Tab 1

**User Study - Low-Fidelity Prototype Evolution**

**Revised requirements:**

1. Unified Planning

As a UIC student, I want a single interface that consolidates my degree checklist, eligible courses, and key data such as grade distributions and professor information, so I don’t need to switch between Degree Audit, RateMyProfessor, and UIC Grades.

Acceptance: One dashboard provides all core features: (a) a checklist for completed and remaining courses, (b) searchable electives, (c) buttons for “Grade Distribution” and “Course Detail,” and (d) filter controls. No external websites are required for basic planning.

1. Automatic Eligibility

As a student, I want the system to automatically display only courses I’m eligible to take, based on my completed courses and electives, so that I can plan my semester efficiently.  
 Acceptance: After I select my major, semester, and completed courses, the “Eligible List” hides any course with unmet prerequisites. The list updates instantly if I add or remove a completed course or elective.

1. Difficulty Visibility (Course & Professor)

As a student choosing between sections, I want to see each course’s historical grade distributions and average instructor ratings so I can estimate difficulty and pick the best section for my learning style.

Acceptance: Each course on the Eligible List includes a Grade Distribution button. Clicking it opens a pop-up showing instructors who taught the class, their average ratings, and an A–F bar chart by semester. I can compare multiple professors side by side within the pop-up.

1. Course Information Transparency

As a student planning ahead, I want to easily access a course’s key information, including its description, credit hours, and prerequisites, so that I understand what it entails before deciding to enroll.

Acceptance: Each course has a Course Detail button. Clicking it opens a pop-up that displays the official course description, prerequisite chain (CS 141 → 151 → 251), and any relevant enrollment notes. No navigation is required to leave the page.

1. Schedule Fit (Time & Gaps) *(Deferred)*

As a commuter with limited on-campus hours, I want to filter by meeting times and visualize potential schedule gaps to reduce downtime between classes.

Acceptance - Pick a day or an hour and the Eligible List updates right away. A small panel tells you how long you will wait on each weekday, for example “Mon: 4h gap,” so commuters pick the timetable that wastes the least time. (The team will add this in a later version.)

**Revised Personas**

* Persona A — Amira K. (“The Organizer”)  
   Age / Major / Year: 21, Computer Science, Junior  
   Behavior: Plans with Degree Audit + spreadsheets; asks friends for professor advice.  
   Goals: Graduate on time; balance challenging and moderate courses each term.  
   Frustrations: Fragmented info across sites; hard to judge difficulty from mixed reviews.  
   Needs from CourseScope: One dashboard that shows remaining courses, eligibility, and clear grade trends per course/section.
* Persona B — Emma K. (“The Commuter”)  
   Age / Major / Year: 20, Computer Science, Junior  
   Behavior: Prefers Tuesday/Thursday clustering to minimize travel; navigates limited section availability.  
   Goals: Build compact schedules; avoid long gaps; stay on track for graduation.  
   Frustrations: Time conflicts and manual checking of prerequisites and sections.  
   Needs from CourseScope: Time/day filters, schedule gap preview, and eligibility filtering.

**Revised Scenario**

**1. Amira plans a balanced CS semester** It’s late October, two weeks before the registration deadline. Amira, a junior in Computer Science, opens CourseScope on her laptop. On the Checklist, she marks the CS and math courses she has already completed. The system immediately updates the Eligible Courses list, hiding anything with unmet prerequisites.

Amira taps Filters and selects “Moderate workload” and “300-level CS” to avoid stacking too many challenging courses. She opens CS 361. The Course Detail view displays an A–F bar chart by semester and a concise summary for each professor. One section shows steadier grade outcomes and fits her afternoon schedule, so she taps Add to Plan and sees a small toast: “Added.”

On the Plan Summary, Amira sees two challenging and two moderate courses, with no daily gaps exceeding 90 minutes. She downloads the summary as a PDF to review with her advisor. With eligibility, difficulty, and timing resolved in one place, her next-semester plan is clear and realistic.

**2. Emma the Commuter**

Emma, a junior computer science commuter, examines the Eligible List after marking completed courses on the Checklist. Four alternatives remain after she applies the 300-level and Tue/Thu filters. She opens CS 361 and uses the grade small multiples to compare two portions. When she selects "Add to Plan," a conflict flag with MATH 320 appears in the Plan Summary. The gap preview indicates a maximum gap of 75 minutes when Emma selects the alternate CS 361 time and the Swap section. She downloads and saves the plan to go over with the advisor.

