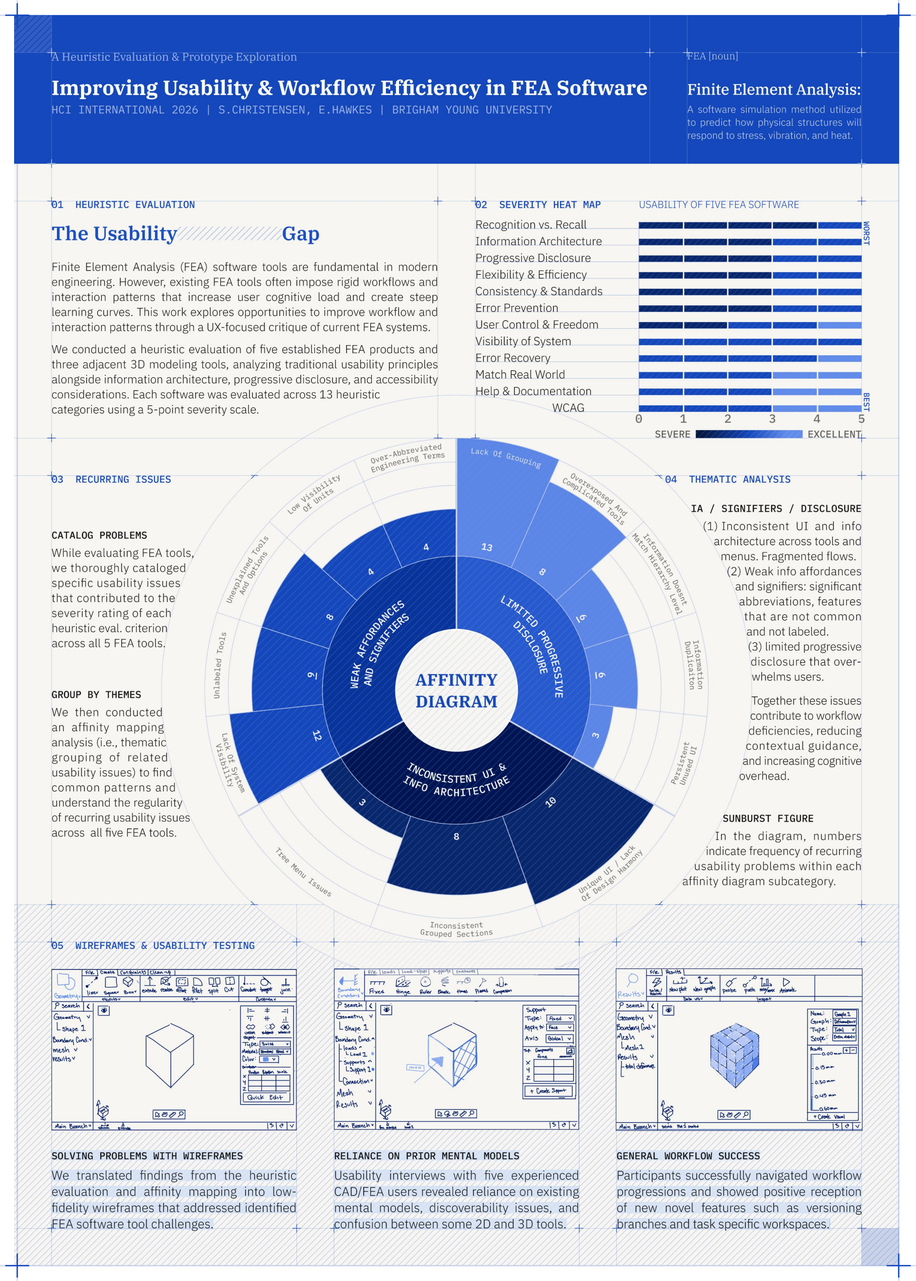
# Improving Engineering Software






# 30 Second Brief

Presented research on engineering software ***in Montreal, CAN at HCII 2026*** with professor Seth Christensen. Led research involving heuristic evaluations and usability testing.

