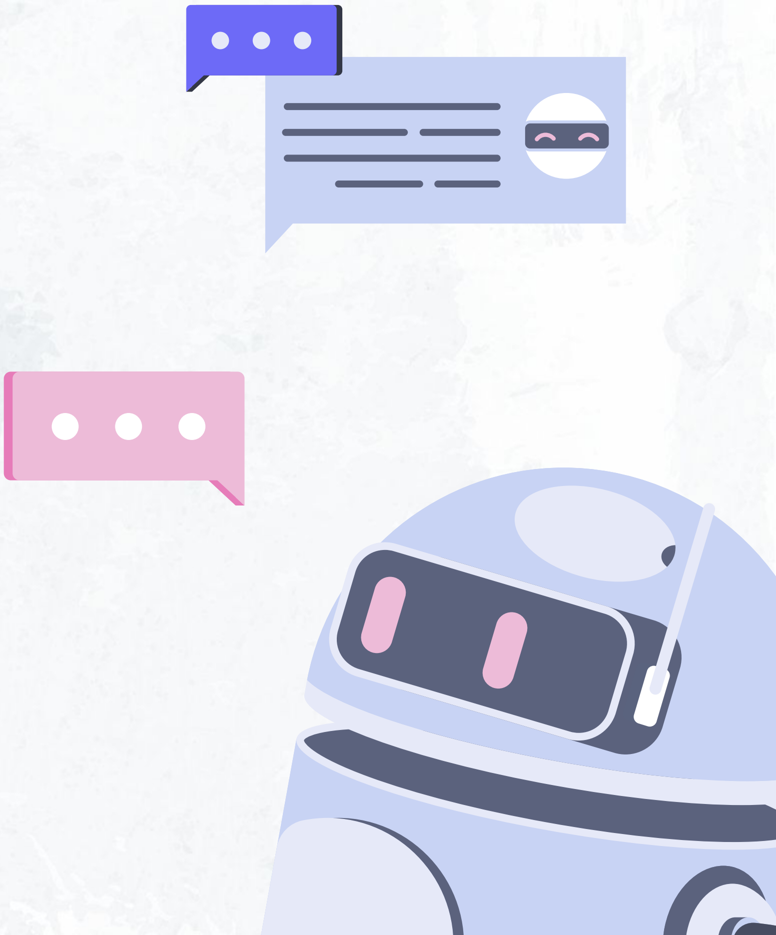
Using AI to help teachers track students' contributions in group discussions.



(AI)

01 →

What is a current issue in education?

(AI)

Unequal Participation in Group Projects

As group projects grow more common, louder voices often dominate while quieter students fade into the background. Teachers may struggle to see who's contributing, leading, or falling behind—especially when key learning points, confusion, or disengagement aren't always visible. Learning happens through communication, not just results. Silence or confusion often signals deeper group issues; a question like "What are you talking about?" can reflect misalignment rather than just misunderstanding. These socio-emotional dynamics affect both academic performance and group behaviour. Without awareness of these interactions, quieter students risk being overlooked, and collaboration suffers. Teachers need clearer insight into group dynamics to assess contributions fairly and support inclusive learning.

02 →

How can AI solve this?

(AI)

AI tools used

Speech recognition

→Converts spoken words into raw text

→Identifies and labels speakers by analysing their specific voices

Transcription AI

→Cleans up raw text

→Fixes punctuation and formatting

→Adds timestamps

Speaker diarisation

→Splits transcript by speaker.

→Assigns labels (e.g., Speaker 1, Speaker 2).

→Identifies speaker transitions.

Natural language processing (NLP)

→Analyzes previous outputs for keywords and sentiment.

→Detect key phrases indicating leadership, initiative or cooperation.

Document edit history

→Displays written contributions in real time.