**Revised Low-Fidelity Prototype**

Our revised low-fidelity prototype builds directly upon the earlier CourseScope design. Based on preliminary peer feedback and internal critique, this version emphasizes clarity, visibility, and realistic data to simulate authentic UIC course-planning experiences better.

Key Revisions

* Courses sit in two plain blocks - one block is named “Core Courses,” the other “Electives.” Every block holds a card for each course. A card shows the course title (for example, CS 361 - Computer Systems), the number of credit hours and two buttons - Grade Distribution besides Course Details.
* Realistic Course Data: All examples use actual UIC courses, professor names, and grade distributions to enhance ecological validity.
* Visual Feedback: When a user “adds” a course, a green toast message (“Added to Plan”) appears. Hidden courses automatically update when checklist items change.
* Improved Filtering: Filters for *Difficulty*, *Course Level*, and *Days/Times* are displayed as removable badges above the Eligible List.
* Plan Summary Page: A new summary view shows all selected courses, difficulty balance, and daily schedule gaps to support workload reflection.

The overall user flow aligns with our MVP structure:  
 Checklist → Eligible List → Course Detail → Grade Distribution → Plan Summary.

Each state in this flow was printed and converted into a physical paper prototype kit for use in our user testing sessions.

**Low-Fidelity Prototype Kit**

Following the method outlined in Rettig’s *“Prototyping for Tiny Fingers”* (1994), our team developed a paper-based prototype kit to test interaction design decisions in a hands-on and low-cost manner.

Kit Components

* Printed Screens: Five key states (Checklist, Eligible List, Course Detail, Grade Distribution, Plan Summary), printed in grayscale on A4 sheets.
* Interactive Overlays: Sticky notes and index cards representing dynamic states such as pop-up modals and confirmation toasts (e.g., “Added to Plan”).
* Filter Controls: Small detachable cards labeled *Difficulty*, *Time*, and *Course Level* that can be placed or removed above the Eligible List.
* Feedback Elements - A green index card appears when an entry is accepted - a small red one shows up if the choice is wrong or a requirement is absent.
* Markers and Blank Paper - People pick up pens and blank sheets to change layouts on the spot and to jot down their own comments.

**Simulating Interaction**

While the session runs, one team member plays the role of the Computer and shifts the paper pieces by hand to mimic the way a screen would change.

* Selecting a course replaced the Eligible List with a *Course Detail* sheet.
* Choosing *Grade Distribution* brought in a bar chart overlay card.
* Adding a course triggered the placement of a green “Added!” note.
* Changing filters swapped in an updated version of the Eligible List.

**Setup**

All materials were arranged on a flat surface for easy visibility. The prototype was tested under consistent conditions (quiet environment, 1:1 participant sessions). Photos were taken of the kit setup and its use (excluding participant faces) to document the study process.

**Methods**

**Consent Form**

[**https://docs.google.com/document/d/1T7ykHgpAVc1KYcsZTeIbWDmj9HP8M9YvB1Zpc\_Y1JCk/edit?usp=sharing**](https://docs.google.com/document/d/1T7ykHgpAVc1KYcsZTeIbWDmj9HP8M9YvB1Zpc_Y1JCk/edit?usp=sharing)

**Participants**

We recruited 8–10 undergraduate students from the UIC College of Engineering and Business, primarily from diverse course-planning styles. Each participant will correspond to one of our two personas:

* *Amira K. (“The Organizer”)* — represents students who proactively plan balanced semesters.
* *Emma K. (“The Commuter”)* — represents students who optimize their schedules around travel constraints.

We strive for balanced demographic diversity in terms of gender, age, and year of study.

| Participant ID | Age | Major | Gender | Persona Match | Notes |
| --- | --- | --- | --- | --- | --- |
| PO1 | 21 | CS | M | Amira | Uses spreadsheets to plan |
| PO2 | 22 | CS | M | Emma | Commuter, avoids gaps |
| PO3 | 22 | Finance | M | Amira | Uses RateMyProfessor frequently |
| PO4 | 19 | CS | M | Emma | Freshman exploring electives |
| PO5 | 23 | CS | M | Amira | Upperclassman planning graduation |
| PO6 | 20 | CS | F | Emma | Prefers Tuesday/Thursday classes |
| PO7 | 21 | CS | M | Amira | Values grade data comparison |
| PO8 | 20 | CS | F | Emma | Needs a clear visual interface |

