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From Teaching to Insight in 50 Minutes: AI-Supported Microteaching Analytics

[1]B M Bharath, [2]Usha P, [3]Danushaa Sri S V, [4]Naresh Kumar Sharma

[1]Department of Computer Science and Engineering
[2,3]Department of Biotechnology
[4]Director, Kalasalingam Teaching Learning Centre (KAL TEC)
[1,2,3,4]Kalasalingam Academy of Research and Education, Tamil Nadu, India

[1] bharathbm83@gmail.com

[2]ushaprabhu1305@gmail.com

[3]danushaasri05@gmail.com

[4]naresh@klu.ac.in

Abstract

This practice adds a fast, suitable AI layer to micro-teaching such that teaching, assessment, and feedback happen in the same class cycle. After a short lesson, students complete a five-item Google Form: four concept questions (multiple choice or short answer) plus a 1–5 self-rating on attention and memory. AI is used only for two enabling tasks: generating candidate questions (with rubrics) aligned to the session outcomes, and providing a first-pass analysis of students' short-answer responses. These tasks use ChatGPT and Perplexity under human oversight; instructors finalize items, scoring, and feedback. Responses are normalized to a compact schema—Q1–Q4 coded Yes/No with "A" for not-attempted/absent; Q5 as 1–5—so a lightweight student-built Streamlit web app can show same-day results without technical hurdles. The app displays daily trends, set-wise comparisons on days with two short tests, attendance-aware patterns, and an Individual view with moving averages, per-question mastery, and item-level detail. Instructors immediately see what to reteach, which examples to adjust, and which learners need targeted support. The approach is human-led, low-cost (CSV + web app), and easy to replicate across courses.

Keywords— **AI-enabled assessment; microteaching analytics; real-time feedback; Streamlit dashboard; student performance tracking; teaching–learning enhancement.**

***JETLP Category*— Analytics for student learning progress**

Implementation

What happens in class (MT with AI in 7 steps)

- Teach a short segment focused on explicit outcomes (e.g., "identify, compare, justify").
- Draft items with AI: prompt ChatGPT for 3–4 MCQs and 1–2 short-answer questions mapped to outcomes; request distractors and a brief rubric. Use Perplexity to sanity-check phrasing or topical alignment if needed.
- Instructor review (non-negotiable): verify alignment, cognitive level, clarity/fairness, local terminology, and rubric sufficiency. Edit or discard as needed.
- Students take the five-item Google Form immediately: Q1–Q4 concepts, Q5 reflective rating (1–5). Some days include a second mini-test (Set2) to compare approaches; other days keep only Set1 to reduce fatigue.
- Export responses to CSV and normalize:
    - P/A attendance at row level.
    - Q1–Q4 → Yes for correct, No for incorrect, "a" for not attempted/absent.
    - Q5 → integer 1–5 (blank allowed).
- Upload CSV to the web app (Streamlit).
- Review results the same day; plan a quick reteach or targeted practice for the next session

What the app shows (simple, decision-ready views)

Overview

- Records processed and attendance percentage (attendance is computed explicitly—missing values count as absent to avoid inflation).
- Class-level correctness for Q1–Q4 and the average Q5 rating.
- Daily trend lines (mean across sets) to check stability and detect dips.
- Grouped bar chart that compares Set 1 and Set 2 on days with two mini-tests. It checks if a change helped people keep what they learned.
- Scatter plot that shows how attendance links to correct answers. Use it to guide outreach.

Individual

- Summary for a selected learner.
- 7- and 14-day moving averages show change direction.
- Mastery and attempt rates per question help identify reteaching needs versus practice.

- Item-level ledger supports a 2–3 minute mentoring chat with evidence.

What AI takes on—and does not take on

- Does: Accelerate item authoring; provide first-pass analysis of free-text for key ideas/misconceptions. Tools: ChatGPT and Perplexity.
- Does not: Instructors keep final control over item selection, scoring, feedback, and next-step teaching.