## My role

conducted research, synth, and usability tests with proposed design solutions.

## Scope

Published paper including research, synthesis and early design solutions.

## Impact

***Identified 127 issues*** across industry tool, to inform research driven solutions of future FEA application in ***early development.***

Full paper ↗ Paper poster ↗

# The Usability Gap

Simulation engineering software is vital to public safety yet is incredibly complex, making it hard to learn, and error prone for even professionals. ***Why?***

# Heuristic eval. of top tools

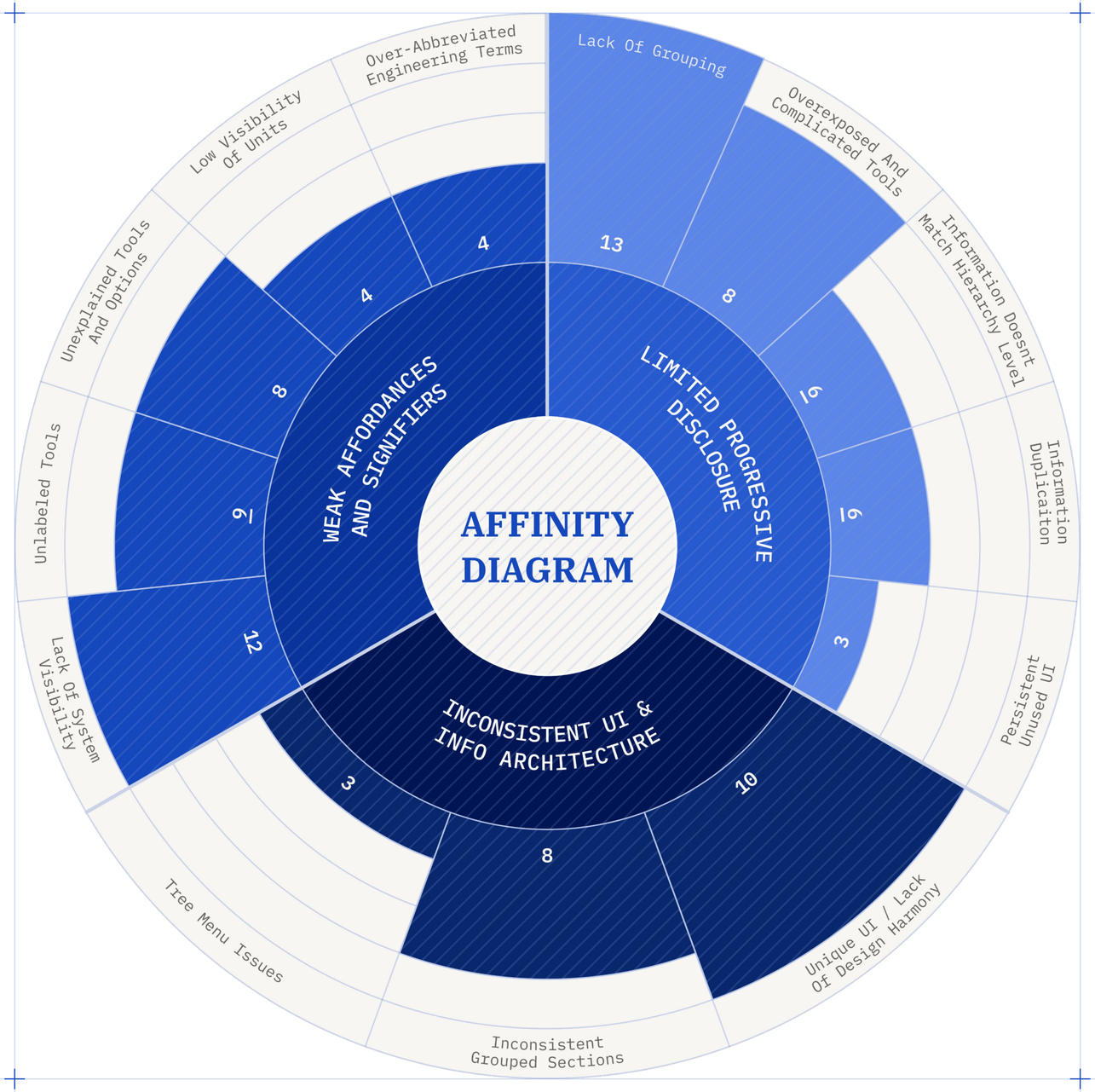
Using common heuristic categories (From NNG) and a few others I cataloged the problems in top simulation tools used in industry.