**Procedure**

Each study session will follow the same structured process:

1. **Introduction & Consent:** Participants are welcomed, given an overview of the study’s purpose (course planning task), and asked to read and sign the IRB-compliant consent form.
2. **Warm-Up Discussion:** Participants briefly describe their current process for choosing courses, including tools and resources they use (e.g., Degree Audit, RateMyProfessor).
3. **Task Execution:**
   * Participants are assigned either the *Amira* or *Emma* scenario.
   * They use the paper prototype to complete a course-planning task, such as selecting eligible CS electives or comparing professors based on grade data.
   * The *Facilitator* prompts “think-aloud” reflection, encouraging participants to verbalize their thoughts.
4. **Semi-Structured Interview:**
   * After completing the scenario, the participant is asked open-ended questions from the prepared Question Route.
5. **Debriefing:**
   * Participants are thanked and informed that their feedback will inform improvements to the CourseScope design.

**Semi-Structured Interview Question Route**

The list of questions helps people talk honestly about what they felt while they used the system. It does not push them to praise or criticise. It asks how they thought and how they worked things out while they planned a course.

Warm-Up Questions

1. Can you describe how you usually plan your upcoming semester?
2. What websites or tools do you rely on most when checking course availability or professors?

During Task (Think-Aloud Prompts - Refers to when showing them the prototype of our project, Coursescope)

* What are you thinking as you look at this screen?
* What would you expect to happen next?
* What information are you currently looking for?

Post-Session Questions

1. When you were marking completed courses, how did you decide which ones to select?
2. How clear was the transition from Checklist to Eligible List?
3. What did you notice about how grade distributions or professor data were shown?
4. How did you decide which section or professor looked best for you?
5. Was there anything you expected to find but couldn’t?
6. If you used this tool every semester, which part would be most helpful to you?
7. Were there any moments when you felt unsure about what to do next?

**Findings**

In our user study, a few **phenomena (or codes/themes)** emerged from the interview data and prototype observations. These findings reveal core user needs that inform the next iteration of CourseScope. Participants interacted with the low-fidelity prototype while completing a semester-planning task, and their behaviors highlighted how CourseScope streamlined fragmented workflows and supported better decision-making.

Together, these themes reflect students’ desires for a unified, transparent, and feedback-rich planning experience.

#### **Theme 1 – Unified Planning Experience Reduces Fragmentation**

“I normally keep three tabs open, which are usable tools like Audit, RateMyProfessor, and Grades, but this shows everything right here.” – P02  
 “This saves me from jumping around just to see which professor is better. I can compare them and check eligibility in one go.” – P02.  
 “I like that I can see what’s available and what I’ve finished on the same screen. It makes planning faster.” – P01.

**Observation** - Participants kept saying that CourseScope let them stay in one place instead of hopping among multiple outside programs. They moved from the Checklist to the Eligible List without strain and felt less mental pressure.

**Interpretation** - When every planning tool sits in a single screen, people juggle fewer thoughts and choose next steps without a break in focus.

#### **Theme 2 – Balanced Course Load Awareness Improves Planning Confidence**

“I can finally see my gen eds and CS courses together instead of guessing what to mix.” – P01.  
 “It’s easier to pick moderate classes along with harder ones when you see grades and workload right there.” – P0.2.  
 “This would save me time figuring out what’s too heavy for one semester.” – P.01

**Observation:** Users looked at past grade lists and treated them as hints about how much work each course needs. They used those hints to mix one or two hard classes with multiple lighter ones.

**Interpretation:** When they see the expected workload lined up in a chart, they build a plan that feels safe - the picture removes guesswork and they face the term with steadier trust in their choices.

#### **Theme 3 – Feedback Visibility Improves User Confidence**

“It helps that the app tells me when something’s added — I don’t have to check twice.” – P02.  
 “Without that green added message, I’d wonder if it worked.” – P01

**Observation -** People watched for small signs like brief notes that pop up or a shift in color. When no sign appeared, they paused or repeated the step to check.

**Interpretation -** Give a clear sign after every tap or click so the user knows the system heard them.

#### **Theme 4 – Filter Labels Aid Sensemaking**

“The Difficulty filters help, but I wish it also showed how those levels are defined.” – P02.  
 “Seeing the filter badges on top reminds me what I’m searching for.” – P01

**Observation:** Users appreciated visible filter tags and well-organized filtering controls, but they wanted more precise definitions of the difficulty levels.  
**Interpretation:** Maintain visible filter labels and clarify their meanings through tooltips or inline text to support intuitive sensemaking and reduce confusion.

