

# First Project Assignment – Research based design report

*Made by:  
Marko Kajtazi (221542),  
Ivona Eftimovska (221519)*

## Understanding the problem

### Determining our context of interest

University learning management systems (LMS) and grading platforms are central to modern higher education, but many are criticized for poor design and inefficiency. The integration of Artificial Intelligence (AI) offers a chance to transform these tools. AI-powered LMS platforms can personalize learning, automate tasks, and provide predictive insights. For example, AI can adapt content to each learner, auto-grade assignments, and highlight at-risk students early. Such capabilities promise a more efficient, engaging, and tailored learning experience than traditional systems. Despite these opportunities, current LMS and grading systems often fall short. Platforms like Blackboard and Gradescope have been called “administrative tools” that “fall short in enhancing student learning”. Students and faculty alike report frustrations: clunky navigation, information overload, and inefficient workflows. This project focuses on designing a more inclusive, AI-enhanced digital space to make it easier for users to find and compare options, make decisions, communicate, grade, and evaluate work.

### Target audience

The primary users are university students, professors (instructors), and teaching assistants (TAs). Each group interacts with LMS and grading tools in different ways.

Students use LMS platforms to access course materials, submit assignments, check grades, and collaborate. They need intuitive navigation, timely feedback, and engaging learning experiences. Many juggle multiple courses and tasks, so clear organization and real-time updates (e.g. deadline reminders) are critical. Students also desire easier ways to communicate with peers and instructors online, as organic discussion and collaboration can be challenging in current tools.

Professors use LMS to distribute content (syllabi, readings, lectures), communicate announcements, and manage grading. They value efficient content organization and reliable delivery of materials. Grading is a major effort. Professors seek to save time on repetitive tasks and ensure fairness and consistency in assessments. Many also want better analytics to understand student progress and adjust teaching strategies.

Teaching Assistants (TAs) often act as intermediaries, helping with grading, answering student questions, and handling administrative tasks. They need streamlined grading tools (for homework, exams, etc.) and a clear overview of student submissions. TAs frequently switch between student and instructor perspectives, so consistency and ease of use in the platform are important.

## The interview plan

To ground our design in real user experiences, we will conduct semi-structured interviews with a diverse sample of 5 university LMS users:

3 undergraduate students – We include three undergraduate students who are in the middle of their degree programs and use the LMS regularly for their courses. These students are tech-savvy and have at least a couple of years of experience navigating the LMS for assignments, lecture materials, grades, and forums. They typically juggle multiple courses, each with its own information from different platforms, and they rely on these platforms daily for updates and submissions.

One professor – our sample includes one professor who teaches undergraduate courses and actively uses the LMS to manage class materials and assessments. This faculty member could be of any experience level (from a few years in teaching to a senior professor) but is familiar with using the LMS features for course delivery.

One teaching assistant – We have one teaching assistant, a graduate student who assists the professor in running the course. The TA interacts with both the student-facing and instructor-facing sides of the LMS. Often, the TA is responsible for much of the day-to-day support in the classes.

# Interviews

To dive into user experiences, we developed a semi structured interview with set of questions targeting feelings, needs, challenges, and routines. Below is a list of key questions we asked our participants (students, professors, and TAs):

## The questions for the students

### 1. LMS Usage Routine

- *“Walk me through how you use your university’s LMS in a typical week. What type of study materials and techniques does your faculty provide you with? For example, do you use books/videos, or do you learn by doing practical work and following examples?”* (This question uncovers common user workflows and important features.)

### 2. Feelings & Frustrations

- *“How do you feel when navigating through your course materials? Do you think it could in any way be made simpler?”*
- *“Can you recall a recent time it made you frustrated or delighted?”* (Aims to capture emotional responses and specific instances, e.g. confusion finding something vs. relief when a feature worked well.)

### 3. Finding Information

- *“Is it easy for you to find what you need on the platform (assignments, readings, grades, etc.)?”*
- *“Describe what you do if you can’t find something.”* (Targets the find and compare options goal - reveals search/navigation issues and any workarounds like using email or external notes.)

### 4. Communication & Collaboration

- *“Do you communicate with professors or TAs through the LMS? If so, are the discussion boards or messaging features effective for you?”* (Addresses the communicate aspect – e.g. do students use LMS forums or resort to external tools like email/Slack.)

### 5. Grading Experience (Students)

- *“How do you typically receive feedback and grades? Do the current tools (gradebook, comments) help you understand your performance?”*
- *“What do you think could improve that experience?”* (Gets student perspective on the grading interface, clarity of feedback, and timeliness.)

