

Human-Computer Interaction Design

Understanding

Our project focuses on improving educational tools using AI, which will make them more efficient, accessible and user-friendly.

Target users for this project are learners and educators. Where students are using AI for personalized learning, simplified explanations of concepts, test their knowledge, note taking and research.

Professors and teachers can use AI for grading, managing a course, doing evaluation of the student success, plagiarism detection. Those who are responsible for creating educational content such as materials, quizzes and many more interactive contents, AI helps to design it better and with smaller effort.

The context of interest is to use AI to enhance digital educational tools. The goal is to design a system which will be easy to discover, making learning fun and enjoyable, help to reduce workload such as grading for teachers, note taking, flashcards for students and so on.

The information will be gathered from students, professors, educational content creators.

- Students, the criteria for student selection includes high school and university students from whom we will select individuals with different academic performance and backgrounds.
- Professors are chosen from different courses, education levels, the level ability to use digital tools and adapt AI to their work.
- Educational content creators can provide information about how AI can improve the creation of content, learning it, making it more accessible and adaptable.

Questions that are planned to be asked:

General:

1. What were your thoughts about ai before you used it?
2. What do you use the ai for the most?
3. Do you use ai to help you while you study?
4. What apps have you used in the past, that has helped you learn something?
5. In which parts of your studies do you use ai the most?
6. What have you tried to learn from the internet?
7. What makes you feel frustrated about ai?
8. How often do you use ai and for what?
9. What other sources have you used to learn in the past?
10. How do you study for exams?
11. How did you start using ai?
12. Does ai give you different solutions than the class solutions and was that ever a problem?
13. Have you ever had problems where ai is not enough for you?

14. What apps have you used while studying?
15. Have your professors ever asked questions during online lectures and has this helped you?
16. What do you use AI for the most?

For students:

1. How do you use digital tools for learning?
2. What is the most frustrating part about digital learning process and what can be better?
3. How can learning with AI make the learning process easier and fun?
4. What are the issues that come up while trying to understand a concept with AI?
5. How effective is AI on your learning process? What is missing and can be improved by your side?
6. Would you use AI to track your learning progress?
7. Is using AI effective on learning tough topics for example the topics that require more critical thinking?
8. When was the last time you struggled to understand a topic. What did you do to get through it?
9. Would it be great to use AI to schedule and organize your learning materials?
10. Is resource searching process frustrating?

For teachers:

1. How are the grades of the students evaluated?
2. Which tasks such as grading, course management, plagiarism detection take most time? Have you ever thought about using AI to automate these tasks? If yes how effective were the results, if not what were the drawbacks.
3. What customization tools are missing in current AI tools?
4. How could AI improve the design process of interactive materials?
5. What features can make AI tools more useful?
6. When students don't understand a material, how do you adjust your teaching methods?

For educational content creators:

1. How could AI make educational tools more accessible and adaptable for learners?
2. What features can enhance content creation?
3. How should AI tools balance between doing things automatically and giving you control over process?
4. What are the challenges that are faced during the creation process of materials?
5. Would it be great to use AI to generate or suggest new content based on the student's performance and feedback?
6. What are the concerns when you use AI to create content?
7. How do you feel about the changes that occur in delivery of education using AI?
8. What was the last time you faced difficulty during content creation? Do you think that AI tools can help in creating content?
9. Do you think AI will make the content more engaging?

Interview

Person 1

What were your thoughts about AI before you used it?

- I wasn't expecting it to be this developed and useful. I thought it would be like google, helping you to search pages

What do you use the ai for the most?

- To help me be more organize, help to structure my project, and to find resources.

Do you use ai to help you while you study?

- Yes, mostly for math classes, when I wasn't in class or when I don't understand something, I ask ai to explain the concepts.

What apps have you used it in the past, that has helped you learn somethings?

- Duolingo and wordle. I don't think Duolingo is helpful for helping you learn the basics and getting you in the hobbit of studying. Wordle was expanding my vocabulary. Actually, it would be good to have an ai giving you custom wordles.

