Building a System to Help Late/Distracted Students Catch Up in Real-Time Online Lectures

CS473 Design Project Pitch - MinCho Avengers

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Motivation: Challenges in Real-Time Online Lectures

Being late or losing track of content in real-time online lectures is very common.
It is especially detrimental in real-time online lectures because they:

- Offer **less smooth and responsive interaction** than offline lectures
- **Increase social pressure** when asking questions due to
  1) lack of proximity and 2) public visibility
- Have trouble following online chat discussion that are **fast and chaotic**

Missing out on lecture content penalizes students by losing flow and context crucial to content comprehension in a limited time setting.

Evidence 1: People get distracted more often online

Total 22 participants

“During offline classes I can at least whisper to the person next to me to ask if i've missed anything important…”

“Awkward to ask again because it seems like I spaced out.”

“Very weird to announce to the whole class that I have to use the bathroom!”

95.5% have missed parts in online lectures

AND

Increased social pressure when catching up than in offline lectures

Evidence 2: Synchronous online communication is chaotic

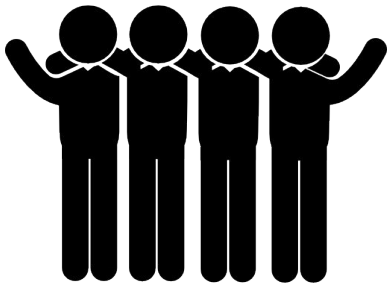
- Synchronous online communication is fast and chaotic that makes users difficult to follow. [1]
- Techniques developed for offline or asynchronous online communication cannot be directly applied. [2]

We must develop a new technique to help users catch up in synchronous online communications.

[1] Doing synchronous online focus groups with young people: Methodological reflections Fiona, Marianne, and Nichola, 2007
[2] Online moderation of synchronous e-argumentation [Asterhan and Schwarz, 2010]

Why Social Computing?

Machine Solution
● Automated models exist, but quality is subpar ● Jargons, accents, difficult words, and proper nouns hinder voice transcripts



Crowd Solution!

Expert Solution
● Expert help is inefficient due to 1) large responsibility on one person 2) varying quality

Problem Statement

In real-time online lectures,

being late or losing track of the content ***heavily penalizes the listener in comparison to physical lectures****,*

leaving large gaps of information and reducing comprehension going forward.

Identified Task & Why They Matter

Helpee

- Identify what content was missed
- Ask timely for clarification on the missed part
- Understand the answers

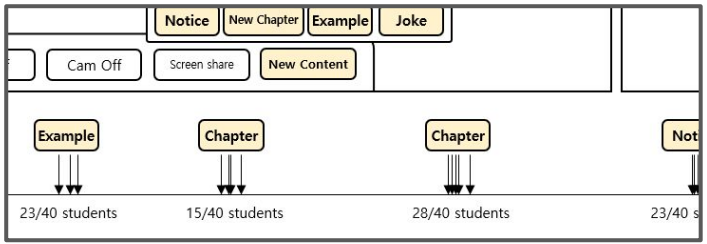
Helper

- Follow the context and flow of the lecture
- Understand and respond to questions in real-time

Solution Features

Lecture Timeline

- Generated by the helpers
- Used to view corresponding lecture materials
- Used to click on to ask questions

