EXPERIMENTING WITH GENERATIVE AI FOR METACOGNITION AND LEARNING

CENTER FOR THE FUTURE OF LEARNING AND WORK
QUALITY MATTERS RESEARCH ONLINE CONFERENCE

THREE UNDERLYING COMMITMENTS

PEDAGOGY OF TRANSPARENCY
CURATION OF THE ANALOG
FREEDOM WITHIN LIMITS

THREE GENERATIVE AI EXPERIMENTS

THREE LEVELS OF READING
PRESENTATION DECKS WITH NOTEBOOKLM
MODALITY PIVOTS FOR RESEARCH + PRODUCTION

THREE LEVELS OF READING

REQUIRED
EXPLORATORY
VOLUNTARY

REQUIRED

READING LIKE IT IS 1995
PREFERABLY IN PRINT, HAND-ANNOTATED,
SUBSEQUENTLY DIGITIZED

EXPLORATORY

REQUIRED TO ENGAGE CONTENT INDIRECTLY

4X-5X AS MUCH CONTENT

INQUIRIES FOR CHAT/PODCAST ARE PROVIDED

THE LEADING QUESTIONS FOR NEXT CLASS PERIOD

VOLUNTARY

IF THE STUDENT WANTS/NEEDS TO GO DEEPER
EXPERTLY CURATED MATERIALS
MAXIMUM QUALITY, RIGOR, AND COMPLEXITY

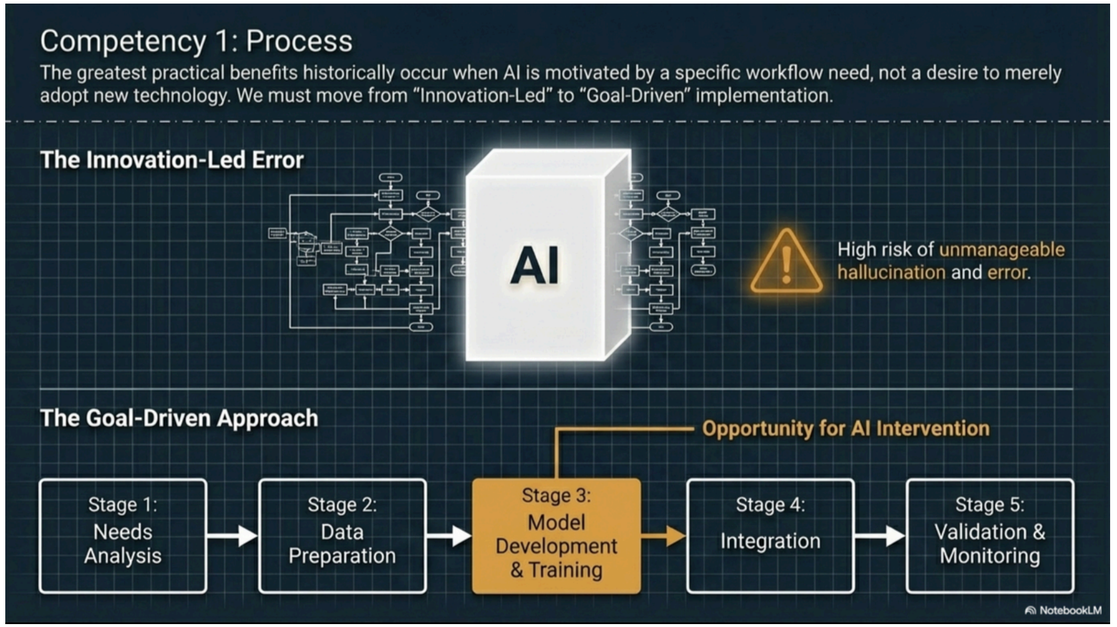
PRESENTATION DECKS WITH NOTEBOOKLM

FOCUSING ON THE “FIRST MILE” AND “LAST MILE”

THE QUALITY OF PRE-WORK IS ESSENTIAL

TRANSPARENCY IS BUILT IN FROM THE START

FROM A LONG LIST OF BULLET POINTS AND A RANDOMLY CHOSEN PHOTO



The student couldn't just "read this slide" as their presentation. They had to understand it and to explain it. This meant better learning by both the presenter and their classmates.