- I like using online pomodoro timers to help me concentrate.

In which parts of your studies do you use the ai the most?

- Most of my exams have essay style questions, but it I use it the most for the tests and quizzes.

What have you tried to learn from the internet?

- Mostly science and math-based things I have watched videos in those. Also, I really like animated history videos to help me learn. But usually, when I try to learn from the internet it isn't successful. I learn better when someone is explaining stuff to me in person or when we are in groups.

What makes you frustrated about ai?

- When I was using it for statistics, it was using the wrong methods and formulas. I think there should be something like a warning about these things.
- I don't think ai is as understandable as other people's explanations.

Person 2

How often do you use ai and for what?

- I use it for all my projects, to help me do research and get to the information easier, I want it to get its information from the books, but it only gives me the books. I also use it to either sum up the lectures when I'm studying or to directly explain the concepts to me.- I get help for the steps of the projects. It explains to me what kind of designs or drawings I can make and tells me the techniques I can use. I have tried to get it to draw pictures, but it is not good at that.

- When I have tried to get documentations from ai, it gives shorter explanations and not enough information.

What other sources have you used to learn in the past?

- I have used the websites where people share their homework with each other, which was very helpful. I have also used Duolingo, but I don't find it very

successful because it was repeating the same things all the time.

What makes you get the frustrated about ai?

- Sometimes it doesn't give good enough information about my questions. The pictures it creates isn't in the university level, also it doesn't solve most of the exercises I sent to it. It either asks me for the steps to solve it or tells me how to solve it instead of doing the exercises itself. Sometimes it skips some steps, or it just gives the wrong answers.

How do you study for exams?

- I usually summarize the lectures and think about the questions professor can ask.

Person 3

How did you start using ai?

- Most of my friends were using it, I saw it from them. I used to use google for my research and to get help. Now I use it for almost everything, it gives more information than google. It helps with all my assignments.
- I like how it explains stuff to me step by step. Makes it way simpler than the explanation in class.

Does it ever give you different solutions than the class solutions and was that ever a problem?

- Yes, sometimes it uses different formulas and techniques to solve the problems.
- Usually, I use ai's version of solving the problems because it is simpler.

Do you ever use ai while studying?

- Yes, because we sometimes have to answer 200-400 questions. I ask ai to answer those for me so that I can directly study from there.

Have you ever had problems, where ai is not enough for you?

- No, because I find that it gives good information about my department. What else have you used for learning?
- I used to use videos to learn things, but now, I only use ai.
- Also, I have used flora app, which blocks your phone while you study. This helps me concentrate.

What about when you study, how do you use ai then?

- Usually, first I read the material and then I ask ai to explain it to me. I also use it to give me more ideas. It is really great at giving innovative ideas.
- I used to summarize the lectures myself but now, I use ai for it.
- I have tried a routine of studying that ai recommended, and I saw improvement on my grades.

Person 4

What apps have you used while studying?

- I use mostly the dictionary and google. But mostly I use books to study. I like to study in groups.

Have your professors ever asked questions during online lectures and has this helped

you?

- Some of them has, but I didn't see any improvement from it.

What do you use ai for the most?

- I ask it to comment on my thoughts or to give me more ideas like mine. Because I think that it is really successful at that.
- I also use it to help me when doing projects and any research.
- When I struggle to understand something, I ask ai to explain it simpler.

For teachers, grading large assignments and detecting plagiarism is the job that is taking the most amount of time. Automated grading tools were useful but grading things like essays is requiring human intervention. The thing that was missing in ai grading systems is that it should give feedback and make grading easier by somehow making it able to grade more complex homework's, exams and so on. It could be a good idea by using ai while a student is studying a topic, give them real time analytics and predict the areas where they can struggle.

When a topic is not understood by a student teachers are using alternative explanations, real world examples and this thing can be adapted to ai by based on the student's feedback.