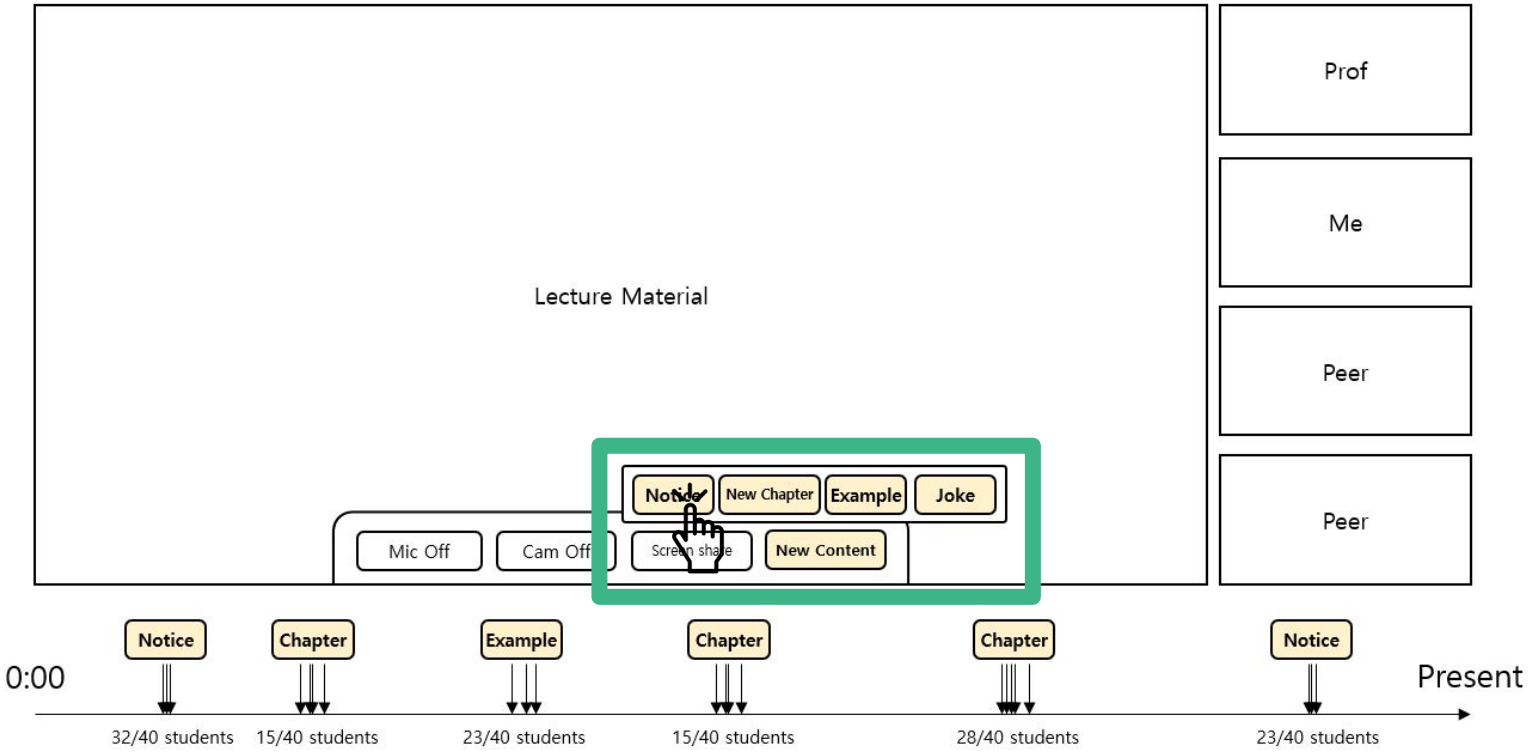


Q&A Thread

- Generated by the helpees asking question
- Answered by any helpers, with anonymity

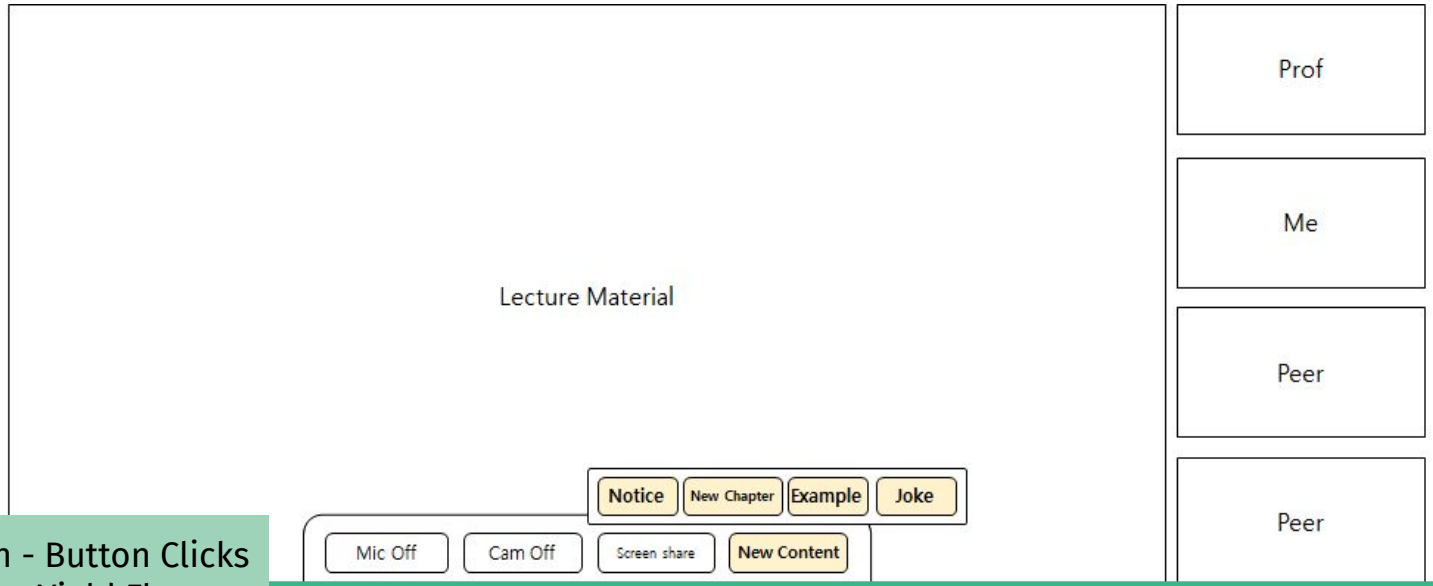
Helper

Identify segments of the lecture with buttons, collectively generating the lecture timeline

