

Cognitive Artifacts, External Memory, and Co-Cognition

How Tools Become Part of Human Thought

Cognition in Mediated Systems Series – Note #2

A. Jacobs – Cognitive Drift Papers

The Basic Pattern

Human beings rarely think without artifacts. Writing preserves ideas beyond memory, diagrams make relationships visible, and notebooks support reflection. These objects are often treated as aids to cognition, but in many situations they become part of the process through which cognition occurs.

Cognitive science describes these objects using terms such as cognitive artifacts, external memory, distributed cognition, extended cognition, and representational tools. Although these concepts differ, they all describe how thought can be organized through external structures that preserve information, reduce cognitive load, and allow complex reasoning to unfold beyond the individual mind.

Artificial intelligence deepens this pattern. External artifacts no longer only store or display thought. They can now summarize, reorganize, compare, and generate representations in response to the person using them. Notes can become searchable memory, diagrams can become interactive models, and questions can develop through sustained exchange with an AI system.

Co-Cognition describes the broader condition in which people and external representational systems actively construct understanding together.

When Tools Become Cognitive Structures

A tool supports cognition when it makes a task easier. A cognitive artifact becomes more consequential when the reasoning process depends on the structure the tool provides.

A notebook can separate, compare, and revise ideas rather than merely store them. Diagrams can make relationships visible by placing them into spatial form, while maps influence which routes, boundaries, and possibilities become available to thought. In each case, the artifact does not simply hold information. It helps determine how that information can be understood.

The distinction matters because many thoughts are not fully formed before they are externalized. Writing can produce an idea rather than merely record it, drawing can reveal structure that language obscures, and arranging notes can create relationships that did not previously exist in the mind.

The important question is therefore not whether tools help people think, but when an artifact becomes a functional part of the thinking process itself.

How Cognitive Artifacts Become Integrated

Stage 1 – External Record

A person uses an artifact to preserve information that would otherwise need to be remembered internally. The tool primarily functions as storage.

Stage 2 – Cognitive Organization

The artifact begins structuring the information it contains. Notes are grouped, diagrams reveal relationships, maps guide action, and written language makes ideas easier to compare.

Stage 3 – Cognitive Dependence

Reasoning increasingly relies upon the artifact. The person no longer simply remembers the information through the tool but thinks through the arrangement, categories, and representations the tool provides.

Stage 4 – Co-Cognition

The external system actively participates in transforming the representation. AI assistants reorganize notes, generate alternatives, compare interpretations, extend diagrams, and help produce new understanding through interaction with the person.

The absence of purely internal thought is not evidence that cognition has weakened. It may indicate that cognition has become more deeply integrated with the artifacts through which it operates.

The Cognitive Artifact Stack

External thought becomes more powerful as experience moves through successive layers of representation. It may first be expressed in language, preserved in writing, organized into notes, grouped into categories, and then transformed into diagrams, maps, or shared models. Those models can then guide decisions and future action.

Each layer makes thought easier to preserve, manipulate, and communicate, but it also gives the artifact more influence over the reasoning process. This representation stacking allows thought to become more stable and shareable, but it can also increase the distance between the original experience and the form through which it is later understood.

What begins as a vague experience gradually becomes structured by the forms used to represent it. Writing emphasizes some distinctions, categories stabilize certain relationships, and diagrams make particular patterns easier to see than others.

Once reasoning depends on the arrangement of notes, classifications, visual models, or shared representations, the artifact becomes part of the environment in which the problem is understood. The more cognition relies on these structures, the more important their design, limits, and semantic fidelity become.

Semantic Fidelity and Cognitive Drift

Cognitive artifacts influence thought by determining what becomes visible, memorable, and easy to manipulate. Every representation therefore preserves some structure while reducing or omitting other parts of the original experience.

Semantic Fidelity asks whether an artifact preserves the distinctions, relationships, and context needed for reliable reasoning. A diagram may make one pattern clearer while pushing others out of view, and a summary can retain the conclusion while stripping away the path that justified it. Even a large note-taking system can distort emphasis by making some categories far easier to retrieve than others.

This is where external memory becomes vulnerable to Cognitive Drift. The artifact remains available and useful, but the structure it imposes can gradually reshape the person's understanding of the material. What is easy to record becomes easier to remember. What is easy to retrieve becomes easier to treat as important. What fits the representation becomes easier to think.

Reliable Co-Cognition therefore depends not only on access to external artifacts but on maintaining semantic fidelity between the representations they contain and the realities those representations are intended to support.

Examples Across Systems

Notebooks: Written notes preserve ideas across time while allowing people to compare earlier thoughts, identify recurring patterns, and continue reasoning beyond the limits of working memory.