For students, most of the students from different majors are using ChatGPT for explanations. While some of them were using digital flashcards as learning method some of them were finding this time consuming since finding flashcards that is covering whole material as it should is kind of hard, making them by themselves is also time consuming. So, the thing that can be understood is that ai is not good at creating complete and accurate learning materials since it can miss important details.

As sometimes ai cannot generate correct answers or provide reliable explanations, students may need to double check the information through trusted sources. AI is having a good impact on students where they need to have quick clarifications, but it is not as good as being an interactive study tool.

One of the students struggled while studying probability and statistics concepts, which made the learning process more challenging. However, with the help of AI tools like ChatGPT, the student was able to receive clearer explanations and guidance. While AI can sometimes simplify complex topics, it's still important to check the information.

The thoughts of educational content creators were that AI should help automate content structuring, generate practice questions, and suggest engaging visuals. It should also provide analytics on how learners interact with the content. The quizzes that are generated by AI should be editable so that they can be corrected before publishing them.

Automated grading tools are great for marking objective questions like multiple-choice or fill-in-the-blank tests. However, tasks that need personal judgment, like essays, presentations, or projects, still need human involvement. AI can be more helpful if it goes beyond just grading. For instance, it can point out areas for improvement or common mistakes in student's work, which can save teachers time.

AI could also help grade more complex exams, like coding assignments or math problems, by looking at the logic, steps, and accuracy of the answers. It can then give helpful feedback on how the student approached the problem.

Research on Similar Products

There are 3 similar products which we did our research on. Those are Anki, Otter.ai, Perplexity. And based on our interactions with those systems we did the following evaluation.

1. Otter.ai

<i>Pros</i>	<i>Cons</i>
Provides transcripts of the livestream.	Does not integrate with different platforms.
Provides transcripts for offline video and audio.	Does not generate quizzes based on the transcripts.
Generates summaries for the transcripts.	Too complex user interface.
Transcripts can be shared.	Does not generate live quizzes to engage active learning.
AI chatbot.	

2. Anki

<i>Pros</i>	<i>Cons</i>
Popular flashcards can be used.	The AI that is integrated for custom flashcard creation is not working properly.
The way of asking	Does not ask the right question to give you the product that you need.
Flashcards are separated based on the subject.	The difficulty level of the questions is not right for the needs of the students.
Cards can be imported from different type of documents.	The interface of the flash cards is confusing and quite boring.
Flashcard creation is easy and good.	
It keeps a record for the spaced repetition.	