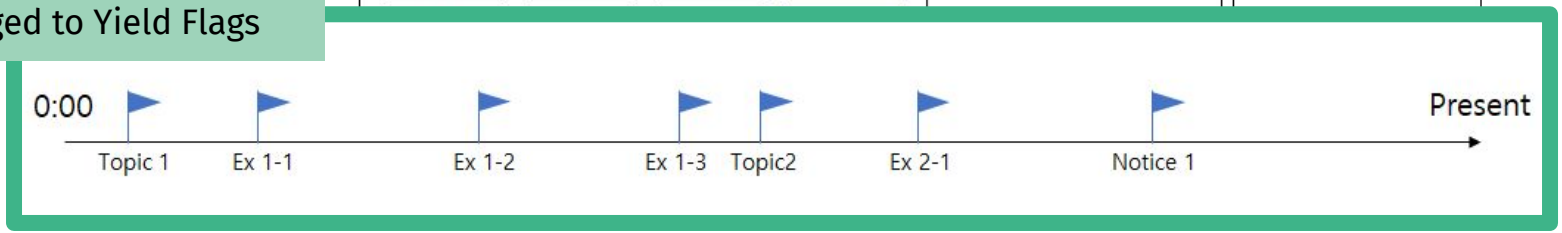


Helpee

Watch the helper-generated timeline to identify the lecture segment they missed

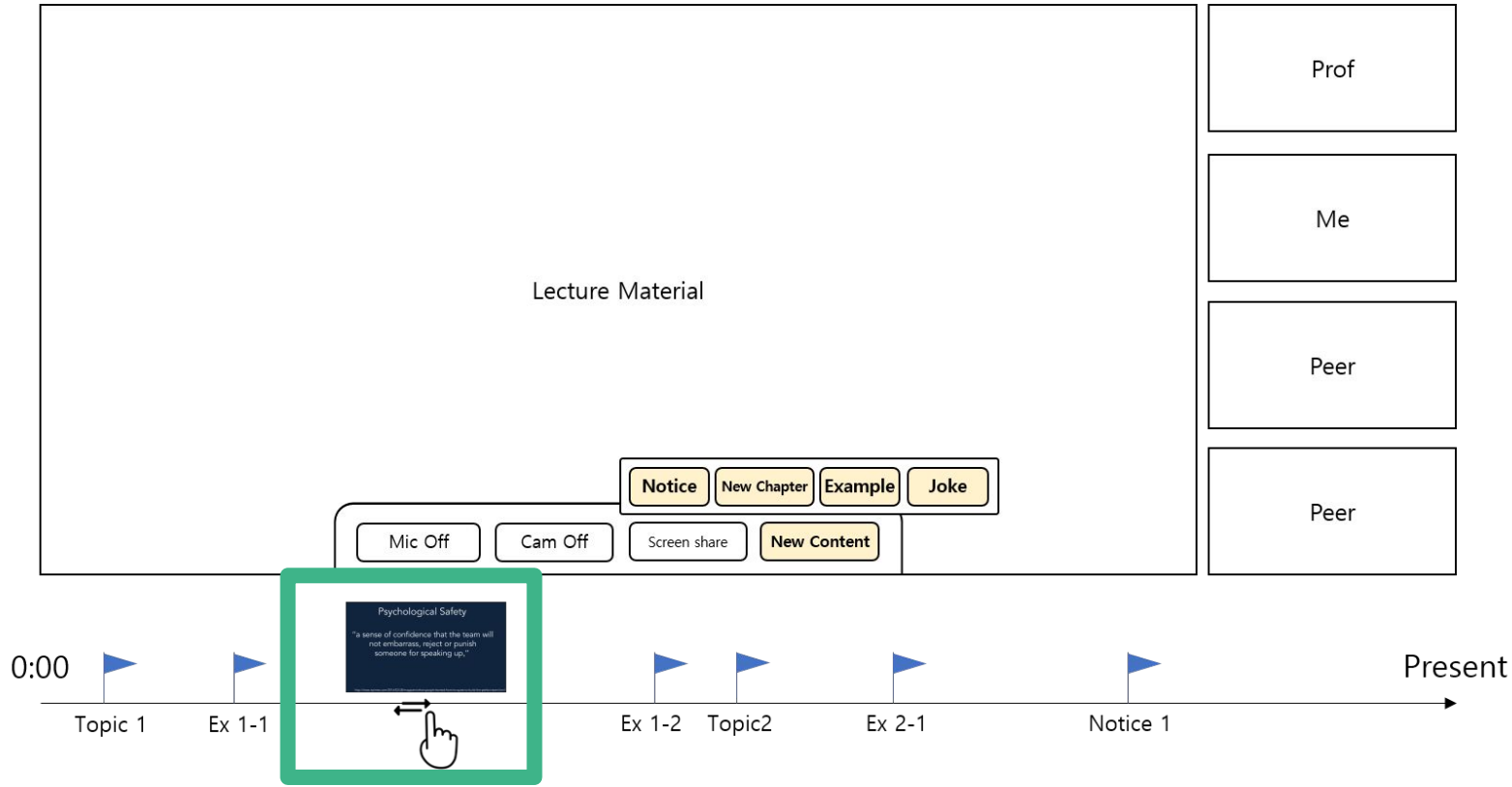


Aggregation - Button Clicks Merged to Yield Flags



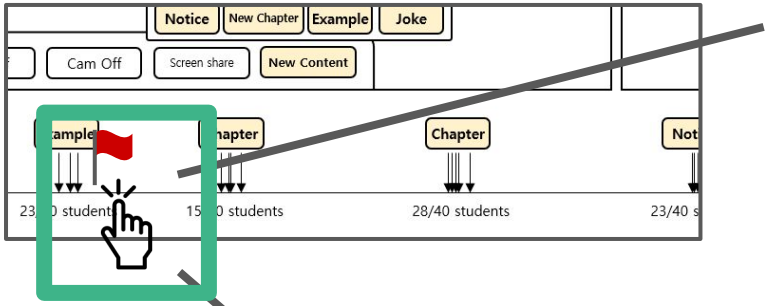
Helpee

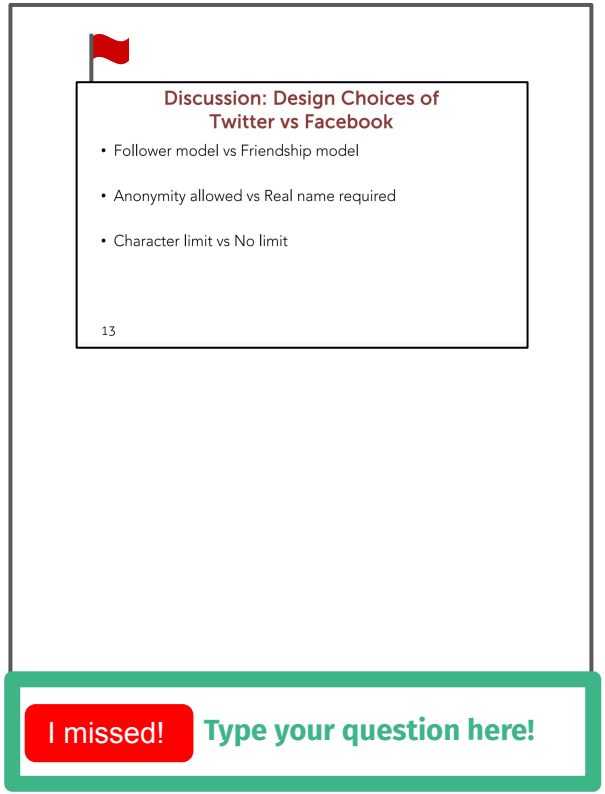
Scroll on the helper-generated timeline to understand the matching lecture materials