MODALITY CHANGES FOR SYSTEM 2 THINKING

LEVERAGING SURPRISE AND REFLECTION FOR MORE EFFECTIVE AND EFFICIENT ITERATION AND PRODUCTION

Organizational Behavior and Human Decision Processes 138 (2017) 15–27

Contents lists available at ScienceDirect

Organizational Behavior and Human Decision Processes

journal homepage: www.elsevier.com/locate/obhdp

Ideas rise from chaos: Information structure and creativity

Yeun Joon Kim*, Chen-Bo Zhong

University of Toronto, Canada

ARTICLE INFO

Article history:
Received 30 July 2015
Revised 29 September 2016
Accepted 27 October 2016
Available online 19 November 2016

Keywords:
Information structure
Creativity
Cognitive flexibility
Dual pathway to creativity model

ABSTRACT

Is structure good or bad for creativity? When it comes to organizing information, management scholars have long advocated for a hierarchical information structure (information organized around higher-order categories as opposed to a flat information structure where there is no higher-order category) to reduce complexity of information processing and increase efficiency of work. However, a hierarchical information structure can be a double-edged sword that may reduce creativity, defined as novel and useful combination of existing information. This is because a hierarchical information structure might obstruct combining information from distal conceptual categories. Thus, the current research investigates whether information structure influences creativity. We theorize that a hierarchical information structure, compared to a flat information structure, will reduce creativity because it reduces cognitive flexibility. Three experiments using a sentence construction task and a LEGO task supported our prediction.
© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Organizations are complex systems with hierarchical structures, consisting of distinct subsystems that are subordinated by higher-level systems. Such structures arise because the existence of stable intermediary units (subsystems) is a superior form in the evolution of systems (Simon, 1962). In the Herbert Simon's (1962) example of watchmaking, suppose a watch contains 1000 components, a watchmaker could either piece all of them together at once, or assemble relatively stable subparts first and then integrate the subparts. Further assuming that the watchmaking process is frequently interrupted by external forces (e.g., phone calls) and every time that happens the watchmaker has to start from the beginning, the former flat system is hugely inefficient compared to the latter hierarchical system because the cost of interruption is much higher.

Hierarchical structures underlie many organizational activities.[1] For example, production management systems, such as the lean manufacturing system, categorize all components into clearly defined categories so that workers can easily and rapidly distinguish and use necessary components in manufacturing lines (Krafcik, 1988). The importance of structure on production efficiency is best illustrated in the fast-food industry, where ingredients and raw materials are neatly categorized in separate containers and can be quickly assembled on demand rather than making everything from scratch. Similarly, organizational information is highly structured as well. Since employees are clustered around jobs and roles, both explicit (e.g., job manual) and implicit information (e.g., embedded information) are categorized by job function. Generally speaking, it is advantageous for companies to organize information or materials by higher order categories due to the gain on efficiency in learning and production.

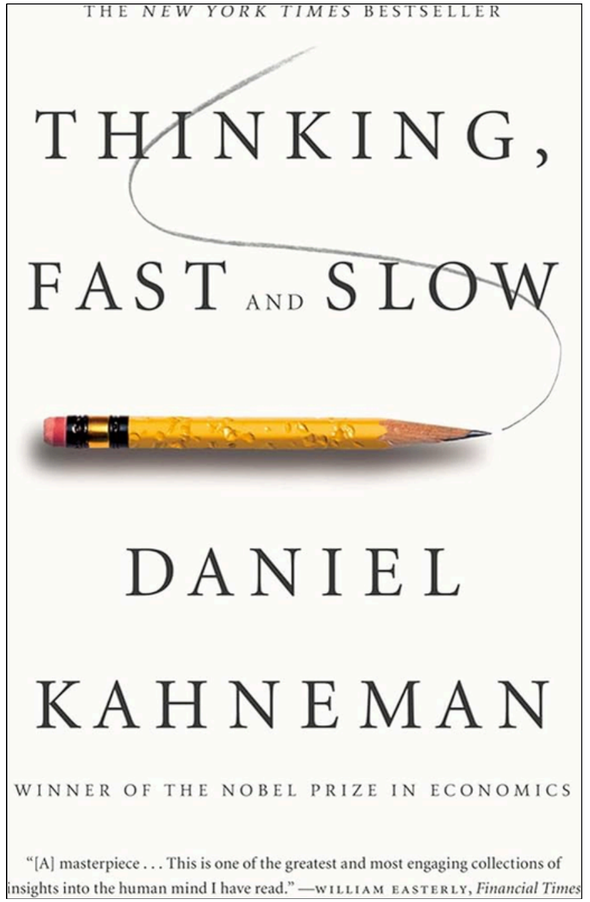
Without disputing the benefits of having such hierarchical structure, the current research asks whether structure might come with the cost of reduced creativity. In the example of watchmaking, suppose the goal is not to make a watch as quickly as possible but to create a novel watch, is the final product likely to be more or less creative if the components are organized into distinct categories as opposed to when there is no structure? Thus, in this paper we investigate the effects of hierarchical structure on creativity. We do so by focusing on the simplest form of hierarchical structure – the presence of high-order category that is just one level up.