Most tools did poorly in many categories, with several catalogued problems.

View full heuristic evaluation ↗

| Heuristic | Ansys | HyperWorks | NX Siemens | Abaqus | Patron |
|---|---|---|---|---|---|
| Visibility of System Status | 3 | 4 | 3 | 2 | 3 |
| Match Between System and the Real World | 5 | 3 | 3 | 4 | 3 |
| User Control and Freedom | 4 | 4 | 3 | 3 | 4 |
| Consistency and Standards | 2 | 3 | 2 | 3 | 2 |
| Error Prevention | 2 | 2 | 4 | 2 | 4 |
| Recognition Rather Than Recall | 3 | 3 | 4 | 1 | 2 |
| Flexibility and Efficiency of Use | 3 | 5 | 3 | 2 | 3 |
| Help Users Recognize, Diagnose, and Recover from Errors | 3 | 2 | 4 | 3 | N/A |
| Help and Documentation | 4 | 5 | 3 | N/A | 2 |
| Information Architecture (IA) | 3 | 3 | 2 | 3 | 3 |
| Progressive Disclosure | 2 | 3 | 4 | 2 | 3 |
| WCAG Accessibility Standards | 5 | 5 | 4 | 4 | 4 |
| **Total Score (out of 65):** | 39 | 42 | 39 | 29 | 33 |

(lower is better)




# Three themes emerged

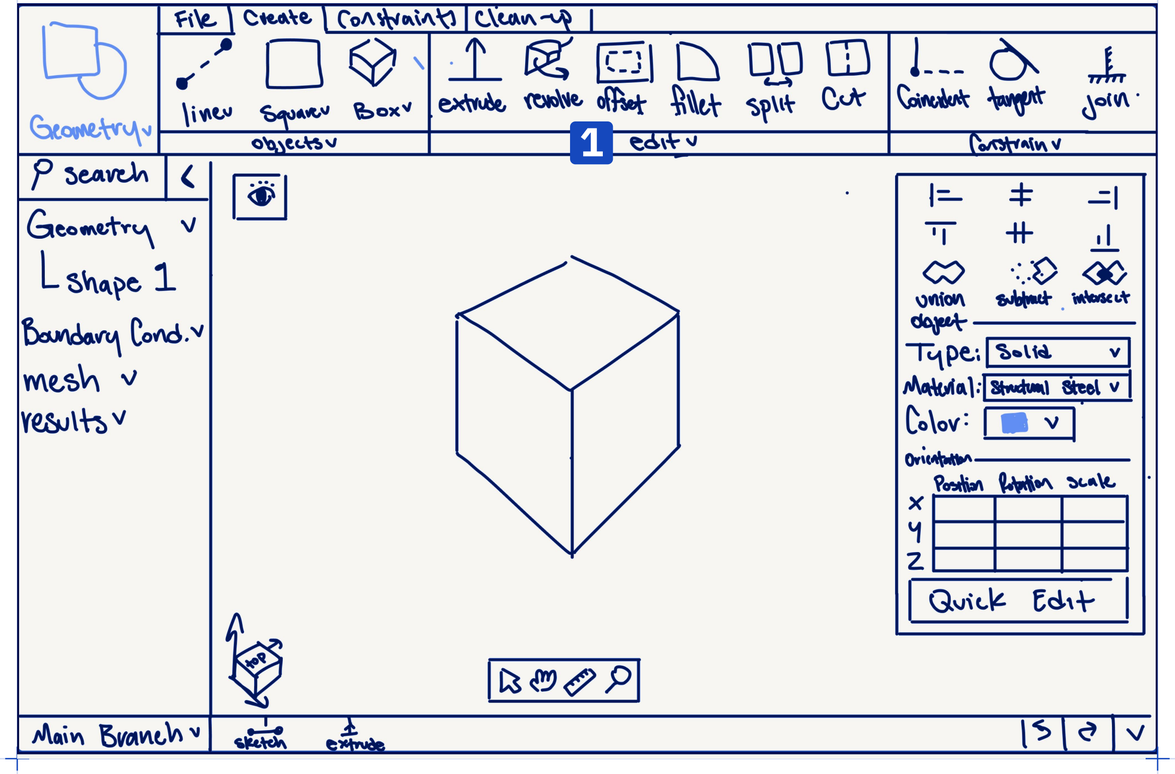
127 total insights from were grouped into categories then placed under larger themes:

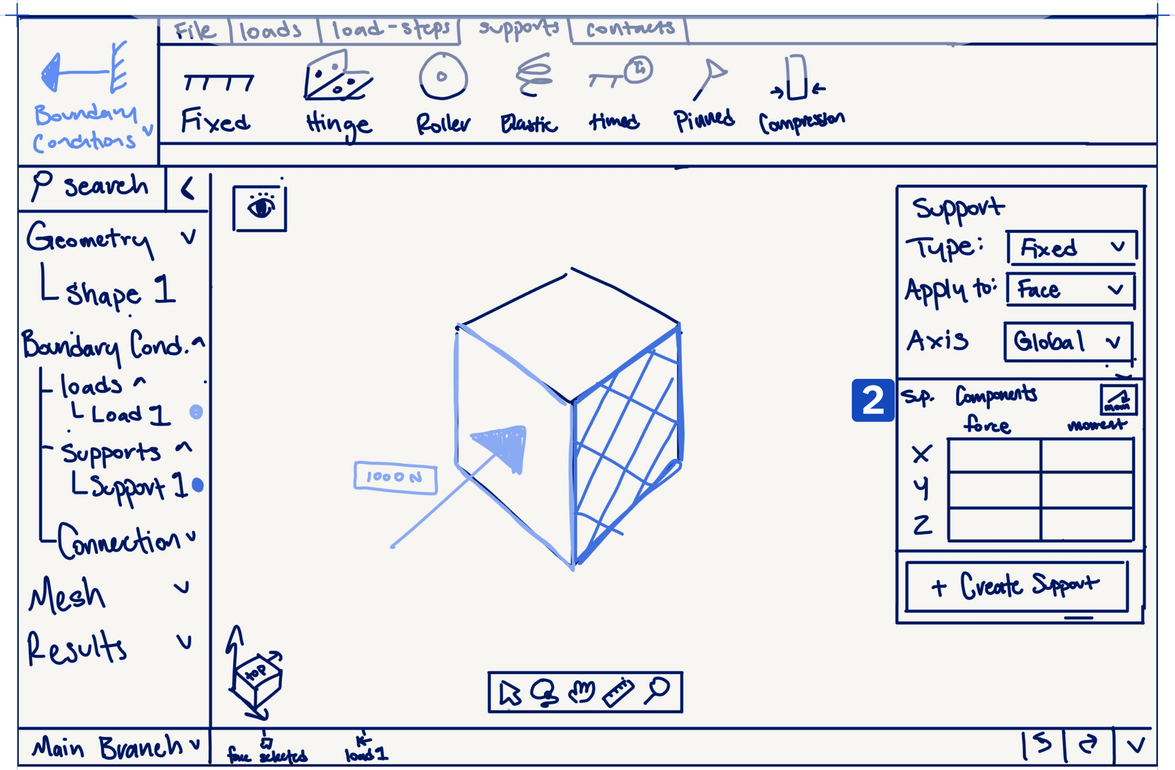
- **Weak Affordances & Signifiers:** lack of tool names, and use of heavy abbreviations
- **Limited Progressive Disclosure:** menus, tools, and settings persistently open.
- **Inconsistent UI & Info Architecture:** lack of system and experience consistency.