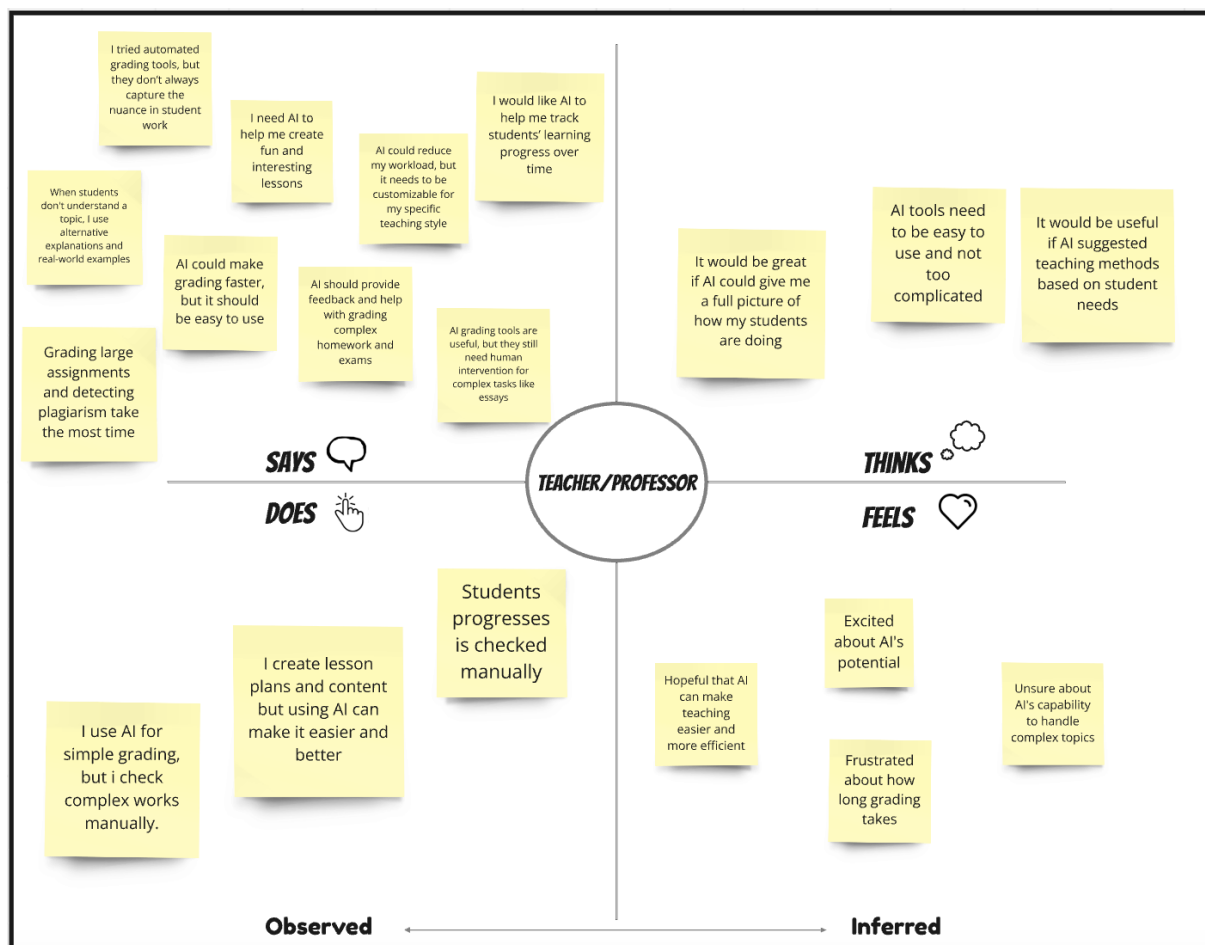
3. Perplexity

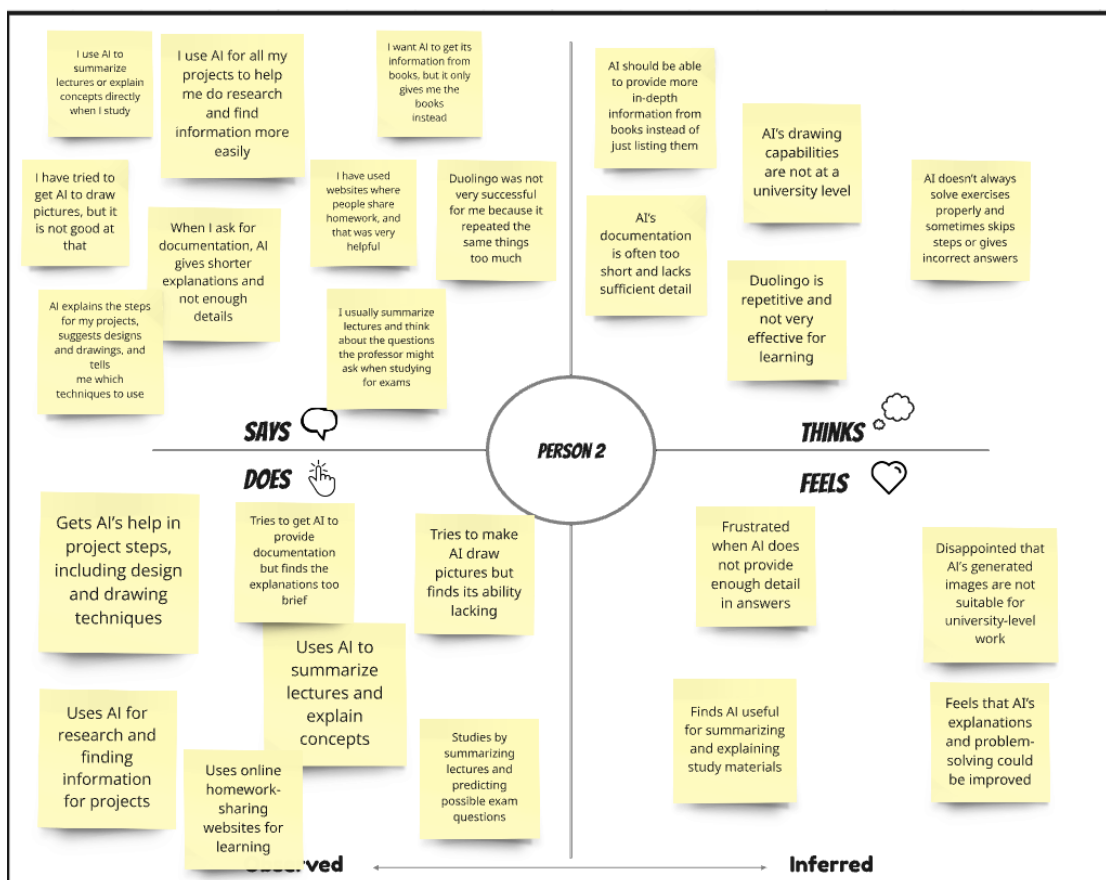
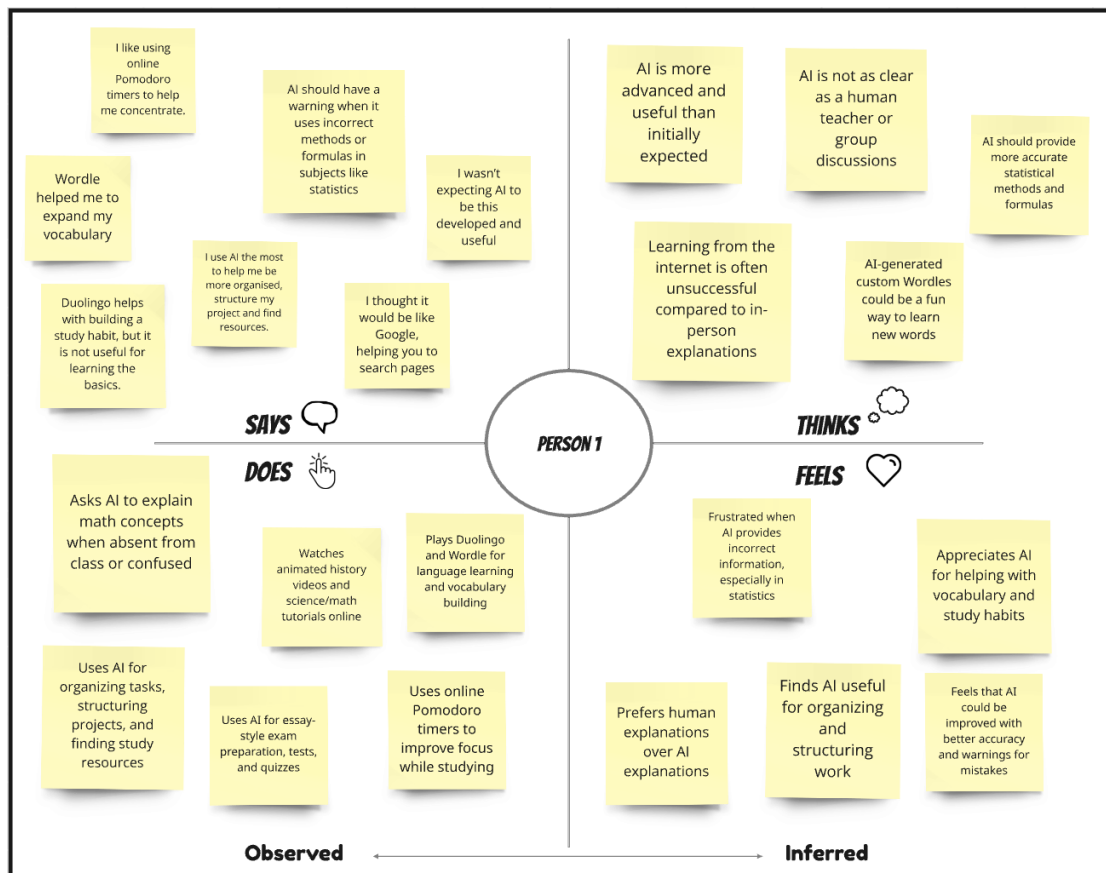
<i>Pros</i>	<i>Cons</i>
The design is futuristic, and it takes attention to the answer.	Lacks interactive features for learning, it is just a search bar.
It gives you the resources it has used while finding the answers.	
Instead of giving you just the answer, it remembers the	