Creativity is one of the defining features that separate humans from other species (Csikszentmihalyi, 1997; Nijstad, De Dreu, Rietzschel, & Baas, 2010). In the current research, creativity refers to novel and useful combinations of information (Koestler, 1964; Ward, 1994). We use the term information broadly, consistent with the concept of declarative information, which refers to "chunks," including objects, symbols, or facts that possess distin-

* Corresponding author at: 105 St George St., Toronto, Ontario M5S 3E6, Canada.
E-mail address: Yeunjoon.Kim13@Rotman.Utoronto.ca (Y.J. Kim).

[1] By hierarchy we do not imply authority-ranking relationships but it simply refers to the presence of subsystems and higher order categories or systems following Simon (1962). In the watchmaking example the process that involve subparts is a hierarchical system as contrasting to a "flat" system where everything is assembled at once.

http://dx.doi.org/10.1016/j.obhdp.2016.10.001
0749-5978/© 2016 Elsevier Inc. All rights reserved.



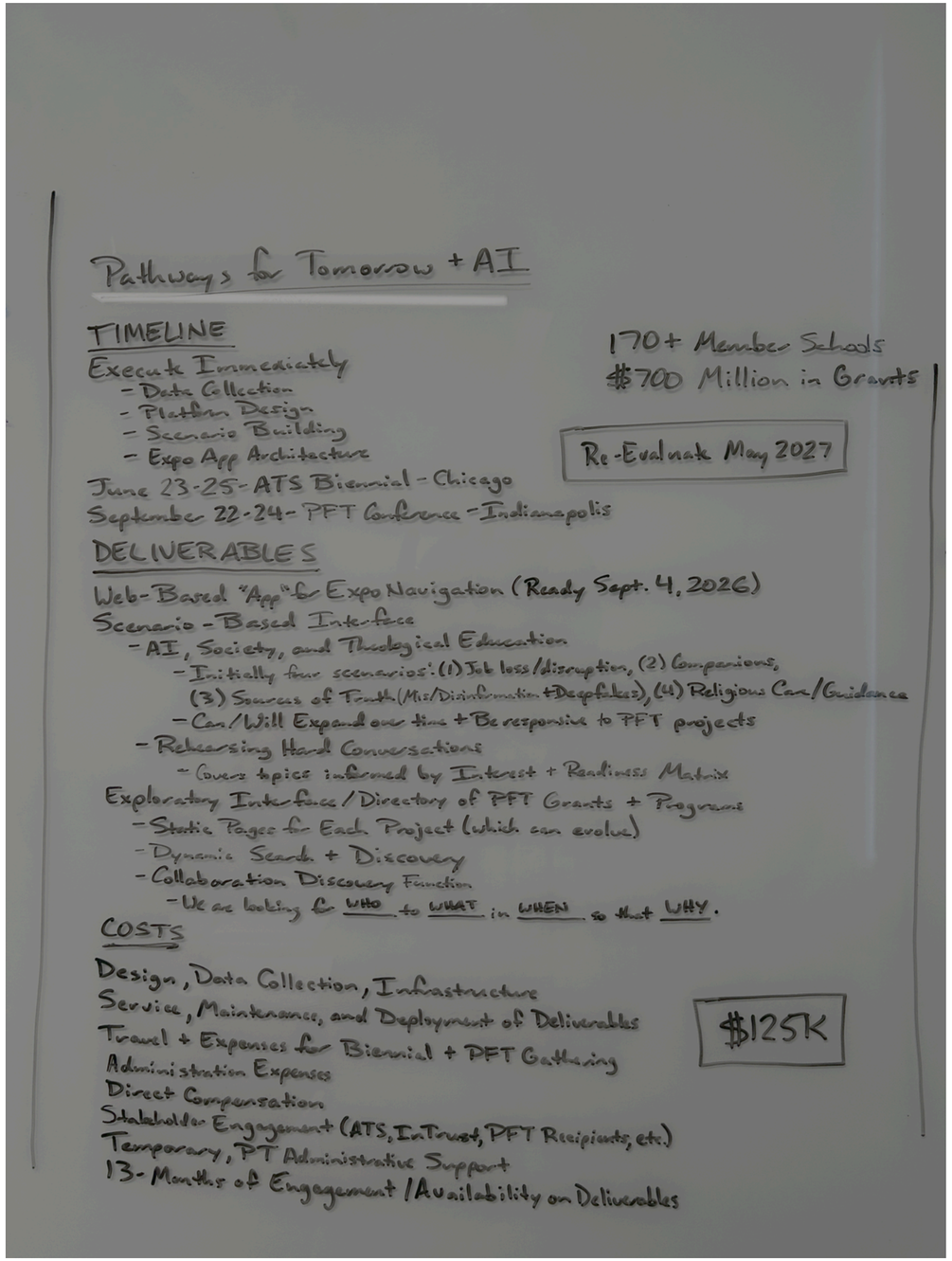
ANALOG

DIALOGUE --> TRANSFORMATION

VISUALIZATION --> DOCUMENTATION

CONVERSATIONAL OVERVIEW

(APPROACHING) FINAL COPY


Pathways for Tomorrow + AI
TIMELINE
Execute Immediately
- Data Collection
- Platform Design
- Scenario Building
- Expo App Architecture
170+ Member Schools
$700 Million in Grants
Re-Evaluate May 2027
June 23-25 - ATS Biennial - Chicago
September 22-24 - PFT Conference - Indianapolis
DELIVERABLES
Web-Based "App" for Expo Navigation (Ready Sept. 4, 2026)
Scenario-Based Interface
- AI, Society, and Theological Education