Note: Larger sections are broken down into smaller sections with insight counts.

# Labels and progressive disc.

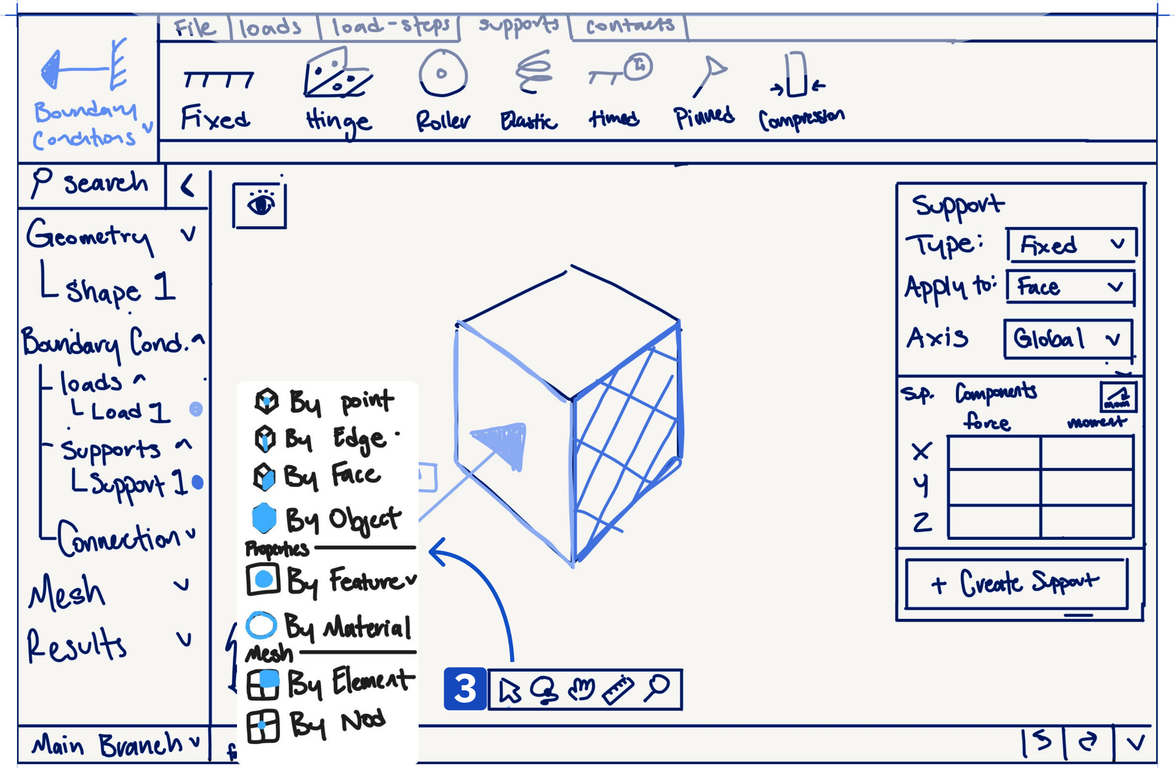
Each tool was given an explicit label and grouped together with similar tools. Less common tools available in the drop down under each section [1].




# Contextual menu space [2]

To limit persistently open menus and provide the user with pertinent information the right menu changes depending on what the user is doing.