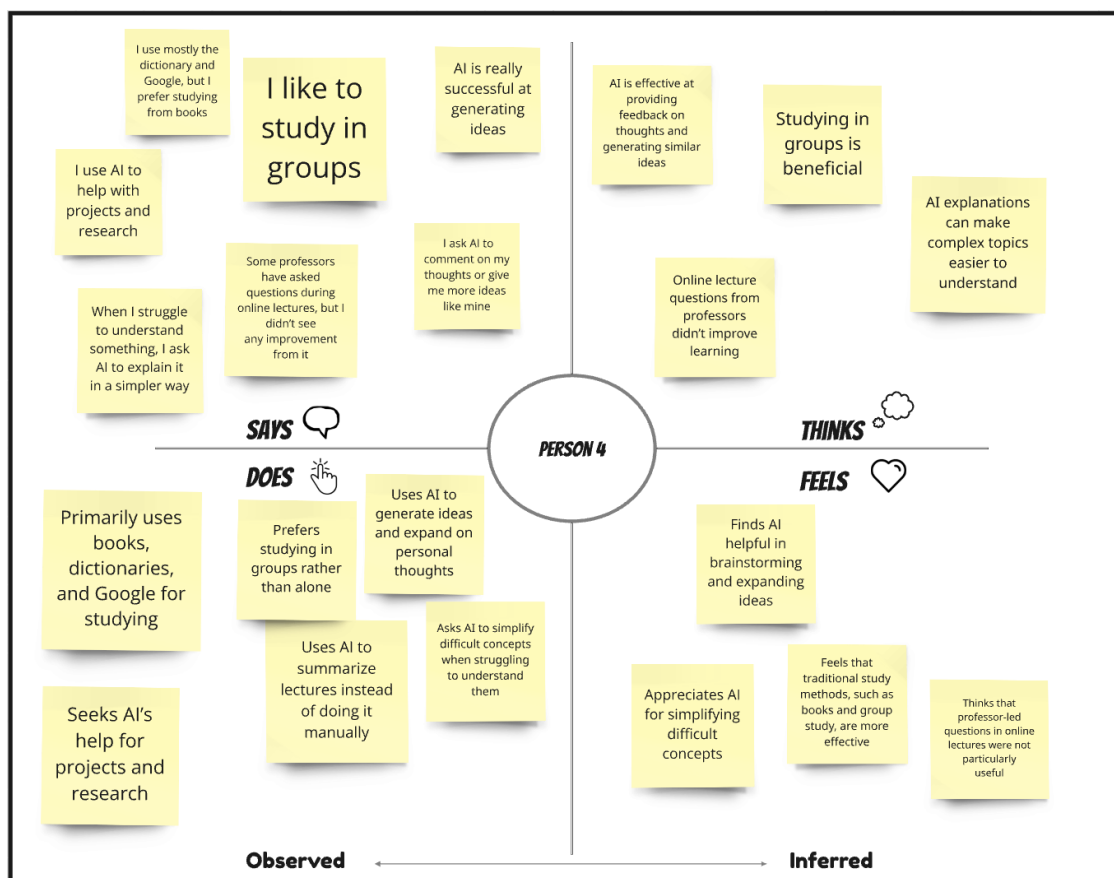
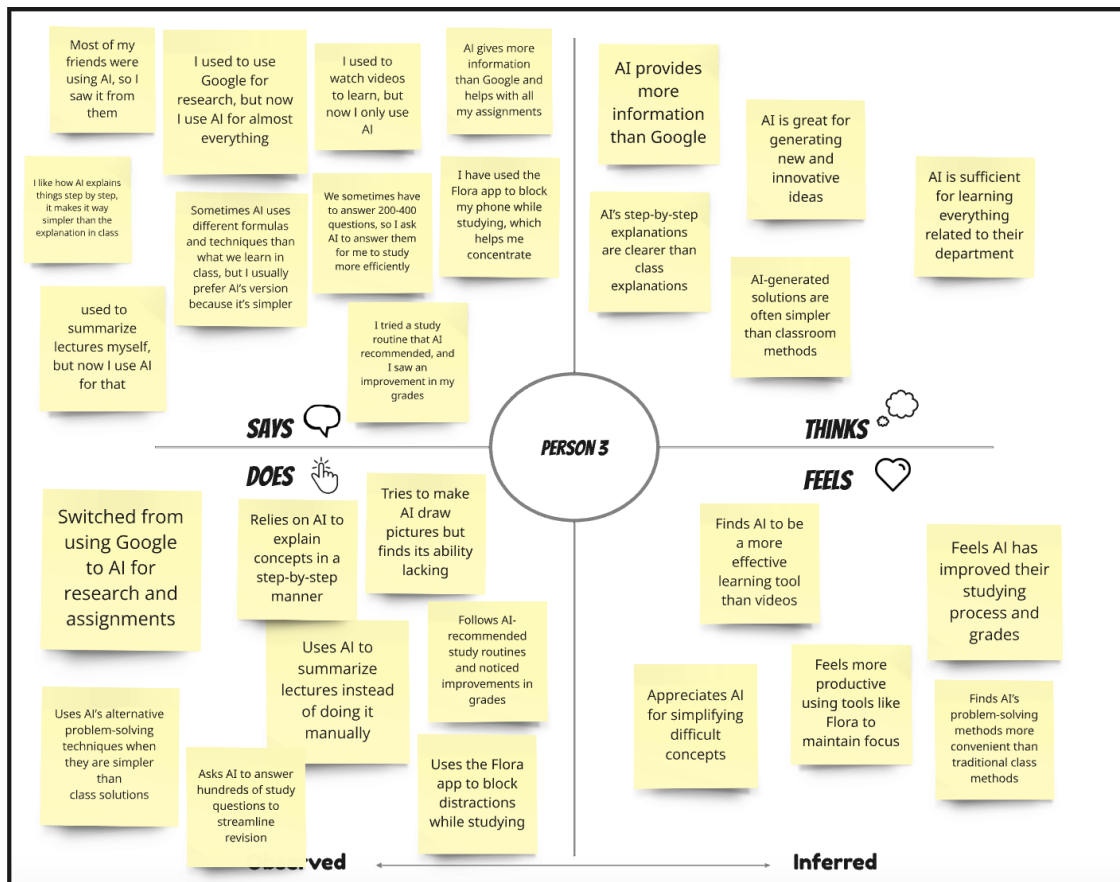
previous questions and keeps a conversation.	
It has 4 different interfaces for news, library and the search bar.	