- Initially four scenarios: (1) Job loss/disruption, (2) Companions, (3) Sources of Truth (Mis/Disinformation + Deepfakes), (4) Religious Care/Guidance
- Can/Will Expand over time + Be responsive to PFT projects
- Rehearsing Hard Conversations
- Covers topics informed by Interest + Readiness Matrix
Exploratory Interface / Directory of PFT Grants + Programs
- Static Pages for Each Project (which can evolve)
- Dynamic Search + Discovery
- Collaboration Discovery Function
- We are looking for WHO to WHAT in WHEN so that WHY.
COSTS
Design, Data Collection, Infrastructure
Service, Maintenance, and Deployment of Deliverables
Travel + Expenses for Biennial + PFT Gathering
Administration Expenses
Direct Compensation
Stakeholder Engagement (ATS, InTrust, PFT Recipients, etc.)
Temporary, PT Administrative Support
13-Months of Engagement / Availability on Deliverables
$125K

ANALOG





Can you help me draft an interactive, web-based proposal using this information that includes discussion of the Pathways for Tomorrow Grants and The Paideia Initiative. I have also attached the logo for our work.

Synthesized proposal components and mapped interactive design strategy >

Let me pull in some context from our past conversations on the Paideia Initiative, then read the relevant skill files to build this right.

Synthesized comprehensive information about grant initiatives >

Now let me read the frontend-design skill to build this properly.

Architected interactive React proposal showcasing Paideia Initiative branding >

Now let me build this. I'll create an interactive proposal that matches the Paideia Initiative's visual identity — pulling the deep teal, copper, and olive from that logo.

