

WarpMind #2 Assignment Report: Implementing the Instrument of Illucidation

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1 System Usage Guide

The **Instrument of Illucidation** is a web interface built with HTML, CSS, and vanilla JavaScript. Open `index.html` in a modern browser to start. Users can:

1. Upload a PDF via the file input.
2. Load the default sample PDF (`sample.pdf`).
3. Enable *Mock mode* for simulated AI explanations or use WarpMind for real AI answers.

The interface has three panels:

- **Left:** Extracted concepts list.
- **Center:** PDF viewer with page navigation.
- **Right (Workspace):** Concept cards area.

Clicking a concept opens a draggable card. Each card initially shows “Generating explanation...”. Users can adjust sliders (Complexity, Length), dropdowns (Audience, Form, Tone), and context buttons (Theory, Methods, Applications). Cards can be duplicated, refreshed, or copied, supporting multiple simultaneous views.

2 Design Alignment and Divergence

Our implementation largely preserves the core design features of WarpMind #1, including sliders, dropdowns, toggles, and the ability to compare multiple concept views. To highlight the alignment and intentional divergences, Table 1 summarizes the main elements and their implementation differences.

Table 1: Comparison of WarpMind #1 and WarpMind #2 design elements

Element	WarpMind #1	WarpMind #2
Layout	Tripartite: Concepts/PDF/Views	CSS Grid with persistent PDF, three columns
Parameter Controls	Sliders, Dropdowns, Toggles	Embedded in individual cards, same styles
Multiple Views	Single comparison	Draggable independent cards
Feedback	Static or delayed updates	Streaming text updates

Intentional Divergences: Parameters are now embedded locally within each card, allowing independent control. Additional buttons for Duplicate, Refresh, and Copy further enhance usability and flexibility.

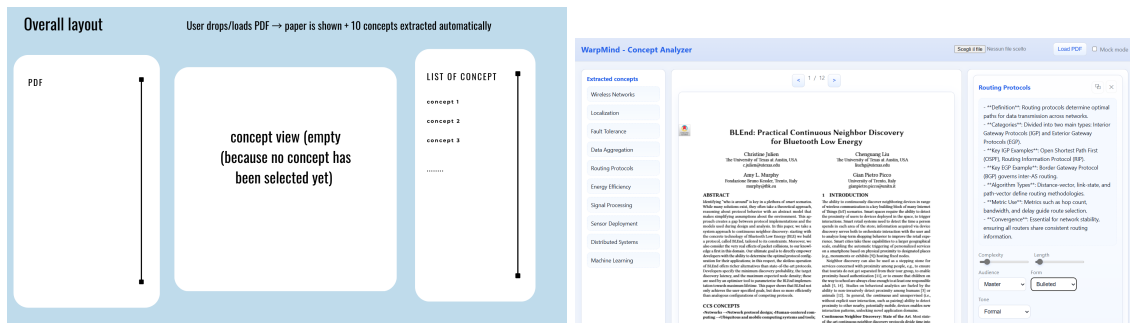


Figure 1: WarpMind #1 (left) vs WarpMind #2 (right) interface.

3 Technical Challenges and Solutions

Developing the Instrument of Illucidation required addressing several technical challenges. First, multiple concept cards needed to maintain independent state without any frameworks. This was achieved by cloning a card template in `openConceptCard`, with each card keeping its own internal state and event listeners, ensuring that adjustments on one card did not affect the others.

Second, rapid user interactions, such as adjusting sliders for complexity or length, could easily overwhelm the API. We mitigated this by implementing a debounce mechanism and, in Mock mode, adding artificial delays between 300ms and 1200ms. This reduced the number of API calls while keeping the interface responsive and smooth.

Finally, the layout and streaming of text output posed a challenge. Using a three-column CSS Grid, we ensured persistent visibility of the concepts list, PDF viewer, and workspace. WarpMind's streaming functionality progressively updates explanations sentence by sentence, enhancing the perceived speed and interactivity. While the explanation is being generated, cards display “Generating explanation...” as a placeholder, providing immediate feedback to the user.