Click on the helper-generated timeline to ask detailed questions

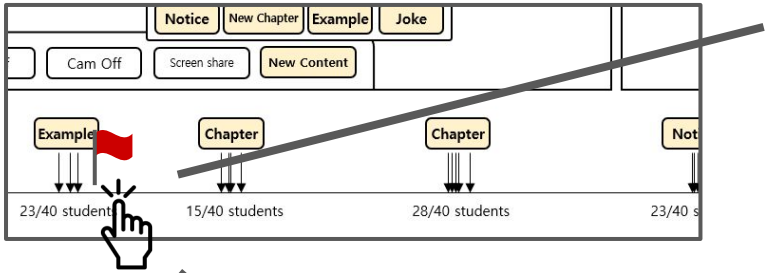
Helpee

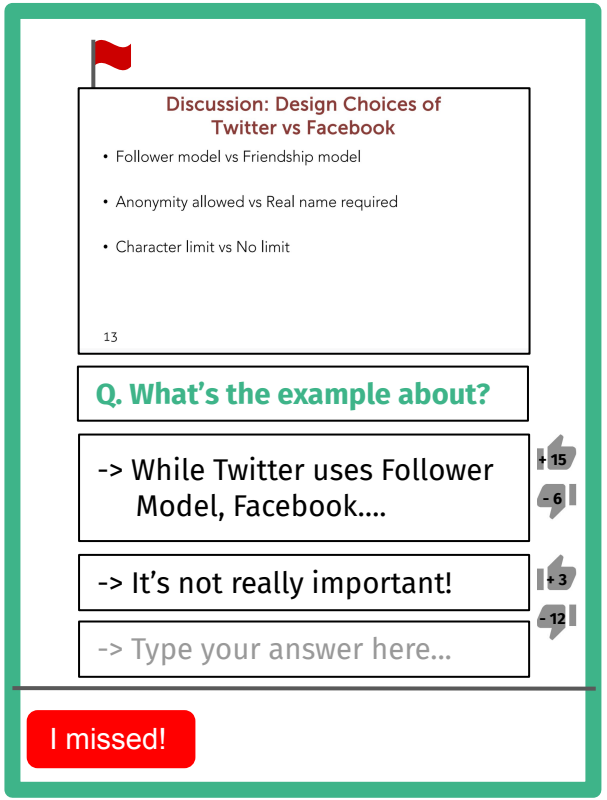




Helper

Answer questions of the helpee & upvote/downvote the answers

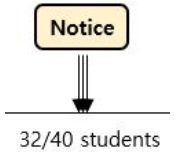




Quality Control, Motivation, and Minimizing Distraction

Quality control

- Ensure helper-generated timeline quality with majority voting
- Ensure answer quality with upvote/downvote



Motivation

- Helpees can ask questions anonymously, reducing pressure
- Helpers receive participation rank at the end by clicking buttons, answering questions, upvote/downvoting
- Helpers can boast their knowledge when answering (boost intrinsic motivation)

Minimizing distraction

- To minimize distraction for helpers, we minimize the workload
  (One click for button & upvote/downvote, word limit on the answer)

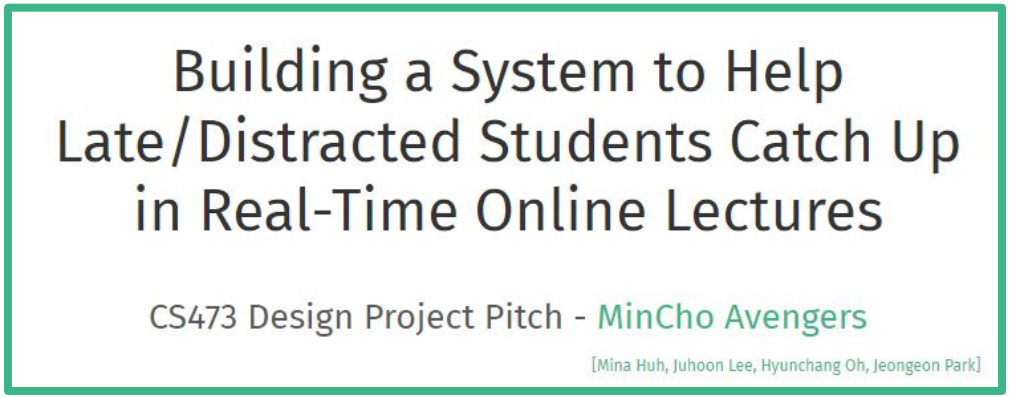
Role Distribution and Finding the Users

- Who will be responsible for what?
  - **UI Designer** (*Jeongeon Park*): Design and implement UI frontend
  - **Module Developer** (*Juhoon Lee*): Implement backend modules for structuralizing/organizing lectures
  - **Server Engineer** (*Mina Huh*): Attach modules to frontend and deploy
  - **User Researcher** (*Hyunchang Oh*): Survey users, gain insights, and conduct user study

- How will you find the crowd or users to use and test your system?
  - As a CS101 TA, Hyunchang is voluntarily making supplementary materials, and will host a real-time help-desk session.
  - Ask student councils/TAs to use our system during online help sessions.

Timeline

Week 4-5	Problem identification & Needfinding
Week 6-8	Needfinding & Solution Brainstorming & Pitch
Week 9-10	Low-fi Prototype
Week 11-12	High-fi Prototype
Week 13-14	User Testing & Iteration
Week 15	Final Presentation



Thank you for listening!

Any questions?

