Research Question

RQ-1 How effective are LLM-generated analogies for student understanding without human intervention?

In-class Test

Research Question

RQ-2 What kind of analogies do teachers need LLMs to generate for classroom practice?

Pre-class Interview

RQ-3 How effective are these LLM-generated analogies for classroom practice with teacher intervention?

Classroom Experiments

Study I

Students answer concept questions using analogies and textbook explanations, without examiner guidance.

In-class Test

Preparations & Settings

49 Students divided into **2** Groups   **20** multiple-choice questions for **4** Concepts

| Plain Analogy Generation | + | **Strategies** from Error Annotation | → | Analogy Generation with **Revised Prompt** |

Procedures

5-minute Introduction → **25**-minute Test · Accuracy · Rating → **2**-minute One-on-one Interview with **8** Students

Study II

Teachers introduce and explain concepts with analogies in classroom.

Pre-class Interview

2 Teachers (T1,T2) and **2** Senior Students (S1, S2) → **Findings** for Classroom Experiments Design

Classroom Experiments

Preparations & Settings

2 Teachers (T1,T2) using analogies to teach **2** Subjects to **50** Students from **2** Classes (C1, C2)

| Analogy Generation with **Revised Prompt** | + | **Strategies** from Pre-class **Findings** | → | Analogy Generation |

Procedures

1-week Teaching for a total of **12** Lessons · Observation · Recording → **20**-minute One-on-one Interview

Practical System