#### 6. Grading Process (Professors/TAs)

- *“What’s the most tedious or challenging part of grading assignments?”*
- *“If there were a tool that could improve the grading process, what would you want it to do?”* (Aims at instructors/TAs to surface pain points in grading – e.g. uploading scores, using rubrics, handling many submissions.)

#### 7. Decision Making

- *“Do the LMS tools available to you provide any help in decision-making? For instance, do they offer insights that help you decide where to focus your studying or teaching effort?”* (For students: choosing what to study next or which task to prioritize; for instructors: identifying which students need help.)

#### 8. Accessibility & Inclusivity

- *“Have you encountered any issues using the LMS due to the way it’s designed (for example, if English isn’t your first language, or if you have any accessibility needs)?”*
- *“What would make it more inclusive for you?”* (Finds out if current systems pose barriers and what improvements could make the space more inclusive.)

#### 9. Aspirations

- *“How do you envision AI (artificial intelligence) helping in an ideal digital learning space?”*
- *“What features or abilities would it have that current systems don’t?”* “(Encourages them to dream big – this can reveal innovative ideas or validate our AI enhancement focus, such as AI tutoring, smart recommendations, etc.)

#### 10. AI Attitudes

- *“What are your thoughts on using AI in your learning or teaching tools? For example, an AI that could offer help in studying or help grade assignments – would you find that helpful?”* (This gauges openness to AI augmentation and any fears, ensuring our design addresses trust and ethics.)