Proposed Solution - Roles

Helpee

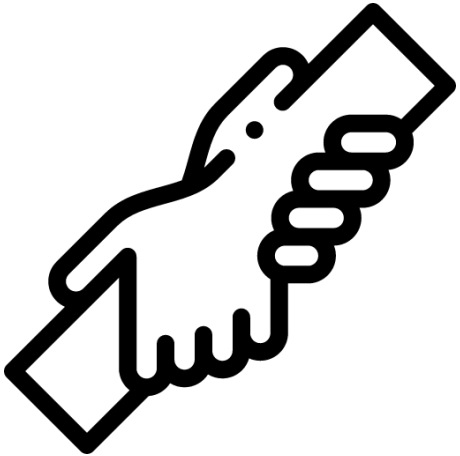
1. Watch the helper-generated timeline to identify the lecture segment they missed
2. Scroll on the helper-generated timeline to understand the matching lecture materials
3. Click on the helper-generated timeline to ask detailed questions

Helper

1. Identify segments of the lecture with buttons, collectively generating the lecture timeline
2. Answer questions of the helpee & upvote/downvote the answers

- **Organization (10%)**: Overall structure and flow of the presentation.
- **Problem (20%)**: Well defined? Is it a real problem? What's the evidence?
- **Solution (30%)**: Novel? Feasible? Quality control / aggregation / motivation... thought out?
- **Plan (10%)**: Who does what and deployment plan.
- **Visual aids (10%)**: Design and readability of the slides, use of effective visual aids and examples.
- **Overall (20%)**: Delivery and clarity of the presentation. How engaging was the overall talk? Handling Q&A went smoothly?

- Motivation - Juhoon
- Quality control
    a. Majority power (minority overtaken), visibility/transparency (everyone can see/prof be a motivator)
- Aggregation
    a. Flag (Done?)
    b. Answers (upvote/downvote - slide not yet)
- Motivation in solution - Mina
    a. Helpee: should feel how useful it is
    b. Helper: participation score? fun
- Timeline
- Make 12-13



keywords

Public

- Structurized slides (flow chart)
- Shared slide with post-it
- Improved chatting / Q&A System

Matching

- Private friend channel
- Voice
- Option on helper side “Decline / Later / OK”

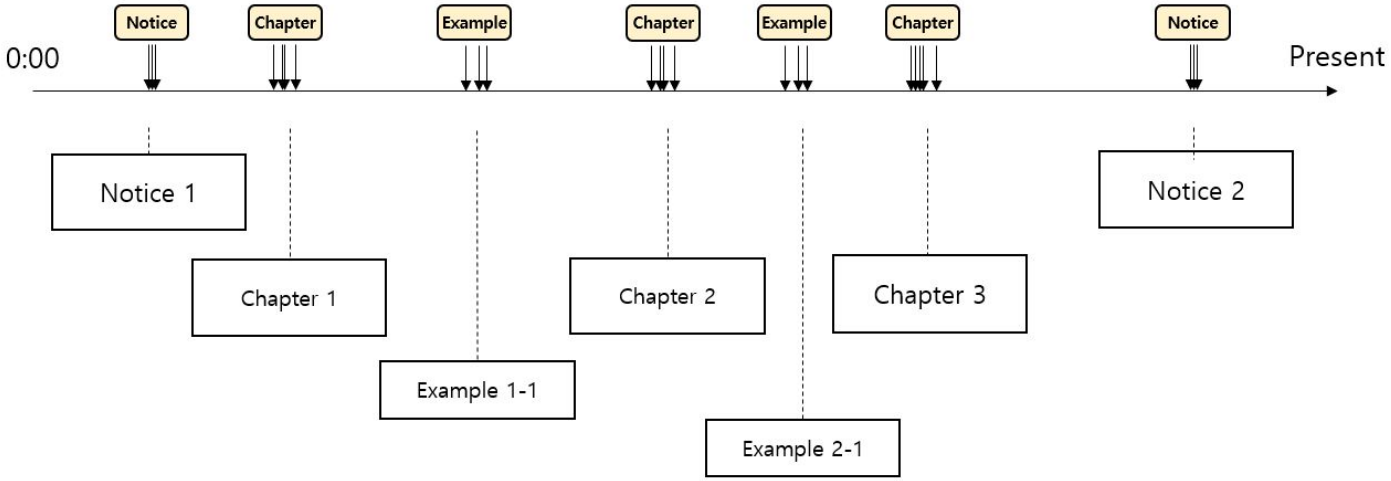
Motivation

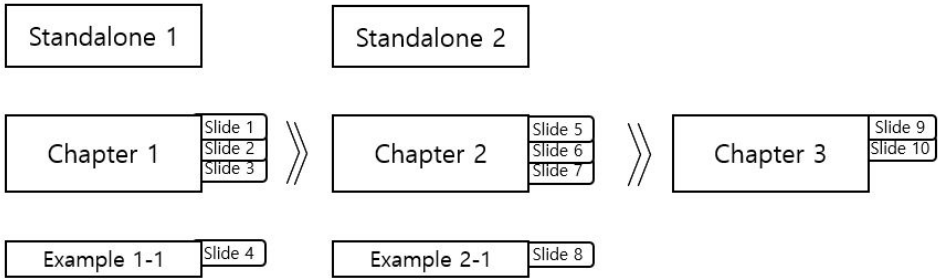
Benefits of the Solution

Create a system which:

1. Minimizes time taken for the tasks for both understanding and helping
2. Reduces individual burden
3. Bolsters answer quality through consistent cross-validation
    a. Validation across individuals/answers
    b. Validation compared to other automated systems