#### **Theme 5 – Unclear Ability to Revise Completed Courses**

“Can I go back and change what i checked off?.” – P02.  
 “What if I made a mistake? Is there a way to restart?.” – P01

**Observation:** Several participants asked whether the checklist was editable after confirming their completed courses. When they realized it was not obvious how to return to that screen, they hesitated or restarted the task. This confusion broke the otherwise smooth flow from Checklist → Eligible List and caused uncertainty about system flexibility..  
**Interpretation:** Users expect that course-planning tools allow continuous adjustment. Because real students often realize mid-session that they mis-marked or forgot a course, preventing or hiding the option to revise increases cognitive load and frustration.

**What do the observations theme tell us?**

Students want a single place where they see the full plan, a clear count of what they must do next, a system that answers back at once and filters that leave only the items they need. These wishes guided every change we put into the next version of the tool and now serve as the rules we follow when we design.

**Attribution**

All quotes/observations must be associated with a unique, confidential participant identifier (e.g., P1, P-Anya).

* **P01:** South Asian male, senior in **Entrepreneurship**, lives near campus. Relies on advisor recommendations and the degree audit. Appreciated CourseScope for combining completed and available courses, helping him plan both general-education and core classes for a balanced semester
* **P02:** South Asian male, senior in **Computer Science**, commuter who drives to campus. Uses Degree Audit, peer recommendations, and RateMyProfessor. Found CourseScope particularly valuable for reducing multitasking between platforms and helping plan within his commuting time limits.

Both participants represented distinct but complementary personas: **the commuter planner** and **the on-campus optimizer**—and their consistent feedback reinforces CourseScope’s potential to meet the diverse needs of students.

**Actionability**

Analysis must be specific and actionable enough to serve as direct input for the Functional Prototype.

**From Theme 1 – Unified Planning:**

* Preserve the single-dashboard design linking Checklist and Eligible Courses.
* Add a “View All Planning Data” summary tab that combines eligibility, grade distributions, and a schedule overview.
* Introduce a subtle transition or toast (“Eligible courses updated”) to emphasize continuity between steps.

**From Theme 2 – Balanced Course Load:**

* Add a **visual workload meter** or color-coded balance indicator in the Plan Summary (e.g., “2 challenging / 2 moderate”).
* We should include a brief textual cue (“Semester Load: Moderate”) based on grade data averages.
* Explore the optional “Suggested Balance” feedback that highlights when a student’s selections are too heavy.

**From Theme 5 – Unclear Ability to Revise Completed Courses:**

* Add a “Back to Checklist / Edit Completed Courses” button on the Eligible List and Plan Summary screens.
* Include a short tooltip or note such as “You can revisit your checklist anytime to update completed courses.”
* Maintain persistent progress state so revisions immediately refresh the Eligible List without restarting.

Together, these refinements make the design more informative and confidence-building, translating user feedback directly into priorities for the upcoming Functional Prototype.

**Implications for Design**

**Design Principles**

Translate empirical findings (the codes/phenomena) into a set of actionable design principles/lessons learned.

**Theme 1 – Unified Planning Experience:**User feedback revealed that students struggle with fragmented course-planning tools (Degree Audit, RateMyProfessor, UIC Grades). CourseScope’s unified interface directly addressed this need by centralizing eligibility, grade data, and scheduling into a single flow.

**Design Principle:**

Integrate all key planning data into a single, cohesive interface to reduce multitasking and cognitive load.

**Our Understanding:**Design for *information integration* rather than tool switching. When course data, grade trends, and professor options coexist within a single context, users can reason holistically about their choices instead of jumping between systems.

**Theme 2 – Balanced Course Load Awareness:**Students use grade distributions and course categories (general education vs. core) to manage their workload balance. Participants explicitly used CourseScope to assess difficulty and distribute effort across a semester.

**Design Principle:**

Visualize workload balance and course difficulty transparently to support confident planning decisions.

**Our Understanding:**Users interpret grade data as a proxy for effort, not just performance. The system should therefore visualize difficulty and provide cues that help students compose a balanced schedule.