## Our observations

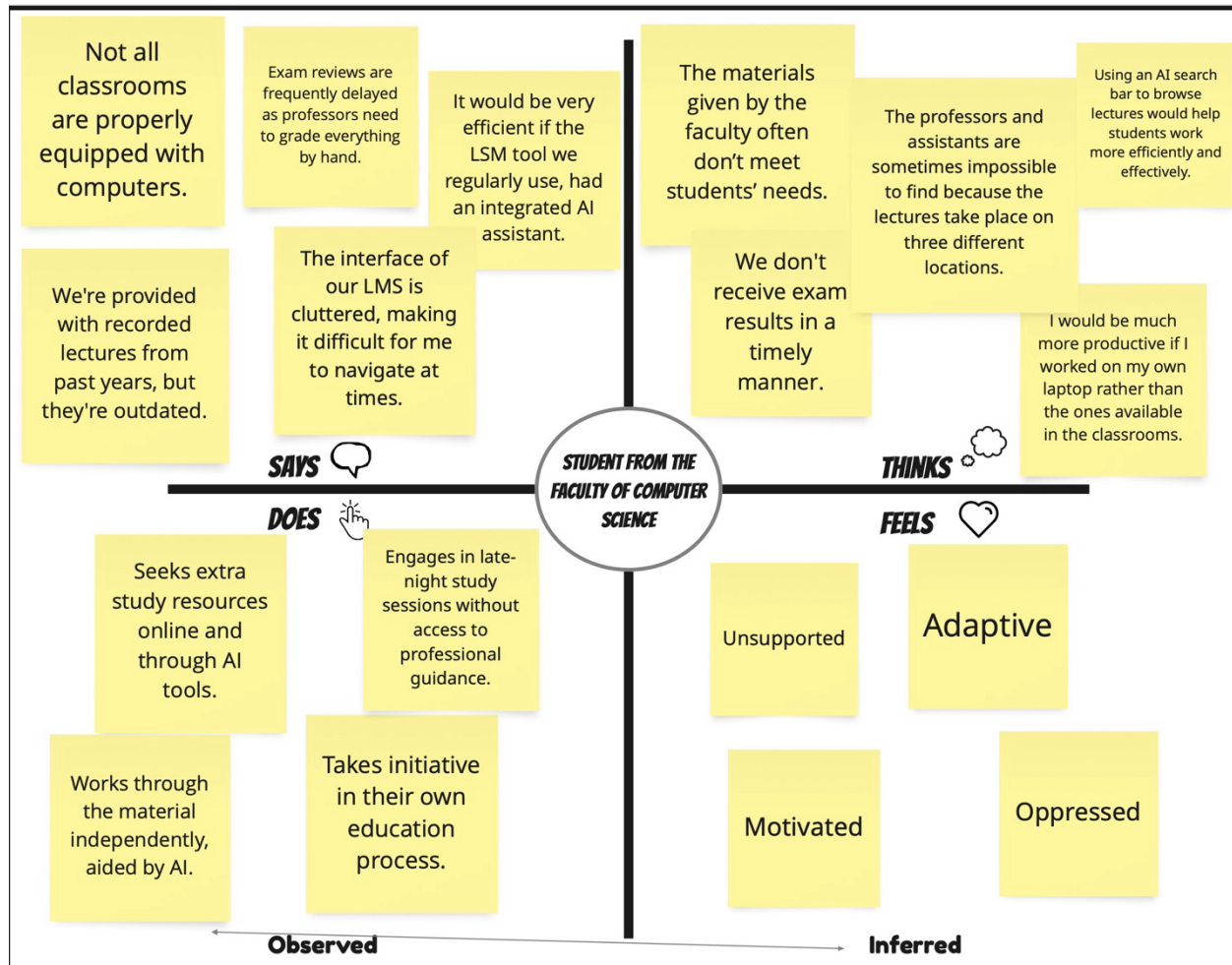


Figure: Empathy map for a computer science student

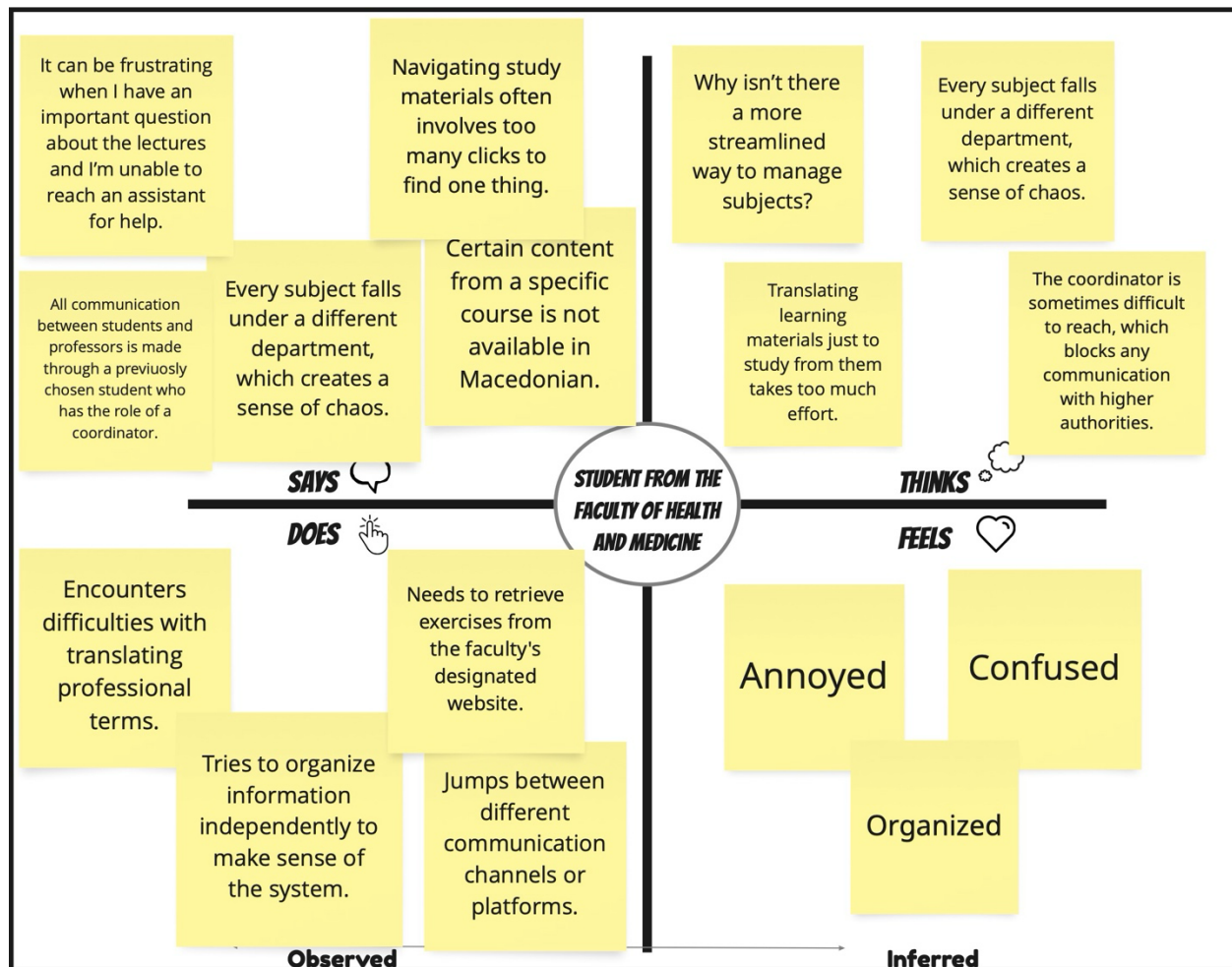


Figure: Empathy map for health and medicine student

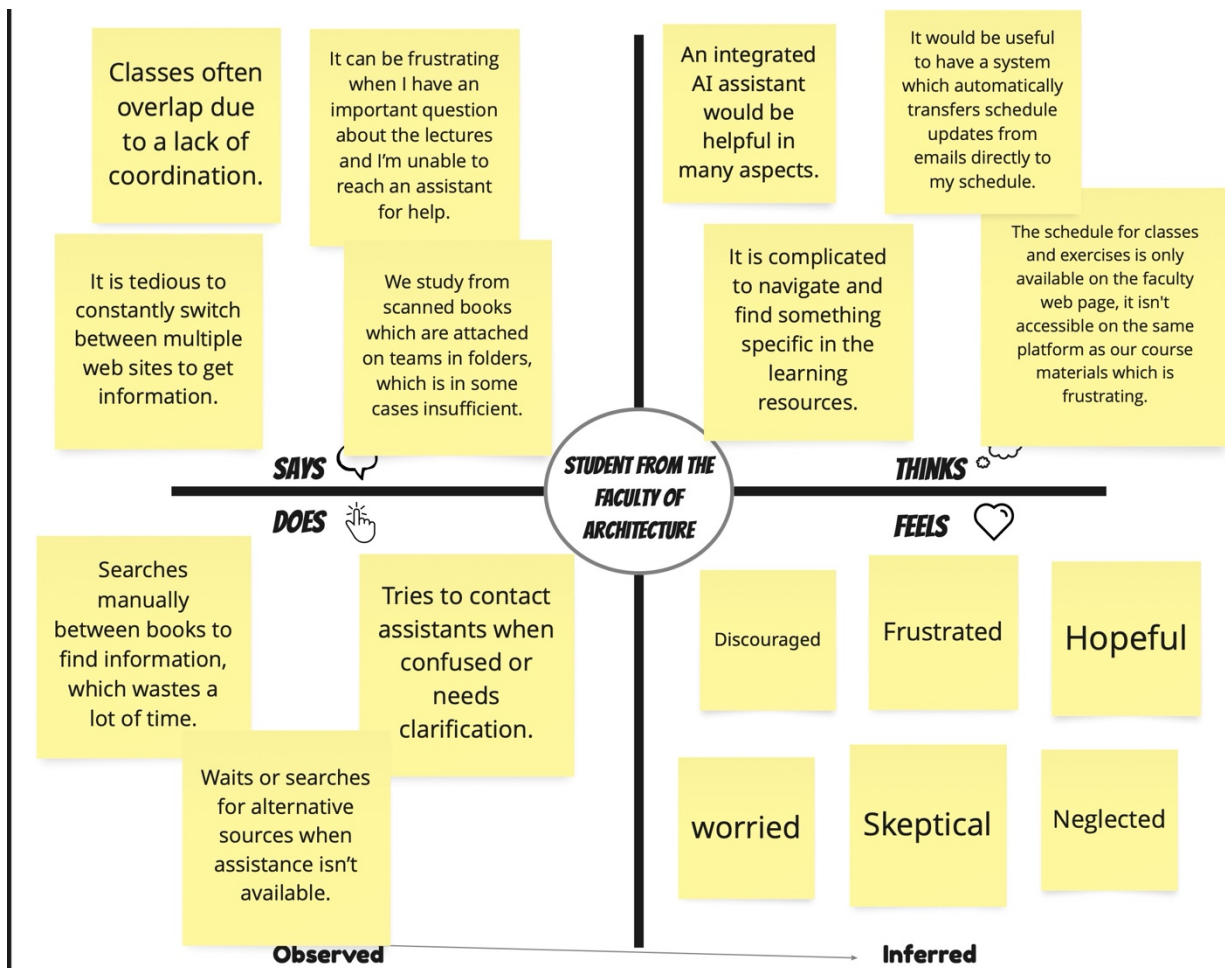


Figure: Empathy map for an architecture student



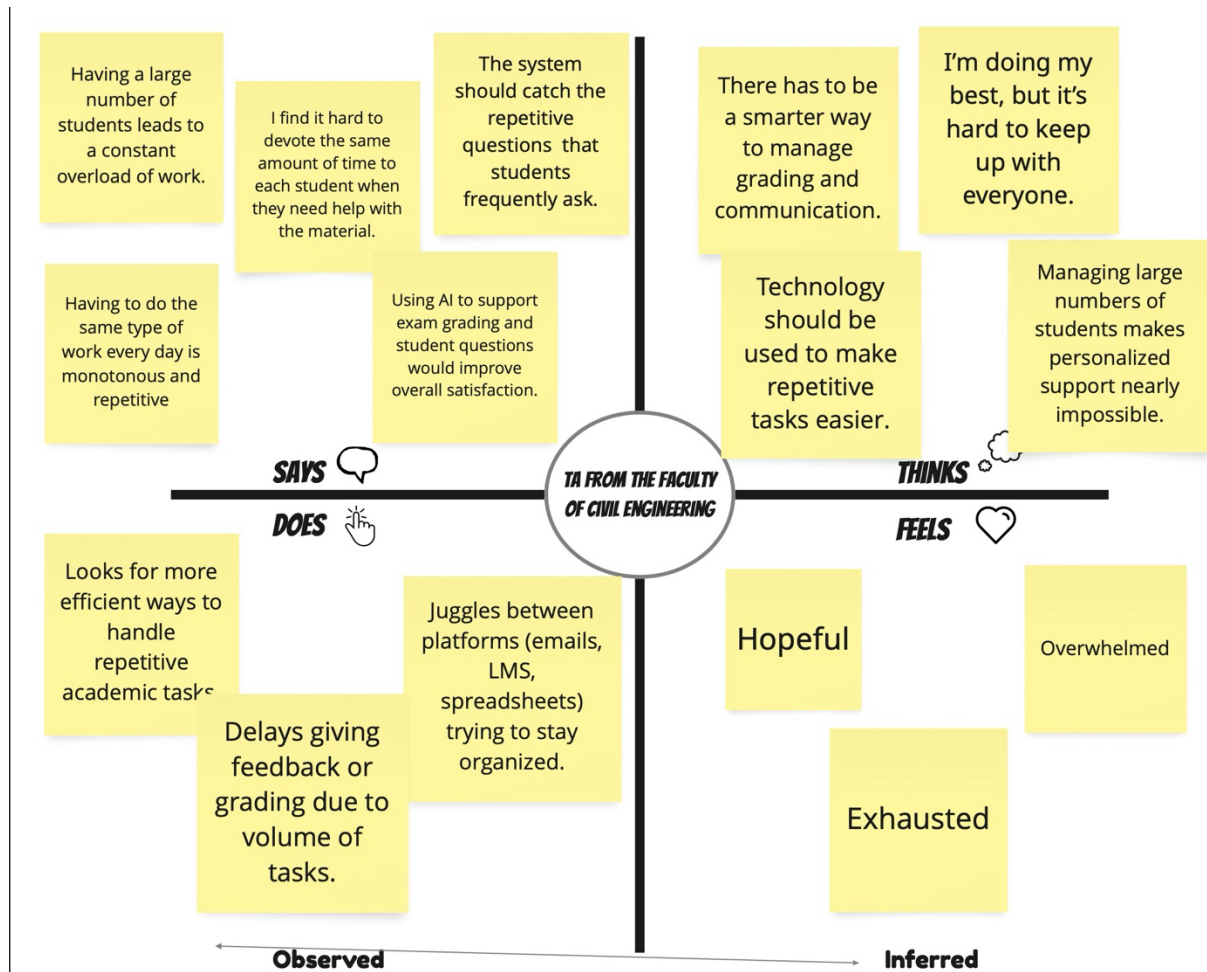


Figure: Empathy map for a civil engineer TA



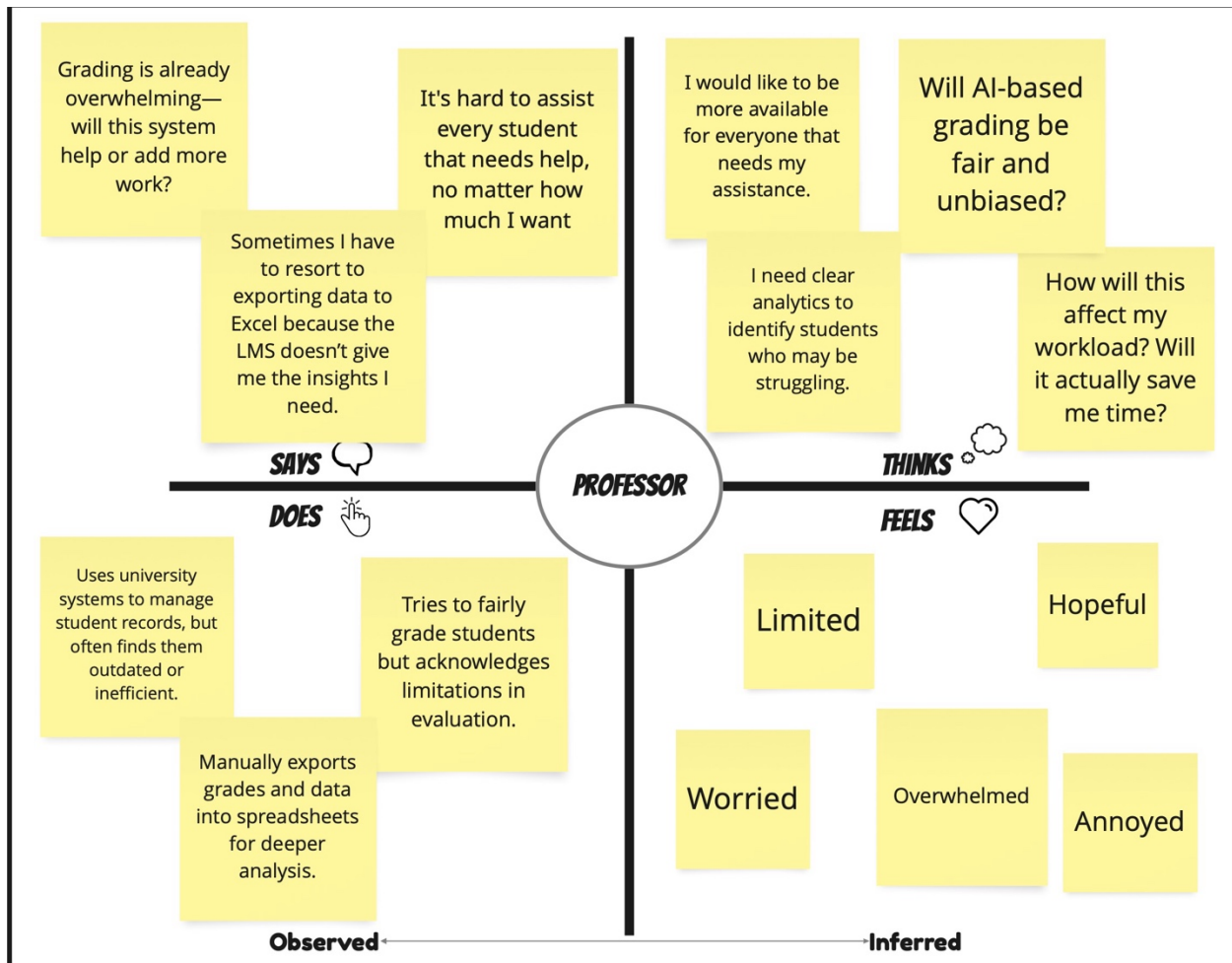


Figure: Empathy map for a professor

## Summarization of the interviews

**Empathy Map:** After interviewing users and synthesizing their feedback, we mapped out what our target users Think, Feel, See, and Do in the context of LMS and grading tools:

**Think:** Users often think that the LMS is a necessary hub for their academic work, yet many believe it's not leveraging modern tech to help them enough. Students think about staying on top of deadlines and worry "Am I missing any assignment updates?" TAs and professors think about fairness and efficiency, for example, "How can I grade all these assignments consistently and in a timely manner?" Both groups have an underlying expectation that the technology should simplify their lives, not complicate it. There's also a concern about transparency – students want insight into the factors contributing to their success, and instructors want to ensure students see the rationale behind grades.

**Feel:** Emotions run high, especially frustration and stress. Many students feel overwhelmed when juggling multiple courses on different platforms; as one put it, using the LMS can feel like *“too many clicks to find one thing”*. Instructors feel drained by tedious grading workflows; repetitive tasks make grading feel like a chore rather than an instructional exercise. There is also frustration with poor communication tools – for instance, students feel isolated when discussion boards are ghost towns or when their question goes unanswered. On the positive side, students feel supported when they receive prompt, helpful feedback. Notably, there is some hope and curiosity around AI – a few students were excited by the idea that “an AI could give me quick feedback before the professor even grades it,” while others feel skeptical or worried about AI fairness.