Backend: Segment to Lecture Flowchart

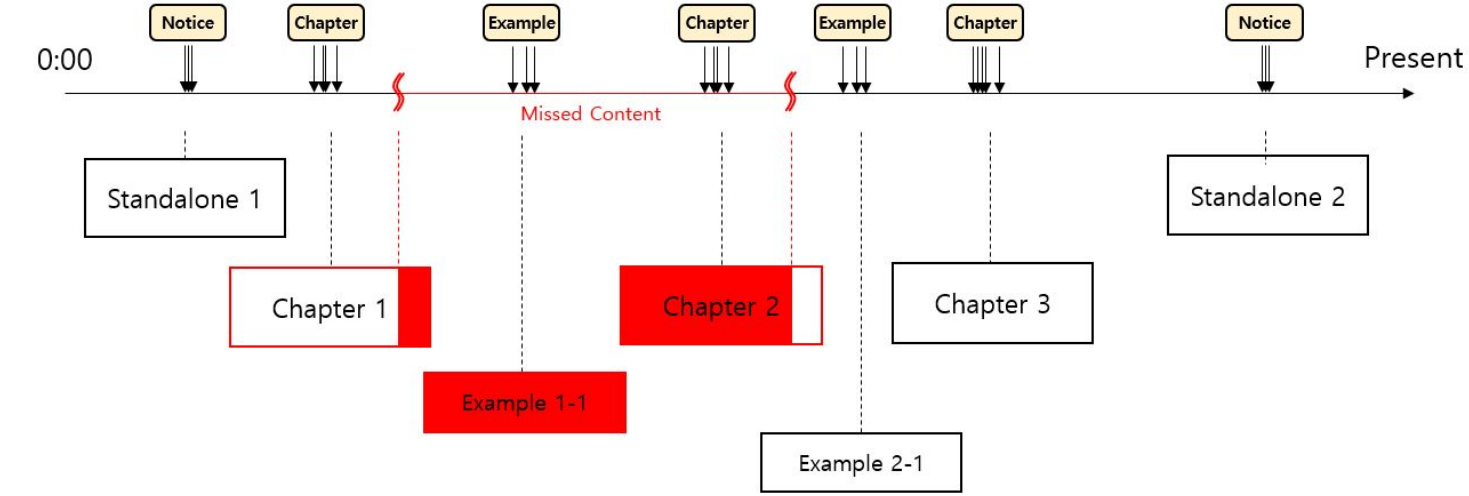


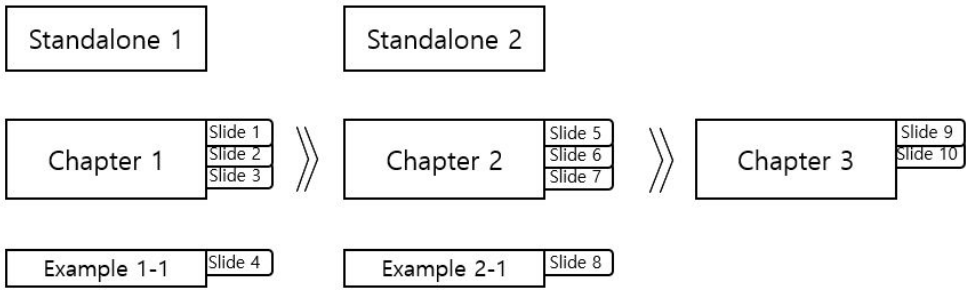


Aggregation:
Merge close enough individual segment identifications.

Match with slides (slide ends pull buttons like magnets) to control quality.