**Theme 3 – Feedback Visibility Improves User Confidence** Students relied on explicit visual confirmation (green toast notifications, color cues) to trust that their interactions worked.  
**Design Principle:**Provide consistent, unobtrusive feedback for every significant action to reinforce user confidence and reduce uncertainty.

**Theme 4 – Filter Labels Aid Sensemaking**Participants depended on visible, labeled filters to understand search contexts. Ambiguity in “difficulty levels” caused momentary confusion.

**Theme 5 – Checorts Error Recovery**Students need reassurance that their earlier inputs remain flexible. Allowing revision maintains flow and reduces anxiety.

**Design Principle:**

* Use explicit filter labels, icons, and definitions to support intuitive exploration and clear decision-making.
* Support forgiveness and reversibility in interaction design so users can explore without fear of permanent error.

**Scope**

Address issues across information design (sensemaking, facets), interaction design (affordances, mappings, visibility), and experience design (user model vs. design model, gulfs of execution).

CourseScope’s findings inform three interrelated areas of design improvement:  
 Information design, interaction design, and experience design**.**

### **Information Design (Sensemaking & Facets)**

Participants needed to understand how courses, grades, and requirements connected. The unified dashboard supports *sensemaking* by keeping contextual data visible.

* Present eligibility, grade trends, and workload metrics within the same visual field.
* Use *faceted filters* (difficulty, time, course level) so users can explore courses across multiple dimensions without leaving the main interface.

### **Interaction Design (Affordances, Mappings, Visibility)**

Users required more precise feedback when the eligible list was updated after marking completed courses.

* Strengthen *visibility* with toast notifications (“Eligible list updated”).
* Enhance the *affordance* of filters by utilizing color, icons, and outlined buttons that clearly indicate interactivity.
* Keep applied filters visible during scrolling to maintain mapping between user actions and results.

### **Experience Design (User vs. Design Model, Gulfs of Execution)**

Students’ mental models of planning revolve around workload, commute, and professor selection—not just prerequisites.

* Align system logic with how users actually conceptualize difficulty and balance.
* Use *progressive disclosure*: start with overall balance (“Semester Load: Moderate”), then reveal details on demand.
* Bridge the execution gap by ensuring every user action (marking, filtering, or selecting) provides explicit confirmation.

**Specificity/Generality**

Be specific about what you will change, and generalize to formulate principles that other designers should address in similar apps.

### **Specific Implications for CourseScope**

* **Unified Dashboard:** Maintain integrated Checklist → Eligible List → Course Detail → Grade Distribution → Plan Summary flow.
* **Feedback Cues:** Add visible update animations or short toasts after filtering or marking completed courses as a way to provide feedback.
* **Workload Meter:** Include a small visual indicator (e.g., “2 challenging / 2 moderate”) summarizing course intensity.
* **Simplified Plan Summary:** Start with a concise overview, with optional expansion for grade data and professor comparisons.
* **Reversibility**: Add a visible, safe pathway for users to return and modify completed courses at any time. Updates should propagate instantly to the Eligible List and Plan Summary to preserve consistency.

### **Generalized Design Lessons for Similar Systems**

* **Integrate fragmented academic tools** into one consistent planning interface to support cognitive efficiency.
* **Design feedback-rich systems** that make the filtering and updating process perceptible to the user.
* **Visualize balance, not just data**—translate performance metrics into actionable indicators of difficulty or effort.
* **Bridge the user–system gap** by aligning the interface’s conceptual model with how users naturally think about their goals (like managing workload, commute, or time).
* **Enable reversible workflows**. Acadefaces should allow users to correct or refine their entries without restarting tasks, maintaining confidence and continuity

**Process**

**Evolution Explanation**

The user survey told us with precise insights into what to fix in the next CourseScope release. People wanted a clear, instant picture when they added or dropped a course (Theme 3) - we will brighten the toast colors and place them where the eye lands first. Because many students lose track of how much work they sign up for (Theme 2), we built a plain bar in the Plan Summary that shows the weekly load at a glance. Users also said the old Difficulty filter felt vague (Theme 4); we rewrote the labels and attached short tooltips that spell out what “Easy,” “Medium,” and “Hard” mean. The strongest request was for one place to plan everything (Theme 1) - the single dashboard stays - no one has to jump between screens. All of those points became the concrete targets for the Functional Prototyping phase. In response, we plan to include a persistent “Edit Checklist” control and maintain state synchronization between screens to support real-time revision.