→ Easy to understand

Generative AI

→Compile data into a report

→Generate visuals (eg pie charts)

How would it would come together

01

Speech recognition
Converts spoken words from meetings and discussions into raw text in real time

02

Speaker diarisation
Identify when different speakers are talking and split

03

Speaker recognition
Label each specific voice to make it clear who said what

04

Transcription AI
Makes raw text readable and easily understandable by fixing punctuation, formatting, and adding timestamps

05

NLP
Analyses text to identify leadership and cooperation via text classification, keyword extraction, and sentiment analysis

06

Edit history (Google docs)
Tracks written contributions and changes and indicates who did what

07

Generative AI (eg OpenAI)
Compile all data into a final report and generate visuals for data

To make it more practical in the classroom, ceiling-mounted microphones combined with signal processing ,to reduce noise, cancel echoes, and level sound, ensuring clearer audio.

Final Output

1

Written transcript

Speakers labeled with timestamps and proper formatting

2

Participation report

Who spoke for how long, Who contributed what, Includes graphs

3

Keyword/phrase Analysis

example, “I suggest…” indicates leadership

4

Tone report

Assigns sentiment scores and highlights positive/negative points

5

Written work contribution

Extracted from docs, includes graphs

03 →

Closer look into specific aspects

(AI)

Speech recognition

Function: →

Converts spoken words into raw text →

Analyses voices and labels them accordingly

Use:

→ Captures all spoken meetings and discussions converting it into raw text.

→ Uses the labels from speaker diarisation and matches each to a specific speaker's voice, eg speaker 1 = Bob , helping identify who said what

Possible challenges:

→ Raw text can lack context or clarity, making it difficult to understand

→ Distinguishing voices that sound similar, can lead to misidentification

Transcription AI

Function:

→ Fixes punctuation, formatting

→ adds timestamps to the raw text

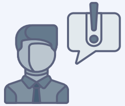
Use:

→ Generates transcript from raw text and makes it readable and easy to understand.

→ Adds timestamps so it’s easier to track key moments

Possible challenges:

→ Could misinterpret complex words or phrases if speech is not clear, therefore may require human editing for full accuracy



Speaker Diarisation

Function:
→ Splits up the transcript into different segments, with each being a distinct speaker

Use:
→ Distinguish between multiple speakers in a conversation or meeting
→ Even in noisy environments and when many speakers are involved
→ Creates rough speaker labels, eg speaker 1, speaker 2

Possible challenges:
→ May make mistakes if multiple speakers talk over each other

Natural Language Processing (NLP)

Function:
→ Looks for keywords and identifies sentiments using text classification, keyword extraction, and sentiment analysis

Use:
→ Helps identify patterns like cooperation through use of keywords , eg "Going off that..."
→ Gauge the emotional tone of the conversation which can help highlight positive and negative attitudes

Possible challenges:
→ Depending on context, words can have different meanings, which could lead to misinterpretations
→ Struggles with sarcasm

Document Edit History

Function:
→ Shows written contributions in real time

Use:
→ Track written contributions in documents making them easy to understand
→ Allowing teachers and instructors to ensure all members are involved

Possible challenges:
→ Many discussions are done verbally and cannot be tracked by this

Generative AI

Function:
Compile data into a report and generate visuals

Use:
→ Compile understandable and organised summaries
→ Generate visuals , eg pie charts, using all previous data

Possible challenges:
Works best with clean, well-organised input data and does not have the ability to correct issues with input data leading to wrong outputs

04 →

It is the most effective and transparent solution

As it allows judgement to be made using real-time data,
fine-grained analysis, and continuous visibility,
ensuring fairness and promoting equity in group dynamics

(AI)

Advantages of This solution

Objective real time feedback
based off of group dynamics, ensuring there is no subjective judgement

NLP identifies key phrases
indicating leadership, collaboration, and taking initiative, ensuring insights are accurate

Provide more real-time insights of group dynamics
Helps identify positive and negative behaviour

