelling of Argument*: www.comma-conf.org
Articles, books, news, movies, software, user/developer community…

http://projects.kmi.open.ac.uk/hyperdiscourse