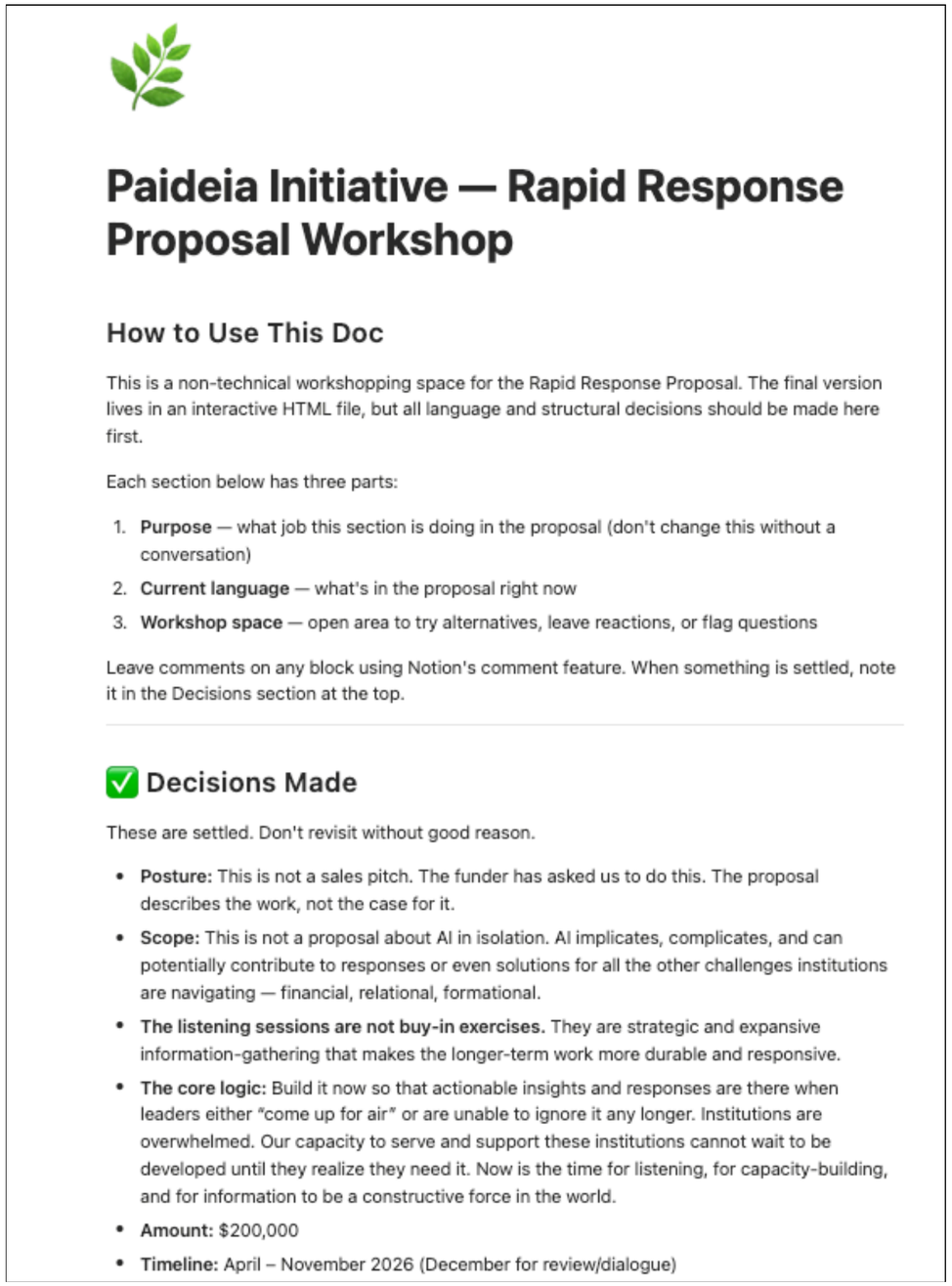
Assembled proposal framework incorporating grant initiatives >

Here's your interactive proposal, Michael. It's a self-contained HTML file with the Paideia logo embedded, organized into six scrollable sections: Opportunity, PFT Context, Deliverables (with tabbed views for the Expo Navigator, Scenario Engine, and Directory), Timeline, Investment (with animated budget bars), and Vision/CTA.