Diagrams: Visual structures make relationships, hierarchies, sequences, and feedback loops visible, often revealing patterns that remain difficult to detect in prose.

Writing: Language externalizes thought, allowing ideas to become objects that can be edited, questioned, rearranged, and shared.

Digital Knowledge Systems: Note-taking applications, wikis, databases, and knowledge graphs preserve information while also determining how that information can be organized and retrieved.

Artificial Intelligence: AI systems transform cognitive artifacts by summarizing notes, generating diagrams, finding relationships, and participating in the creation of new representations.

Co-Cognition as a General Principle

Cognitive artifacts have always extended human intelligence. Writing, maps, diagrams, and external memory systems allow people to preserve ideas, make relationships visible, and reason through structures that exceed the capacity of unaided cognition.

Co-Cognition does not replace the study of cognitive artifacts or distributed cognition. It describes the broader pattern that emerges when external representations become active participants in the development of thought. This distinction becomes especially important with artificial intelligence. Earlier artifacts mainly preserved and displayed representations, while AI can now organize, interpret, and transform them. The cognitive environment no longer remains static while a person reasons through it. It responds, reorganizes, and contributes new material to the process.

The deeper transition occurs when artifacts become dynamic partners in cognition. Human thought increasingly develops through interaction with external systems that help determine what is remembered, compared, connected, and carried forward. This creates richer cognitive environments that can expand memory, reasoning, and collaboration, but it also allows the structure of external representations to quietly reshape understanding.

Reliable Co-Cognition therefore depends on preserving semantic fidelity between cognitive artifacts and the realities they help people perceive, remember, and act upon.

Related Concepts

Cognitive Artifacts: External objects or systems that preserve, organize, or transform information in ways that become part of the thinking process.

External Memory: Information stored outside biological memory in forms that can later support recall, reasoning, and continued thought.

Extended Cognition: The idea that tools and external structures can function as parts of cognition when a person's reasoning depends upon them.

Distributed Cognition: A view of cognition as something spread across people, artifacts, representations, and environments rather than contained within one mind.

Semantic Fidelity: The degree to which meaning, context, and important relationships survive as information is represented, transformed, and reused.

Co-Cognition: The shared process through which human cognition and external systems jointly generate, refine, and apply representations.

Frequently Asked Questions

What is a cognitive artifact?

A cognitive artifact is an external object or system that helps preserve, organize, or transform thought. Examples include notebooks, diagrams, maps, calendars, databases, and AI systems.

How is a cognitive artifact different from an ordinary tool?

An ordinary tool helps someone perform a task. A cognitive artifact becomes part of the reasoning process by shaping what can be remembered, compared, noticed, or understood.

Does externalizing thought weaken human cognition?

Not necessarily. Externalization can expand memory and make complex reasoning possible. The risk appears when people become dependent on representations without examining how those representations shape or omit reality.

How does artificial intelligence change cognitive artifacts?

Earlier artifacts were mostly static. AI can actively reorganize notes, generate alternatives, identify relationships, and transform representations in response to the user.

Why is semantic fidelity important for cognitive artifacts?

Because every artifact simplifies. Semantic fidelity determines whether that simplification preserves the distinctions and context necessary for sound judgment.

How can cognitive artifacts contribute to Cognitive Drift?

They can make certain categories, relationships, and interpretations easier to retrieve than others. Over time, the structure of the artifact may begin replacing direct contact with the underlying reality.

Canonical References

[Cognitive Drift: Concept Paper and Definition](#)

Describes how human cognition can remain active and coherent while gradually losing alignment with reality as thought becomes more reliant on recursive, mediated representations than direct grounding.

[Co-Cognition: Concept Paper and Definition](#)

Defines the shared feedback loop in which human cognition and external systems jointly generate, refine, and apply representations, creating new possibilities for both insight and drift.

[Recursive Compression: Concept Paper and Definition](#)

Explains how systems iteratively compress, store, and reapply representations, enabling intelligence and coordination while creating conditions for drift when fidelity and grounding weaken.

[Semantic Fidelity: Concept Paper and Definition](#)

Defines the degree to which meaning survives transformation while preserving intent, nuance, context, and the relationship between a representation and what it refers to.

Related Phrases

- cognitive artifacts
- external memory

- extended cognition
- extended mind
- distributed cognition
- external reasoning
- representational tools
- visual thinking
- note-taking systems
- diagrams and cognition
- shared representations
- AI-assisted thinking
- human-AI cognition
- semantic fidelity
- cognitive drift
- co-cognition