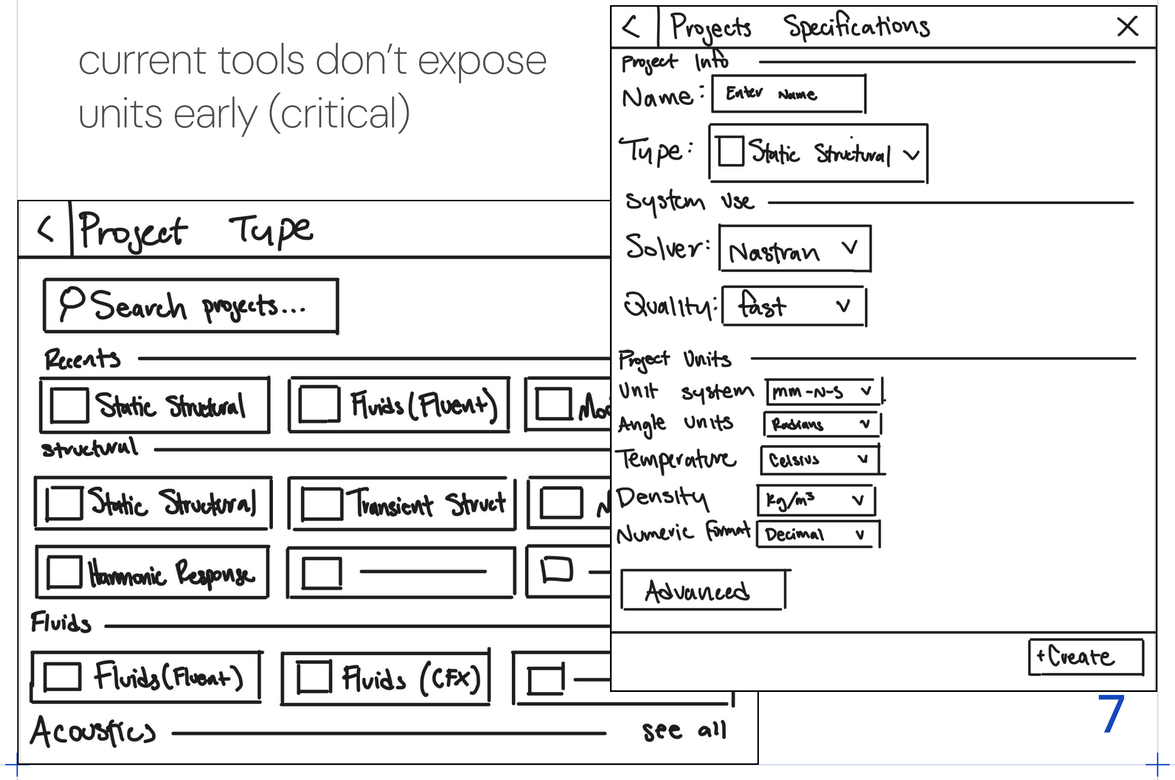

## Bottom 3D canvas tools [3]

Tools for canvas navigation are grouped into one area, at the bottom of the canvas, reducing friction for quick 3D space navigation.

## Assisted project startup

Different project types are organized by recents, and larger groups (or searchable), and units and project settings are shown early.

current tools don't expose units early (critical)



## Insights from 5 user tests

1. Workflow structure was understood and appreciated. (5/5 participants)
2. Existing mental models from using other tools shaped expectations. (4/5)
3. Geometry 2D tools needed better labeling or were missing and needed to be added. (4/5)

Current engineering professors and students completed common tasks with the wireframes

## Next Steps

Collaborating with the engineering department, this project will inform the development of a simulation (FEA) tool currently in early stages.

While the proposed solutions provided a clearer workflow, next I would target tools for geometry creation, making sure the follow industry norms.

# Exploring Montreal with my professor



# Thank You.