**See:** Users see a fragmented digital environment. Students see multiple tabs and windows: one for the LMS, another for email, maybe a messaging app, etc., because no single tool covers all their needs. They see peers forming ad-hoc group chats outside the official platform, which indicates the LMS isn’t serving their collaboration needs. Professors see piles of submissions in the queue and maybe spreadsheets they maintain outside the system to track grades. A surprising observation: some instructors still see physical paper printouts or manual processes alongside the LMS (e.g. printing out summaries of online quizzes) because they find it easier to review or compare. In terms of content, users see a lot of text-heavy pages – long lists of resources or forum posts – which can be daunting. They also see inconsistency; each professor’s course might look different (navigation items, where to find things), causing confusion when students take multiple courses. This visual and organizational inconsistency was a major pain point mentioned in interviews. They also see opportunities: for example, TAs noticed patterns (like the same question asked by many students) and thought “the system should catch this.” Overall, what they see is potential for a more unified, smarter system versus the siloed, cluttered interfaces they have now.

**Do:** Users take various actions to cope with or workaround current limitations. They frequently search their email for keywords because it’s faster to find a message about an assignment than to locate it in the LMS – a clear sign search in LMS is lacking. Students also keep their own spreadsheets, or to-do lists to track assignments, essentially doing the job the LMS should be doing in organizing their workload. Professors and TAs spend significant time doing manual operations: exporting grades, copying feedback from one place to another, or even writing the same comment on 30 submissions individually. On the communication side, if a student has a question, what they do is often skip the LMS messaging and send an email or a chat message, indicating the LMS is lacking the feature of a built-in messaging feature. Instructors “do” a lot of double-checking – they manually verify that an assignment is published correctly or that grades are calculated as intended, reflecting a lack of confidence in automation.

Many users describe feeling overwhelmed or stressed by current LMS tools. Such frustration stems from confusing interfaces and tedious workflows. Our interviews found that simplifying tasks and providing timely support would significantly improve user satisfaction.

## Research on similar products and inspirations

### FINKI LMS (Courses)

FINKI LMS is an in-house learning management system built on Moodle, used by FINKI to organize course content into sequential topics and provide detailed grading and tracking tools.

*Good features:* FINKI LMS offers structured course organization with clear progression, robust assignment workflows, advanced grading tools including rubrics, and integrations like plagiarism checkers that help ensure academic rigor and fairness.

*Pain points:* Important materials may be buried deep within sequential modules, requiring excessive scrolling or manual searches. New users can feel overwhelmed by the lack of intuitive shortcuts to access frequently used content.

*Key takeaway:* While FINKI LMS excels in delivering comprehensive academic functionality, its design would benefit from modernizing the interface to enhance ease-of-use and quick access to vital information.

### Gradescope

Gradescope is a specialized grading platform widely used for assignments and exams, especially in STEM courses.

*Good features:* Gradescope addresses grading pain points directly. Instructors can scan or upload student submissions (even handwritten papers) and grade them online. A standout feature is its AI-assisted grading: the system uses machine learning to group similar answers together.

*Bad features:* Since Gradescope is specialized, it doesn't manage broader course content or communication – it's not a full LMS. Users face a learning curve to utilize all features (setting up templates for assignments, understanding the interface).

## Blackboard

Blackboard is one of the oldest LMS platforms, offering a wide range of features for course management.

*Good features:* It has a comprehensive set of tools (assignments, quizzes, discussions, grade center) and supports complex administrative needs. Recent updates by Anthology (Blackboard's parent company) are integrating generative AI in novel ways. For example, Blackboard now includes an "AI Design Assistant" to help instructors auto-generate course content like modules and assessment questions.

*Bad features:* Historically, Blackboard has a reputation for a "cumbersome interface". Users often describe it as unintuitive and slow; one educator even called navigating Blackboard "point-and-click Hell", noting it's a time drain.

*Key takeaway:* We admire Blackboard's powerful capabilities and new AI initiatives (like goal-tracking and AI tutors), but our design should avoid its trap of complexity. Streamlining workflows is essential – features are only useful if easily accessible. AI features must be integrated in a seamless way (not adding more clicks). Blackboard's experience underscores the importance of user-centric design even in a feature-rich system.

## Brainstorming ideas

With the above opportunities in mind, we generated a wide range of ideas, without filtering. Some of the brainstormed ideas included:

- **AI-Powered Universal Search Bar:** A search that not only looks up keywords but can answer questions about the course (e.g. "When is the next quiz?" or "Show me all assignments due next week") using semantic understanding. This could include filtering by type (notes, assignments, discussions) and even searching within uploaded PDFs or videos transcripts.
- **Personal AI Study Coach (Chatbot):** An assistant students can chat with on the LMS to ask questions like "I don't understand this concept" and get explanations, or "What should I study next?" and get a personalized plan. It could even quiz the student with flashcards generated from class notes.