Backend: Post Questions to Each Segment





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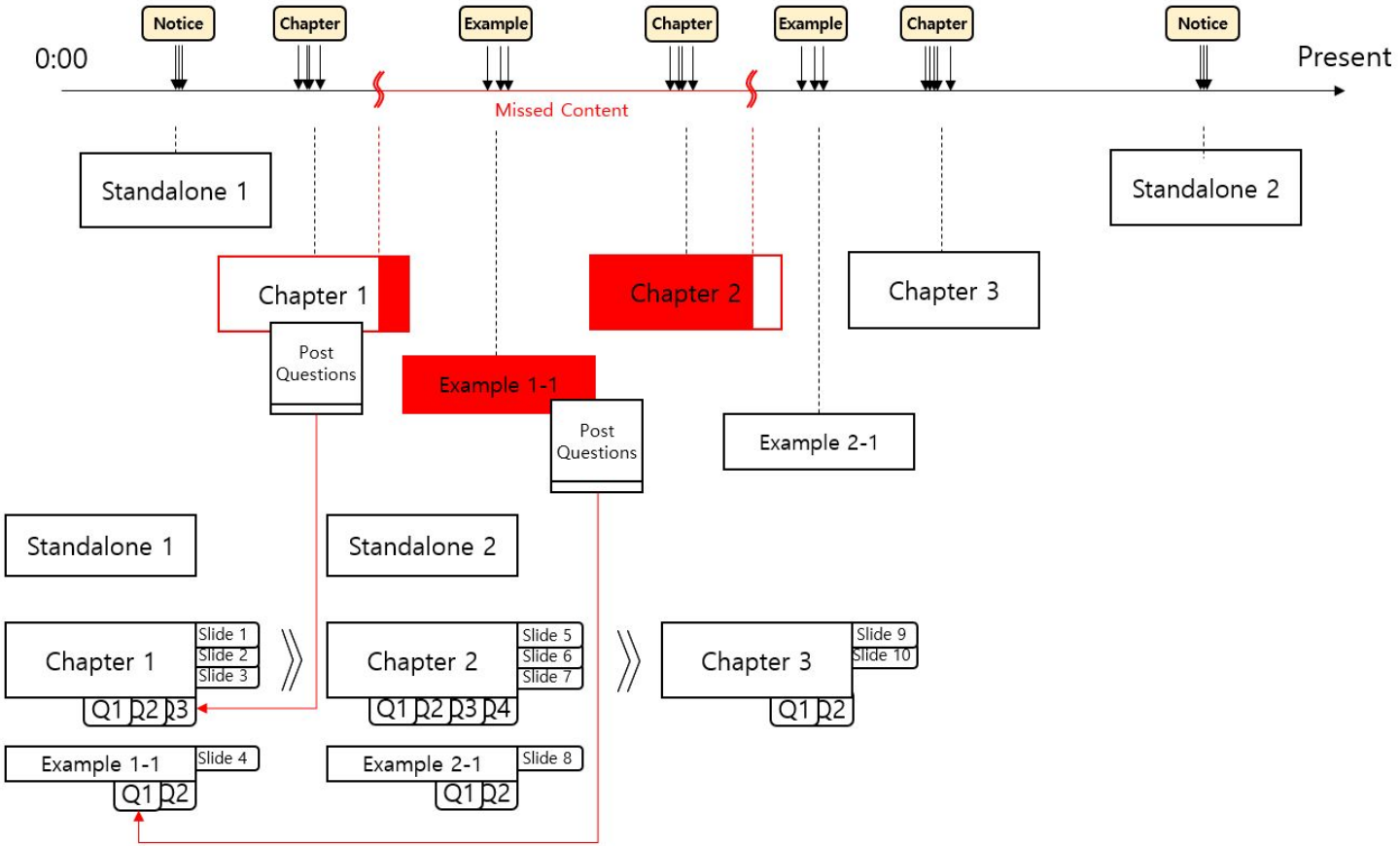
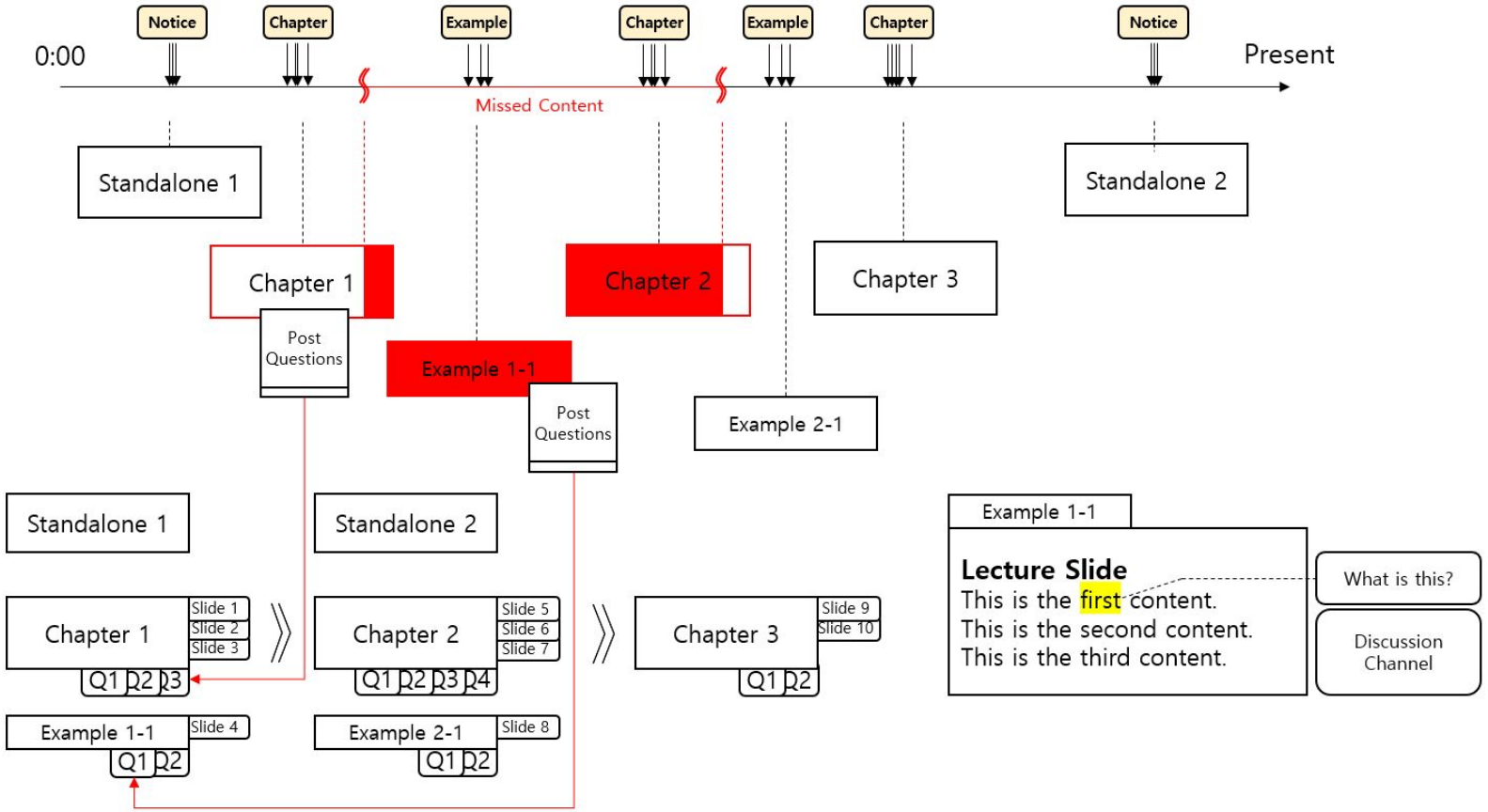
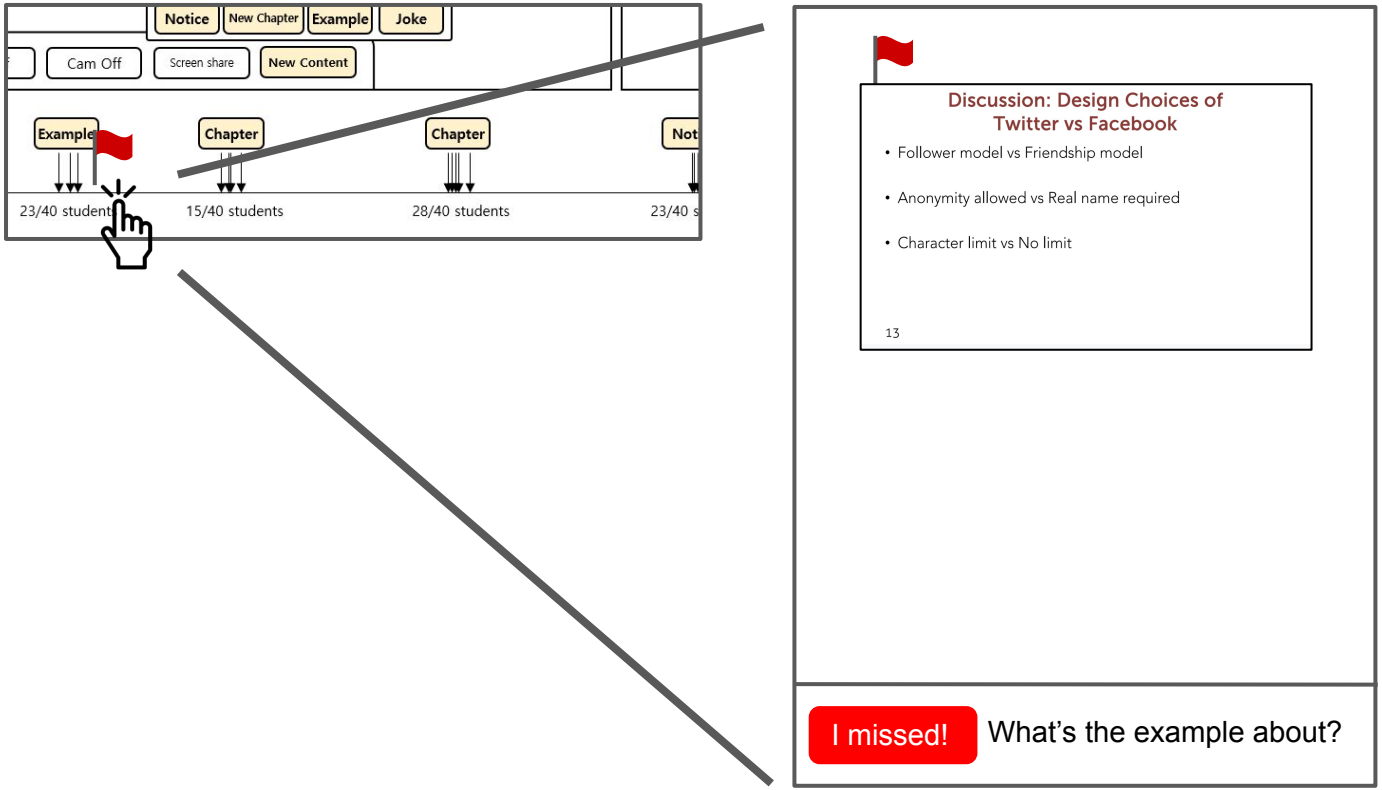