A few design notes and decisions worth flagging:

What I built from your whiteboard: The four scenarios, the WHO/WHAT/WHEN/WHY collaboration formula, the timeline milestone[illegible]e $125K total, and the 13-month engagement period are all faithfully translated. I gave the deliverables descriptive framing

DIALOGUE --> TRANSFORMATION



Paideia Initiative — Rapid Response Proposal Workshop

How to Use This Doc

This is a non-technical workshopping space for the Rapid Response Proposal. The final version lives in an interactive HTML file, but all language and structural decisions should be made here first.

Each section below has three parts:

1. **Purpose** — what job this section is doing in the proposal (don't change this without a conversation)
2. **Current language** — what's in the proposal right now
3. **Workshop space** — open area to try alternatives, leave reactions, or flag questions

Leave comments on any block using Notion's comment feature. When something is settled, note it in the Decisions section at the top.

✅ Decisions Made

These are settled. Don't revisit without good reason.

- **Posture:** This is not a sales pitch. The funder has asked us to do this. The proposal describes the work, not the case for it.
- **Scope:** This is not a proposal about AI in isolation. AI implicates, complicates, and can potentially contribute to responses or even solutions for all the other challenges institutions are navigating — financial, relational, formational.
- **The listening sessions are not buy-in exercises.** They are strategic and expansive information-gathering that makes the longer-term work more durable and responsive.
- **The core logic:** Build it now so that actionable insights and responses are there when leaders either "come up for air" or are unable to ignore it any longer. Institutions are overwhelmed. Our capacity to serve and support these institutions cannot wait to be developed until they realize they need it. Now is the time for listening, for capacity-building, and for information to be a constructive force in the world.
- **Amount:** $200,000
- **Timeline:** April – November 2026 (December for review/dialogue)

VISUALIZATION --> DOCUMENTATION

CONVERSATIONAL OVERVIEW

(APPROACHING) FINAL COPY



The Anatomy of a Generative Pedagogy:
Building AI-Resilient Learning Structures

Layer 5: The Final Work Product
The final delivery (slides or document) is produced with high clarity and confidence, reflecting the "facets" revealed by each previous modality shift.

