**Problem**

- Knowledge generated during the design process frequently goes uncaptured, or is poorly organized and buried in obscure documents.
- Barriers to effective capture and reuse of design knowledge:
  - Knowledge isolation
  - Knowledge messiness
  - Lack of knowledge synthesis
- Effective capture of both semantic knowledge and episodic knowledge can have many benefits for both student and professional design teams.

**Project goal**

- Create analytic tools that summarize the evolving content of the documents created by a group and enable the visualization and navigation of the ideas and their connections.
- Create visualization tools that integrate and summarize the team communications to track the emergence of the shared solution.

**Questions**

- Can the structure of an engineering artifact be extracted from a set of relevant design documents?
- How can machine learning techniques be used for synthesizing design knowledge from multiple sources of information used and created by students during a design project?
- How can the segmented documents be matched across their various versions and be presented to the user in a navigable form as the envisioned DesignWebs?

**Data capture**

With the Kiva, we capture most of the student conversations that would normally go through email and chat. For the project courses we studied, each course Kiva contained hundreds of topic threads and thousands of individual posts and files.

**Organizational Memory Testbed**

- CEE Junior Projects Class
  - Students work on preliminary design of campus-based infrastructure projects, e.g.
  - Redesign of drainage on Morewood Parking lot
  - Improving pedestrian safety and wayfinding on University Center Turn-around

**Visionary Scenario**

- One year, a team of students worked on redesigning Forbes Avenue and uncovered several design problems with UC turn-around. However, redesigning the entrance was beyond the scope of their project.
- Next year, a new team of students took on redesigning UC entrance.
- Even though they could access the information from the previous year, they found it tedious to go through old reports and presentations.
- Suppose instead the students had a DesignWeb from the previous year that would have included all the documents and presentations generated by the previous year’s team, all the documents and websites they referenced and their internal discussions.
- In these figures, the interface is a mockup, but the underlying data is derived from the class.

**Kiva** (Web based Asynchronous Collaboration Tool)

**Traffic Counts DesignWeb**

**Opening screen of the DesignWeb**

**Viewing a document fragment in a DesignWeb**