Recent studies show AI supports teachers (Jeon, E, 2025). ChatGPT and simple analytics help make and check class materials. They let teachers assess students at once. Teachers can give personal feedback. Teachers stay in charge. Synesthetic teaching uses data and new tech. It makes lessons and student results better. Other studies show that automating questions, reading responses, and tracking trends helps teachers. They find gaps, change lessons, and help mentoring. (Bharath, 2025; Lyanda, 2025; Kumari, 2025; Cardona, M, 2023).

Impact and Outcomes

- Teacher outcomes. AI drafts question ideas. Teacher reviews and edits them. Students take a short 5-item check (Q1–Q4 and Q5). Export a CSV and upload it to the dashboard. View class patterns and individual results. Announce one small change for the next class. Provide targeted support to specific students.
- As shown in Fig. 1, the overall student analysis dashboard same-day visibility supports "reteach tomorrow" instead of waiting for midterm signals. Set-wise bars revealed whether a change in example, timing, or instructions raised retention; daily lines showed stability and outliers to target fixes precisely.
- The Q5 self-rating explains performance patterns. If correctness is steady while ratings dip, pacing/variety likely needs adjustment; when both are low, cognitive load or unclear framing is suspected. Sharing class-level summaries increased student buy-in for frequent micro-assessments.

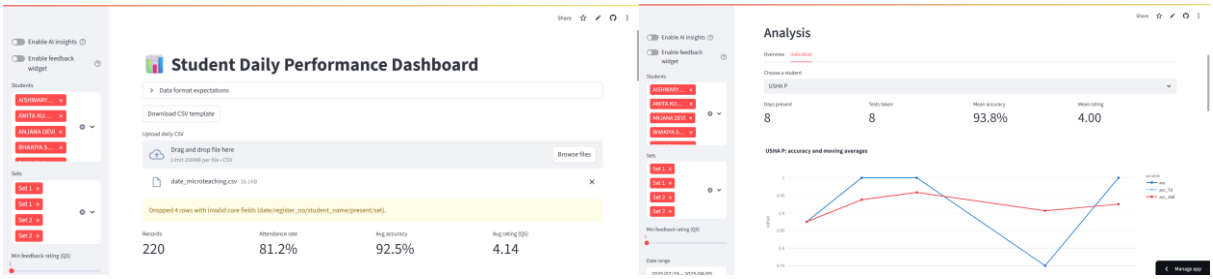

Figure 1: Overall student analysis dashboard

- The Individual view turned feedback into specific actions (e.g., "Q2 justification weak—practice two worked examples" or "Increase attempts on Q3 before office hours"). Moving averages set short, realistic goals for the next class.

- A student group built the app and data pipeline. They used software and data skills to meet a real classroom need. The simple stack (CSV + web app) made adoption easy and let the team iterate weekly without IT support.
- AI use is purpose-bound and advisory; instructors review/own all decisions. Only minimal identifiers are exported; prompts/outputs are archived for transparency.

Research has shown that both AI and Hybrid Feedback assist students in their academic performance. Students have seen a rise in grade point averages, an increase in motivation to write, and improved writing skills due to these types of feedback (Zhang Y, 2024; Lo, N, 2025) . Student Dashboards are viewed by educators as "game changers." Student Dashboards collect attendance records, test scores, and other forms of engagement data. This allows educators to make informed decisions when it comes to supporting their classes or students individually (Groher et al., 2024). Micro-teaching research has supported this. Micro-teaching assists in increasing educator's self-confidence levels and raises student participation. In addition, it enhances educator instructional practices (Jeon, E, 2025; Cerruto, A, 2023).