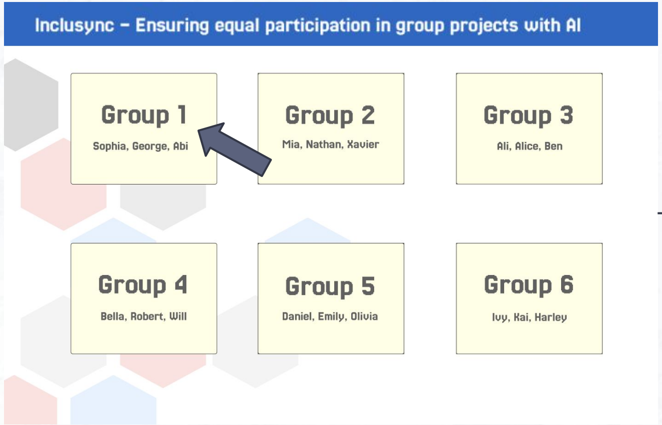
Speaker diarisation and recognition combined
we can identify individual voices and track contributions accordingly, ensuring all students’ contributions are acknowledged, and preventing anyone from being drowned out.

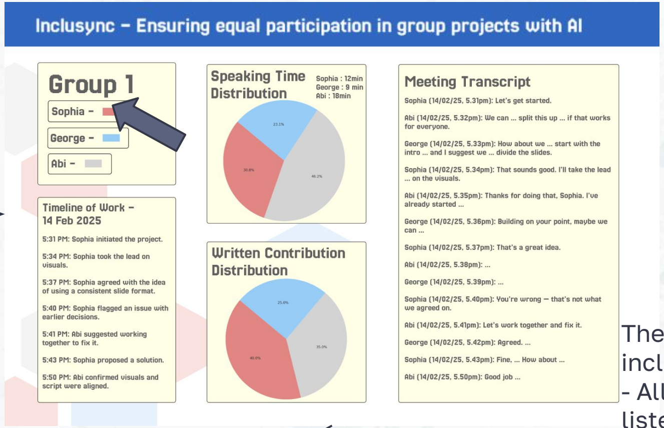
Visibility into written contribution
As both verbal and written contributions are tracked, judgements can be made more accurately based off actual data of contributions

Ensures all voices are heard
regardless of volume, ensuring that their contributions are acknowledged

What would the interface look like?

First, we start with a basic interface for teachers and instructors to be able to view all their groups





Then, teachers can select a group they want more insights on and they will be taken to the following page for insights of the entire group.

The group page includes:
- All group members listed and assigned a color.

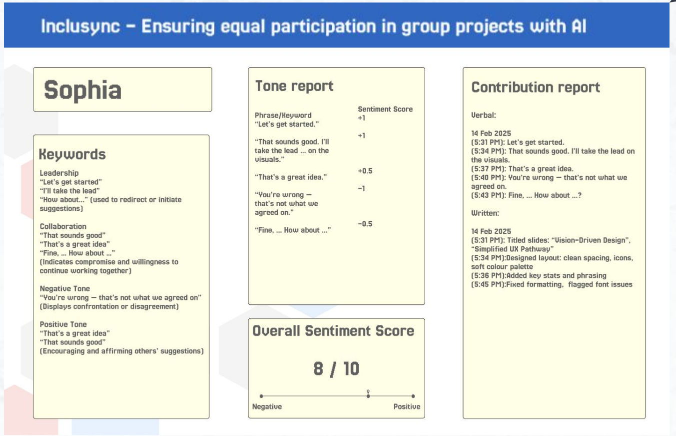
- Colors are used for pie charts to simplify data interpretation.

- Meeting transcript is included for reference.

- Timeline of work is provided for tracking progress.

- Teachers can review discussions and work in detail.

After that, if teachers want insights on specific students, they can click on their name and will be taken to a page with information about that specific student



The individual page includes:
- Keywords used by the student and what they indicate.

- Contribution report shows what each student did during the project.

- Tone report highlights the overall behavior of the students.

- Overall sentiment score is displayed on a linear scale for easy interpretation.

References:

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ChatGPT was used to explore the concept of speaker diarisation and provide clarification on its application. It also assisted in generating placeholder content for the app interface, project title ideation, as well as summarizing the use of Natural Language Processing (NLP) for slides.

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