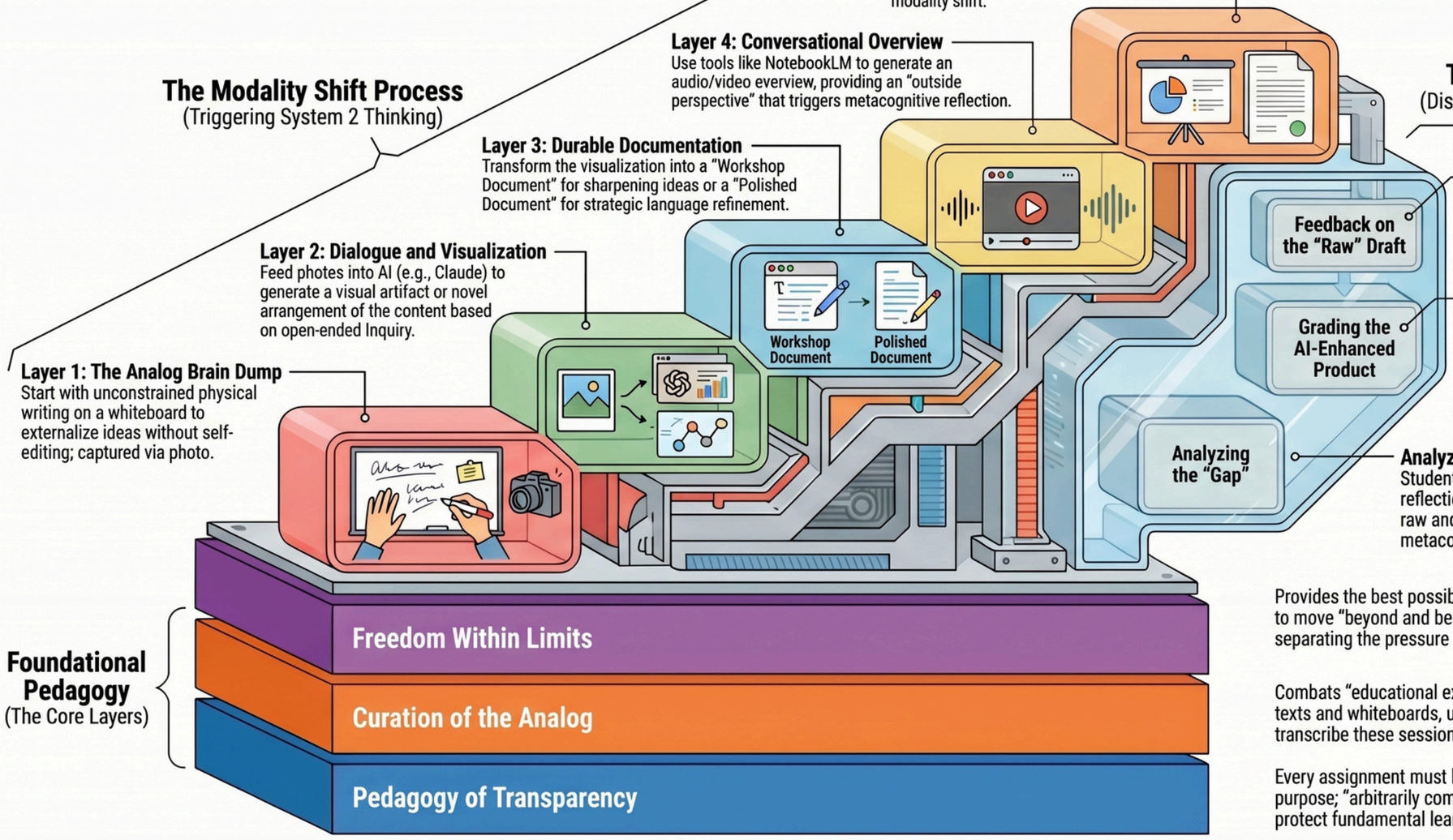
Layer 4: Conversational Overview
Use tools like NotebookLM to generate an audio/video everview, providing an "outside perspective" that triggers metacognitive reflection.

Layer 3: Durable Documentation
Transform the visualization into a "Workshop Document" for sharpening ideas or a "Polished Document" for strategic language refinement.

Layer 2: Dialogue and Visualization
Feed photes into AI (e.g., Claude) to generate a visual artifact or novel arrangement of the content based on open-ended Inquiry.

Layer 1: The Analog Brain Dump
Start with unconstrained physical writing on a whiteboard to externalize ideas without self-editing; captured via photo.

The Modality Shift Process
(Triggering System 2 Thinking)



The Assessment Engine
(Disentangling Grades from Learning)

Feedback on the "Raw" Draft
Instructors provide non-punitive feedback on the student's Initial human-generated work to improve grammar, mechanics, and core ideation.

Grading the AI-Enhanced Product
The final score is based on the "polished" version where students use AI tools to meet professional-grade clarity and accuracy standards.

Analyzing the "Gap"
Students must submit a 1-2 paragraph reflection on the difference between their raw and Ai-enhanced work to bridge the metacognitive gap.

Foundational Pedagogy
(The Core Layers)

Provides the best possible materials while allowing students to move "beyond and beside" the set path, explicitly separating the pressure of grades from the space for feedback.

Combats "educational exhaustion" by utilizing physical texts and whiteboards, using technology only to record and transcribe these sessions for comprehensive recail.

Every assignment must have a publicly articulated purpose; "arbitrarily complex" tasks are eliminated to protect fundamental learning and model essential skills.

NotebookLM

KEY TAKEAWAYS

GENERATIVE AI IS AN INCREDIBLE TECHNOLOGY WHEN USED STRATEGICALLY IT IS TRANSFORMATIVE YOU ARE ESSENTIAL TO THAT BEING POSSIBLE

ASK ANYTHING

LET'S STAY CONNECTED ON LINKEDIN

EMAIL: MICHAEL@INTERSECTIONS.AI

CENTER FOR THE FUTURE OF LEARNING AND WORK
QUALITY MATTERS RESEARCH ONLINE CONFERENCE