Session 4.

Applying LLMs in academic research

Co-construction, distributed cognition & relational attribution

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Session aims &
initial participant discussion

Aims of Session 4

- **Introduction to key concepts** - researcher/LLM co-construction, distributed cognition & relational attribution

- **Harness participant experience** of LLMs in research to date

- **The role of Collaborative Critical Praxis (CCP)** as a rapid recursive activity

- Understand how to use **LLMs in the research process** – opportunities/risks

- Understand **distributed cognition and relational attribution** as CCP activities

- Create LLM-related **methodological annexes** for staff and students.

- **Identify dimensions of institutional support for CCP** – not doing this alone.

Discussing existing LLM research practices

Group work

How have you used LLMs for research?

What benefits have you experienced?

What are the perceived risks?

Feedback prior to formal presentation

CCP – a short rapid cycle applied to the research process

Stage of relationship

Collaborative Critical Praxis

1. **Ideological, moral & political foundation**

Defining the guiding principles and desired disposition of the machine.

2. **Articulation & Shaping**

Structuring the exchange through – question, context and dispositional engineering.

3. **Generation & Production**

Mandating the machine to present evidence-based counterarguments (where appropriate).

4. **Assessment & Critique**

Assessing machine outputs against input objectives and desired academic style (not an affective relationship).

5. **Rapid recursive lamination**

Repeated questioning - requiring the machine to make clear train of thinking, provide accurate sources (with URLs) and to calibrate responses.

6. **Criticality-based partnership**

Maintaining collaborative critical praxis, including identifying human intellectual labour <u>and</u> the machine computational labour.

Risk reduction of distorted HI-MI research relationships

CCP stages

**Stage 1 (Ethico-Political Foundation)
& Stage 2 (Articulation & Shaping)**

**Stage 4 (Critical Audit)
& Stage 5 (Rapid Recursive Lamination)**

Stage 6 (Final Product & Attribution)

Purpose

**Confront risks of deskilling and
ideological drift –** researcher imposed ethical
framework and theoretical boundaries via –
question prompt, context and dispositional
engineering.

**Confront risks of hallucination
and opacity** - repeatedly verifies the LLM's
generated sources and logic, then feeds human
corrections back into the Machine.

Confronts the risk of authorship erosion - assertion
of epistemic authority by making the final critical
judgment and formally documenting the Machine's
specific contribution.

Stages of research & the role of the Machine

RESEARCH STAGE	LLM MECHANISM
1. Topic & Question Formulation	Literature mapping; gap identification
2. Literature Review	Source summarisation; theoretical comparison
3. Methodology Design	Protocol drafting; method explanation
4. Data Collection & Coding (Qual/Quant)	Code generation; data cleaning scripts
5. Data Analysis & Interpretation	Statistical support; thematic coding prompts
6. Writing & Drafting	Section drafting; argument elaboration
7. Editing & Language Refinement	Clarity, grammar, tone adjustment
8. Dissemination & Publication Prep	Journal formatting; abstract optimisation

Distributed cognition & relational attribution

Distributed Cognition System

Distributed Cognitive System - emerging from the disciplined distribution of the Human Intellect (HI) and the Machine Intellect (LLM as a cognitive artifact).

Human Intellect (HI) - acts as the **director** to provide the ethical frame and critical telos (purpose).

Machine Intellect (MI) - acts as the **executor** using rapid computational labour and synthesis at scale.

Fusion Intellect (FI) - the **accelerated completion** of complex cognitive tasks that neither HI & MI could achieve as efficiently alone.

Relational attribution – recognizing Machine labour

1. Human intentionality - the initial **question, context and dispositional prompts** and subsequent **critical interventions**(corrections and rejections) made during the distributed cognition process.

2. Machine labour – key points of the machine's computational contribution.

3. Synthesis - creating a **transparent account** of the dialectic of HI & MI & how a **Fusion Intellect** has been achieved.

4. Benefits of reflection – compelling the researcher to reflect on the use of MI and fusion possibilities and to recognize distributed cognition.

Distributed cognition and HI attribution activities

Research stage	Machine activity	Examples of role of the Machine
1. Topic Formulation	Maps trends; flags gaps; suggests keywords	Clarifies AI suggested gaps; affirms human framing of question
2. Literature Review	Summarises; clusters themes; extracts citations	Notes AI aided scope; affirms human selection & interpretation
3. Methodology Design	Generates code; drafts protocols; explains methods	States AI provided templates; affirms human design & justification
4. Data Coding	Cleans data; tags codes; runs prelim analyses	Reports AI coding & affirms human audit & refinement
5. Analysis	Runs stats; suggests themes; visualises patterns	Distinguishes AI pattern detection from human interpretation
6. Writing	Drafts text; refines grammar; adjusts tone	Identifies AI drafting; affirms human argument & voice
7. Revision	Simulates reviews; flags inconsistencies; formats refs	Acknowledges AI for rehearsal/formatting; affirms human judgment
8. Dissemination	Adapts abstracts; translates terms; optimises layout	Confirms AI assisted formatting; affirms human review & responsibility

Methodological Annex to support relational attribution

1. Define Purpose & Prompt – what did you ask of the Machine?
State research telos, ethical boundaries, and record full dispositional prompt.

2. Explicitly explains respective roles
Document who did what: researcher's judgment vs. machine's execution.

3. Audit & verify outputs
Account main steps taken to validate MI-generated content (sources, code, claims).

4. Map the 'Lamination Path'
Trace how HI critically shaped MI output to achieve Fusion Intellect (FI).

5. Attribute relationally
Explain the Machine's contribution — not as co-author, but as cognitive artifact under human direction.

Institutional support of CCP

Institutional mediation action

1. Establish CNU Ethical Guidelines

2. Training & Support

3. Community & Exchange

4. Attribution & Transparency

Mechanisms for CCP Support

Formal Policy Integration of the CCP framework, suggesting its six stages as the ethical minimum.

Offering Training Support focused on all stages of CCP.

Encouraging **Communities of Practice, Inter-disciplinary Exchange and Learning** to peer-review the methodological annexes and reflect on the HI-MI Synthesis.

Creating a **Standardised Methodological Annex template** that documents the dialectic of HI & MI as a cognitive artifact, including Human intentionality and the machine's specific contribution.

Preparation for Session 5

Reading for Session 5 – LLMs and teaching

- Williams, A. (2025). Integrating artificial intelligence into higher education assessment. Intersection: *A Journal at the Intersection of Assessment and Learning, 6(1)* Early View.

- Beale, R. (2025) *The Revolution Has Arrived: What the Current State of Large Language Models in Education Implies for the Future*. arXiv preprint arXiv:2507.02180. Available at: https://arxiv.org/abs/2507.02180 (Accessed: 30 October 2025).