- **AI-Generated Comparative Study Aids:** A tool that takes all student submissions for an assignment and identifies common mistakes or exemplary answers. It could then produce a summary for the class: “Here are 3 common errors in the latest assignment and 2 examples of creative solutions.” This helps students compare approaches and learn from peers, guided by AI analysis.
- **Smart Notification Digest:** Instead of sending every minor update as a separate notification, the LMS could use AI to compile a daily or weekly digest highlighting what’s important for each user. For example: “3 new forum posts in Calculus (2 from your group), 1 assignment feedback released in History (score: 85, with comments), upcoming deadline tomorrow for Lab report.” This reduces noise and helps users make decisions on what to address first.
- **Engagement Hub:** An AI-powered section of the LMS that aggregates discussion activity and prompts interactions. It alerts instructors when questions remain unanswered and nudges students to form study groups, while summarizing long threads and auto-generating starter questions to boost engagement.
- **Decision Dashboard for Instructors:** A dashboard that uses analytics to highlight things like “Which topic did students struggle with most on the exam? (with an AI-generated suggestion of supplementary material)” or “These 5 students haven’t logged in for a week, you might want to reach out.” Essentially, AI crunches the data and helps instructors prioritize their interventions.

We generated dozens of ideas like these. After brainstorming, we evaluated them against our research findings and user needs. Key criteria included: Does this solve a real user pain point? Will users likely adopt this? Is it technically feasible with AI today? Does it align with the goal of a more inclusive, efficient space? And mainly, is it feasible to implement these features considering the deadline and the knowledge we have obtained until now as undergraduates.

### Top three ideas selected:

1. **LMS AI Assistant – an integrated chatbot + smart search:** This idea combines several related concepts into one cohesive assistant accessible throughout the platform. Users (students or faculty) can ask it anything: “Where can I find my assignment feedback for last week?”, “What’s the average score on the midterm?”, or even “Explain the concept of binary search from class, I’m stuck.” The assistant would use the course data (syllabus, resources, posts) and perhaps external knowledge to answer. We chose this as a top idea because it directly tackles

finding info, decision support, and communication. It acts as a friendly front-end to the complexity, aligning with the insight that users want powerful help but in a simple way. Based on user feedback, we'd ensure its transparent (citing sources for answers, so students trust it) and context-aware (knows which course you're in, etc.). This assistant could reduce frustration significantly – instead of clicking through menus or waiting for an email reply, users get immediate support. It essentially augments the LMS with a 24/7 virtual TA for everyone.

2. Intelligent Grading Studio – AI-augmented grading interface: This is aimed at professors and TAs to make grading faster and more consistent. The Grading Studio would allow instructors to view all submissions for a question side-by-side (if desired) and see AI-generated grouping of answers (e.g. 10 students made the same mistake in question 2). It would also suggest feedback comments: for instance, “These answers all missed mentioning X; suggest comment: ‘Remember to include X in your answer.’” Instructors remain in control – they can accept, edit, or ignore the suggestions – but it saves them typing the same comment repeatedly. For quantitative or programming assignments, the AI could auto-grade or flag anomalies (like potential plagiarism or if a student's answer is unique). We selected this idea because grading pain came up in interviews, and Gradescope's success validates the impact.
  
3. Engagement Hub – AI-driven communication and analytics center: This idea addresses the community and engagement aspect. The Engagement Hub would be a section of the LMS that aggregates discussion activity, prompts interactions, and provides insights. For example, it might highlight: “No one has answered Alice's question in her email for 2 days. (Click to answer or summon AI help)” for instructors, or for students: “5 classmates are interested in forming a study group for Project 1 – join them.” It could use AI to summarize long discussion threads to encourage students to participate without reading everything, and even auto-generate starter questions if a forum is inactive (like an icebreaker related to course content). Another feature: an AI mentor could pop into a discussion with a Socratic question if the conversation is going in circles, guiding students to think deeper. We chose this idea because it targets the less tangible but vital aspect of engagement and communication.

In conclusion, this research-based design report captures an iterative journey: from understanding user frustrations and needs, through analyzing current tools, to defining key opportunities and ideating innovative solutions. By leveraging AI thoughtfully, we aim to design a next-generation LMS/grading platform that is inclusive, supportive, and efficient, where students, professors, and TAs can find information quickly, make informed decisions, communicate effortlessly, and grade or receive feedback in a fair and timely manner. With a human-centered approach and the power of AI, the future of digital learning space can truly empower its users and transform education.