Backend: Relate Questions to Lecture Materials



(Helpee) Answer questions of the helpee & upvote/downvote the answers



Click on the helper-generated timeline to ask detailed questions

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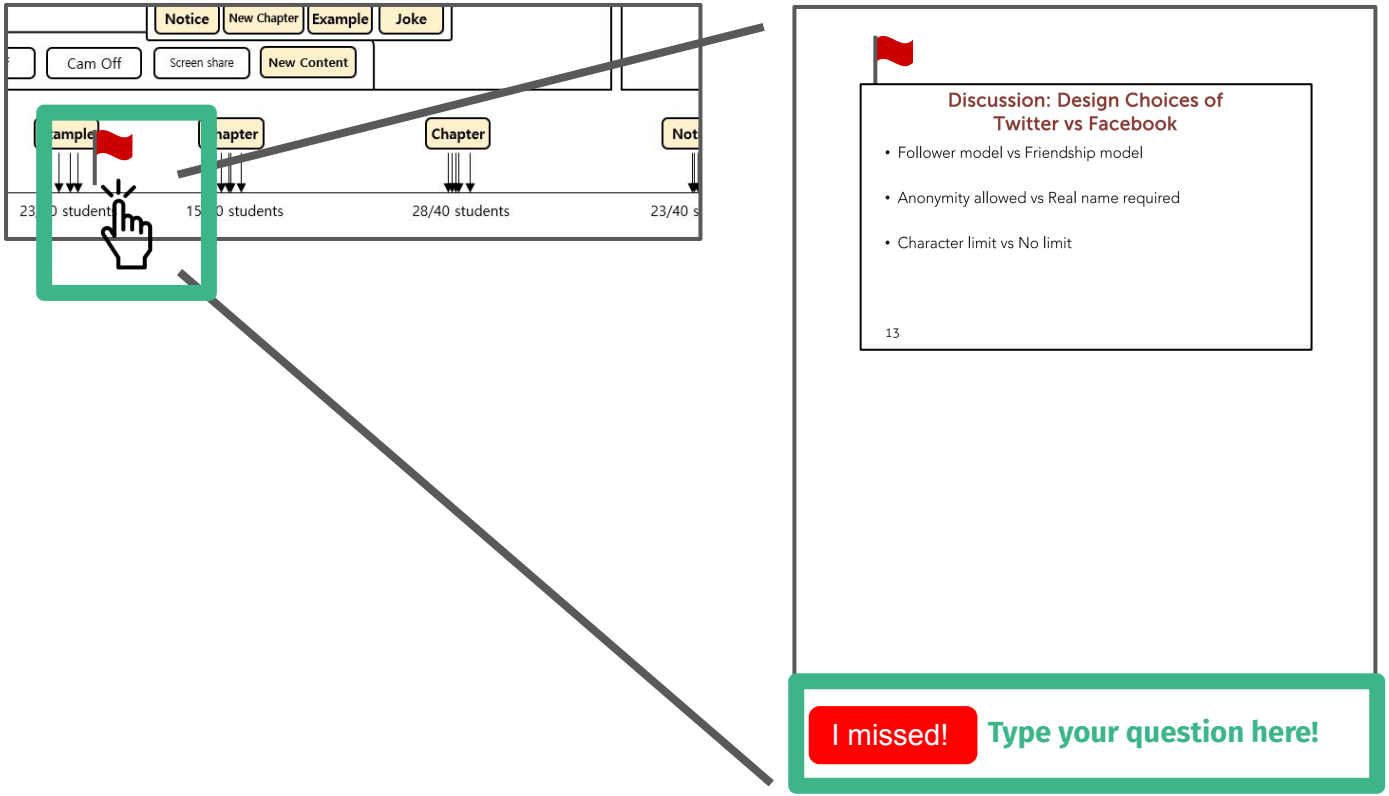

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