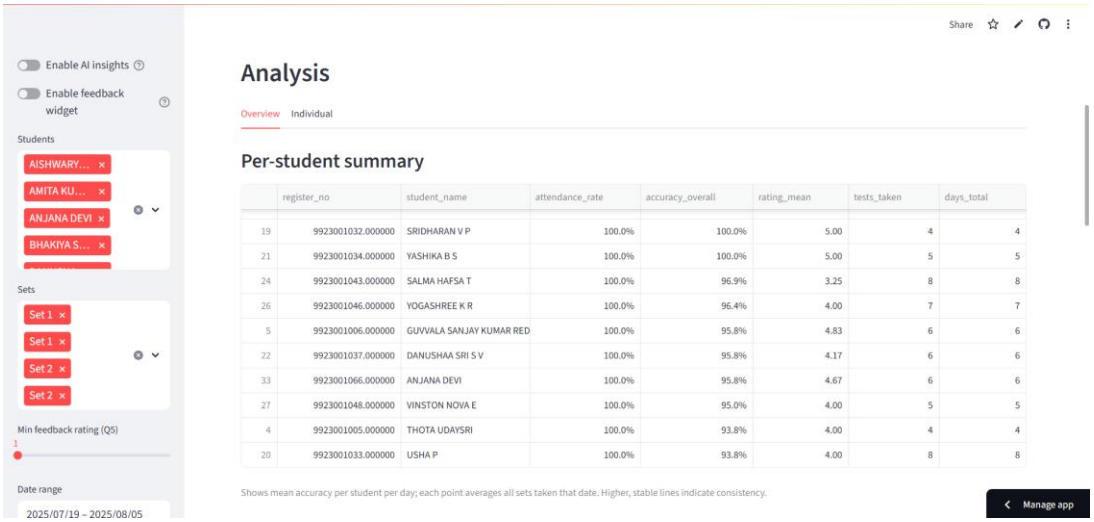

Figure 2: Individual student analysis dashboard

Lessons Learned

- Develop a few specific learning goals for your students. This will help you develop meaningful discussion questions that focus on student learning and not just student grades.
- Use the five item check to create a short term learning habit; show at least one change from the previous day's lesson the next time the class meets. This is an excellent way to build credibility with your students, while also encouraging them to be reflective about their learning.
- Only allow AI to assist in generating questions, initial readings of very short responses, etc... Make sure it is clearly understood by both the students and staff members involved that the teacher will have the final say as to what constitutes a valid response. This can greatly improve the confidence of both your students and your colleagues.

- A compact summary with a brief individual view allows for two-minute mentoring. Give clear next steps, such as "practice Q2 justification with two examples," instead of unclear advice.
- When you run two mini-tests in one day, make sure to clarify what the second test aims to do. Is it example-first or definition-first? This prevents over-reading. Share simple class patterns and promise one change to keep motivation focused on progress, not perfection.

There is growing evidence that supports the use of Artificial Intelligence (AI) as a tool to enhance the effectiveness of microteaching. The benefits of AI are: it provides clarity in the development of prompt(s), and it assists with the clarity of the question(s) which can encourage the student to engage in the development of lesson plans post-class (Konakbayeva et al., 2025). Using short feedback loops such as an assessment of a teacher's reflection through a 5-point check will assist in building trust between teachers and their students (Zhumabayeva et al., 2025). Let AI facilitate suggestions for potential assessments and the initial screening, but have the teacher be the ultimate authority on decisions made during this process. Use of AI in microteaching will increase confidence among students and staff (Gorman et al., 2025). Mentoring in microteaching, including simple mentoring and providing brief summary statements for each individual developing specific skills, will enable individuals to receive constructive, and valuable feedback (Shekharappa, K. R et al., 2021). Provide the purpose of the assessment i.e. example-first or definition-first. Breaking down the assessment into smaller steps will promote motivation and reduce perfectionism in the classroom (Konakbayeva et al., 2025; Shekharappa, K. R et al., 2021).

Future Work

- Testing the model in other courses / departments and colleges to observe the model performance. Future studies will track students over time. A measurement of learning across sessions and semesters will be monitored. The outcome and analysis will be connected to the University LMS data. This lets us compare courses and identify curriculum patterns. A record on how the "reteach tomorrow" idea helps will be documented to show explanations clearer and reduces repeated misconceptions.

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