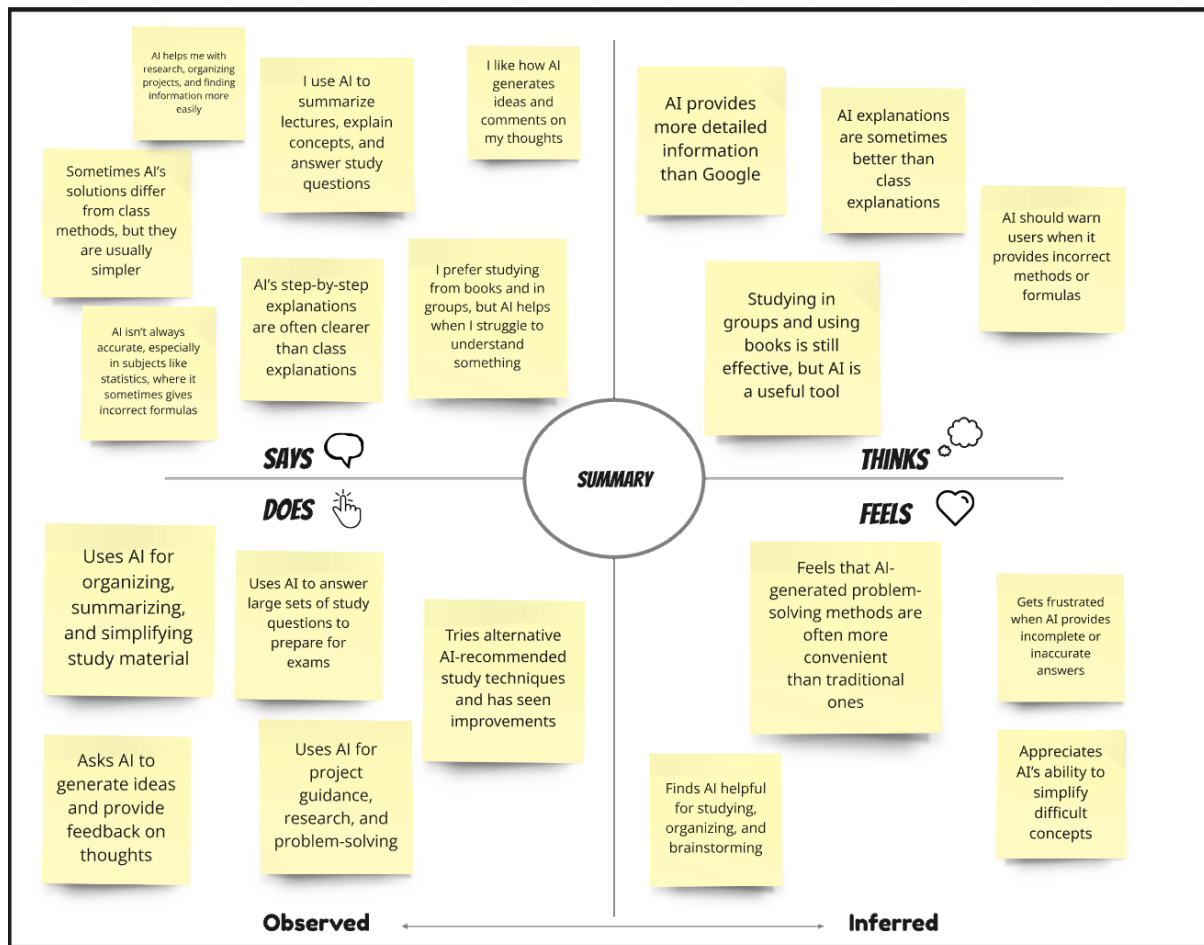
As conclusion while these systems are offering useful features like flashcards, transcripts, AI assistance they lack integration, interactive learning and user-friendly design. For better learning experiment and engagement AI accuracy and interface simplicity is a must.

Define and Ideate









Discussion of Surprises and Contradictions

- Contradictions: While users said that they prefer customized options, most of the time they were using the default settings of the system.
- Surprising trend: Large number of users rely on external tools to complete missing functionalities.

Initial Assessment of User Needs and Insights

- Users need a way to complete tasks with fewer tasks and less clicks.
- They require better resources and conceptual features.
- Users need to be able to track their progress and receive real time feedback based on their actions.
- The main point for users is the unclear instructions.

Contributors and Brainstorming Insights

We engaged with college students from different majors, with teachers and those who are creating content for a course. As a takeaway we need to prioritize simpleness in user interface and implement features that will help conceptual thinking.